List of Appendices to the Thesis

The Econometrics of Maritime Safety

Recommendations to enhance safety at sea

by

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Note from the author:

Please note, that the full appendix is not included in the printed version of the thesis due to the large volume of pages. The appendix for further reference is therefore made available online and can be downloaded here.

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List of Appendices

Appendix 1: List of Member States of each MoU

Paris MoU	Caribbean MoU	Viña del Mar	Indian MoU	AMSA (Tokyo MoU)
Belgium	Anguilla	Argentina	Australia	Australia
Canada (1994)	Antigua & Barbuda	Bolivia (1999)	Bangladesh	Canada
Croatia (1997)	Aruba	Brazil	Djibouti	Chile (2002)
Denmark	Bahamas	Chile	Eritrea	China
Estonia (2005)	Barbados	Colombia	Ethiopia (Obs.)	Fiji (1996)
Finland	Bermuda	Cuba (1995)	India	Hong Kong
France	British Virgin Islands	Ecuador	Iran	Indonesia (1996)
Germany	Cayman Islands	Honduras (2001)	Kenya	Japan
Greece	Dominica	Mexico	Maldives	Republic of Korea
Iceland (2000)	Grenada	Panama	Mauritius	Malaysia
Ireland	Guyana	Peru	Mozambique	New Zealand
Italy	Jamaica	Uruguay	Myanmar	Papua New Guinea
Latvia (2005)	Montserrat	Venezuela	Oman	Philippines (1997)
Netherlands	Netherlands Antilles		Seychelles	Russian Fed. (1995)
Norway	St. Kitts & Nevis		South Africa	Singapore
Poland (1992)	St. Lucia		Sri Lanka	Solomon Islands *)
Portugal	St. Vinc.& Grenadines		Sudan	Thailand (1996)
Russian Fed. (1996)	Suriname		Tanzania	Vanuatu
Slovenia (2003)	Trinidad & Tobago		Yemen	Viet Nam (1999)
Spain	Turks & Caicos Islands			
Sweden	Cuba			*) *not yet accepted*
UK	Dominican Republic			

Appendix 2: List of Detainable Deficiencies[1]

The following is a list of detainable deficiencies as per the IMO PSC Guidelines and are split up into the relevant legal bases:

SOLAS (all ships)

1. improper operation of propulsion or essential machinery
2. insufficient cleanliness in engines room, excessive dirty bilges, insulation of piping and contamination of oil, improper operation of bilge pumping arrangements
3. failure of proper operation of emergency generator, lighting, batteries and switches
4. failure of proper operation of main and auxiliary steering gear
5. absence or insufficient life savings appliances, survival craft and launching arrangements or serious deterioration thereof
6. non-functional fire fighting detection or fighting system or equipment including fire dampers and ventilation valves
7. absence or serious deterioration of fire fighting equipment of the cargo deck area for tankers.
8. absence or serious deterioration of lights, shapes or sound signals
9. absence or serious deterioration of radio equipment for distress and safety communication
10. absence of serious deterioration of navigational equipment
11. absence of corrected navigational charts or publications
12. absence of non-sparking exhaust ventilation for cargo pump rooms
13. number of crew does not match the safe manning certificate
14. non-implementation of the enhanced survey program when applicable

IBC and IGC Code (ships carrying dangerous cargo and gas carriers)

1. ship is carrying cargo not mentioned in the certificate of fitness or missing cargo information
2. missing or damaged high pressure safety devices
3. electrical installation not in compliance with IBC Code
4. sources of ignition in hazardous locations
5. exceeding of maximum allowable cargo quantity per tank
6. insufficient heat protection for sensitive products
7. missing closing devices for accommodation or service spaces
8. bulkhead not gastight
9. defective air locks
10. missing of defective quick-closing valves or safety valves
11. ventilation in cargo area not operable
12. pressure alarms for cargo tanks not operable
13. gas detection plant and/or toxic gas detection plant defective

Load Line Convention

1. significant damage or corrosion effecting seaworthiness of vessel
2. insufficient stability
3. absence of sufficient and reliable information for loading and ballasting of the vessel to maintain stability
4. absence or substantial deterioration of closing devices, hatch covers and watertight and weather tight doors
5. overloading
6. absence or impossible to read draught marks or load line marks

[1] as per IMO guidelines on PSC, Chapter 2.3 and Appendix I (detainable deficiencies)

MARPOL Annex I, Annex II

1. malfunction of oily water separator
2. remaining capacity of slop/sludge tanks insufficient for the intended voyage
3. Oil Record Book not available
4. unauthorized discharge bypass fitted
5. failure to meet requirements of 13G(4) or 13G(7) – Crude Oil Washing
6. Absence of P&A Manual
7. Cargo is not categorized
8. No Cargo Record Book
9. Transport of oil-like substances without satisfying the requirement

STCW Convention

1. invalid certificate of competence or no endorsement by the flag state
2. failure to comply to safe manning requirements by the flag state
3. failure of navigational or engineering watch arrangements to conform to flag state requirements
4. absences in a watch of a qualified person to operate equipment for safe navigation, safety radio communications or the prevention of marine pollution
5. non compliance to sufficient rest periods

Appendix 3: IMO Definitions of Selected Major Ship Types[2]

Passenger Ship: ship that carries more than twelve passengers.

Cargo Ship: any ship which is not a passenger ship.

Tanker: cargo ship constructed or adapted for the carriage in bulk of liquid cargoes of an inflammable nature.

Oil Tanker: a ship constructed or adapted primarily to carry oil in bulk in its cargo spaces and includes the combination carriers and any "chemical tanker" when it is carrying a cargo or part cargo of oil in bulk. For the purpose of the Condition Assessment Scheme, oil tankers are divided into three categories as follows:

> Category 1: oil tanker of 20,000 tons deadweight and above carrying crude oil, fuel oil, heavy diesel oil or lubricating oil as cargo, and of 30,000 tons deadweight and above carrying oil other than the above, which does not comply with the requirements for new oil tankers as defined in regulation 1(26) of MARPOL Annex I.[3]
>
> Category 2: oil tanker of 20,000 tons deadweight and above carrying crude oil, fuel oil, heavy diesel oil or lubricating oil as cargo, and of 30,000 tons deadweight and above carrying oil other than the above, which complies with the requirements for new oil tankers as defined in regulation 1(26) of MARPOL Annex I.
>
> Category 3: oil tanker of 5,000 tons deadweight and above but less than that specified for category 1 and 2.

Combination Carrier: a ship designed to carry either oil or solid cargoes in bulk.

Chemical Tanker: is a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product listed in either:

- Chapter 17 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code)
- Chapter VI of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk adopted by resolution A.212(VII).

Gas Carrier: a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other products listed in either:

- Chapter 19 of the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code)
- Chapter XIX of the Code for Construction and Equipment of Ships Carrying Liquefied Gases in Bulk adopted by resolution A.328 (IX).

Bulk Carrier: a ship which is constructed generally with single deck, top-side tanks and hopper side tanks in cargo spaces, and is intended primarily to carry dry cargo in bulk, and includes such types as ore carriers and combination carriers

Fishing Vessel: a vessel used for catching fish, whales, seals, walrus or other living resources of the sea.

Ro-Ro Passenger: a passenger ship with ro-ro cargo spaces or special category spaces as defined in regulation II-2/3. (SOLAS).

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[2] All sources of definitions are taken from SOLAS and MARPOL

[3] Refers to the date the vessel was built

Appendix 4: Variable List and Respective Coding for Regressions

The following list of variables shows a list of variables which have been used either in the probability of detention or probability of casualty models. Some variables are the same in both models while some variables only appear in one model. Due to the large size of variables in the detention models, only one ship type is shown below as an example. The detention models also use the following coding:

**) Variable+ Ship Type (e.g. GC) + PSC Regime (1 for Paris MoU)*

Type of Models - Codes Used		
Detention*)	**Casualty**	**Explanation of Variable**
IMO	IMO	IMO number of vessel
n/a	Casualty	ship had casualty (split into seriousness)
n/a	VerySerious	very serious casualty
n/a	Serious	serious casualty
n/a	LessSerious	less serious casualty
detained	detained	ship was detained
AgebyGC1	lnAge	Age at time of inspection/casualty
SizeGC1	lnTon	Gross Tonnage
n/a	ST1_max	general cargo ship
n/a	ST2_max	dry bulk carrier
n/a	ST3_max	container
n/a	ST4_max	tanker
n/a	ST5_max	passenger
n/a	ST6_max	other ship type
n/a	ST7_max	fishing vessel
CG	n/a	general cargo ship (middle portion of code)
DB	n/a	dry bulk carrier (middle portion of code)
CO	n/a	container (middle portion of code)
TA	n/a	tanker (middle portion of code)
PA	n/a	passenger (middle portion of code)
OT	n/a	other ship type (middle portion of code)
n/a	RS_Ins	ship inspected by Rightship
n/a	RS_1S	Rightship 1 star vessel
n/a	RS_2S	Rightship 2 star vessel
n/a	RS_3S	Rightship 3 star vessel
n/a	RS_4S	Rightship 4 star vessel
n/a	RS_5S	Rightship 5 star vessel
n/a	Green	ship is Greenaward certified
n/a	DH	double hull
n/a	STChgd	ship type changed
n/a	FLChgd	flag changed
n/a	CLChgd	classification society changed
n/a	CLWd_d	classification society withdrawn
n/a	OWChgd	ownership changed
1	n/a	Paris MoU (end portion of code)
2	n/a	Caribbean MoU (end portion of code)
3	n/a	Viña del Mar (end portion of code)
4	n/a	Indian Ocean MoU (end portion of code)
5	n/a	USCG (end portion of code)
6	n/a	AMSA (end portion of code)
n/a	PMOU_av	average inspection fraction Paris MoU

Type of Models - Codes Used		
Detention*)	**Casualty**	**Explanation of Variable**
n/a	CMOU_av	average inspection fraction Caribbean MoU
n/a	VMOU_av	average inspection fraction Viña del Mar MoU
n/a	IMOU_av	average inspection fraction Indian Ocean MoU
n/a	USCG_av	average inspection fraction USCG
n/a	AMSA_av	average inspection fraction AMSA
n/a	PMOU_s	number inspection fraction Paris MoU
n/a	CMOU_s	number inspection fraction Caribbean MoU
n/a	IMOU_s	number inspection fraction Indian Ocean MoU
n/a	VMOU_s	number inspection fraction Viña del Mar MoU
n/a	USCG_s	number inspection fraction USCG
n/a	AMSA_s	number inspection fraction AMSA
n/a	det_PMOU	detained by Paris MoU
n/a	det_CMOU	detained by Caribbean MoU
n/a	det_VMOU	detained by Viña del Mar MoU
n/a	det_IMOU	detained by Indian Ocean MoU
n/a	det_USCG	detained by USCG
n/a	det_AMSA	detained by AMSA
n/a	lnTimebw	time in-between inspections
OWEMNGC1	OW_EMN	Owner from Emerging Maritime Nation
OWTMNGC1	OW_TMN	Owner from Traditional Maritime Nation
OWOORGC1	OW_OOR	Owner from Old Open Registry
OWNORGC1	OW_NOR	Owner from New Open Registry
OWIORGC1	OW_IOR	Owner from Intern. Open Registry
OWUNKGC1	OW_UNKn	Owner Unknown
n/a	LI_FLRet	Number of Legal Instruments Ratified by Flag
n/a	LI_OWRet	Number of Legal Instr. Ratified by Owner Country
FL_AFGC1	FL_AF	FL_Afghanistan
FL_ALGC1	FL_AL	FL_Albania
FL_DZGC1	FL_DZ	FL_Algeria
FL_AGGC1	FL_AG	FL_Antigua
FL_ANGC1	FL_AN	FL_AntillesNetherland
FL_ARGC1	FL_AR	FL_Argentina
FL_AUGC1	FL_AU	FL_Australia
FL_ATGC1	FL_AT	FL_Austria
FL_AZGC1	FL_AZ	FL_Azerbaijan
FL_BSGC1	FL_BS	FL_Bahamas
FL_DHGC1	FL_DH	FL_Bahrain
FL_BDGC1	FL_BD	FL_Bangladesh
FL_BBGC1	FL_BB	FL_Barbados
FL_BEGC1	FL_BE	FL_Belgium
FL_BZGC1	FL_BZ	FL_Belize
FL_BMGC1	FL_BM	FL_Bermuda
FL_BOGC1	FL_BO	FL_Bolivia
FL_BRGC1	FL_BR	FL_Brazil
FL_BGGC1	FL_BG	FL_Bulgaria
FL_BVIGC1	FL_BVI	FL_BVI
FL_KHGC1	FL_KH	FL_Cambodia
FL_CAGC1	FL_CA	FL_Canada
FL_KYGC1	FL_KY	FL_CaymanIslands
FL_CLGC1	FL_CL	FL_Chile
FL_CNGC1	FL_CN	FL_China
FL_COGC1	FL_CO	FL_Colombia

Type of Models - Codes Used		
Detention*)	**Casualty**	**Explanation of Variable**
FL_KMGC1	FL_KM	FL_Comoros
FL_HRGC1	FL_HR	FL_Croatia
FL_CUGC1	FL_CU	FL_Cuba
FL_CYGC1	FL_CY	FL_Cyprus
FL_DKGC1	FL_DK	FL_Denmark
FL_DMGC1	FL_DM	FL_Dominica
FL_DOGC1	FL_DO	FL_DominicanRepublic
FL_ECGC1	FL_EC	FL_Ecuador
FL_EGGC1	FL_EG	FL_Egypt
FL_ERGC1	FL_ER	FL_Eritrea
FL_EEGC1	FL_EE	FL_Estonia
FL_ETGC1	FL_ET	FL_Ethiopia
FL_FOGC1	FL_FO	FL_FaroeIslands
FL_FJGC1	FL_FJ	FL_Fiji
FL_FIGC1	FL_FI	FL_Finland
FL_FRGC1	FL_FR	FL_France
FL_GEGC1	FL_GE	FL_Georgia
FL_DEGC1	FL_DE	FL_Germany
FL_GIGC1	FL_GI	FL_Gibraltar
FL_GRGC1	FL_GR	FL_Greece
FL_GYGC1	FL_GY	FL_Guyana
FL_HTGC1	FL_HT	FL_Haiti
FL_HNGC1	FL_HN	FL_Honduras
FL_HKGC1	FL_HK	FL_HongKong
FL_ISGC1	FL_IS	FL_Iceland
FL_INGC1	FL_IN	FL_India
FL_IDGC1	FL_ID	FL_Indonesia
FL_IRGC1	FL_IR	FL_Iran
FL_IQGC1	FL_IQ	FL_Iraq
FL_IEGC1	FL_IE	FL_Ireland
FL_IMGC1	FL_IM	FL_IselofMan
FL_ILGC1	FL_IL	FL_Israel
FL_ITGC1	FL_IT	FL_Italy
FL_JMGC1	FL_JM	FL_Jamaica
FL_JPGC1	FL_JP	FL_Japan
FL_JOGC1	FL_JO	FL_Jordan
FL_KIGC1	FL_KI	FL_Kiribati
FL_KWGC1	FL_KW	FL_Kuwait
FL_LVGC1	FL_LV	FL_Latvia
FL_LBGC1	FL_LB	FL_Lebanon
FL_LRGC1	FL_LR	FL_Liberia
FL_LYGC1	FL_LY	FL_Libya
FL_LTGC1	FL_LT	FL_Lithuania
FL_LUGC1	FL_LU	FL_Luxembourg
FL_MYGC1	FL_MY	FL_Malaysia
FL_MVGC1	FL_MV	FL_Maldives
FL_MTGC1	FL_MT	FL_Malta
FL_MHGC1	FL_MH	FL_MarshallIslands
FL_MUGC1	FL_MU	FL_Mauritius
FL_MXGC1	FL_MX	FL_Mexico
FL_MDGC1	FL_MD	FL_Moldovia
FL_MNGC1	FL_MN	FL_Mongolia

Type of Models - Codes Used		
Detention*)	**Casualty**	**Explanation of Variable**
FL_MAGC1	FL_MA	FL_Morocco
FL_MMGC1	FL_MM	FL_Myanmar
FL_NAGC1	FL_NA	FL_Namibia
FL_NLGC1	FL_NL	FL_Netherlands
FL_NZGC1	FL_NZ	FL_NewZealand
FL_NIGC1	FL_NI	FL_Nicaragua
FL_NGGC1	FL_NG	FL_Nigeria
FL_NISGC1	FL_NIS	FL_NIS
FL_KPGC1	FL_KP	FL_NorthKorea
FL_NOGC1	FL_NO	FL_Norway
FL_OTGC1	FL_OT	FL_Other
FL_PKGC1	FL_PK	FL_Pakistan
FL_PAGC1	FL_PA	FL_Panama
FL_PYGC1	FL_PY	FL_Paraguay
FL_PEGC1	FL_PE	FL_Peru
FL_PHGC1	FL_PH	FL_Philippines
FL_PLGC1	FL_PL	FL_Poland
FL_PTGC1	FL_PT	FL_Portugal
FL_QAGC1	FL_QA	FL_Quatar
FL_ROGC1	FL_RO	FL_Romania
FL_RUGC1	FL_RU	FL_RussianFed
FL_ASGC1	FL_AS	FL_Samoa
FL_STGC1	FL_ST	FL_SaoTomePrin
FL_SAGC1	FL_SA	FL_SaudiaArabia
FL_SCGC1	FL_SC	FL_Seychelles
FL_SGGC1	FL_SG	FL_Singapore
FL_SKGC1	FL_SK	FL_Slovakia
FL_ZAGC1	FL_ZA	FL_SouthAfrica
FL_KRGC1	FL_KR	FL_SouthKorea
FL_ESGC1	FL_ES	FL_Spain
FL_LKGC1	FL_LK	FL_SriLanka
FL_VCGC1	FL_VC	FL_StVincentGrenad
FL_SDGC1	FL_SD	FL_Sudan
FL_SEGC1	FL_SE	FL_Sweden
FL_CHGC1	FL_CH	FL_Switzerland
FL_SYGC1	FL_SY	FL_Syria
FL_TWGC1	FL_TW	FL_Taiwan
FL_THGC1	FL_TH	FL_Thailand
FL_TOGC1	FL_TO	FL_Tonga
FL_TTGC1	FL_TT	FL_TrinidadTobago
FL_TNGC1	FL_TN	FL_Tunisia
FL_TRGC1	FL_TR	FL_Turkey
FL_TMGC1	FL_TM	FL_Turkmenistan
FL_TVGC1	FL_TV	FL_Tuvalu
FL_AEGC1	FL_AE	FL_UAE
FL_UKGC1	FL_UK	FL_UK
FL_UAGC1	FL_UA	FL_Ukraine
FL_UNGC1	FL_UN	FL_Unknown
FL_USGC1	FL_US	FL_USA
FL_VUGC1	FL_VU	FL_Vanuatu
FL_VEGC1	FL_VE	FL_Venezuela
FL_VNGC1	FL_VN	FL_VietNam

Type of Models - Codes Used		
Detention*)	**Casualty**	**Explanation of Variable**
CLABSGC1	CL_ABS	CL_ABS
CLBKGC1	CL_BKI	CL_BiroKlasIndo
CLBUKGC1	CL_BUK	CL_BulgarskiKoraben
CLBVGC1	CL_BV	CL_BureauVeritas
CLCCGC1	CL_CCS	CL_ChinaClass
CLCOOGC1	CL_CCO	CL_ChinaCorp
CLCRRGC1	CL_CRR	CL_CroatianRS
CLDNVGC1	CL_DNV	CL_DNV
CLGLGC1	CL_GL	CL_GermanischerLloyd
CLGBKGC1	CL_GBS	CL_GuardianBS
CLHELGC1	CL_HEL	CL_Hellenic
CLHINGC1	CL_HIN	CL_HondurasInterNav
CLINCGC1	CL_INC	CL_Inclamar
CLINRGC1	CL_INR	CL_IndianRegister
CLINSGC1	CL_INS	CL_InterNavSurB
CLIRSGC1	CL_IRS	CL_InterRegShipping
CLIBSGC1	CL_IBS	CL_IsthmusBS
CLJRSGC1	CL_JRS	CL_JosonRS
CLKRSGC1	CL_KRS	CL_KoreanSouth
CLLRGC1	CL_LR	CL_LloydsUK
CLNKKGC1	CL_NKK	CL_NKKJapan
CLNCLGC1	CL_NCL	CL_NoClass
CLOCLGC1	CL_OCL	CL_OtherClass
CLPBSGC1	CL_PBS	CL_PanamaBureauS
CLPMDGC1	CL_PMD	CL_PanamaMDS
CLPMSCG1	CL_PMS	CL_PanamaMSurveyorB
CLPRCGC1	CL_PRC	CL_PanamaRegCorp
CLPSRCG1	CL_PSR	CL_PanamaShipReg
CLPRSGC1	CL_PRS	CL_PolskiReSt
CLRSAGC1	CL_RSA	CL_RegisterAlbania
CLRCCGC1	CL_RCC	CL_RegistroCubano
CLRSCGC1	CL_RSC	CL_RegShipChina
CLRSKGC4	CL_RSK	CL_RegShipDRKorea
CLRSGGC1	CL_RSG	CL_RegShipGhana
CLRINGC1	CL_RIN	CL_RINA
CLRIPGC1	CL_RIP	CL_RINAVE
CLRNRGC1	CL_RNR	CL_RomanianNaval
CLRMSGC1	CL_RMS	CL_RussianMS
CLRRRGC1	CL_RRR	CL_RussianRiver
CLSRUGC1	CL_SRU	CL_SRUkraine
CLTLLGC1	CL_TLL	CL_TurkishLloyd
CLVRSGC1	CL_VRS	CL_VietnamRS
C0100GC1	Code_0100	Ship's certificates and documents
C0200GC1	Code_0200	Crew certificates
C0300GC1	Code_0300	Accommodation
C0400GC1	Code_0400	Food and catering
C0500GC1	Code_0500	Working spaces and accident prev.
C0600GC1	Code_0600	Life saving appliances
C0700GC1	Code_0700	Fire Safety measures
C0800GC1	Code_0800	Accident prevention (ILO147)
C0900GC1	Code_0900	Structural Safety
C1000GC1	Code_1000	Alarm signals

Type of Models - Codes Used		
Detention*)	**Casualty**	**Explanation of Variable**
C1100GC1	Code_1100	Cargoes
C1200GC1	Code_1200	Load lines
C1300GC1	Code_1300	Mooring arrangements (ILO 147)
C1400GC1	Code_1400	Propulsion & auxiliary engine
C1500GC1	Code_1500	Safety of navigation
C1600GC1	Code_1600	Radio communications
C1700GC1	Code_1700	MARPOL Annex I
C1800GC1	Code_1800	Gas and chemical carriers
C1900GC1	Code_1900	MARPOL Annex II
C2000GC1	Code_2000	SOLAS Operational deficiencies
C2100GC1	Code_2100	MARPOL related oper. deficiencies
C2200GC1	Code_2200	MARPOL Annex III
C2300GC1	Code_2300	MARPOL Annex V
C2500GC1	Code_2500	ISM related deficiencies
C2600GC1	Code_2600	Bulk carriers
C2700GC1	Code_2700	Security
C2900GC1	Code_2900	MARPOL Annex IV
C9800GC1	Code_9800	Other def. clearly hazardous safety
C9900GC1	Code_9900	Other def. not clearly hazardous
PS1_BE	PS1_BE	PS1_Belgium
PS1_CA	PS1_CA	PS1_Canada
PS1_HR	PS1_HR	PS1_Croatia
PS1_DK	PS1_DK	PS1_Denmark
PS1_FI	PS1_FI	PS1_Finland
PS1_FR	PS1_FR	PS1_France
PS1_DE	PS1_DE	PS1_Germany
PS1_GR	PS1_GR	PS1_Greece
PS1_IS	PS1_IS	PS1_Iceland
PS1_IE	PS1_IE	PS1_Ireland
PS1_IT	PS1_IT	PS1_Italy
PS1_NL	PS1_NL	PS1_Netherlands
PS1_NO	PS1_NO	PS1_Norway
PS1_PL	PS1_PL	PS1_Poland
PS1_PT	PS1_PT	PS1_Portugal
PS1_RU	PS1_RU	PS1_Russia
PS1_SI	PS1_SI	PS1_Slovenia
PS1_ES	PS1_ES	PS1_Spain
PS1_SE	PS1_SE	PS1_Sweden
PS1_UK	PS1_UK	PS1_UK
PS2_AG	PS2_AG	PS2_Antigua
PS2_AN	PS2_AN	PS2_AntillesNetherlands
PS2_BS	PS2_BS	PS2_Bahamas
PS2_BB	PS2_BB	PS2_Barbados
PS2_BVI	PS2_BVI	PS2_BVI
PS2_KY	PS2_KY	PS2_Cayman
PS2_CU	PS2_CU	PS2_Cuba
PS2_JM	PS2_JM	PS2_Jamaica
PS2_VC	PS2_VC	PS2_StVincentGren
PS2_SR	PS2_SR	PS2_Suriname
PS2_TT	PS2_TT	PS2_Trinidad
PS3_AR	PS3_AR	PS3_Argentina
PS3_BR	PS3_BR	PS3_Brasil

Type of Models - Codes Used		
Detention*)	**Casualty**	**Explanation of Variable**
PS3_CHI	PS3_CHI	PS3_Chile
PS3_COL	PS3_COL	PS3_Colombia
PS3_CUB	PS3_CUB	PS3_Cuba
PS3_ECU	PS3_ECU	PS3_Ecuador
PS3_HN	PS3_HN	PS3_Honduras
PS3_MX	PS3_MX	PS3_Mexico
PS3_PA	PS3_PA	PS3_Panama
PS3_PE	PS3_PE	PS3_Peru
PS3_UY	PS3_UY	PS3_Uruguay
PS3_VE	PS3_VE	PS3_Venezuela
PS4_ER	PS4_ER	PS4_Eritrea
PS4_IN	PS4_IN	PS4_India
PS4_IR	PS4_IR	PS4_Iran
PS4_MU	PS4_MU	PS4_Mauritius
PS4_ZA	PS4_ZA	PS4_SouthAfrica
PS4_LK	PS4_LK	PS4_SriLanka
PS4_SD	PS4_SD	PS4_Sudan
PS4_TZ	PS4_TZ	PS4_Tanzania
PS5_ANCO	PS5_ANCO	PS5_Anchorage_AK
PS5_BALTI	PS5_BALTI	PS5_Baltimore_MD
PS5_BATR	PS5_BATR	PS5_BatonRouge_LA
PS5_BOST	PS5_BOST	PS5_Boston_MA
PS5_BROW	PS5_BROW	PS5_Brownsville_TX
PS5_BUFF	PS5_BUFF	PS5_Buffalo_NY
PS5_CHAR	PS5_CHAR	PS5_Charleston_SC
PS5_CHIC	PS5_CHIC	PS5_Chicago_IL
PS5_CLEV	PS5_CLEV	PS5_Cleveland_OH
PS5_CORP	PS5_CORP	PS5_CorpusChristi_TX
PS5_DETR	PS5_DETR	PS5_Detroit_MI
PS5_DULU	PS5_DULU	PS5_Duluth_MN
PS5_GUAM	PS5_GUAM	PS5_Guam
PS5_HAMP	PS5_HAMP	PS5_HamptonRoads_VA
PS5_HONO	PS5_HONO	PS5_Honolulu_HI
PS5_HOUS	PS5_HOUS	PS5_HoustonGalv_TX
PS5_JACK	PS5_JACK	PS5_Jacksonville_FL
PS5_JUNE	PS5_JUNE	PS5_Juneau_AK
PS5_LCHA	PS5_LCHA	PS5_LakeCharles_LA
PS5_LONG	PS5_LONG	PS5_LongIsland_NY
PS5_LANG	PS5_LANG	PS5_LosAngeles_CA
PS5_MASS	PS5_MASS	PS5_Massena_NY
PS5_MIAM	PS5_MIAM	PS5_Miami_FL
PS5_MOBI	PS5_MOBI	PS5_Mobile_AL
PS5_MORG	PS5_MORG	PS5_MorganCity_LA
PS5_NORL	PS5_NORL	PS5_NewOrleans_LA
PS5_NEWY	PS5_NEWY	PS5_NewYork_NY
PS5_PHIL	PS5_PHIL	PS5_Philadelphia_PA
PS5_POAR	PS5_POAR	PS5_PortArthur_TX
PS5_POCA	PS5_POCA	PS5_PortCarnaveral_FL
PS5_POLA	PS5_POLA	PS5_PortLavaca_TX
PS5_PORM	PS5_PORM	PS5_Portland_ME
PS5_PORO	PS5_PORO	PS5_Portland_OR
PS5_PORT	PS5_PORT	PS5_Portsmouth_NH

Type of Models - Codes Used		
Detention*)	**Casualty**	**Explanation of Variable**
PS5_PROV	PS5_PROV	PS5_Providence_RI
PS5_PUGE	PS5_PUGE	PS5_PugetSound_WA
PS5_SAMO	PS5_SAMO	PS5_AmericanSamoa
PS5_SAND	PS5_SAND	PS5_SanDiego_CL
PS5_SANF	PS5_SANF	PS5_SanFrancisco_CL
PS5_SANJ	PS5_SANJ	PS5_SanJuan_PR
PS5_SANB	PS5_SANB	PS5_SantaBarbara_CL
PS5_SAUL	PS5_SAUL	PS5_SaultMarie_MI
PS5_SAVA	PS5_SAVA	PS5_Savannah_GA
PS5_TAMP	PS5_TAMP	PS5_Tampa_FL
PS5_TOLE	PS5_TOLE	PS5_Toledo_OH
PS5_VALD	PS5_VALD	PS5_Valdez_AK
PS5_WILM	PS5_WILM	PS5_Wilmington_NC
PS5_USVI	PS5_USVI	PS5_USVirginIslands
PS5_OTH	PS5_OTH	PS5_Other
PS6_BELL	PS6_BELL	PS6_BellBay_TAS
PS6_BRIS	PS6_BRIS	PS6_Brisbane_QLD
PS6_BUNB	PS6_BUNB	PS6_Bunbury_WA
PS6_BURN	PS6_BURN	PS6_Burnie_TAS
PS6_CAIR	PS6_CAIR	PS6_Cairns_QLD
PS6_DAMP	PS6_DAMP	PS6_Dampier_WA
PS6_DARW	PS6_DARW	PS6_Darwin_NT
PS6_DEVO	PS6_DEVO	PS6_Devonport_TAS
PS6_ESPE	PS6_ESPE	PS6_Esperance_WA
PS6_FREM	PS6_FREM	PS6_Fremantle_WA
PS6_GEEL	PS6_GEEL	PS6_Geelong_VIC
PS6_GERA	PS6_GERA	PS6_Geraldton_WA
PS6_GLAD	PS6_GLAD	PS6_Gladstone_QLD
PS6_GOVE	PS6_GOVE	PS6_Gove_NT
PS6_HAYP	PS6_HAYP	PS6_HayPoint_QLD
PS6_KURN	PS6_KURN	PS6_Kurnell_NSW
PS6_KWIN	PS6_KWIN	PS6_Kwinana_WA
PS6_MACK	PS6_MACK	PS6_Mackay_QLD
PS6_MELB	PS6_MELB	PS6_Melborne_VIC
PS6_NEWC	PS6_NEWC	PS6_Newcastle_NSW
PS6_OTH	PS6_OTH	PS6_Other
PS6_POAD	PS6_POAD	PS6_PortAdelaide_SA
PS6_POBO	PS6_POBO	PS6_PortBotany_NSW
PS6_POHE	PS6_POHE	PS6_PortHedland_WA
PS6_POKE	PS6_POKE	PS6_PortKembla_NSW
PS6_POWA	PS6_POWA	PS6_PortWalcott_WA
PS6_PORT	PS6_PORT	PS6_Portland_VIC
PS6_SYDN	PS6_SYDN	PS6_Sydney_NSW
PS6_TOWN	PS6_TOWN	PS6_Townsville_QLD
PS6_WALL	PS6_WALL	PS6_Wallaroo_SA
n/a	SY_AU	Australia
n/a	SY_BE	Belgium
n/a	SY_BR	Brazil
n/a	SY_BG	Bulgaria
n/a	SY_CA	Canada
n/a	SY_CL	Chile
n/a	SY_CN	China

Type of Models - Codes Used		
Detention*)	**Casualty**	**Explanation of Variable**
n/a	SY_HR	Croatia
n/a	SY_DK	Denmark
n/a	SY_FI	Finland
n/a	SY_FR	France
n/a	SY_DE	Germany
n/a	SY_GR	Greece
n/a	SY_IN	India
n/a	SY_ID	Indonesia
n/a	SY_IT	Italy
n/a	SY_JP	Japan
n/a	SY_MY	Malaysia
n/a	SY_NL	Netherlands
n/a	SY_NO	Norway
n/a	SY_OT	Other
n/a	SY_PH	Philippines
n/a	SY_PL	Poland
n/a	SY_PT	Portugal
n/a	SY_RO	Romania
n/a	SY_RU	Russian Federation
n/a	SY_SG	Singapore
n/a	SY_KR	South Korea
n/a	SY_ES	Spain
n/a	SY_SE	Sweden
n/a	SY_TW	Taiwan
n/a	SY_TR	Turkey
n/a	SY_UA	Ukraine
n/a	SY_UK	United Kingdom
n/a	SY_US	United States of America
n/a	SY_UN	Unknown
n/a	SY_VN	Viet Nam

Appendix 5: Grouping of Countries of Ownership

The grouping of ownership of a vessel was made according to Alderton and Winchester (1999) and is as follows:

1. *Old Open Registries:* Antigua and Barbuda, Bahamas, Bermuda, Cyprus, Honduras, Liberia, Malta, Marshall Islands, Panama, St. Vincent & the Grenadines

2. *New Open Registries:* Barbados, Belize, Bolivia, Cambodia, Canary Islands, Cayman Islands, Cook Islands, Equatorial Guinea, Gibraltar, Lebanon, Luxembourg, Mauritius, Myanmar, Sri Lanka, Tuvalu and Vanuatu

3. *International Registries:* Anguila, British Virgin Islands, Channel Islands, DIS, Falklands, Faeroes, Hong Kong, Isle of Man, Kerguelen Islands, Macao, Madeira, NIS, Philippines, Sao Tome and Principe, Singapore, Turks and Caicos, Ukraine, Wallis and Fortuna, Netherlands Antilles

4. *Traditional Maritime Nations:* Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Mexico, Netherlands, New Zealand, Norway, Portugal, Russia, South Africa, Spain, Sweden, Switzerland, UK, Uruguay, USA, Venezuela.

5. *Emerging Maritime Nations:* Albania, Algeria, Angola, Azerbaijan, Bahrain, Bangladesh, Benin, Brunei, Bulgaria, Cameroon, Cape Verde, China, Colombia, Comoro, Congo, Costa Rica, Croatia, Cuba, Djibouti, Dominica, Dominican Republic, Egypt, El Salvador, Ecuador, Eritrea, Estonia, Ethiopia, Fiji, Gabon, Gambia, Georgia, Ghana, Grenada, Guatemala, Guinea, Guyana, Haiti, Hungary, India, Indonesia, Iran, Iraq, Israel, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, North Korea, South Korea, Kuwait, Laos, Latvia, Libya, Lithuania, Madagascar, Malaysia, Maldives, Mauritania, Micronesia, Morocco, Mozambique, Namibia, Nicaragua, Nigeria, Oman, Pakistan, Papua New Guinea, Paraguay, Peru, Poland, Qatar, Romania, St. Helena, St. Kitts & Nevis, Samoa, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Slovakia, Slovenia, Solomon Islands, Somalia Republic, Sudan, Surinam, Syria, Taiwan, Tanzania, Thailand, Togo, Trinidad, Tunisia, Turkey, Turkmenistan, UAE, Vietnam, Yemen

6. *Other/Unknown:* Undefined by dataset, Unknown (Fairplay), Azores, Cameroon, Greenland, Monaco, Puerto Rico, Serbia & Montenegro, St. Pierre & Miquel

Appendix 6: Results of Correspondence Analysis for Ship Type Selection

Explained Inertia		chi2 = 1.7371e+004	
Dim1	0.5679		
Dim2	0.1878		
Dim3	0.1166		
Dim4	0.0453		
Xpk = x coordinates		**Ypk = y coordinates**	
General'	0.0740 -0.0587	'C0100'	-0.1099 -0.0162
Bulk'	0.0506 0.1011	'C0200'	-0.0276 -0.1356
Oil'	-0.3927 -0.0029	'C0300'	0.0897 -0.0690
Tanker'	-0.5035 -0.0768	'C0400'	0.0730 0.0101
'RoRoCargo'	0.0180 0.0549	'C0500'	0.0047 -0.0354
Other'	-0.0224 -0.0881	'C0600'	0.0049 -0.0001
Chemical'	-0.6786 -0.0707	'C0700'	-0.0579 0.0966
Reefer'	0.0598 -0.0430	'C0800'	-0.0392 0.0527
'Passenger'	-0.0321 0.2328	'C0900'	0.0172 0.1157
Gas'	-0.7187 -0.0144	'C1000'	-0.0698 0.2267
OBO'	-0.3603 0.1123	'C1100'	0.1528 -0.0307
RoRoPax'	-0.0566 0.4441	'C1200'	0.1032 -0.0243
Offshore'	0.0127 -0.1609	'C1300'	0.1057 -0.0456
Mobile'	-0.1659 -0.2607	'C1400'	-0.0078 0.0402
Factory'	0.1349 -0.1266	'C1500'	0.1108 -0.1742
Special'	0.0873 -0.1850	'C1600'	0.0723 -0.0883
'HeavyLoad'	0.0431 0.0662	'C1700'	-0.0342 -0.0681
HSPax'	-0.0877 0.2967	'C1800'	-2.9875 -0.3640
'Container'	0.0325 0.0296	'C1900'	-1.8985 -0.4299
		'C2000'	0.0143 0.1520
		'C2100'	-0.0006 -0.0399
		'C2200'	0.1443 0.0423
		'C2300'	0.0657 -0.0758
		'C2500'	-0.1028 0.1714
Absolute Row Contribution		**Relative Row Contribution**	
General'	0.0922 0.1753	General'	0.5659 0.3559
Bulk'	0.0164 0.1983	Bulk'	0.0927 0.3703
Oil'	0.2037 0.0000	Oil'	0.9501 0.0001
Tanker'	0.1782 0.0125	Tanker'	0.9157 0.0213
'RoRoCargo'	0.0004 0.0112	'RoRoCargo'	0.0097 0.0902
Other'	0.0002 0.0095	Other'	0.0050 0.0778
Chemical'	0.3635 0.0119	Chemical'	0.9622 0.0104
Reefer'	0.0025 0.0040	Reefer'	0.0973 0.0503
'Passenger'	0.0004 0.0706	'Passenger'	0.0084 0.4386
Gas'	0.1219 0.0001	Gas'	0.8989 0.0004
OBO'	0.0152 0.0045	OBO'	0.6709 0.0652
RoRoPax'	0.0025 0.4681	RoRoPax'	0.0115 0.7086
Offshore'	0.0000 0.0152	Offshore'	0.0013 0.2069
Mobile'	0.0002 0.0012	Mobile'	0.0208 0.0514
Factory'	0.0008 0.0020	Factory'	0.1605 0.1413
Special'	0.0005 0.0070	Special'	0.0501 0.2250
'HeavyLoad'	0.0000 0.0003	'HeavyLoad'	0.0069 0.0164
HSPax'	0.0001 0.0050	HSPax'	0.0244 0.2796

'Container'	0.0013 0.0033	'Container'	0.0337 0.0280
Absolute Column Contribution		**Relative Column Contribution**	
'C0100'	0.0190 0.0012	'C0100'	0.3349 0.0072
'C0200'	0.0011 0.0781	'C0200'	0.0159 0.3833
'C0300'	0.0076 0.0136	'C0300'	0.1959 0.1160
'C0400'	0.0028 0.0002	'C0400'	0.1558 0.0030
'C0500'	0.0000 0.0031	'C0500'	0.0013 0.0751
'C0600'	0.0001 0.0000	'C0600'	0.0157 0.0000
'C0700'	0.0141 0.1192	'C0700'	0.2146 0.5976
'C0800'	0.0007 0.0039	'C0800'	0.0780 0.1406
'C0900'	0.0011 0.1466	'C0900'	0.0164 0.7407
'C1000'	0.0009 0.0273	'C1000'	0.0458 0.4831
'C1100'	0.0099 0.0012	'C1100'	0.3434 0.0139
'C1200'	0.0182 0.0031	'C1200'	0.2879 0.0160
'C1300'	0.0055 0.0031	'C1300'	0.1797 0.0334
'C1400'	0.0001 0.0090	'C1400'	0.0052 0.1377
'C1500'	0.0423 0.3164	'C1500'	0.2760 0.6820
'C1600'	0.0057 0.0257	'C1600'	0.2056 0.3066
'C1700'	0.0024 0.0292	'C1700'	0.0718 0.2851
'C1800'	0.7437 0.0334	'C1800'	0.9723 0.0144
'C1900'	0.1107 0.0172	'C1900'	0.7992 0.0410
'C2000'	0.0002 0.0597	'C2000'	0.0026 0.2896
'C2100'	0.0000 0.0006	'C2100'	0.0000 0.0388
'C2200'	0.0002 0.0000	'C2200'	0.0922 0.0079
'C2300'	0.0014 0.0056	'C2300'	0.1593 0.2120
'C2500'	0.0122 0.1027	'C2500'	0.2260 0.6280
QLTx = quality rows		**QLTy = quality columns**	
General'	0.9218	'C0100'	0.3422
Bulk'	0.4631	'C0200'	0.3991
Oil'	0.9501	'C0300'	0.3119
Tanker'	0.9370	'C0400'	0.1588
'RoRoCargo'	0.0999	'C0500'	0.0764
Other'	0.0828	'C0600'	0.0157
Chemical'	0.9726	'C0700'	0.8122
Reefer'	0.1476	'C0800'	0.2187
'Passenger'	0.4470	'C0900'	0.7570
Gas'	0.8993	'C1000'	0.5289
OBO'	0.7362	'C1100'	0.3573
RoRoPax'	0.7201	'C1200'	0.3039
Offshore'	0.2081	'C1300'	0.2131
Mobile'	0.0722	'C1400'	0.1430
Factory'	0.3018	'C1500'	0.9580
Special'	0.2750	'C1600'	0.5122
'HeavyLoad'	0.0233	'C1700'	0.3570
HSPax'	0.3041	'C1800'	0.9867
'Container'	0.0617	'C1900'	0.8402
		'C2000'	0.2921
		'C2100'	0.0388
		'C2200'	0.1001
		'C2300'	0.3713
		'C2500'	0.8540

Appendix 7: Step 3: Final Models: General Cargo

Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/12/06 Time: 13:21
Sample: 1 66921 IF ST_CARIB=0 AND OUTLIER=0
Included observations: 66473
Convergence achieved after 8 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
ST_PMOU	-2.396743	0.258563	-9.269484	0.0000
ST_VINA	-2.776742	0.574273	-4.835225	0.0000
ST_INDIA	-5.423454	0.219420	-24.71725	0.0000
ST_USCG	-3.560540	0.292474	-12.17386	0.0000
ST_AMSA	-4.323396	0.169246	-25.54511	0.0000
AGEBYGC1+AGEBYGC3+AGEBYGC4+AGEBYGC5+AGEBYGC6	0.303474	0.041264	7.354373	0.0000
SIZEGC1+SIZEGC3+SIZEGC5	-0.236769	0.023654	-10.00971	0.0000
CLDNVGC1+CLDNVGC4	-0.262804	0.106304	-2.472195	0.0134
CLIRSGC4	1.068258	0.393362	2.715712	0.0066
CLNKKGC3+CLNKKGC4	-0.389718	0.197598	-1.972275	0.0486
CLPRSGC5	1.556894	0.442767	3.516284	0.0004
CLRINGC4	1.364312	0.423487	3.221615	0.0013
FL_AGGC1	0.159694	0.085702	1.863360	0.0624
FL_CNGC4	-1.926337	0.709392	-2.715477	0.0066
FL_CYGC1+FL_CYGC3+FL_CYGC6	0.241435	0.088109	2.740176	0.0061
FL_EGGC1	0.520382	0.240305	2.165504	0.0303
FL_GEGC1+FL_GEGC4	0.383888	0.151440	2.534912	0.0112
FL_HKGC5	1.782175	0.658215	2.707589	0.0068
FL_KHGC1+FL_KHGC4+FL_KHGC5	0.487254	0.109845	4.435822	0.0000
FL_KPGC1+FL_KPGC4	0.742358	0.196086	3.785872	0.0002
FL_PAGC1+FL_PAGC3+FL_PAGC4+FL_PAGC5	0.444409	0.071590	6.207729	0.0000
FL_PHGC5	1.850181	0.708661	2.610811	0.0090
FL_RUCG3+FL_RUGC1	0.479156	0.089758	5.338282	0.0000
FL_TOGC1	0.658288	0.271983	2.420325	0.0155
FL_TRGC1+FL_TRGC3	0.461756	0.080259	5.753360	0.0000
FL_TVGC1	1.143535	0.443701	2.577262	0.0100
FL_UAGC1+FL_UAGC3	0.375346	0.136738	2.744992	0.0061
FL_VCGC1+FL_VCGC3	0.408166	0.075652	5.395286	0.0000
C0100GC1	0.608328	0.028775	21.14102	0.0000
C0100GC3	0.289633	0.071321	4.060949	0.0000
C0100GC4	0.694804	0.085867	8.091633	0.0000
C0200GC1	0.323731	0.030793	10.51301	0.0000
C0200GC3	0.426773	0.101380	4.209658	0.0000
C0200GC4	1.095077	0.147104	7.444244	0.0000
C0200GC5	0.642589	0.302999	2.120764	0.0339
C0200GC6	1.262413	0.220674	5.720711	0.0000
C0300GC1	0.112677	0.031673	3.557575	0.0004

C0500GC1+C0500GC3+C0500GC4+C0500GC6	-0.134908	0.040555	-3.326539	0.0009
C0600GC1	0.273745	0.016976	16.12508	0.0000
C0600GC3	0.285547	0.045780	6.237320	0.0000
C0600GC4	0.551724	0.080190	6.880177	0.0000
C0700GC1	0.286724	0.018553	15.45433	0.0000
C0700GC3	0.376301	0.067764	5.553115	0.0000
C0700GC4	0.595082	0.083349	7.139609	0.0000
C0700GC5	0.532211	0.124600	4.271356	0.0000
C0900GC1	0.264649	0.019802	13.36500	0.0000
C0900GC4	0.293164	0.083018	3.531341	0.0004
C0900GC5	-0.355003	0.122205	-2.904985	0.0037
C0900GC6	0.381997	0.074775	5.108619	0.0000
C1000GC1+C1000GC3+C1000GC4+C1000GC5 +C1000GC6	0.593258	0.096774	6.130379	0.0000
C1100GC1	0.159904	0.059198	2.701185	0.0069
C1100GC3	0.957218	0.234715	4.078215	0.0000
C1200GC1+C1200GC4+C1200GC5+C1200GC6	0.260164	0.022788	11.41663	0.0000
C1300GC3+C1300GC4	0.445124	0.126868	3.508561	0.0005
C1400GC1+C1400GC3+C1400GC5	0.265603	0.022441	11.83583	0.0000
C1500GC1+C1500GC3+C1500GC4	0.229082	0.017127	13.37514	0.0000
C1600GC1	0.388279	0.032125	12.08635	0.0000
C1600GC3	0.207432	0.095971	2.161413	0.0307
C1600GC4	0.971456	0.204065	4.760533	0.0000
C1600GC6	0.476381	0.092952	5.125027	0.0000
C1700GC1+C1700GC4+C1700GC5+C1700GC6	0.528471	0.024906	21.21886	0.0000
C2500GC1	0.469264	0.032979	14.22920	0.0000
C2500GC3	0.809943	0.172625	4.691917	0.0000
C2500GC5	2.245713	0.324175	6.927470	0.0000
C2500GC6	1.098274	0.213912	5.134242	0.0000
OWOORGC3	-1.406355	0.529887	-2.654068	0.0080
OWIORGC3+OWIORGC5	-1.283822	0.525952	-2.440949	0.0146
OWTMNGC1	-0.253373	0.053410	-4.743950	0.0000
OWTMNGC3	-1.601115	0.504540	-3.173413	0.0015
OWEMNGC3	-1.308722	0.510937	-2.561418	0.0104
OWUNKGC1	0.404380	0.078866	5.127405	0.0000
OWUNKGC3	-1.278068	0.550262	-2.322655	0.0202
PS1_BE	-1.128189	0.102522	-11.00440	0.0000
PS1_HR	-0.642173	0.123584	-5.196264	0.0000
PS1_DK	-0.576984	0.136279	-4.233855	0.0000
PS1_FI	-0.604053	0.178547	-3.383153	0.0007
PS1_FR	-0.388013	0.093980	-4.128663	0.0000
PS1_DE	-0.873199	0.098076	-8.903262	0.0000
PS1_GR	-1.067856	0.097729	-10.92667	0.0000
PS1_IE	-0.962211	0.168072	-5.725002	0.0000
PS1_NO	-0.340505	0.147174	-2.313621	0.0207
PS1_NL	-1.305595	0.121707	-10.72735	0.0000
PS1_PL	-1.319757	0.133728	-9.868933	0.0000
PS1_PT	-0.633462	0.099375	-6.374443	0.0000
PS1_RU	-1.677765	0.098799	-16.98167	0.0000
PS1_ES	-0.575641	0.075580	-7.616356	0.0000
PS1_SE	-1.364781	0.181103	-7.535948	0.0000

PS1_UK	-1.325170	0.101397	-13.06907	0.0000
PS3_AR	-7.784620	1.188260	-6.551276	0.0000
PS3_CHI	2.135719	0.208660	10.23540	0.0000
PS3_CUB	2.103693	0.216106	9.734561	0.0000
PS3_HN	1.585447	0.365438	4.338486	0.0000
PS4_IR	0.406926	0.176013	2.311906	0.0208
PS4_SD	1.057724	0.346769	3.050222	0.0023
PS5_NORL	0.891379	0.328429	2.714067	0.0066
PS6_BRIS	-0.650901	0.284299	-2.289497	0.0221
PS6_CAIR	-1.872774	0.792762	-2.362341	0.0182
PS6_DARW	-3.263450	0.720632	-4.528594	0.0000
PS6_TOWN	-1.197512	0.422817	-2.832225	0.0046

Mean dependent var	0.083944	S.D. dependent var	0.277306
S.E. of regression	0.212382	Akaike info criterion	0.323725
Sum squared resid	2993.870	Schwarz criterion	0.337285
Log likelihood	-10660.48	Hannan-Quinn criter.	0.327917
Avg. log likelihood	-0.160373		

Obs with Dep=0	60893	Total obs	66473
Obs with Dep=1	5580		

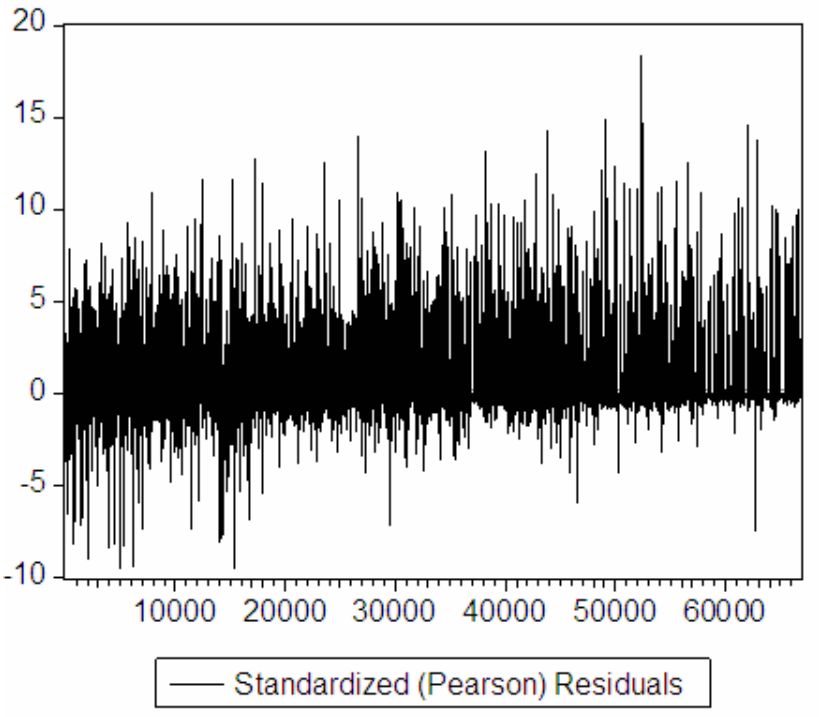
Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/12/06 Time: 13:21
Sample: 1 66921 IF ST_CARIB=0 AND OUTLIER=0
Included observations: 66473
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	5.E-07	0.0049	6642	6625.49	5	21.5071	6647	12.7107
2	0.0049	0.0076	6633	6605.44	14	41.5581	6647	18.3894
3	0.0076	0.0107	6612	6586.71	35	60.2907	6647	10.7060
4	0.0107	0.0147	6598	6564.38	50	83.6197	6648	13.6891
5	0.0147	0.0199	6561	6532.33	86	114.666	6647	7.29239
6	0.0199	0.0275	6536	6491.18	111	155.815	6647	13.1991
7	0.0275	0.0409	6447	6426.30	201	221.702	6648	1.99980
8	0.0409	0.0735	6228	6286.09	419	360.908	6647	9.88740
9	0.0735	0.2029	5673	5845.46	974	801.542	6647	42.1939
10	0.2029	1.0000	2963	2929.61	3685	3718.39	6648	0.68043
		Total	60893	60893.0	5580	5580.00	66473	130.748

H-L Statistic:	130.7482	Prob. Chi-Sq(8)	0.0000
Andrews Statistic:	361.0461	Prob. Chi-Sq(10)	0.0000

Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/12/06 Time: 13:21
Sample: 1 66921 IF ST_CARIB=0 AND OUTLIER=0
Included observations: 66473
Prediction Evaluation (success cutoff C = 0.0842)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	53334	990	54324	60893	5580	66473
P(Dep=1)>C	7559	4590	12149	0	0	0
Total	60893	5580	66473	60893	5580	66473
Correct	53334	4590	57924	60893	0	60893
% Correct	87.59	82.26	87.14	100.00	0.00	91.61
% Incorrect	12.41	17.74	12.86	0.00	100.00	8.39
Total Gain*	-12.41	82.26	-4.47			
Percent Gain**	NA	82.26	-53.21			



Appendix 8: Step 3: Final Models: Dry Bulk

Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/13/06 Time: 10:41
Sample: 1 48103 IF ST_DB2=0 AND OUTLIER=0
Included observations: 47777
Convergence achieved after 11 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
ST_DB1	-4.863602	0.460705	-10.55687	0.0000
ST_DB3	-10.25991	0.951265	-10.78554	0.0000
ST_DB4	-4.915276	0.494817	-9.933529	0.0000
ST_DB5	-9.713906	0.773077	-12.56526	0.0000
ST_DB6	-4.846630	0.467823	-10.35997	0.0000
AGEBYDB1+AGEBYDB3+AGEBYDB4+AGEBY DB5+AGEBYDB6	0.605733	0.064172	9.439227	0.0000
SIZEDB1+SIZEDB3+SIZEDB4+SIZEDB5+SIZED B6	-0.098601	0.039425	-2.501013	0.0124
CLCRRDB5	1.273347	0.525719	2.422106	0.0154
CLLRDB5	-0.964077	0.333624	-2.889710	0.0039
FL_BBDB5	-4.043765	0.831707	-4.862006	0.0000
FL_BRDB3	-2.921903	1.185654	-2.464380	0.0137
FL_BRDB5	1.823917	0.663879	2.747363	0.0060
FL_CYDB6	0.528363	0.174202	3.033043	0.0024
FL_GEDB1	1.231493	0.520730	2.364934	0.0180
FL_HKDB4	-2.071076	0.719395	-2.878915	0.0040
FL_KHDB1	1.236079	0.343956	3.593712	0.0003
FL_MTDB6	0.474747	0.208260	2.279593	0.0226
FL_MYDB3	1.692650	0.658565	2.570209	0.0102
FL_PHDB3	1.165037	0.506899	2.298360	0.0215
FL_PLDB3	1.786038	0.611841	2.919119	0.0035
FL_TRDB1+FL_TRDB3+FL_TRDB4+FL_TRDB5 +FL_TRDB6	0.272667	0.121374	2.246500	0.0247
C0100DB1+C0100DB3+C0100DB4+C0100DB5	0.492153	0.055502	8.867353	0.0000
C0200DB1	0.166678	0.069387	2.402165	0.0163
C0200DB3	0.437528	0.149470	2.927196	0.0034
C0200DB5	2.269534	0.292007	7.772186	0.0000
C0200DB6	0.943160	0.143645	6.565890	0.0000
C0300DB4+C0300DB5	0.414519	0.121660	3.407189	0.0007
C0400DB6	-0.484642	0.169869	-2.853030	0.0043
C0600DB1	0.272873	0.027685	9.856377	0.0000
C0600DB3	0.235242	0.073153	3.215756	0.0013
C0600DB4	0.376844	0.089535	4.208904	0.0000
C0600DB5	0.768639	0.131290	5.854525	0.0000
C0600DB6	0.101006	0.040829	2.473895	0.0134
C0700DB1	0.241506	0.028153	8.578302	0.0000
C0700DB3	0.267494	0.085915	3.113475	0.0018
C0700DB4	0.737742	0.115981	6.360903	0.0000
C0700DB5	0.726521	0.174089	4.173261	0.0000

C0700DB6	0.368198	0.040618	9.064800	0.0000
C0800DB4	-0.759015	0.228804	-3.317317	0.0009
C0900DB1+C0900DB3+C0900DB4+C0900DB5	0.211114	0.027856	7.578800	0.0000
C1100DB3	0.750629	0.322034	2.330904	0.0198
C1200DB1+C1200DB6	0.188567	0.030245	6.234700	0.0000
C1400DB1+C1400DB3+C1400DB4+C1400DB6	0.232820	0.030053	7.746960	0.0000
C1500DB1+C1500DB4	0.168953	0.037561	4.498104	0.0000
C1600DB1	0.201671	0.061314	3.289140	0.0010
C1600DB3	0.566916	0.202119	2.804860	0.0050
C1600DB4	1.058992	0.248197	4.266733	0.0000
C1600DB6	0.450457	0.062530	7.203794	0.0000
C1700DB1	0.524241	0.043123	12.15684	0.0000
C1700DB3	0.834377	0.123995	6.729146	0.0000
C1700DB4	0.893838	0.164103	5.446821	0.0000
C1700DB5	0.655515	0.147198	4.453278	0.0000
C1700DB6	0.724802	0.082148	8.823176	0.0000
C1800DB5	2.666533	0.845398	3.154175	0.0016
C2000DB5	2.289860	0.294759	7.768588	0.0000
C2300DB1	0.299613	0.123344	2.429076	0.0151
C2500DB1	0.599240	0.045846	13.07077	0.0000
C2500DB3	0.552931	0.159583	3.464858	0.0005
C2500DB5	2.256296	0.401158	5.624456	0.0000
C2500DB6	1.058245	0.083928	12.60896	0.0000
C2600DB1	0.506175	0.126805	3.991748	0.0001
C9900DB5	1.135346	0.424252	2.676111	0.0074
OWUNKDB4	-1.256157	0.606619	-2.070750	0.0384
PS1_BE	-0.909947	0.162677	-5.593574	0.0000
PS1_GR	-1.787809	0.433777	-4.121497	0.0000
PS1_IE	-1.164652	0.470797	-2.473785	0.0134
PS1_NL	-0.995044	0.175002	-5.685912	0.0000
PS1_RU	-1.154220	0.184050	-6.271239	0.0000
PS3_BR	3.512539	0.762958	4.603845	0.0000
PS3_CHI	5.940680	0.813183	7.305467	0.0000
PS3_COL	3.718919	0.928646	4.004668	0.0001
PS3_CUB	5.492208	0.837512	6.557769	0.0000
PS3_HN	5.199727	0.938440	5.540819	0.0000
PS5_BATR	3.158521	0.997264	3.167188	0.0015
PS5_BROW	3.793653	1.198999	3.164016	0.0016
PS5_CHAR	5.154124	0.690391	7.465518	0.0000
PS5_CORP	4.294424	0.802039	5.354382	0.0000
PS5_DULU	4.082264	0.930248	4.388360	0.0000
PS5_HAMP	3.947380	0.675171	5.846485	0.0000
PS5_HONO	3.711200	1.344611	2.760055	0.0058
PS5_HOUS	3.933235	0.741468	5.304662	0.0000
PS5_JACK	6.196477	0.750042	8.261508	0.0000
PS5_LANG	4.192381	0.727509	5.762648	0.0000
PS5_MOBI	4.007495	0.735921	5.445551	0.0000
PS5_NORL	4.545155	0.649973	6.992837	0.0000
PS5_POAR	3.910559	1.215048	3.218439	0.0013
PS5_POCA	2.895390	0.895584	3.232962	0.0012
PS5_POLA	4.544957	0.904334	5.025754	0.0000

PS5_PROV	5.430488	0.849466	6.392822	0.0000
PS5_PUGE	3.702121	1.171584	3.159928	0.0016
PS5_SANF	3.534287	0.828315	4.266842	0.0000
PS5_SANJ	4.000131	0.799937	5.000556	0.0000
PS5_SAVA	4.173261	0.782037	5.336395	0.0000
PS5_WILM	4.029798	0.985652	4.088461	0.0000
PS5_USVI	4.037977	1.060904	3.806167	0.0001
PS6_NEWC	0.512666	0.131240	3.906340	0.0001

Mean dependent var	0.046173	S.D. dependent var	0.209861
S.E. of regression	0.167850	Akaike info criterion	0.213693
Sum squared resid	1343.345	Schwarz criterion	0.231324
Log likelihood	-5008.805	Hannan-Quinn criter.	0.219227
Avg. log likelihood	-0.104837		

Obs with Dep=0	45571	Total obs	47777
Obs with Dep=1	2206		

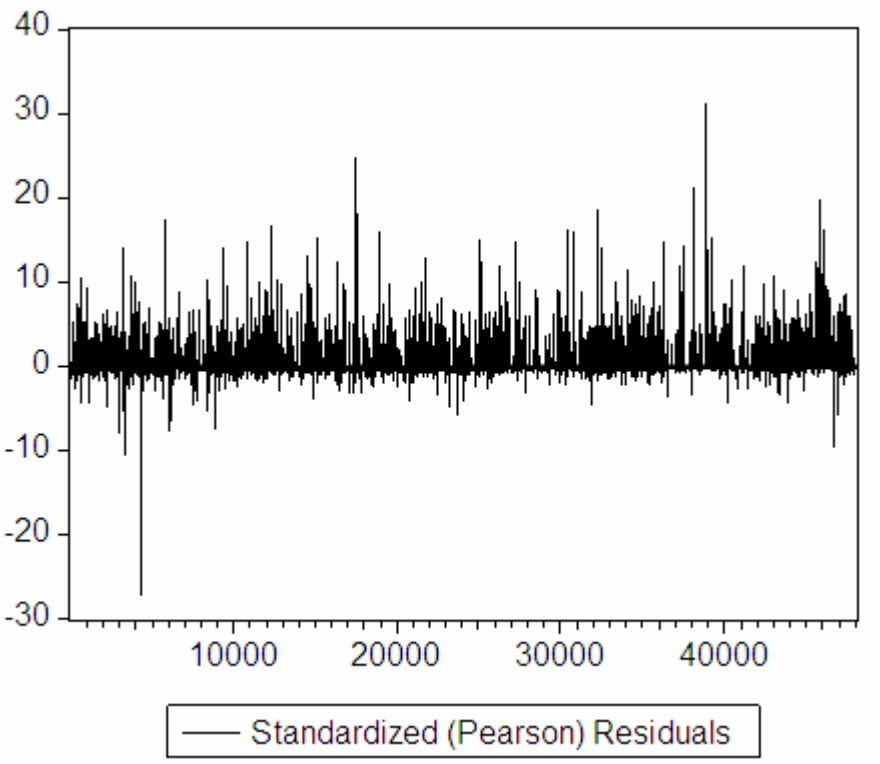
Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/13/06 Time: 10:41
Sample: 1 48103 IF ST_DB2=0 AND OUTLIER=0
Included observations: 47777
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

Quantile of Risk			Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	9.E-07	0.0001	4777	4776.67	0	0.33305	4777	0.33307
2	0.0001	0.0022	4775	4773.10	3	4.90243	4778	0.73902
3	0.0022	0.0042	4768	4762.62	10	15.3793	4778	1.88762
4	0.0042	0.0069	4760	4750.34	17	26.6646	4777	3.52259
5	0.0069	0.0101	4755	4737.89	23	40.1120	4778	7.36186
6	0.0101	0.0151	4742	4718.69	36	59.3077	4778	9.27496
7	0.0151	0.0208	4742	4692.63	35	84.3714	4777	29.4100
8	0.0208	0.0342	4646	4651.99	132	126.009	4778	0.29259
9	0.0342	0.0845	4473	4526.99	305	251.008	4778	12.2576
10	0.0845	1.0000	3133	3180.09	1645	1597.91	4778	2.08477
		Total	45571	45571.0	2206	2206.00	47777	67.1641

H-L Statistic:	67.1641	Prob. Chi-Sq(8)	0.0000
Andrews Statistic:	4190.678	Prob. Chi-Sq(10)	0.0000

Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/13/06 Time: 10:41
Sample: 1 48103 IF ST_DB2=0 AND OUTLIER=0
Included observations: 47777
Prediction Evaluation (success cutoff C = 0.0462)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	39896	349	40245	45571	2206	47777
P(Dep=1)>C	5675	1857	7532	0	0	0
Total	45571	2206	47777	45571	2206	47777
Correct	39896	1857	41753	45571	0	45571
% Correct	87.55	84.18	87.39	100.00	0.00	95.38
% Incorrect	12.45	15.82	12.61	0.00	100.00	4.62
Total Gain*	-12.45	84.18	-7.99			
Percent Gain**	NA	84.18	-173.07			



Appendix 9: Step 3: Final Models: Tanker

Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/12/06 Time: 17:28
Sample: 1 34232 IF ST_TA2=0 AND OUTLIER=0
Included observations: 34045
Convergence achieved after 9 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
ST_TA1	-5.535312	0.410159	-13.49554	0.0000
ST_TA3	-6.690566	0.505985	-13.22284	0.0000
ST_TA4	-5.188466	0.417693	-12.42171	0.0000
ST_TA5	-7.030510	0.466257	-15.07862	0.0000
ST_TA6	-4.828701	0.450807	-10.71123	0.0000
AGEBYTA1+AGEBYTA3+AGEBYTA4+AGEBYTA5+AGEBYTA6	0.584318	0.079500	7.349933	0.0000
SIZETA1+SIZETA3+SIZETA4+SIZETA5+SIZETA6	-0.077829	0.032430	-2.399903	0.0164
CLDNVTA1+CLDNVTA3+CLDNVTA4+CLDNVTA5+CLDNVTA6	-0.433907	0.116753	-3.716448	0.0002
CLLRTA1+CLLRTA3+CLLRTA4+CLLRTA5+CLLRTA6	-0.304074	0.113948	-2.668539	0.0076
FL_DKTA5	2.425072	0.651415	3.722774	0.0002
FL_DZTA1	1.415417	0.427059	3.314338	0.0009
FL_GRTA1+FL_GRTA6	0.769372	0.218595	3.519622	0.0004
FL_INTA1	1.269371	0.645176	1.967481	0.0491
FL_LRTA5+FL_LRTA6	0.569171	0.227455	2.502344	0.0123
FL_MTTA1+FL_MTTA3+FL_MTTA4+FL_MTTA5	0.554515	0.133630	4.149638	0.0000
FL_MYTA5	2.517000	0.683128	3.684524	0.0002
FL_PATA1+FL_PATA3	0.628293	0.147813	4.250579	0.0000
FL_RUTA1+FL_RUTA4	-1.275017	0.482062	-2.644923	0.0082
FL_SGTA1+FL_SGTA4+FL_SGTA5+FL_SGTA6	0.748859	0.194485	3.850473	0.0001
FL_SVTA1+FL_SVTA3	0.864004	0.316449	2.730310	0.0063
FL_TRTA1	0.928918	0.230715	4.026248	0.0001
C0100TA1+C0100TA3+C0100TA4+C0100TA5+C0100TA6	0.418259	0.049272	8.488800	0.0000
C0200TA3	0.410550	0.153947	2.666827	0.0077
C0200TA4	1.424165	0.260327	5.470679	0.0000
C0200TA5	1.845868	0.380577	4.850178	0.0000
C0200TA6	0.922030	0.307034	3.003018	0.0027
C0300TA1	0.230829	0.086337	2.673575	0.0075
C0300TA4	0.992158	0.302599	3.278784	0.0010
C0600TA1	0.205752	0.045251	4.546896	0.0000
C0600TA4	0.407612	0.105758	3.854205	0.0001
C0600TA5	0.602255	0.102714	5.863428	0.0000
C0700TA1+C0700TA3+C0700TA4+C0700TA5+C0700TA6	0.318834	0.030905	10.31643	0.0000
C0900TA1+C0900TA4+C0900TA5	0.364193	0.044010	8.275235	0.0000
C1000TA1+C1000TA3+C1000TA4	0.549623	0.196366	2.798973	0.0051
C1100TA1+C1100TA5+C1100TA6	0.160004	0.073994	2.162402	0.0306

C1200TA1+C1200TA3+C1200TA4+C1200TA5+ C1200TA6	0.196855	0.055233	3.564102	0.0004
C1300TA1	0.504547	0.130558	3.864534	0.0001
C1300TA3	0.543656	0.194147	2.800232	0.0051
C1400TA1+C1400TA3+C1400TA4+C1400TA5+ C1400TA6	0.140424	0.030735	4.568870	0.0000
C1500TA1+C1500TA3+C1500TA4+C1500TA5+ C1500TA6	0.168793	0.053770	3.139189	0.0017
C1600TA3	-0.457937	0.171973	-2.662841	0.0077
C1600TA4	1.123342	0.419671	2.676719	0.0074
C1600TA6	0.595624	0.156004	3.818017	0.0001
C1700TA1	0.620208	0.070545	8.791703	0.0000
C1700TA3	0.300404	0.108723	2.763027	0.0057
C1700TA4	1.258187	0.196260	6.410826	0.0000
C1800TA5+C1800TA6	0.795913	0.257512	3.090783	0.0020
C2000TA5	1.856354	0.531754	3.491004	0.0005
C2300TA1	-0.875584	0.301646	-2.902689	0.0037
C2300TA6	0.963999	0.444912	2.166718	0.0303
C2500TA1+C2500TA5+C2500TA6	0.958027	0.073315	13.06732	0.0000
PS1_BE	-0.973391	0.314221	-3.097789	0.0019
PS1_NL	-0.457643	0.189581	-2.413973	0.0158
PS1_RU	-0.846889	0.324301	-2.611427	0.0090
PS1_IT	0.802182	0.135479	5.921062	0.0000
PS1_NO	0.908834	0.298974	3.039843	0.0024
PS3_CHI	2.319149	0.406718	5.702112	0.0000
PS3_CUB	2.201791	0.344635	6.388761	0.0000
PS5_LANG	1.304536	0.537759	2.425874	0.0153
PS5_POLA	2.179698	0.657943	3.312899	0.0009
PS5_SANF	1.577417	0.438778	3.595022	0.0003
PS5_SANJ	1.329240	0.473945	2.804628	0.0050
PS5_SAVA	1.638115	0.524612	3.122529	0.0018
PS5_USVI	1.301552	0.529656	2.457354	0.0140

Mean dependent var	0.031135	S.D. dependent var	0.173686
S.E. of regression	0.140591	Akaike info criterion	0.154295
Sum squared resid	671.6644	Schwarz criterion	0.170152
Log likelihood	-2562.481	Hannan-Quinn criter.	0.159352
Avg. log likelihood	-0.075267		

Obs with Dep=0	32985	Total obs	34045
Obs with Dep=1	1060		

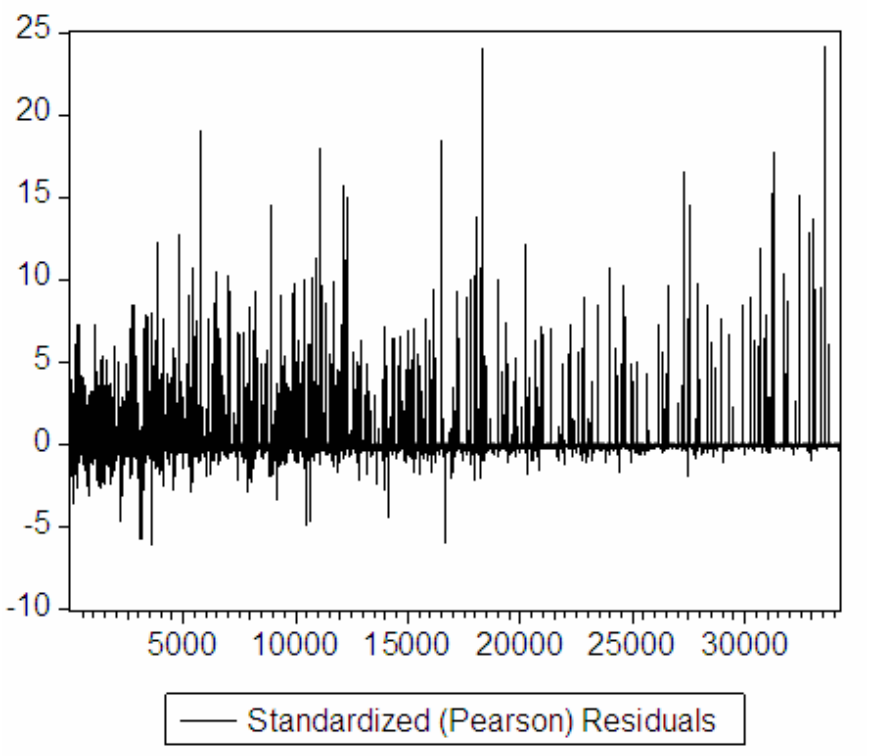
Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/12/06 Time: 17:28
Sample: 1 34232 IF ST_TA2=0 AND OUTLIER=0
Included observations: 34045
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

Quantile of Risk			Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	0.0002	0.0011	3404	3401.53	0	2.47066	3404	2.47245
2	0.0011	0.0017	3403	3400.11	2	4.88934	3405	1.70990
3	0.0017	0.0025	3404	3396.80	0	7.20099	3404	7.21626
4	0.0025	0.0036	3401	3394.69	4	10.3067	3405	3.87082
5	0.0036	0.0054	3395	3388.99	9	15.0106	3404	2.41746
6	0.0054	0.0080	3397	3382.62	8	22.3764	3405	9.29764
7	0.0080	0.0121	3373	3370.38	31	33.6224	3404	0.20658
8	0.0121	0.0196	3359	3352.87	46	52.1292	3405	0.73186
9	0.0196	0.0450	3298	3304.82	106	99.1808	3404	0.48293
10	0.0450	1.0000	2551	2592.19	854	812.813	3405	2.74147
		Total	32985	32985.0	1060	1060.00	34045	31.1474

H-L Statistic:	31.1474	Prob. Chi-Sq(8)	0.0001
Andrews Statistic:	6562.7804	Prob. Chi-Sq(10)	0.0000

Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/12/06 Time: 17:28
Sample: 1 34232 IF ST_TA2=0 AND OUTLIER=0
Included observations: 34045
Prediction Evaluation (success cutoff C = 0.0312)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	29293	142	29435	32985	1060	34045
P(Dep=1)>C	3692	918	4610	0	0	0
Total	32985	1060	34045	32985	1060	34045
Correct	29293	918	30211	32985	0	32985
% Correct	88.81	86.60	88.74	100.00	0.00	96.89
% Incorrect	11.19	13.40	11.26	0.00	100.00	3.11
Total Gain*	-11.19	86.60	-8.15			
Percent Gain**	NA	86.60	-261.70			


25
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30000
Standardized (Pearson) Residuals

Appendix 10: Step 3: Final Models: Container

Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/12/06 Time: 13:52
Sample: 1 18273 IF ST_CO2=0 AND OUTLIER=0
Included observations: 18211
Convergence achieved after 9 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
ST_CO1	-3.314751	0.777403	-4.263877	0.0000
ST_CO3	-4.604093	0.812864	-5.664041	0.0000
ST_CO4	-4.003957	0.760576	-5.264378	0.0000
ST_CO5	-7.255512	0.944948	-7.678210	0.0000
ST_CO6	-3.855125	0.867522	-4.443838	0.0000
AGEBYCO1+AGEBYCO3+AGEBYCO4+AGEBYCO5+AGEBYCO6	0.399090	0.100698	3.963224	0.0001
SIZECO1+SIZECO3+SIZECO4+SIZECO5+SIZECO6	-0.234550	0.075783	-3.095044	0.0020
CLDNVCO5	1.624808	0.604100	2.689635	0.0072
CLGLCO5	1.168670	0.544606	2.145900	0.0319
CLKRSCO1	1.518730	0.577507	2.629802	0.0085
CLLRCO3	-3.746199	1.447404	-2.588219	0.0096
CLNKKCO5	1.608657	0.633728	2.538402	0.0111
FL_AECO1	1.834057	0.601684	3.048205	0.0023
FL_GRCO1+FL_GRCO5	0.864207	0.403136	2.143710	0.0321
FL_PACO6	0.751744	0.334081	2.250185	0.0244
FL_SVCO5	3.110014	0.639569	4.862670	0.0000
C0100CO1+C0100CO3+C0100CO4+C0100CO5+C0100CO6	0.430801	0.080231	5.369531	0.0000
C0200CO3	0.779165	0.192860	4.040057	0.0001
C0200CO4	2.088648	0.466835	4.474056	0.0000
C0200CO5	2.026444	0.369552	5.483518	0.0000
C0200CO6	1.280295	0.285648	4.482076	0.0000
C0300CO6	-2.040599	0.894815	-2.280470	0.0226
C0400CO1+C0400CO6	0.419840	0.143674	2.922170	0.0035
C0600CO1+C0600CO3+C0600CO4+C0600CO5+C0600CO6	0.341900	0.056925	6.006123	0.0000
C0700CO4	0.556971	0.210317	2.648239	0.0081
C0700CO5	1.074654	0.191472	5.612597	0.0000
C0700CO6	0.513815	0.127318	4.035685	0.0001
C0900CO1	0.316889	0.074006	4.281924	0.0000
C0900CO3	0.607121	0.120382	5.043295	0.0000
C0900CO4	0.992812	0.252719	3.928523	0.0001
C0900CO6	0.682726	0.212296	3.215912	0.0013
C1200CO1+C1200CO3+C1200CO4+C1200CO5+C1200CO6	0.527114	0.080427	6.553939	0.0000
C1400CO1+C1400CO3+C1400CO5	0.496323	0.063345	7.835286	0.0000
C1600CO1+C1600CO3+C1600CO5+C1600CO6	0.706465	0.120606	5.857616	0.0000
C1700CO1+C1700CO4+C1700CO5+C1700CO6	0.755629	0.092480	8.170691	0.0000
C2100CO1+C2100CO3	1.226981	0.340824	3.600047	0.0003

C2500CO1	1.062322	0.123474	8.603605	0.0000
C2500CO5	0.822388	0.289862	2.837167	0.0046
C2500CO6	2.899858	0.416603	6.960726	0.0000
OWOORCO1+OWOORCO5	1.855869	0.375055	4.948251	0.0000
PS1_BE	-2.284398	0.572662	-3.989083	0.0001
PS1_DE	-0.644273	0.309791	-2.079700	0.0376
PS1_ES	-0.861510	0.402300	-2.141462	0.0322
PS1_NL	-1.226030	0.459249	-2.669642	0.0076
PS1_PL	-5.910341	1.765251	-3.348159	0.0008
PS1_PT	-1.014073	0.380828	-2.662811	0.0077
PS1_UK	-2.009466	0.501136	-4.009824	0.0001
PS3_CHI	1.640829	0.390182	4.205294	0.0000
PS5_CHAR	3.307899	0.622088	5.317414	0.0000
PS5_HOUS	1.991272	0.840023	2.370498	0.0178
PS5_JACK	2.503537	0.766680	3.265426	0.0011
PS5_LANG	2.132072	0.585276	3.642846	0.0003
PS5_PUGE	1.873799	0.730002	2.566843	0.0103
PS5_SANJ	2.271206	0.586286	3.873891	0.0001
PS5_SAVA	1.818636	0.718386	2.531560	0.0114
PS6_MELB	1.095316	0.422420	2.592956	0.0095
PS6_SYDN	1.408712	0.615070	2.290329	0.0220
PS6_POBO	1.018581	0.349593	2.913617	0.0036

Mean dependent var	0.023392	S.D. dependent var	0.151151
S.E. of regression	0.122979	Akaike info criterion	0.123128
Sum squared resid	274.5452	Schwarz criterion	0.148001
Log likelihood	-1063.139	Hannan-Quinn criter.	0.131303
Avg. log likelihood	-0.058379		

Obs with Dep=0	17785	Total obs	18211
Obs with Dep=1	426		

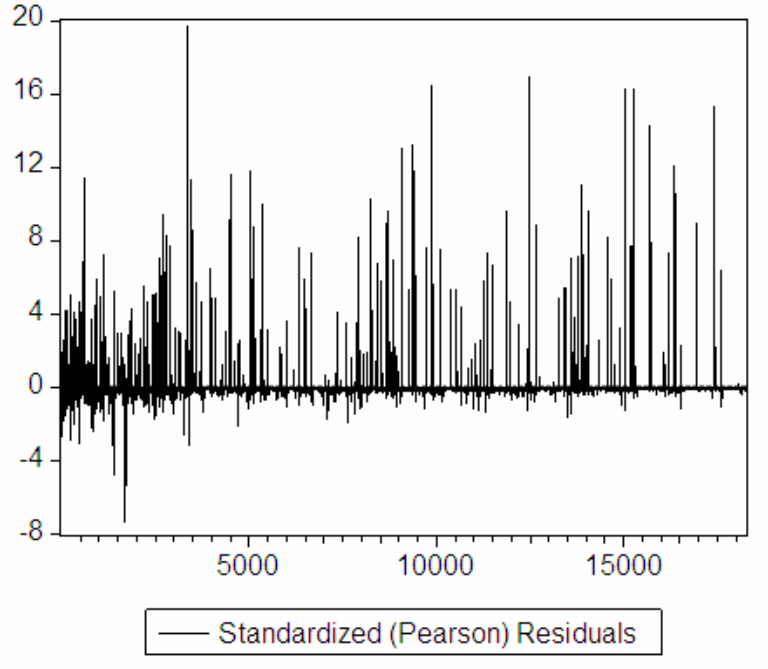
Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/12/06 Time: 13:52
Sample: 1 18273 IF ST_CO2=0 AND OUTLIER=0
Included observations: 18211
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	1.E-05	0.0004	1821	1820.60	0	0.39931	1821	0.39939
2	0.0004	0.0009	1821	1819.79	0	1.21397	1821	1.21478
3	0.0009	0.0016	1821	1818.73	0	2.27098	1821	2.27382
4	0.0016	0.0025	1821	1817.18	0	3.81798	1821	3.82600
5	0.0025	0.0037	1819	1815.46	2	5.54358	1821	2.27205
6	0.0037	0.0056	1816	1812.75	5	8.24782	1821	1.28474
7	0.0056	0.0082	1812	1808.57	9	12.4298	1821	0.95289
8	0.0082	0.0125	1810	1802.45	11	18.5480	1821	3.10322
9	0.0125	0.0278	1782	1788.05	39	32.9458	1821	1.13303
10	0.0278	1.0000	1462	1481.42	360	340.583	1822	1.36151
		Total	17785	17785.0	426	426.000	18211	17.8214

H-L Statistic:	17.8214	Prob. Chi-Sq(8)	0.0226
Andrews Statistic:	6807.503	Prob. Chi-Sq(10)	0.0000

Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/12/06 Time: 13:52
Sample: 1 18273 IF ST_CO2=0 AND OUTLIER=0
Included observations: 18211
Prediction Evaluation (success cutoff C = 0.024)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	16094	60	16154	17785	426	18211
P(Dep=1)>C	1691	366	2057	0	0	0
Total	17785	426	18211	17785	426	18211
Correct	16094	366	16460	17785	0	17785
% Correct	90.49	85.92	90.38	100.00	0.00	97.66
% Incorrect	9.51	14.08	9.62	0.00	100.00	2.34
Total Gain*	-9.51	85.92	-7.28			
Percent Gain**	NA	85.92	-311.03			


20
16
12
8
4
0
-4
-8
5000
10000
15000
Standardized (Pearson) Residuals

Appendix 11: Step 1: Results of Regressions: Passenger Vessels

Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/12/06 Time: 10:52
Sample: 1 6118
Included observations: 6118
Convergence achieved after 9 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
ST_PA1	-3.890047	0.722440	-5.384597	0.0000
ST_PA3	-4.017614	0.932956	-4.306328	0.0000
ST_PA4	-2.581474	0.897105	-2.877560	0.0040
ST_PA5	-5.140974	0.705674	-7.285198	0.0000
ST_PA6	-3.070255	0.922434	-3.328429	0.0009
LNAGE	0.379143	0.130987	2.894505	0.0038
LNSIZE	-0.266163	0.058338	-4.562441	0.0000
CL_IBS	2.528660	0.642884	3.933308	0.0001
FL_UA	1.333388	0.522104	2.553873	0.0107
C0100S	0.381253	0.104339	3.653982	0.0003
C0200S	0.520087	0.119328	4.358477	0.0000
C0600S	0.180514	0.053974	3.344458	0.0008
C0700S	0.143179	0.040379	3.545888	0.0004
C0800S	0.424934	0.154150	2.756634	0.0058
C0900S	0.131048	0.041988	3.121065	0.0018
C1700S	0.522460	0.106176	4.920714	0.0000
C2500S	0.341149	0.116281	2.933830	0.0033
PS1_DK	1.312464	0.483531	2.714330	0.0066
PS1_DE	1.136637	0.421763	2.694966	0.0070
PS1_GR	1.812856	0.371036	4.885927	0.0000
PS1_IT	1.466290	0.270606	5.418549	0.0000
PS1_NO	2.022123	0.568614	3.556233	0.0004
PS1_ES	1.437482	0.408665	3.517503	0.0004
PS5_CORP	2.995867	0.871895	3.436041	0.0006
PS5_JACK	2.927490	0.722331	4.052836	0.0001
PS5_PORM	3.029211	0.886602	3.416651	0.0006

Mean dependent var	0.034488	S.D. dependent var	0.182495
S.E. of regression	0.150989	Akaike info criterion	0.184638
Sum squared resid	138.8830	Schwarz criterion	0.213192
Log likelihood	-538.8064	Hannan-Quinn criter.	0.194544
Avg. log likelihood	-0.088069		

Obs with Dep=0	5907	Total obs	6118
Obs with Dep=1	211		

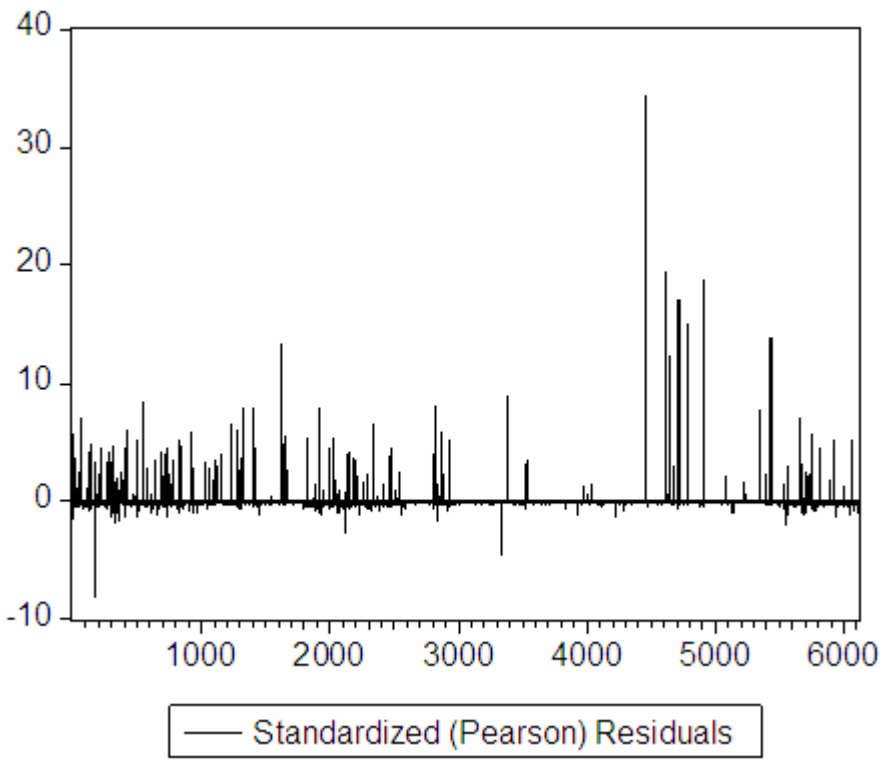
Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/12/06 Time: 10:52
Sample: 1 6118
Included observations: 6118
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	0.0003	0.0007	611	610.704	0	0.29585	611	0.29599
2	0.0007	0.0010	611	611.493	1	0.50651	612	0.48122
3	0.0010	0.0019	612	611.111	0	0.88919	612	0.89048
4	0.0019	0.0040	609	610.206	3	1.79449	612	0.81222
5	0.0040	0.0063	609	608.845	3	3.15517	612	0.00767
6	0.0063	0.0098	610	606.184	1	4.81648	611	3.04813
7	0.0098	0.0167	605	604.079	7	7.92130	612	0.10856
8	0.0167	0.0307	602	598.008	10	13.9915	612	1.16535
9	0.0307	0.0624	582	585.651	30	26.3486	612	0.52877
10	0.0625	1.0000	456	460.719	156	151.281	612	0.19555
		Total	5907	5907.00	211	211.000	6118	7.53394

H-L Statistic:	7.5339	Prob. Chi-Sq(8)	0.4803
Andrews Statistic:	1194.704	Prob. Chi-Sq(10)	0.0000

Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/12/06 Time: 10:52
Sample: 1 6118
Included observations: 6118
Prediction Evaluation (success cutoff C = 0.0345)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	4994	28	5022	5907	211	6118
P(Dep=1)>C	913	183	1096	0	0	0
Total	5907	211	6118	5907	211	6118
Correct	4994	183	5177	5907	0	5907
% Correct	84.54	86.73	84.62	100.00	0.00	96.55
% Incorrect	15.46	13.27	15.38	0.00	100.00	3.45
Total Gain*	-15.46	86.73	-11.93			
Percent Gain**	NA	86.73	-345.97			


40
30
20
10
0
-10
1000
2000
3000
4000
5000
6000
Standardized (Pearson) Residuals

Appendix 12: Step 1: Results of Regressions: Other Ship Types

Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/12/06 Time: 11:11
Sample: 1 10077 IF OUTLIER=0
Included observations: 10073
Convergence achieved after 8 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
ST_OT1	-6.883984	0.422584	-16.29022	0.0000
ST_OT3	-8.466110	0.593436	-14.26626	0.0000
ST_OT4	-4.405082	0.465133	-9.470582	0.0000
ST_OT5	-7.184651	0.392313	-18.31356	0.0000
ST_OT6	-6.395696	0.550852	-11.61056	0.0000
LNAGE	0.609421	0.124318	4.902099	0.0000
CL_GL	-0.765959	0.365430	-2.096048	0.0361
CL_NCL	1.231356	0.236801	5.199963	0.0000
FL_AG	1.177324	0.374456	3.144092	0.0017
FL_CY	0.684888	0.306411	2.235189	0.0254
FL_VC	0.940171	0.244227	3.849573	0.0001
FL_UA	1.709392	0.445812	3.834337	0.0001
C0100S	0.536713	0.073369	7.315290	0.0000
C0200S	0.748906	0.119644	6.259473	0.0000
C0400S	0.465803	0.234115	1.989633	0.0466
C0600S	0.189598	0.053331	3.555099	0.0004
C0700S	0.469129	0.074097	6.331291	0.0000
C1100S	0.461109	0.139448	3.306664	0.0009
C1400S	0.418814	0.058910	7.109414	0.0000
C1700S	0.427365	0.078831	5.421298	0.0000
C2500S	0.752588	0.131418	5.726669	0.0000
PS1_IT	1.739326	0.350807	4.958067	0.0000
PS3_CHI	2.947174	0.572770	5.145474	0.0000
PS3_MX	3.194675	0.842992	3.789684	0.0002
PS3_PA	3.503819	0.656842	5.334341	0.0000
PS5_HOUS	0.905284	0.349862	2.587546	0.0097
PS5_JACK	2.065930	0.326899	6.319788	0.0000
PS5_MOBI	0.837545	0.344516	2.431076	0.0151
PS5_PHIL	1.189509	0.397842	2.989907	0.0028
PS5_SANF	1.230329	0.430642	2.856968	0.0043
PS5_WILM	1.546897	0.581667	2.659419	0.0078
PS5_OTH	1.290303	0.374795	3.442691	0.0006

Mean dependent var	0.037129	S.D. dependent var	0.189087
S.E. of regression	0.156133	Akaike info criterion	0.190012
Sum squared resid	244.7751	Schwarz criterion	0.212941
Log likelihood	-924.9935	Hannan-Quinn criter.	0.197770
Avg. log likelihood	-0.091829		

Obs with Dep=0	9699	Total obs	10073
Obs with Dep=1	374		

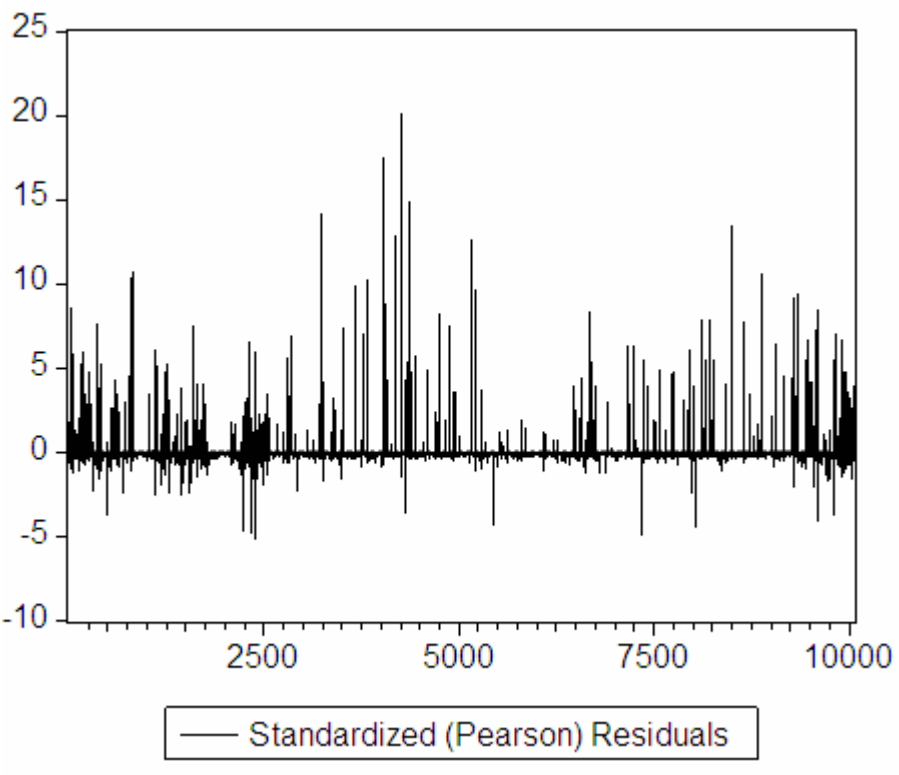
Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/12/06 Time: 11:11
Sample: 1 10077 IF OUTLIER=0
Included observations: 10073
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	0.0001	0.0022	1007	1005.61	0	1.38771	1007	1.38963
2	0.0022	0.0038	1005	1004.07	2	2.93105	1007	0.29661
3	0.0038	0.0047	1006	1002.67	1	4.32559	1007	2.56780
4	0.0047	0.0056	1006	1002.83	2	5.17263	1008	1.95597
5	0.0056	0.0075	1005	1000.59	2	6.40621	1007	3.05001
6	0.0075	0.0108	1001	997.848	6	9.15246	1007	1.09579
7	0.0108	0.0156	1000	994.937	8	13.0632	1008	1.98825
8	0.0156	0.0255	988	987.017	19	19.9826	1007	0.04929
9	0.0255	0.0601	958	969.041	49	37.9586	1007	3.33752
10	0.0601	1.0000	723	734.380	285	273.620	1008	0.64965
		Total	9699	9699.00	374	374.000	10073	16.3805

H-L Statistic:	16.3805	Prob. Chi-Sq(8)	0.0372
Andrews Statistic:	948.3127	Prob. Chi-Sq(10)	0.0000

Dependent Variable: DETAINED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/12/06 Time: 11:11
Sample: 1 10077 IF OUTLIER=0
Included observations: 10073
Prediction Evaluation (success cutoff C = 0.0372)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	8555	61	8616	9699	374	10073
P(Dep=1)>C	1144	313	1457	0	0	0
Total	9699	374	10073	9699	374	10073
Correct	8555	313	8868	9699	0	9699
% Correct	88.20	83.69	88.04	100.00	0.00	96.29
% Incorrect	11.80	16.31	11.96	0.00	100.00	3.71
Total Gain*	-11.80	83.69	-8.25			
Percent Gain**	NA	83.69	-222.19			


25
20
15
10
5
0
-5
-10
2500
5000
7500
10000
Standardized (Pearson) Residuals

Appendix 13: Step 1: Results of Regressions: Caribbean MoU

Classification Table(c)

Observed			Predicted					
			Selected Cases(a)			Unselected Cases(b)		
			detained_new		Percentage Correct	detained_new		Percentage Correct
			0	1		0	1	
Step 1	detained_new	0	450	23	95.1	191	8	96.0
		1	2	20	90.9	6	8	57.1
	Overall Percentage				94.9			93.4

a Selected cases validate EQ 1, b Unselected cases validate NE 1, c The cut value is .050

Contingency Table for Hosmer and Lemeshow Test

		detained_new = 0		detained_new = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	206	205.957	0	.043	206
	2	65	64.960	0	.040	65
	3	68	67.832	0	.168	68
	4	9	9.931	1	.069	10
	5	96	95.582	1	1.418	97
	6	29	28.738	20	20.262	49

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	56.271(a)	.221	.725

a Estimation terminated at iteration number 9 because parameter estimates changed by less than .001.

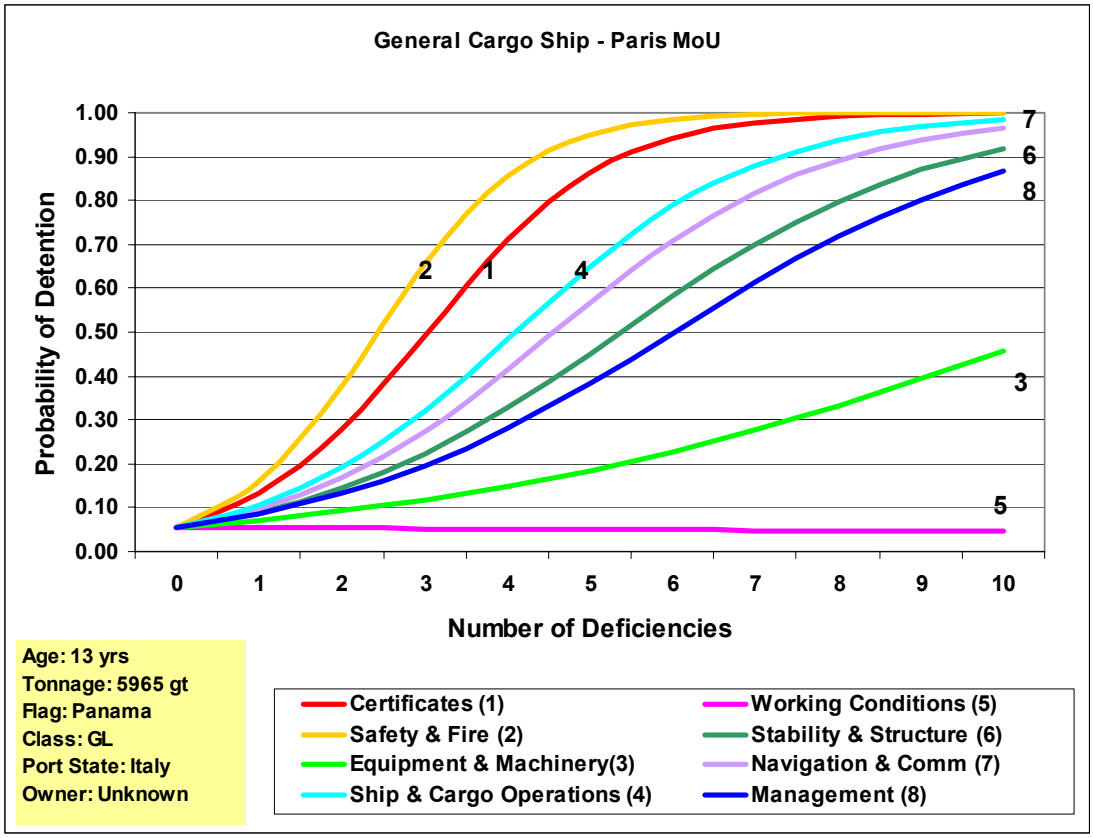
Omnibus Tests of Model Coefficients

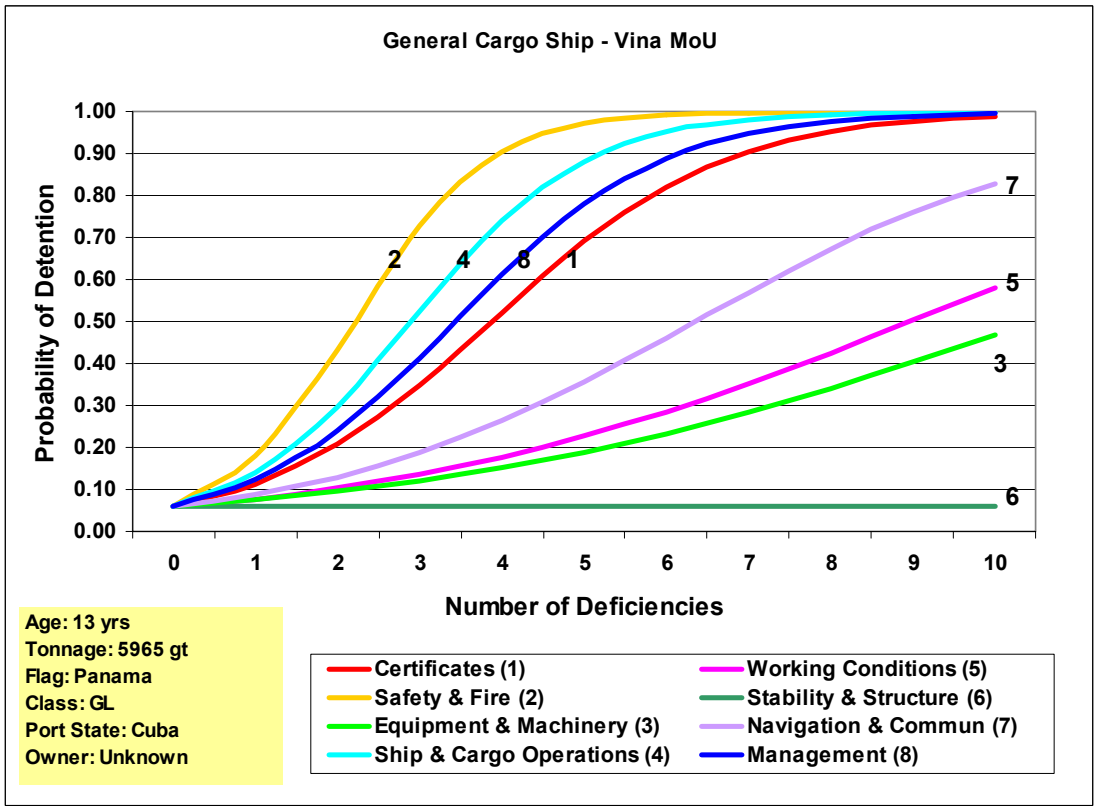
		Chi-square	df	Sig.
Step 1	Step	123.731	8	.000
	Block	123.731	8	.000
	Model	123.731	8	.000

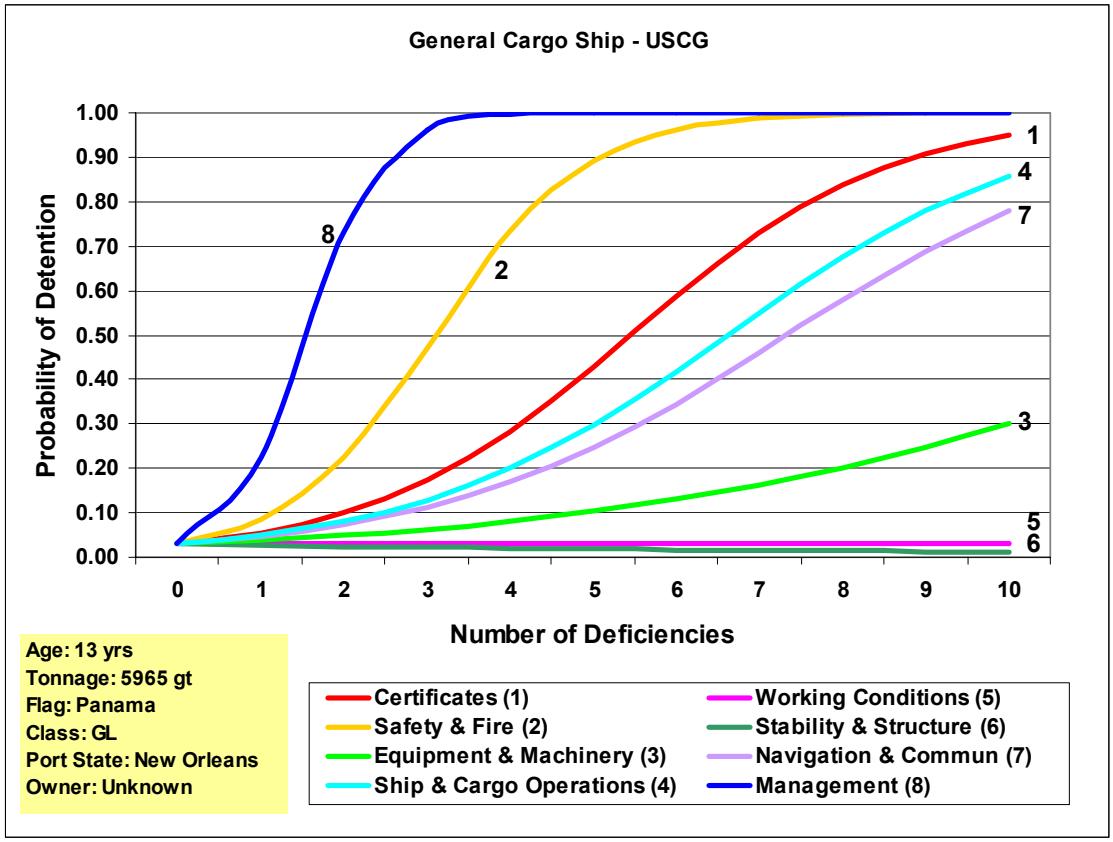
Variables in the Equation

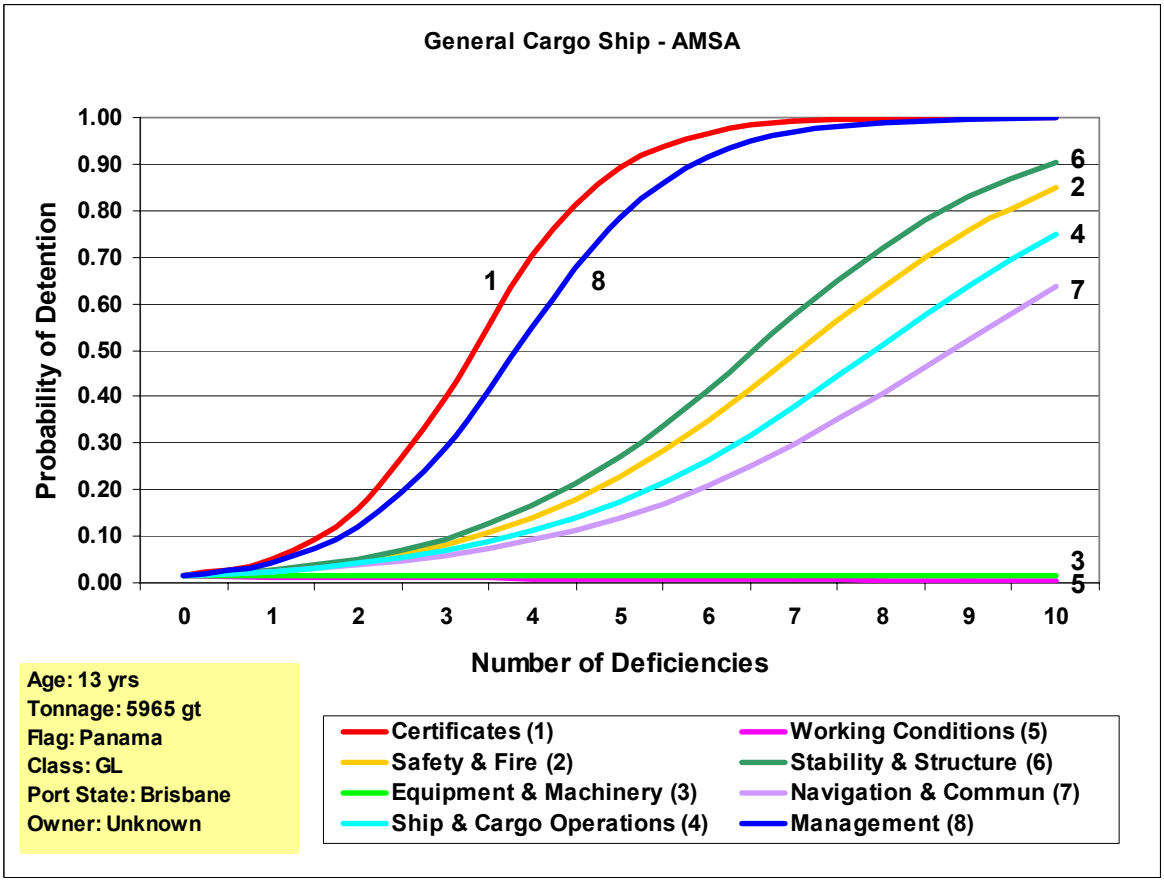
		B	S.E.	Wald	Sig.	Exp(B)
Step	CL_GermanischerLloyd	2.537	1.333	3.621	.057	12.647
	Code_0100	1.131	.417	7.373	.007	3.100
	Code_0200	2.176	.752	8.386	.004	8.815
	Code_1200	1.497	.468	10.240	.001	4.467
	Code_1400	1.477	.575	6.594	.010	4.381
	Code_1500	3.215	.839	14.695	.000	24.910
	OW_TraditionalMN	-4.270	1.360	9.860	.002	.014
	OW_EmergingMN	-3.194	1.537	4.320	.038	.041
	Constant	-4.210	.690	37.246	.000	.015

Appendix 14: Step 3: Probability of Detention: General Cargo

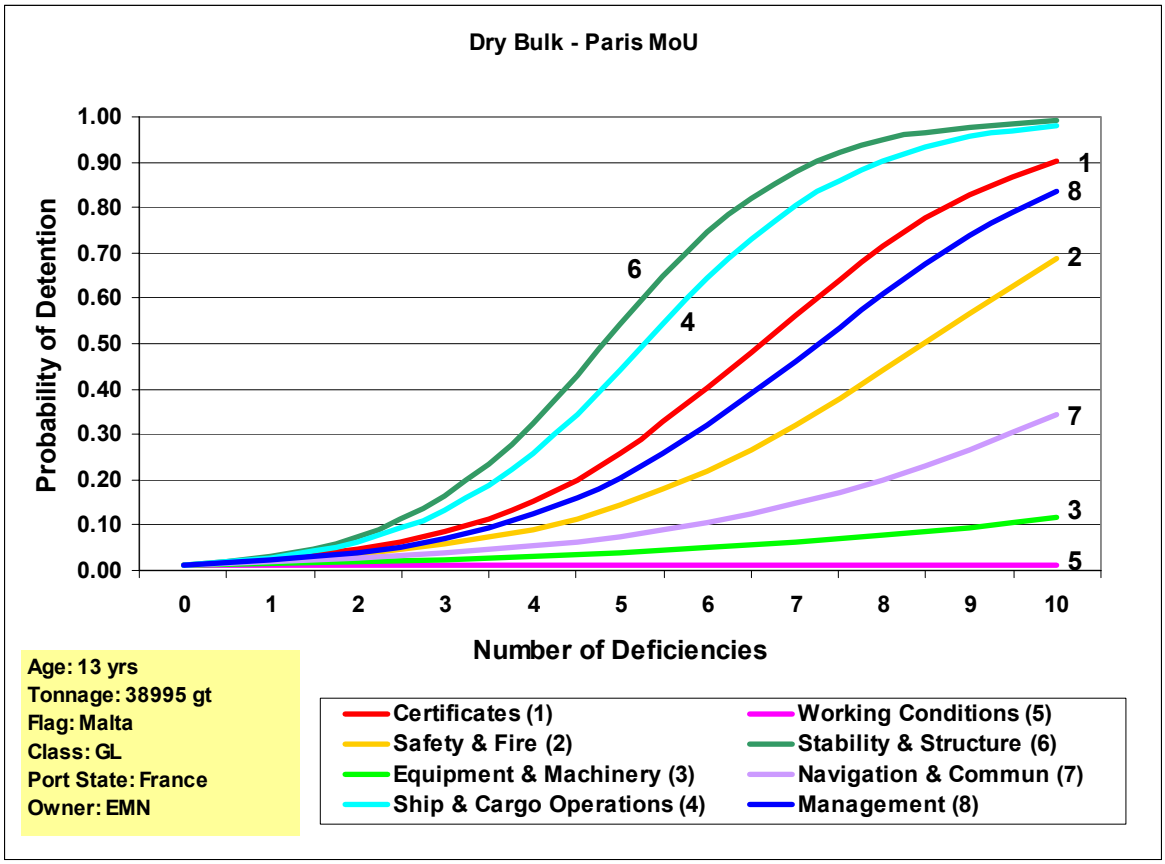


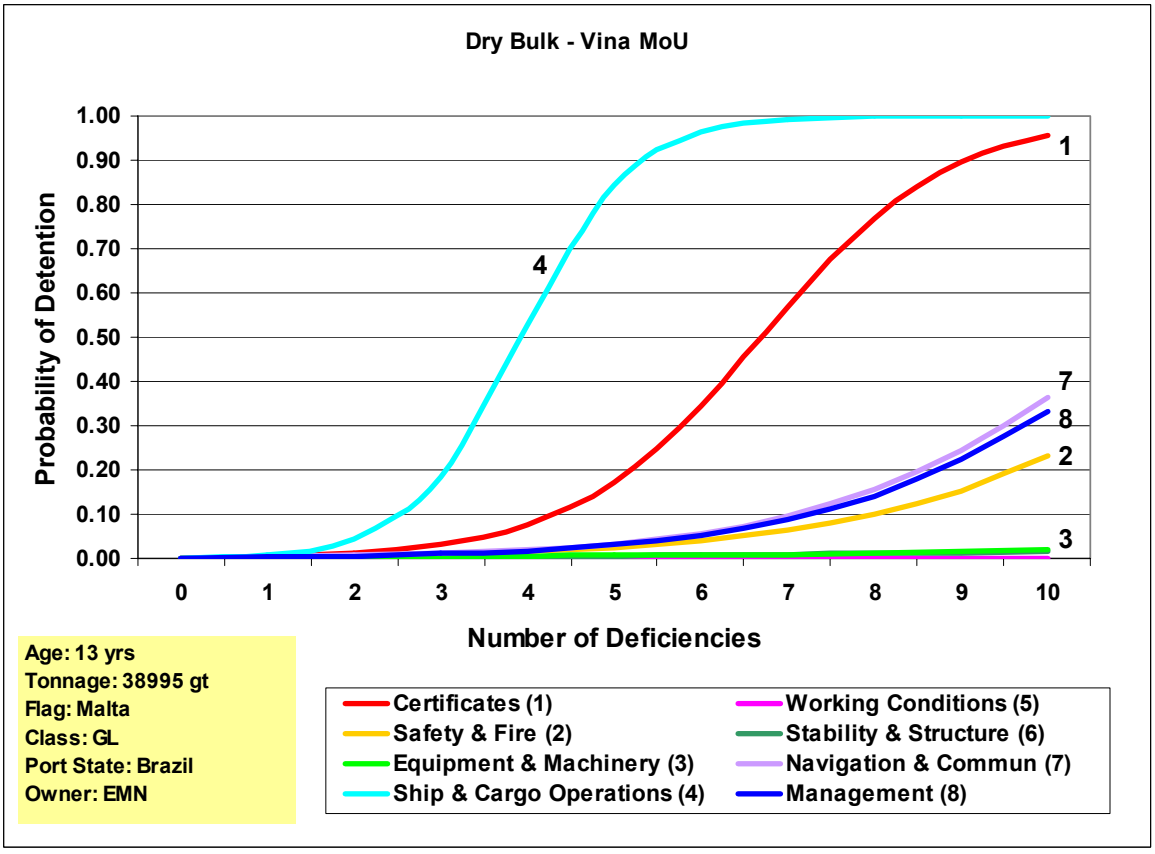


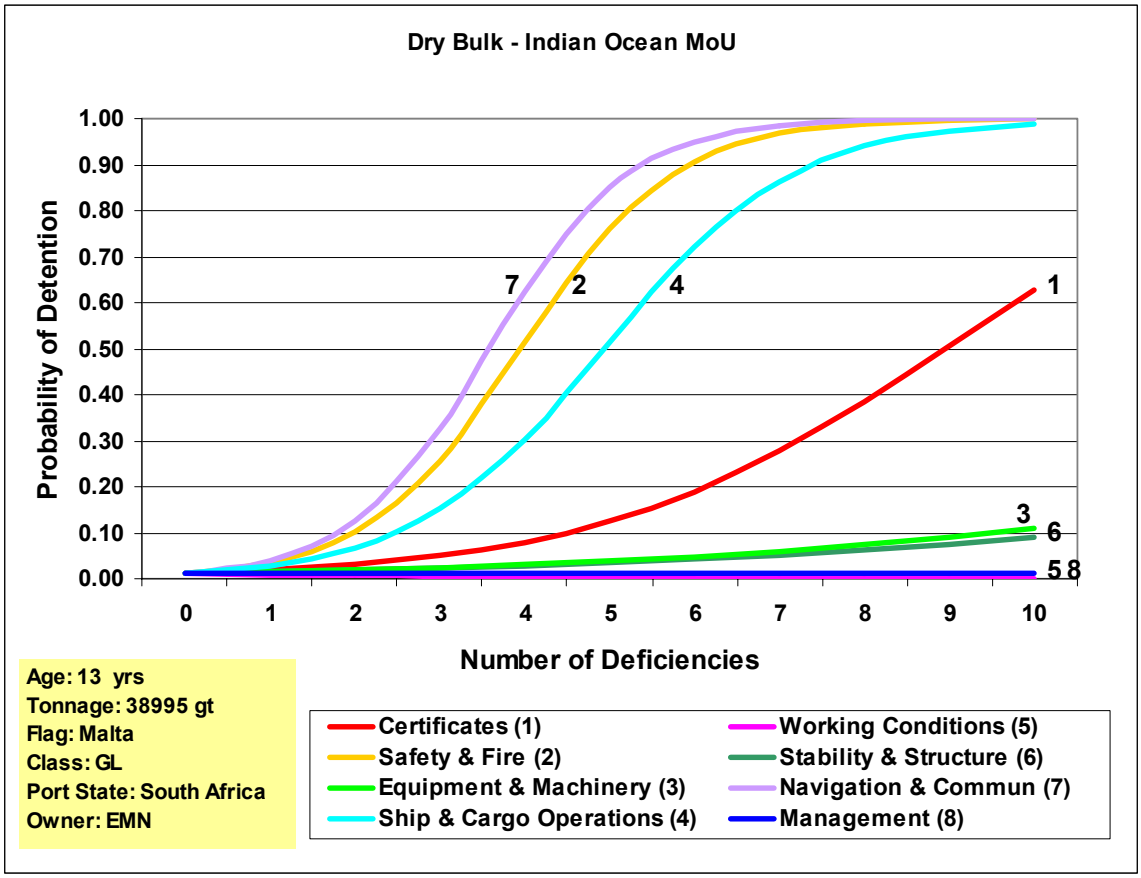

General Cargo Ship - USCG
Probability of Detention
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
1
2
3
4
5
6
7
8
9
10
Number of Deficiencies
1
2
3
4
5
6
7
8
Age: 13 yrs
Tonnage: 5965 gt
Flag: Panama
Class: GL
Port State: New Orleans
Owner: Unknown
Certificates (1)
Safety & Fire (2)
Equipment & Machinery (3)
Ship & Cargo Operations (4)
Working Conditions (5)
Stability & Structure (6)
Navigation & Commun (7)
Management (8)

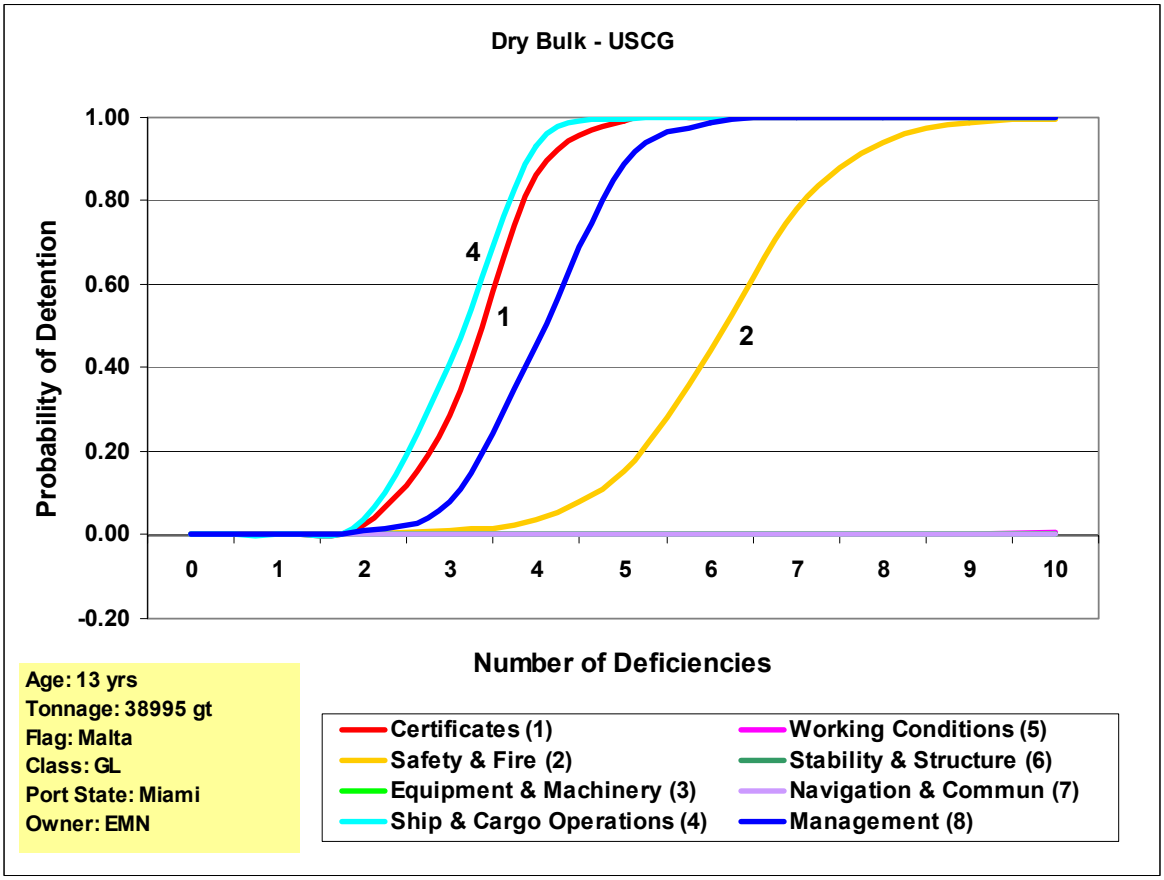

General Cargo Ship - AMSA
Probability of Detention
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
1
2
3
4
5
6
7
8
9
10
Number of Deficiencies
1
2
3
4
5
6
7
8
Age: 13 yrs
Tonnage: 5965 gt
Flag: Panama
Class: GL
Port State: Brisbane
Owner: Unknown
Certificates (1)
Safety & Fire (2)
Equipment & Machinery (3)
Ship & Cargo Operations (4)
Working Conditions (5)
Stability & Structure (6)
Navigation & Commun (7)
Management (8)

Appendix 15: Step 3: Probability of Detention: Dry Bulk

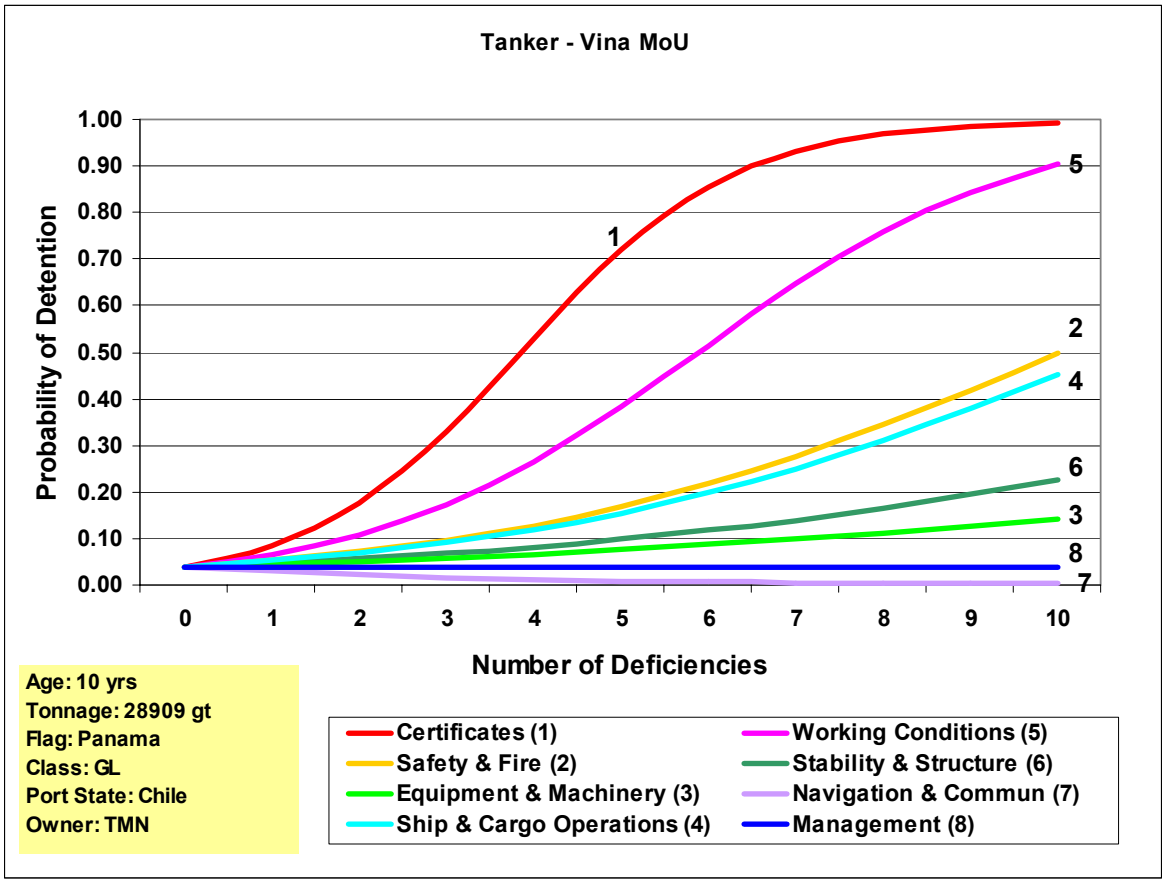


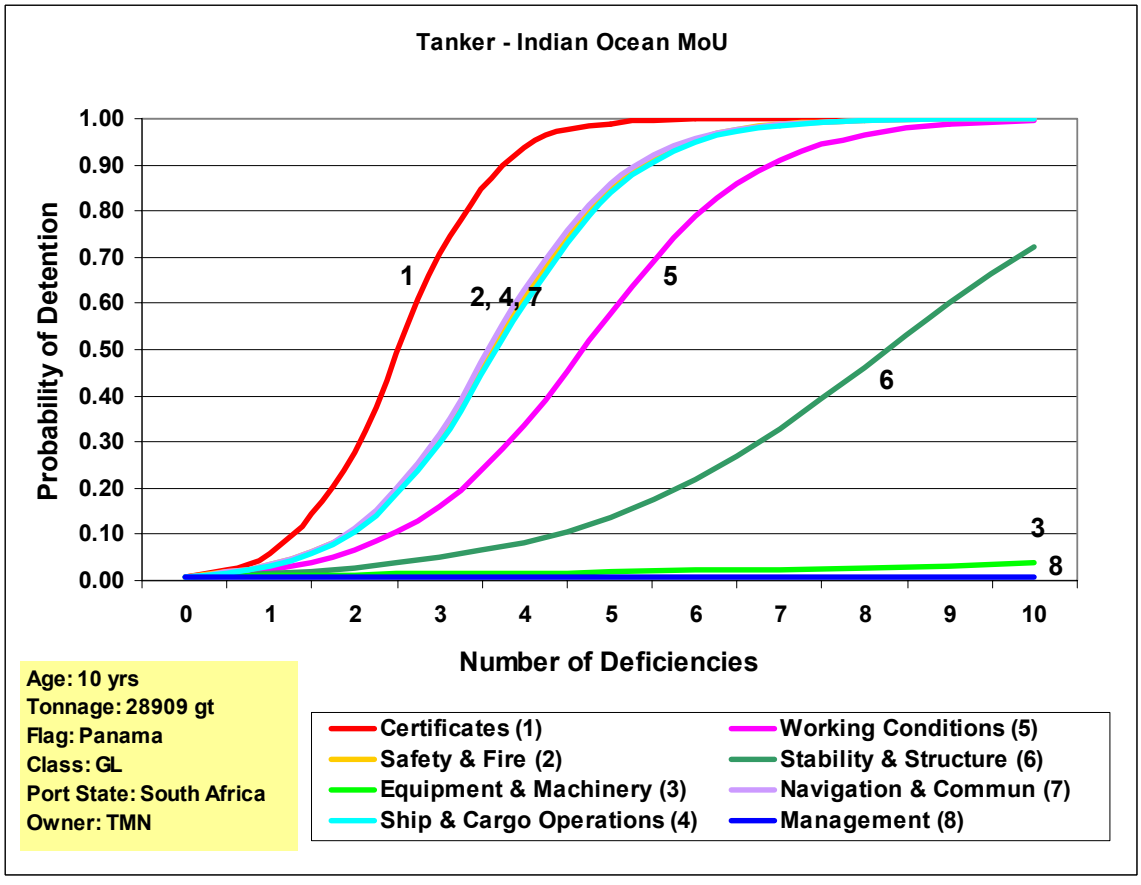


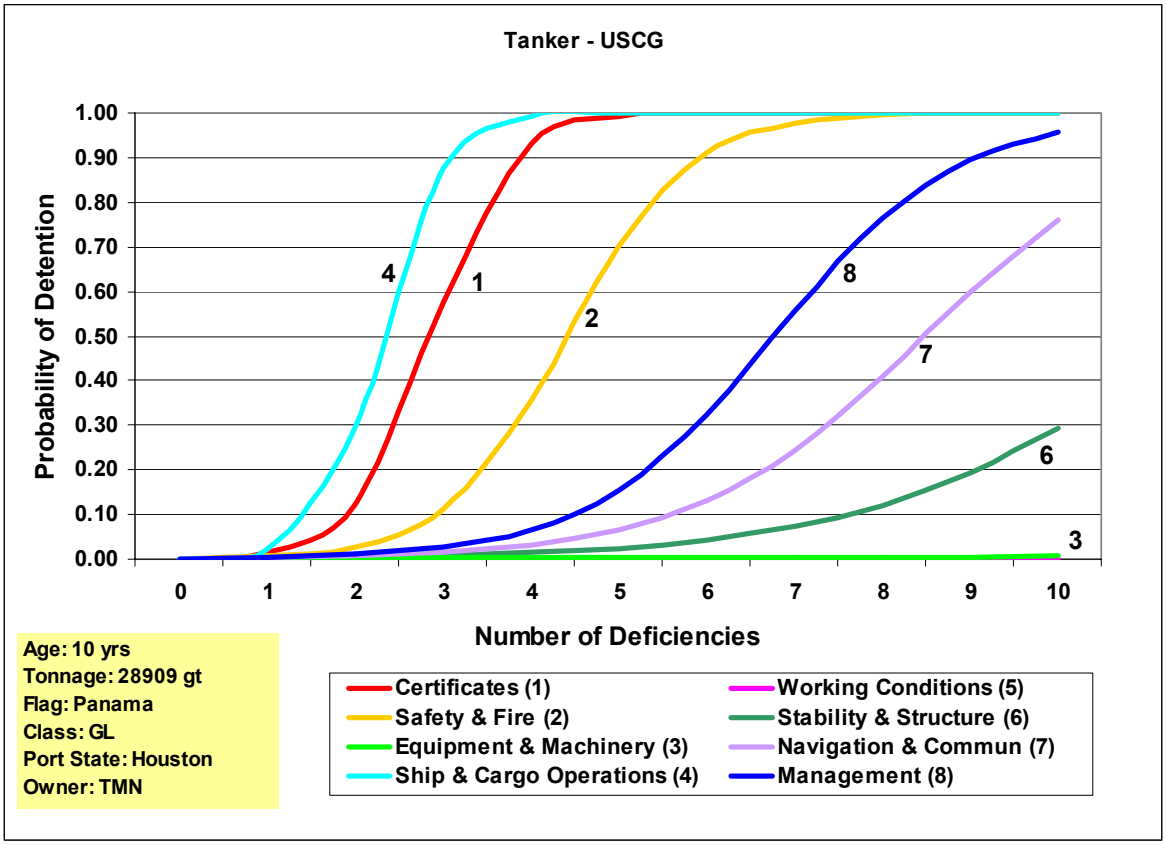

Dry Bulk - Indian Ocean MoU
Probability of Detention
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0 1 2 3 4 5 6 7 8 9 10
Number of Deficiencies
7
2
4
1
3
6
5 8
Age: 13 yrs
Tonnage: 38995 gt
Flag: Malta
Class: GL
Port State: South Africa
Owner: EMN
Certificates (1)
Safety & Fire (2)
Equipment & Machinery (3)
Ship & Cargo Operations (4)
Working Conditions (5)
Stability & Structure (6)
Navigation & Commun (7)
Management (8)

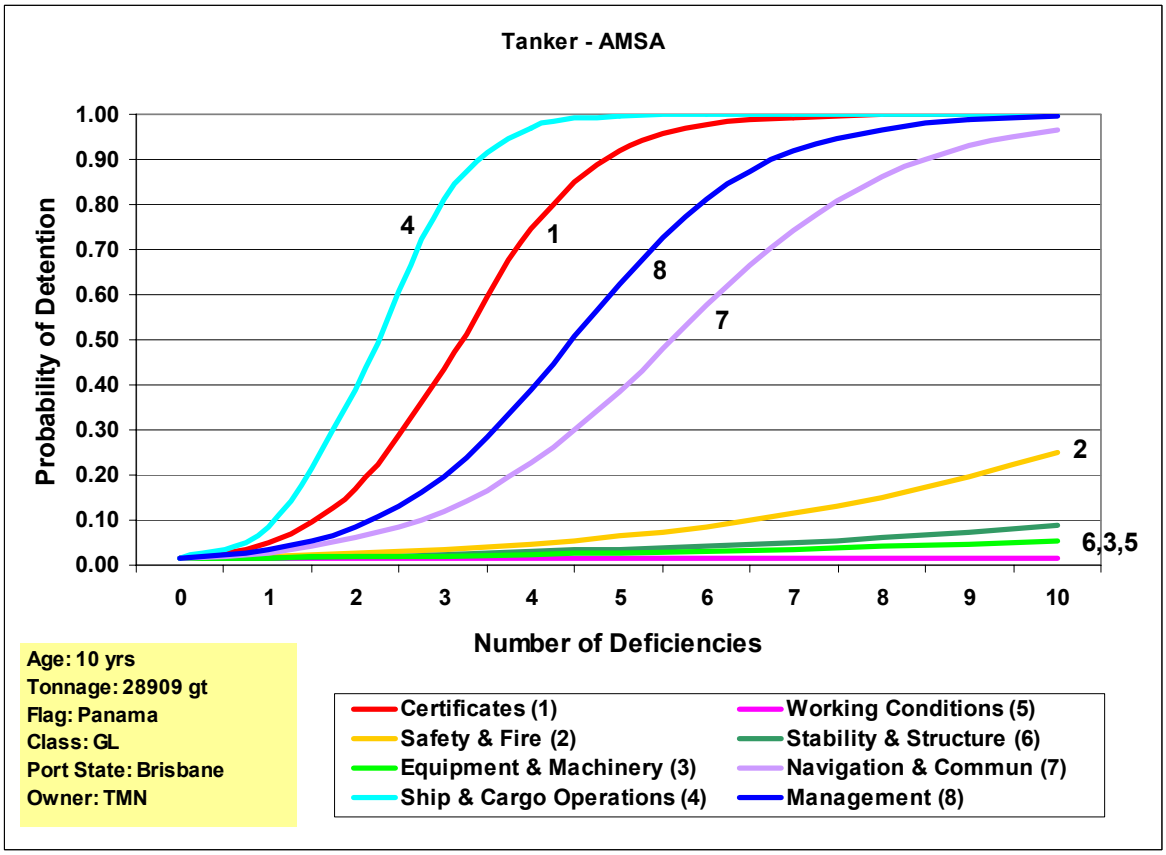

Dry Bulk - USCG
Probability of Detention
1.00
0.80
0.60
0.40
0.20
0.00
-0.20
0 1 2 3 4 5 6 7 8 9 10
Number of Deficiencies
4
1
2
Age: 13 yrs
Tonnage: 38995 gt
Flag: Malta
Class: GL
Port State: Miami
Owner: EMN
Certificates (1)
Safety & Fire (2)
Equipment & Machinery (3)
Ship & Cargo Operations (4)
Working Conditions (5)
Stability & Structure (6)
Navigation & Commun (7)
Management (8)

Appendix 16: Step 3: Probability of Detention: Tanker

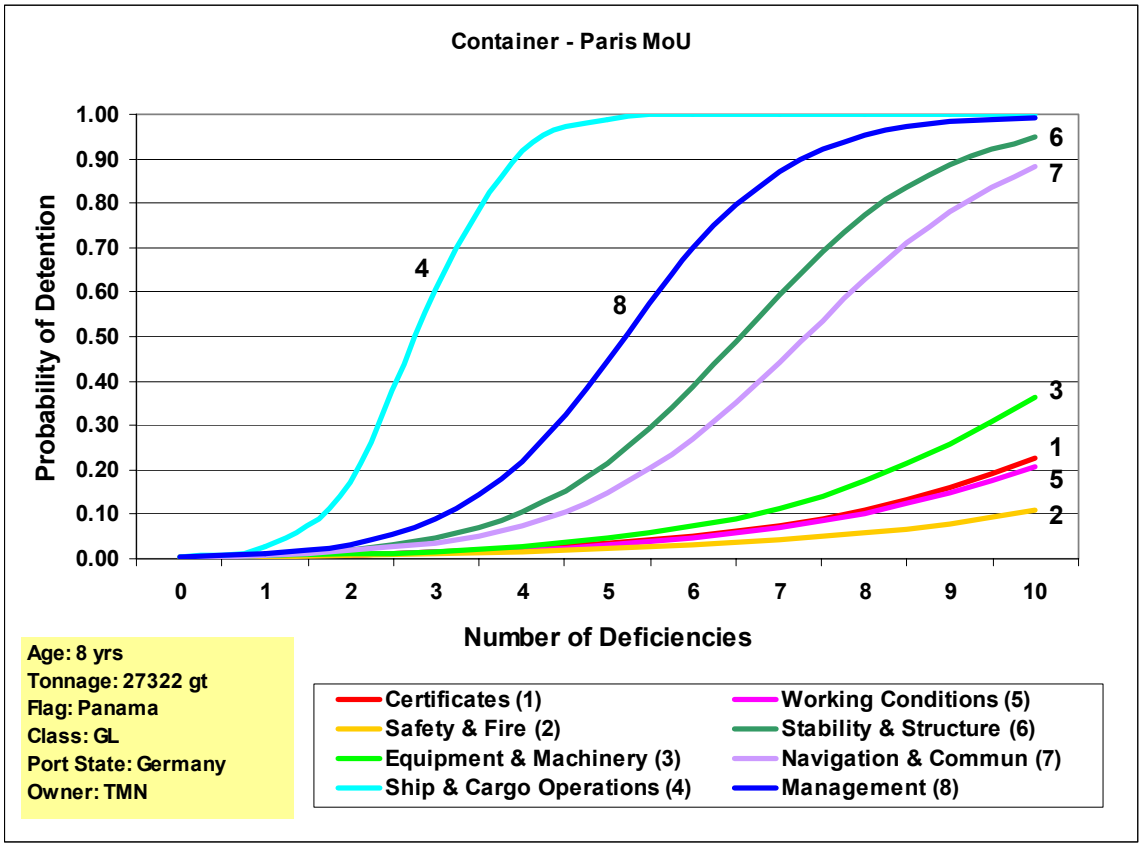


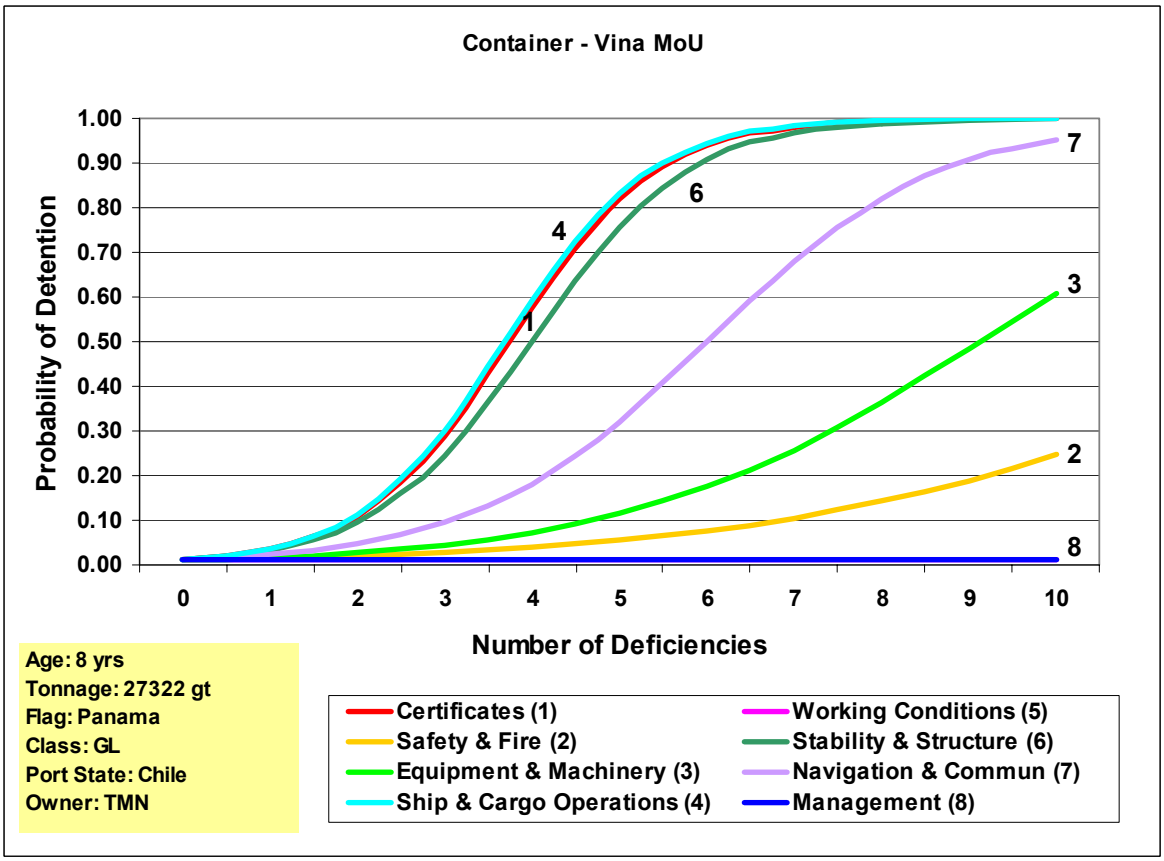


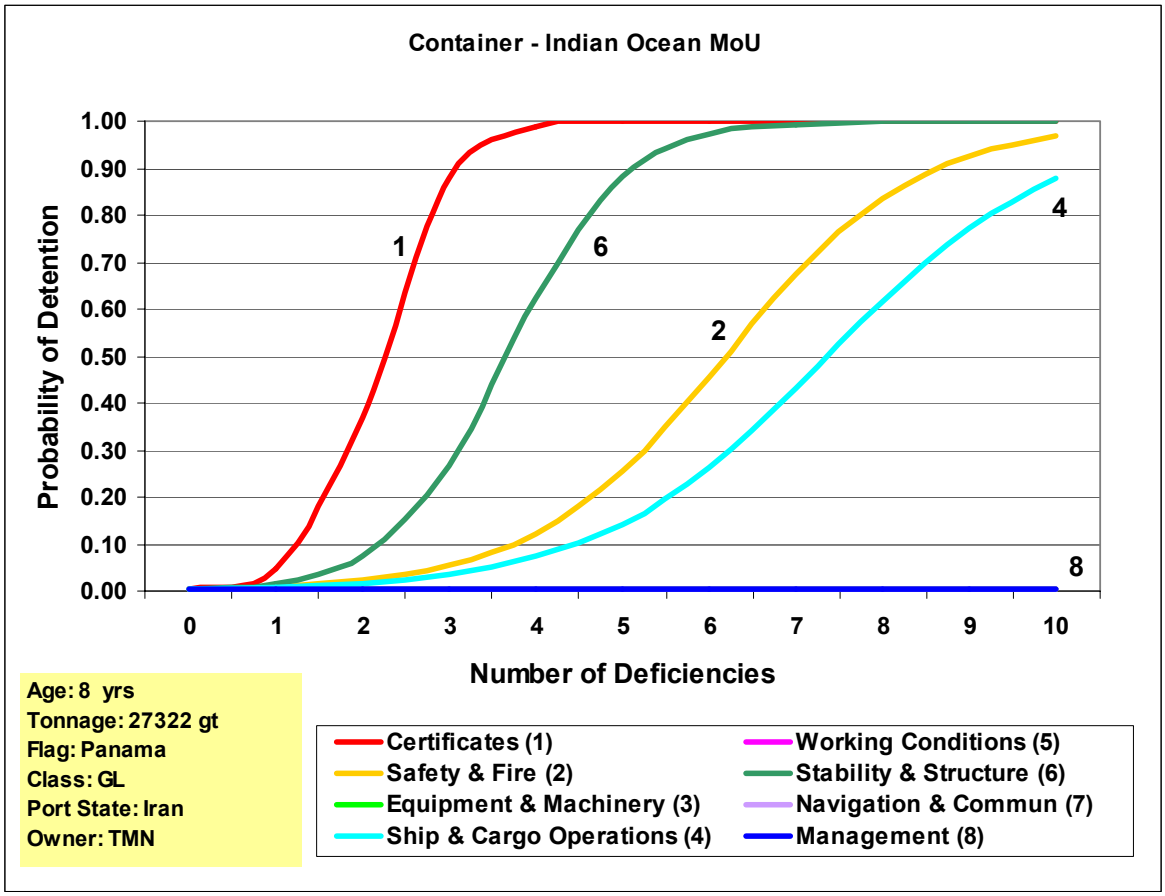

Tanker - USCG
Probability of Detention
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0 1 2 3 4 5 6 7 8 9 10
Number of Deficiencies
4
1
2
8
7
6
3
Age: 10 yrs
Tonnage: 28909 gt
Flag: Panama
Class: GL
Port State: Houston
Owner: TMN
Certificates (1)
Working Conditions (5)
Safety & Fire (2)
Stability & Structure (6)
Equipment & Machinery (3)
Navigation & Commun (7)
Ship & Cargo Operations (4)
Management (8)

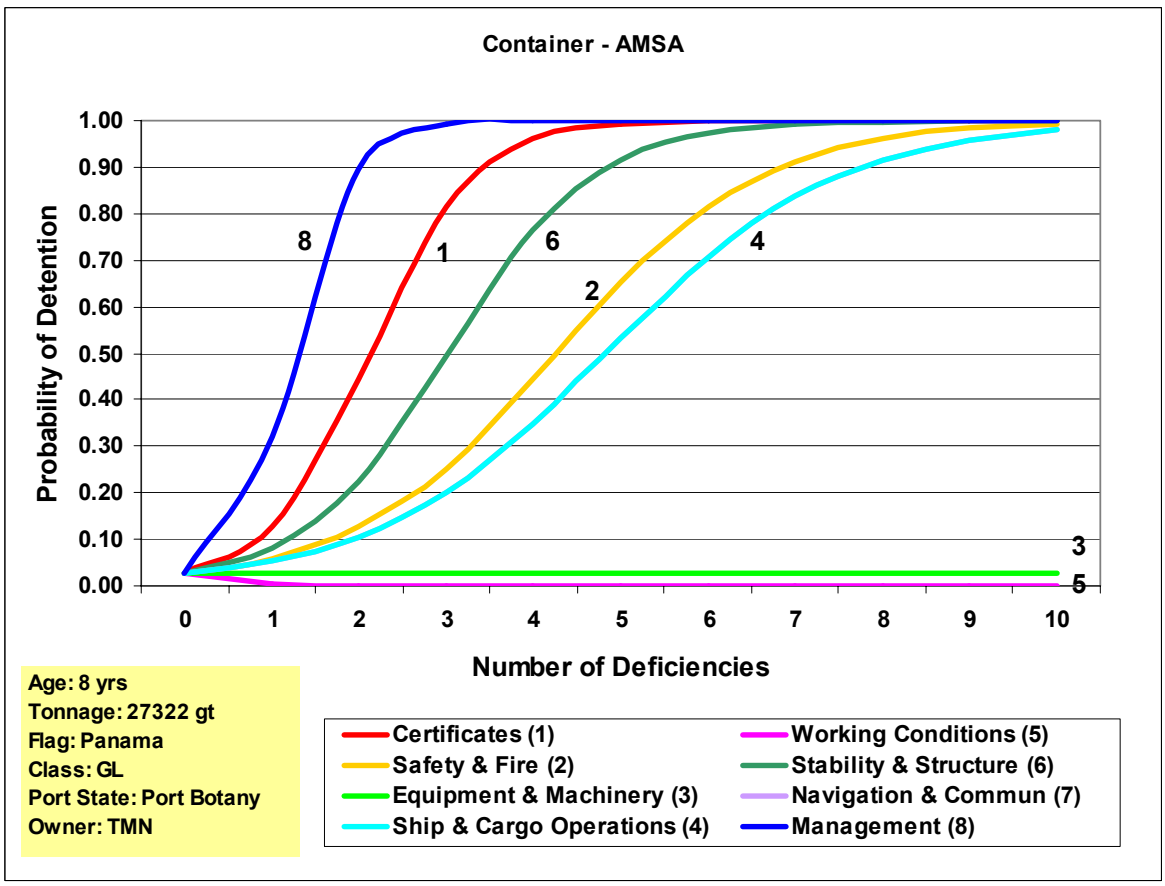

Tanker - AMSA
Probability of Detention
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0 1 2 3 4 5 6 7 8 9 10
Number of Deficiencies
4
1
8
7
2
6,3,5
Age: 10 yrs
Tonnage: 28909 gt
Flag: Panama
Class: GL
Port State: Brisbane
Owner: TMN
Certificates (1)
Working Conditions (5)
Safety & Fire (2)
Stability & Structure (6)
Equipment & Machinery (3)
Navigation & Commun (7)
Ship & Cargo Operations (4)
Management (8)

Appendix 17: Step 3: Probability of Detention: Container






Container - Indian Ocean MoU
Probability of Detention
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
1
2
3
4
5
6
7
8
9
10
Number of Deficiencies
1
6
2
4
8
Age: 8 yrs
Tonnage: 27322 gt
Flag: Panama
Class: GL
Port State: Iran
Owner: TMN
Certificates (1)
Working Conditions (5)
Safety & Fire (2)
Stability & Structure (6)
Equipment & Machinery (3)
Navigation & Commun (7)
Ship & Cargo Operations (4)
Management (8)


Container - AMSA
Probability of Detention
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
1
2
3
4
5
6
7
8
9
10
Number of Deficiencies
8
1
6
2
4
3
5
Age: 8 yrs
Tonnage: 27322 gt
Flag: Panama
Class: GL
Port State: Port Botany
Owner: TMN
Certificates (1)
Working Conditions (5)
Safety & Fire (2)
Stability & Structure (6)
Equipment & Machinery (3)
Navigation & Commun (7)
Ship & Cargo Operations (4)
Management (8)

Appendix 18: LM Test for Very Serious Casualties

Tonnage

Dependent Variable: BRMR_Y
Method: Least Squares
Date: 05/11/06 Time: 23:15
Sample: 1 47169 IF EXCESSOB=0 AND ST7_MAX=0 AND
OUTLIER=0 AND CMOU_S=0
Included observations: 38076

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAC	-1.361108	0.545723	-2.494137	0.0126
ST1_MAX*FAC	0.778387	0.194644	3.999026	0.0001
LNTON*FAC	-0.449967	0.100681	-4.469252	0.0000
LNAGE*FAC	0.256059	0.089978	2.845795	0.0044
CLWD_D*FAC	0.472311	0.203908	2.316295	0.0205
CLCHGD*FAC	-0.478080	0.241530	-1.979379	0.0478
OWCHGD*FAC	3.753590	0.761337	4.930262	0.0000
CL_RNR*FAC	1.967802	0.791299	2.486800	0.0129
FL_AG*FAC	1.028536	0.469510	2.190659	0.0285
FL_BG*FAC	1.290962	0.783771	1.647117	0.0995
FL_BZ*FAC	0.829271	0.353460	2.346155	0.0190
FL_TR*FAC	0.504822	0.305642	1.651681	0.0986
OW_EMN*FAC	0.806087	0.238956	3.373377	0.0007
OW_TMN*FAC	1.111524	0.273993	4.056759	0.0000
OW_IOR*FAC	0.931463	0.320292	2.908166	0.0036
OW_OOR*FAC	1.876627	0.446509	4.202888	0.0000
SY_KR*FAC	0.631551	0.420017	1.503630	0.1327
SY_NO*FAC	0.735646	0.375644	1.958358	0.0502
SY_UN*FAC	2.570107	0.530377	4.845812	0.0000
LI_FLRET*FAC	-0.033462	0.013931	-2.401985	0.0163
RS_INS*FAC	-0.571063	0.182827	-3.123517	0.0018
AMSA_S*FAC	-1.050391	0.266198	-3.945904	0.0001
IMOU_S*FAC	-1.305526	0.342302	-3.813958	0.0001
PMOU_S*FAC	-0.382504	0.085432	-4.477263	0.0000
USCG_S*FAC	-1.025581	0.251547	-4.077092	0.0000
VMOU_S*FAC	-0.346312	0.117173	-2.955573	0.0031
LNTON*(-XB)*FAC	0.085733	0.016986	5.047259	0.0000

R-squared	0.000645	Mean dependent var	0.004893
Adjusted R-squared	-0.000039	S.D. dependent var	0.950329
S.E. of regression	0.950348	Akaike info criterion	2.736731
Sum squared resid	34349.90	Schwarz criterion	2.742794
Log likelihood	-52053.00	Durbin-Watson stat	1.871794

Age

Dependent Variable: BRMR_Y
Method: Least Squares
Date: 05/11/06 Time: 23:21
Sample: 1 47169 IF EXCESSOB=0 AND ST7_MAX=0 AND
OUTLIER=0 AND CMOU_S=0
Included observations: 38076

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAC	0.809542	0.520551	1.555162	0.1199
ST1_MAX*FAC	-0.496444	0.174625	-2.842918	0.0045
LNTON*FAC	0.147913	0.059624	2.480777	0.0131
LNAGE*FAC	0.165110	0.085700	1.926591	0.0540
CLWD_D*FAC	-0.205618	0.189997	-1.082216	0.2792
CLCHGD*FAC	0.265909	0.234107	1.135847	0.2560
OWCHGD*FAC	-2.129391	0.577153	-3.689475	0.0002
CL_RNR*FAC	-1.113987	0.748194	-1.488901	0.1365
FL_AG*FAC	-0.670327	0.452134	-1.482585	0.1382
FL_BG*FAC	-0.668855	0.763096	-0.876502	0.3808
FL_BZ*FAC	-0.539366	0.342280	-1.575802	0.1151
FL_TR*FAC	-0.324981	0.301973	-1.076191	0.2818
OW_EMN*FAC	-0.489567	0.220287	-2.222410	0.0263
OW_TMN*FAC	-0.710166	0.249947	-2.841267	0.0045
OW_IOR*FAC	-0.578825	0.303549	-1.906856	0.0565
OW_OOR*FAC	-1.083118	0.382319	-2.833023	0.0046
SY_KR*FAC	-0.614768	0.430522	-1.427961	0.1533
SY_NO*FAC	-0.476987	0.365988	-1.303285	0.1925
SY_UN*FAC	-1.630392	0.440520	-3.701058	0.0002
LI_FLRET*FAC	0.020322	0.013307	1.527239	0.1267
RS_INS*FAC	0.349586	0.172224	2.029839	0.0424
AMSA_S*FAC	0.619145	0.231486	2.674661	0.0075
IMOU_S*FAC	0.908718	0.312149	2.911165	0.0036
PMOU_S*FAC	0.222707	0.069441	3.207120	0.0013
USCG_S*FAC	0.586517	0.209840	2.795071	0.0052
VMOU_S*FAC	0.206786	0.107447	1.924538	0.0543
LNAGE*(-XB)*FAC	-0.130285	0.033647	-3.872119	0.0001

R-squared	0.000369	Mean dependent var	0.004893
Adjusted R-squared	-0.000314	S.D. dependent var	0.950329
S.E. of regression	0.950478	Akaike info criterion	2.737007
Sum squared resid	34359.37	Schwarz criterion	2.743070
Log likelihood	-52058.24	Durbin-Watson stat	1.871407

Appendix 19: Estimation Results of Greene Model, Very Serious Casualties

Age and Tonnage

LogL: LL1
Method: Maximum Likelihood (Marquardt)
Date: 05/13/06 Time: 00:31
Sample: 1 47169 IF EXCESSOB=0 AND ST7_MAX=0 AND
OUTLIER=0 AND CMOU_S=0
Included observations: 38076
Evaluation order: By observation
Estimation settings: tol= 1.0e-05, derivs=accurate numeric
Initial Values: BETA(1)=0.41130, BETA(2)=0.52333, BETA(3)=0.51187,
BETA(4)=0.69811, BETA(5)=0.07680, BETA(6)=0.74075,
BETA(7)=0.95502, BETA(8)=0.81404, BETA(9)=0.07958,
BETA(10)=0.85638, BETA(11)=0.62122, BETA(12)=0.41764,
BETA(13)=0.57133, BETA(14)=0.99269, BETA(15)=0.69978,
BETA(16)=0.10224, BETA(17)=0.85978, BETA(18)=0.55634,
BETA(19)=0.30227, BETA(20)=0.20892, BETA(21)=0.42523,
BETA(22)=0.59285, BETA(23)=0.29655, BETA(24)=0.68481,
BETA(25)=0.93063, BETA(26)=0.08356, GAM(1)=0.00349,
GAM(2)=0.28542
Convergence achieved after 189 iterations

	Coefficient	Std. Error	z-Statistic	Prob.
BETA(1)	-5.014612	0.721928	-6.946135	0.0000
BETA(2)	1.955363	0.405091	4.826969	0.0000
BETA(3)	-0.935205	0.230269	-4.061357	0.0000
BETA(4)	0.754552	0.164262	4.593579	0.0000
BETA(5)	1.146784	0.403194	2.844252	0.0045
BETA(6)	-1.009336	0.425415	-2.372592	0.0177
BETA(7)	9.008728	1.609522	5.597144	0.0000
BETA(8)	4.700616	1.273900	3.689941	0.0002
BETA(9)	2.650216	0.778979	3.402168	0.0007
BETA(10)	2.955407	1.713680	1.724596	0.0846
BETA(11)	2.143534	0.619450	3.460385	0.0005
BETA(12)	1.086505	0.544248	1.996342	0.0459
BETA(13)	1.969195	0.456945	4.309481	0.0000
BETA(14)	2.651248	0.526253	5.037971	0.0000
BETA(15)	2.290799	0.612264	3.741522	0.0002
BETA(16)	4.190399	0.831645	5.038686	0.0000
BETA(17)	1.432996	0.765205	1.872697	0.0611
BETA(18)	1.908346	0.708711	2.692699	0.0071
BETA(19)	6.501460	1.107278	5.871568	0.0000
BETA(20)	-0.084136	0.024775	-3.396006	0.0007
BETA(21)	-1.424921	0.370641	-3.844483	0.0001
BETA(22)	-2.607840	0.529732	-4.922940	0.0000
BETA(23)	-3.914086	0.788980	-4.960946	0.0000
BETA(24)	-0.949919	0.182783	-5.196977	0.0000
BETA(25)	-2.456774	0.467197	-5.258536	0.0000

BETA(26)	-0.942375	0.233599	-4.034150	0.0001
GAM(1)	0.080157	0.017731	4.520697	0.0000
GAM(2)	-0.048332	0.035069	-1.378193	0.1681

Log likelihood	-1293.243	Akaike info criterion	0.069400
Avg. log likelihood	-0.033965	Schwarz criterion	0.075686
Number of Coefs.	28	Hannan-Quinn criter.	0.071394

Tonnage Only

LogL: LL1
Method: Maximum Likelihood (Marquardt)
Date: 05/12/06 Time: 00:59
Sample: 1 47169 IF EXCESSOB=0 AND ST7_MAX=0 AND
OUTLIER=0 AND CMOU_S=0
Included observations: 38076
Evaluation order: By observation
Estimation settings: tol= 1.0e-05, derivs=accurate numeric
Initial Values: BETA(1)=0.66868, BETA(2)=0.64867, BETA(3)=0.64281,
BETA(4)=0.82909, BETA(5)=0.29897, BETA(6)=0.51628,
BETA(7)=0.78892, BETA(8)=0.28128, BETA(9)=0.86711,
BETA(10)=0.79424, BETA(11)=0.30990, BETA(12)=0.46415,
BETA(13)=0.33391, BETA(14)=0.02463, BETA(15)=0.79715,
BETA(16)=0.20055, BETA(17)=0.69548, BETA(18)=0.92699,
BETA(19)=0.97617, BETA(20)=0.55996, BETA(21)=0.92988,
BETA(22)=0.46306, BETA(23)=0.31914, BETA(24)=0.72321,
BETA(25)=0.27320, BETA(26)=0.75714, GAM(1)=0.31511
Convergence achieved after 112 iterations

	Coefficient	Std. Error	z-Statistic	Prob.
BETA(1)	-4.968107	0.846124	-5.871607	0.0000
BETA(2)	2.449522	0.439826	5.569297	0.0000
BETA(3)	-1.240318	0.267346	-4.639370	0.0000
BETA(4)	0.686511	0.165193	4.155816	0.0000
BETA(5)	1.470035	0.481397	3.053688	0.0023
BETA(6)	-1.243165	0.516467	-2.407057	0.0161
BETA(7)	11.41535	1.629473	7.005550	0.0000
BETA(8)	5.983110	1.499014	3.991364	0.0001
BETA(9)	3.300294	0.893889	3.692063	0.0002
BETA(10)	3.704389	2.184891	1.695457	0.0900
BETA(11)	2.667721	0.735841	3.625403	0.0003
BETA(12)	1.364804	0.667685	2.044083	0.0409
BETA(13)	2.405654	0.505676	4.757300	0.0000
BETA(14)	3.243644	0.555757	5.836446	0.0000
BETA(15)	2.858932	0.676138	4.228328	0.0000
BETA(16)	5.240314	0.856515	6.118183	0.0000
BETA(17)	1.902673	0.898725	2.117080	0.0343
BETA(18)	2.373656	0.865118	2.743737	0.0061
BETA(19)	8.186691	1.094707	7.478430	0.0000

BETA(20)	-0.104756	0.028347	-3.695439	0.0002
BETA(21)	-1.780047	0.412698	-4.313193	0.0000
BETA(22)	-3.344526	0.564716	-5.922494	0.0000
BETA(23)	-5.086684	0.833368	-6.103765	0.0000
BETA(24)	-1.222197	0.190369	-6.420162	0.0000
BETA(25)	-3.122190	0.483228	-6.461111	0.0000
BETA(26)	-1.235696	0.269779	-4.580395	0.0000
GAM(1)	0.091619	0.017580	5.211461	0.0000

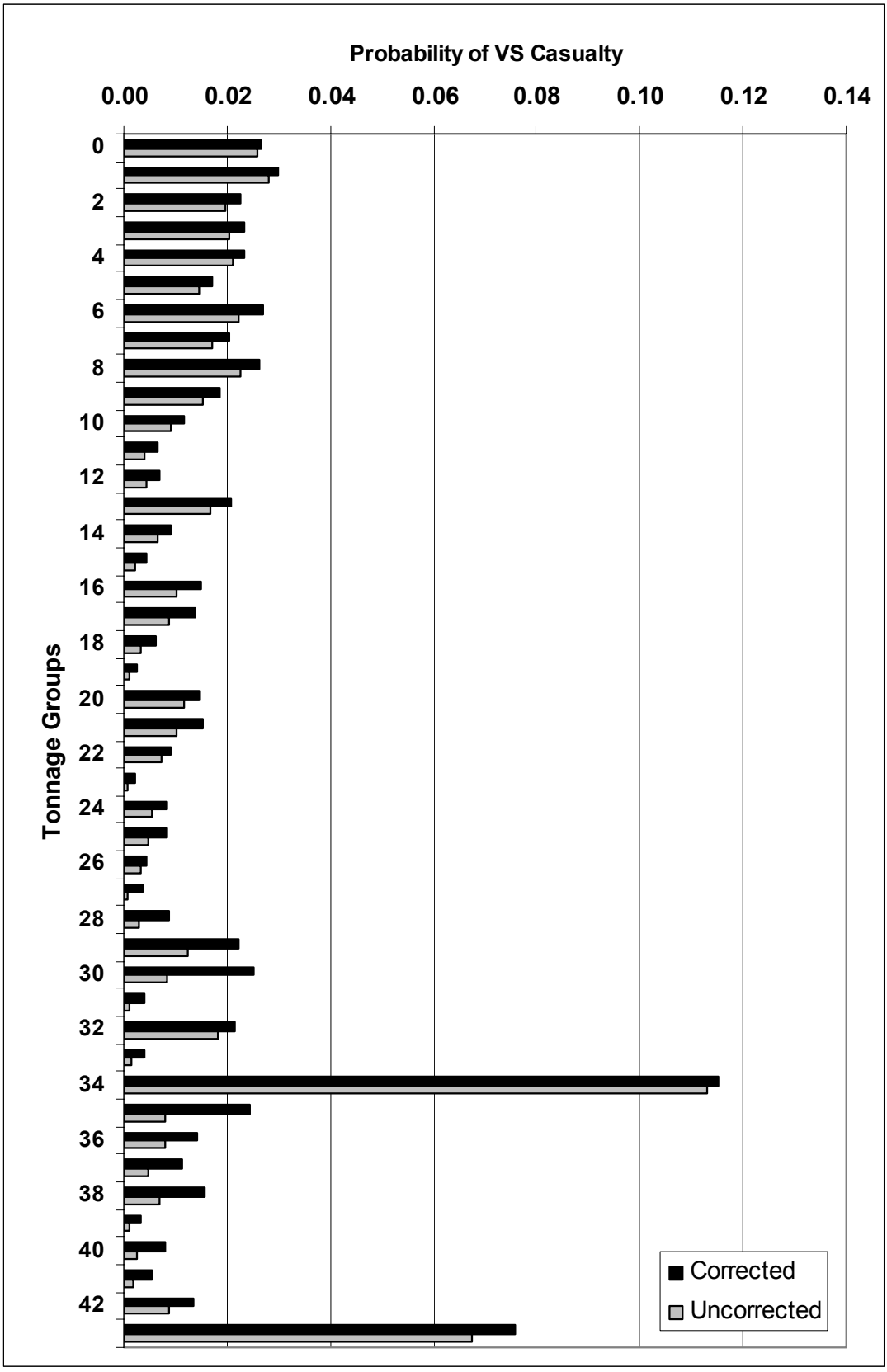
Log likelihood	-1294.314	Akaike info criterion	0.069404
Avg. log likelihood	-0.033993	Schwarz criterion	0.075465
Number of Coefs.	27	Hannan-Quinn criter.	0.071327

Greene Program Used

```
' HPROBIT1.PRG (1.0 - 6/29/98)
' example program for EViews LogL object
' revised for version 5.0 (3/26/2004)
' Estimate probit specification with multiplicative heterogeneity.
" Example 19.7 (p. 890) of Greene, William H. (1997) Econometric Analysis, ' 3rd edition, Prentice-Hall.

coef(26) beta
rnd (beta)
coef(1) gam
rnd (gam)

' specify the likelihood
logl ll1
ll1.append @logl logl1
ll1.append index =
(beta(1)+beta(2)*st1_max+beta(3)*lnton+beta(4)*lnage+beta(5)*clwd_d+beta(6)*clchgd+beta(7)*owchgd+beta(8)*cl_rnr+beta(9)*fl_ag+beta(10)*fl_bg+beta(11)*fl_bz+beta(12)*fl_tr+beta(13)*ow_emn+beta(14)*ow_tmn+beta(15)*ow_ior+beta(16)*ow_oor+beta(17)*sy_kr+beta(18)*sy_no+beta(19)*sy_un+beta(20)*li_flret+beta(21)*rs_ins+beta(22)*amsa_s+beta(23)*imou_s+beta(24)*pmou_s+beta(25)*uscg_s+beta(26)*vmou_s)/exp(gam(1)*lnton)
ll1.append logl1 = casualty*log(@clogistic(index))+(1-casualty)*log(1-@clogistic(index))

' carry out MLE and display results
ll1.ml(showopts, m=1000, c=1e-5)
show ll1.output
```

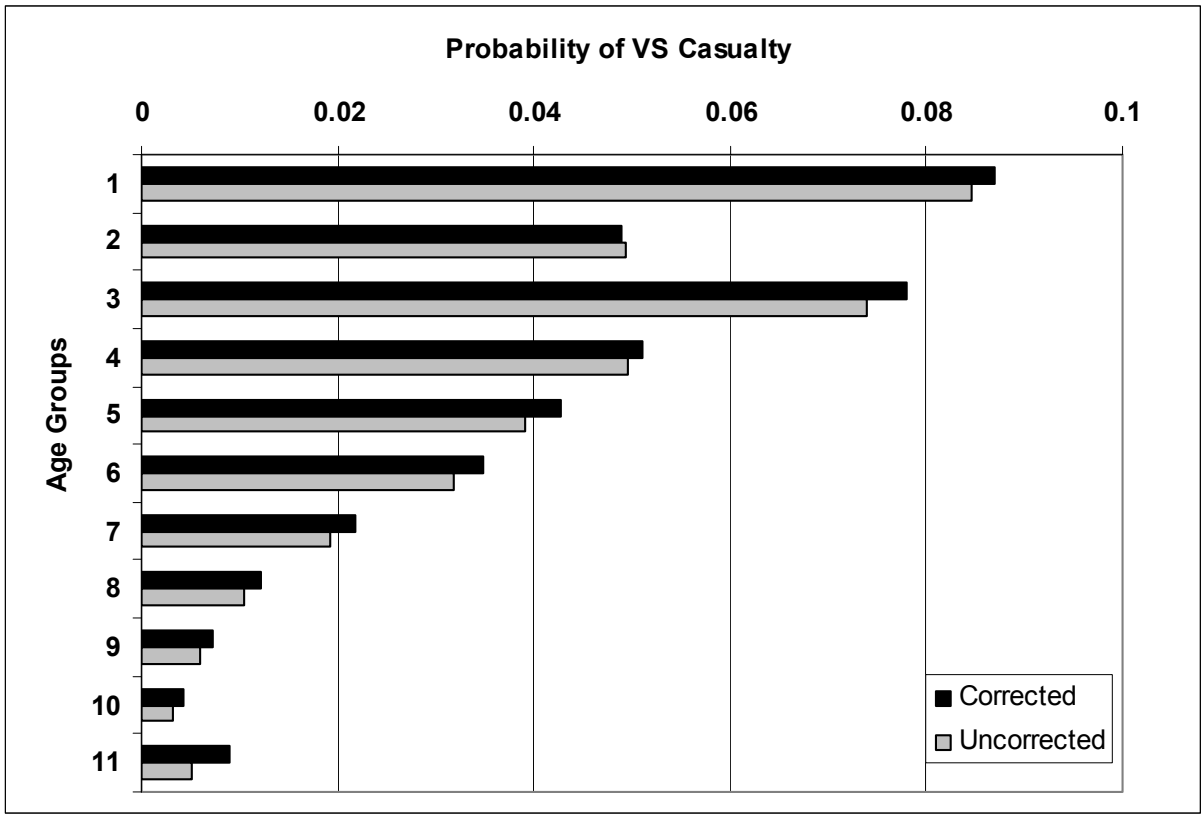
Note: for the model with age and tonnage, the last term of the index is changed to the following term: exp(gam(1)*lnton) + gam(2)*lnage and coef (1) is changed to coef (2) for gam

Appendix 20: Average Probabilities of Corrected versus Uncorrected Model Tonnage Groups



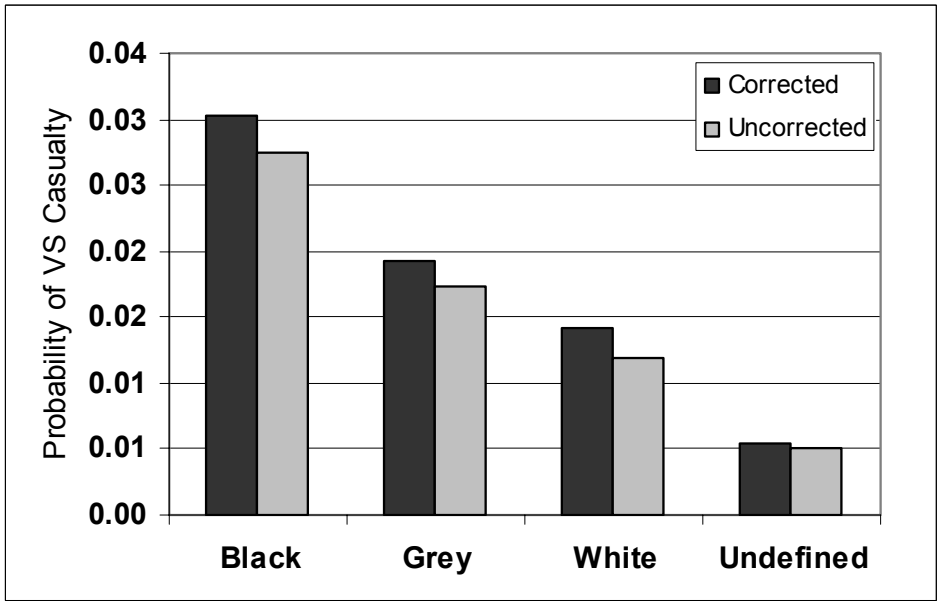
For an explanation on the groups in detail, please refer to ***Error! Reference source not found.***

Age Groups



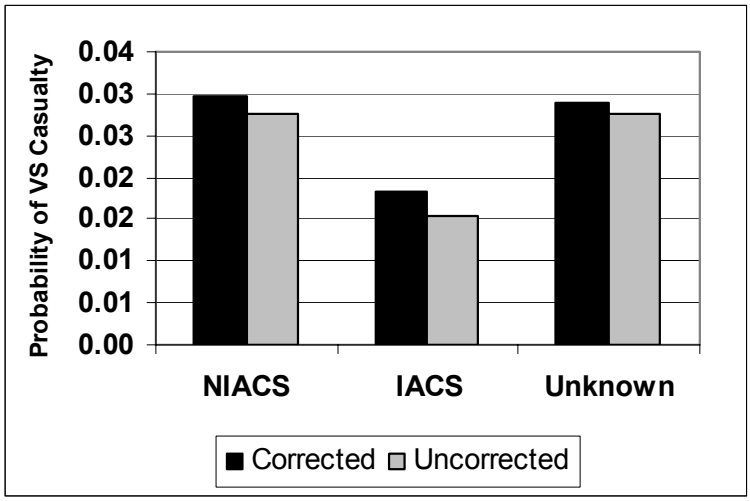
For an explanation on the groups in detail, please refer to ***Error! Reference source not found.***

Flag States Groups



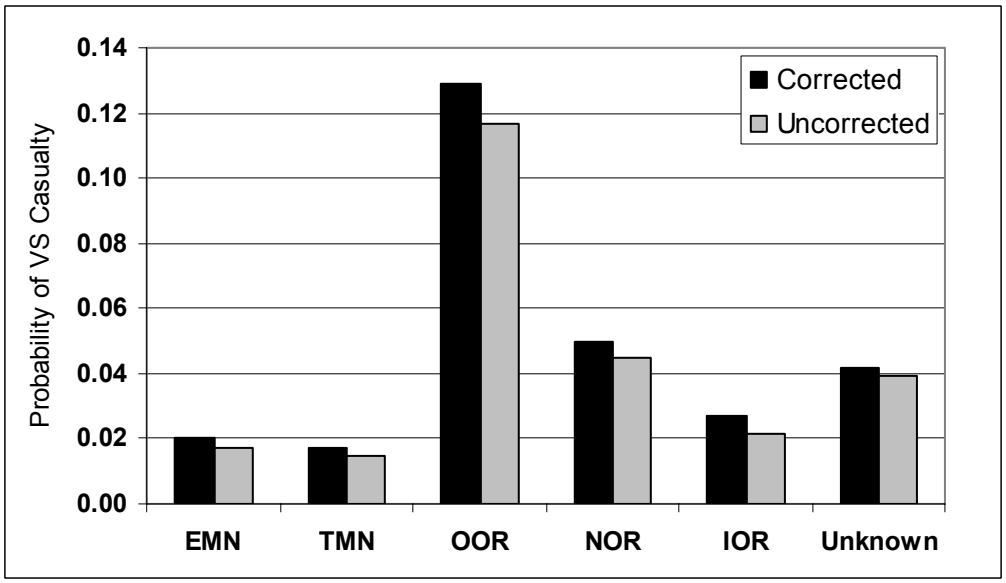
For an explanation on the groups in detail, please refer to ***Error! Reference source not found.***

Classification Society Groups



For an explanation on the groups in detail, please refer to ***Error! Reference source not found.***

Ownership Groups



For an explanation on the groups in detail, please refer to ***Error! Reference source not found.***

Appendix 21: Results of Regression: Very Serious Casualties

Dependent Variable: CASUALTY
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/08/06 Time: 22:24
Sample: 1 47169 IF EXCESSOB=0 AND ST7_MAX=0 AND
OUTLIER=0 AND CMOU_S=0
Included observations: 38076
Convergence achieved after 9 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-4.589385	0.625279	-7.339740	0.0000
ST1_MAX	1.250761	0.128888	9.704245	0.0000
LNTON	-0.371789	0.054477	-6.824711	0.0000
LNAGE	0.405964	0.088256	4.599860	0.0000
CLWD_D	0.580286	0.198103	2.929219	0.0034
CLCHGD	-0.696574	0.245789	-2.834030	0.0046
OWCHGD	5.368643	0.189853	28.27788	0.0000
CL_RNR	2.774375	0.881943	3.145753	0.0017
FL_AG	1.685907	0.531297	3.173193	0.0015
FL_BG	1.754525	0.700529	2.504570	0.0123
FL_BZ	1.353529	0.335335	4.036353	0.0001
FL_TR	0.753613	0.289022	2.607455	0.0091
OW_EMN	1.309416	0.197466	6.631090	0.0000
OW_TMN	1.796132	0.197710	9.084668	0.0000
OW_IOR	1.510983	0.286985	5.265027	0.0000
OW_OOR	2.794337	0.323119	8.648001	0.0000
SY_KR	1.227254	0.440791	2.784209	0.0054
SY_NO	1.215751	0.331591	3.666423	0.0002
SY_UN	4.070845	0.169600	24.00267	0.0000
LI_FLRET	-0.054392	0.013386	-4.063246	0.0000
RS_INS	-0.945467	0.140214	-6.743014	0.0000
AMSA_S	-1.520106	0.263189	-5.775720	0.0000
IMOU_S	-2.176095	0.343539	-6.334354	0.0000
PMOU_S	-0.544375	0.061421	-8.863061	0.0000
USCG_S	-1.468562	0.278380	-5.275379	0.0000
VMOU_S	-0.493493	0.125032	-3.946943	0.0001

Mean dependent var	0.018962	S.D. dependent var	0.136393
S.E. of regression	0.090137	Akaike info criterion	0.070020
Sum squared resid	309.1437	Schwarz criterion	0.075856
Log likelihood	-1307.036	Hannan-Quinn criter.	0.071871
Restr. log likelihood	-3578.068	Avg. log likelihood	-0.034327
LR statistic (25 df)	4542.064	McFadden R-squared	0.634709
Probability(LR stat)	0.000000		

Obs with Dep=0	37354	Total obs	38076
Obs with Dep=1	722		

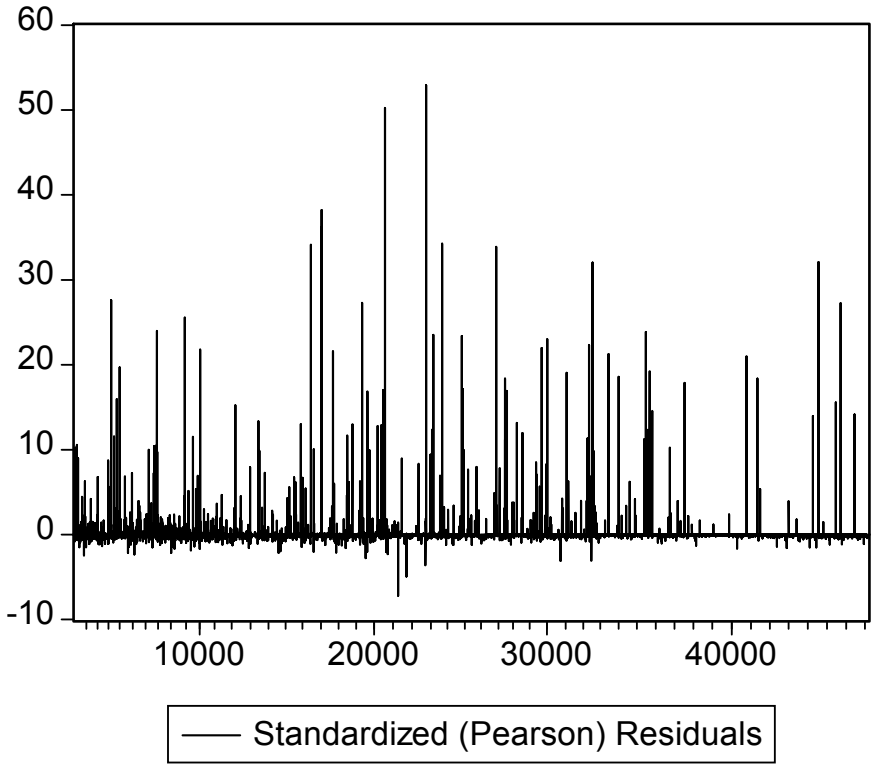
Dependent Variable: CASUALTY
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/08/06 Time: 22:24
Sample: 1 47169 IF EXCESSOB=0 AND ST7_MAX=0 AND OUTLIER=0 AND CMOU_S=0
Included observations: 38076
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	0.0000	6.E-08	3807	3807.00	0	3.7E-05	3807	3.7E-05
2	6.E-08	5.E-06	3808	3808.00	0	0.00477	3808	0.00477
3	5.E-06	7.E-05	3807	3806.90	0	0.09870	3807	0.09870
4	7.E-05	0.0004	3806	3807.21	2	0.79211	3808	1.84230
5	0.0004	0.0010	3801	3805.32	7	2.68493	3808	6.93985
6	0.0010	0.0018	3800	3801.68	7	5.32050	3807	0.53091
7	0.0018	0.0032	3793	3798.67	15	9.33058	3808	3.45329
8	0.0032	0.0060	3792	3790.28	15	16.7211	3807	0.17793
9	0.0060	0.0137	3782	3774.80	26	33.2042	3808	1.57682
10	0.0137	0.9998	3158	3154.16	650	653.843	3808	0.02727
		Total	37354	37354.0	722	722.000	38076	14.6519

H-L Statistic:	14.6519	Prob. Chi-Sq(8)	0.0663
Andrews Statistic:	5583.790	Prob. Chi-Sq(10)	0.0000

Dependent Variable: CASUALTY
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/08/06 Time: 22:24
Sample: 1 47169 IF EXCESSOB=0 AND ST7_MAX=0 AND OUTLIER=0 AND CMOU_S=0
Included observations: 38076
Prediction Evaluation (success cutoff C = 0.0189)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	34936	82	35018	0	0	0
P(Dep=1)>C	2418	640	3058	37354	722	38076
Total	37354	722	38076	37354	722	38076
Correct	34936	640	35576	0	722	722
% Correct	93.53	88.64	93.43	0.00	100.00	1.90
% Incorrect	6.47	11.36	6.57	100.00	0.00	98.10
Total Gain*	93.53	-11.36	91.54			
Percent Gain**	93.53	NA	93.31			


60
50
40
30
20
10
0
-10
10000
20000
30000
40000
Standardized (Pearson) Residuals

Appendix 22: Results of Regression: Serious Casualties

Dependent Variable: CASUALTY
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/27/06 Time: 12:30
Sample: 1 49854 IF EXCESSOB=0 AND ST7_MAX=0 AND
OUTLIER=0 AND CAS_FERRIES=0
Included observations: 41009
Convergence achieved after 7 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-3.092465	0.210296	-14.70530	0.0000
ST1_MAX	0.668466	0.054811	12.19580	0.0000
ST2_MAX	0.407800	0.073937	5.515484	0.0000
ST5_MAX	0.591748	0.100596	5.882422	0.0000
CLWD_D	0.670376	0.060123	11.15006	0.0000
CLCHGD	-2.156467	0.100328	-21.49417	0.0000
OWCHGD	2.426333	0.063340	38.30655	0.0000
CL_ABS	0.220091	0.096757	2.274670	0.0229
CL_BV	0.283156	0.090137	3.141377	0.0017
CL_CRR	1.745061	0.395830	4.408614	0.0000
CL_DNV	0.239336	0.095810	2.498030	0.0125
CL_GL	0.315691	0.099929	3.159160	0.0016
CL_HEL	1.126282	0.191428	5.883587	0.0000
CL_LR	0.238559	0.076532	3.117114	0.0018
CL_PRS	0.989989	0.246507	4.016066	0.0001
FL_AG	1.677071	0.172287	9.734189	0.0000
FL_AN	3.791955	0.499641	7.589366	0.0000
FL_AU	4.896389	0.496010	9.871545	0.0000
FL_BB	3.698497	0.500170	7.394481	0.0000
FL_BG	2.615955	0.445411	5.873127	0.0000
FL_BS	1.288386	0.168382	7.651552	0.0000
FL_BZ	1.282967	0.245786	5.219847	0.0000
FL_CA	5.667824	0.367547	15.42067	0.0000
FL_CH	4.017011	0.772602	5.199329	0.0000
FL_CI	-0.528456	0.052641	-10.03888	0.0000
FL_CL	3.449410	0.452342	7.625661	0.0000
FL_CN	0.926625	0.216719	4.275700	0.0000
FL_CY	1.795461	0.209121	8.585771	0.0000
FL_DE	4.757727	0.357369	13.31322	0.0000
FL_DK	3.158602	0.358656	8.806777	0.0000
FL_EE	1.865066	0.615691	3.029223	0.0025
FL_EG	2.443472	0.312348	7.822928	0.0000
FL_ES	3.567010	0.319016	11.18128	0.0000
FL_FI	4.431572	0.490034	9.043392	0.0000
FL_FR	3.305033	0.434322	7.609643	0.0000
FL_FO	5.123701	0.739233	6.931106	0.0000
FL_GI	2.277671	0.488577	4.661850	0.0000

FL_GR	2.731950	0.191291	14.28165	0.0000
FL_HK	2.556422	0.385528	6.630958	0.0000
FL_IE	4.447324	0.450956	9.861982	0.0000
FL_IM	4.530595	0.429767	10.54198	0.0000
FL_IN	2.327092	0.250481	9.290498	0.0000
FL_IT	2.416283	0.237086	10.19159	0.0000
FL_JP	3.117043	0.282379	11.03850	0.0000
FL_KH	1.320022	0.204835	6.444315	0.0000
FL_KR	2.678093	0.222986	12.01015	0.0000
FL_KW	2.518723	0.538670	4.675820	0.0000
FL_LR	0.773762	0.164247	4.710973	0.0000
FL_MH	2.317475	0.404445	5.730006	0.0000
FL_MT	4.398416	0.319629	13.76100	0.0000
FL_MY	1.576575	0.320774	4.914909	0.0000
FL_NIS	4.540584	0.401066	11.32129	0.0000
FL_NL	4.063273	0.356062	11.41170	0.0000
FL_NO	5.137925	0.383828	13.38600	0.0000
FL_NZ	5.063607	0.692862	7.308243	0.0000
FL_PA	0.888314	0.114369	7.767070	0.0000
FL_PL	2.155938	0.429161	5.023608	0.0000
FL_PT	2.495289	0.373013	6.689548	0.0000
FL_SE	4.451411	0.424953	10.47507	0.0000
FL_SG	3.946599	0.406321	9.713013	0.0000
FL_TO	1.792702	0.596090	3.007434	0.0026
FL_UK	5.129702	0.356429	14.39192	0.0000
FL_US	4.360653	0.325468	13.39810	0.0000
FL_VC	1.008740	0.160391	6.289266	0.0000
OW_EMN	0.998902	0.127474	7.836136	0.0000
OW_IOR	1.707517	0.161042	10.60291	0.0000
OW_OOR	2.596296	0.162111	16.01559	0.0000
OW_TMN	1.968789	0.160918	12.23472	0.0000
LI_FLRET	-0.124485	0.010146	-12.26910	0.0000
LI_OWRET	-0.036024	0.008848	-4.071546	0.0000
SY_AR	1.511256	0.460342	3.282900	0.0010
SY_BG	1.387078	0.247395	5.606738	0.0000
SY_BR	1.829303	0.250725	7.296056	0.0000
SY_CA	0.911227	0.230245	3.957638	0.0001
SY_CN	0.701901	0.153577	4.570359	0.0000
SY_DE	0.948511	0.093630	10.13044	0.0000
SY_DK	1.023127	0.168166	6.084046	0.0000
SY_ES	0.859322	0.162852	5.276711	0.0000
SY_FI	1.025017	0.181672	5.642145	0.0000
SY_FR	1.454359	0.207273	7.016644	0.0000
SY_GR	1.793982	0.278736	6.436137	0.0000
SY_HR	1.470937	0.201326	7.306258	0.0000
SY_IT	1.081655	0.195505	5.532619	0.0000
SY_JP	0.574232	0.077664	7.393845	0.0000
SY_KR	0.993873	0.109156	9.105032	0.0000
SY_NL	0.927623	0.116488	7.963272	0.0000
SY_NO	1.488261	0.118315	12.57879	0.0000
SY_OT	1.838009	0.183975	9.990551	0.0000

SY_PL	0.764665	0.178705	4.278919	0.0000
SY_RO	1.277681	0.160963	7.937723	0.0000
SY_RU	0.796697	0.168806	4.719605	0.0000
SY_SE	1.380393	0.200647	6.879717	0.0000
SY_TR	1.610577	0.186590	8.631655	0.0000
SY_UK	1.195786	0.137620	8.689071	0.0000
SY_US	0.886520	0.196212	4.518162	0.0000
AMSA_S	-0.172419	0.025038	-6.886212	0.0000
PMOU_S	0.045986	0.007260	6.334319	0.0000
USCG_S	0.029542	0.009051	3.264050	0.0011

Mean dependent var	0.077983	S.D. dependent var	0.268148
S.E. of regression	0.231704	Akaike info criterion	0.398456
Sum squared resid	2196.387	Schwarz criterion	0.419059
Log likelihood	-8072.138	Hannan-Quinn criter.	0.404970
Restr. log likelihood	-11228.88	Avg. log likelihood	-0.196838
LR statistic (97 df)	6313.485	McFadden R-squared	0.281127
Probability(LR stat)	0.000000		

Obs with Dep=0	37811	Total obs	41009
Obs with Dep=1	3198		

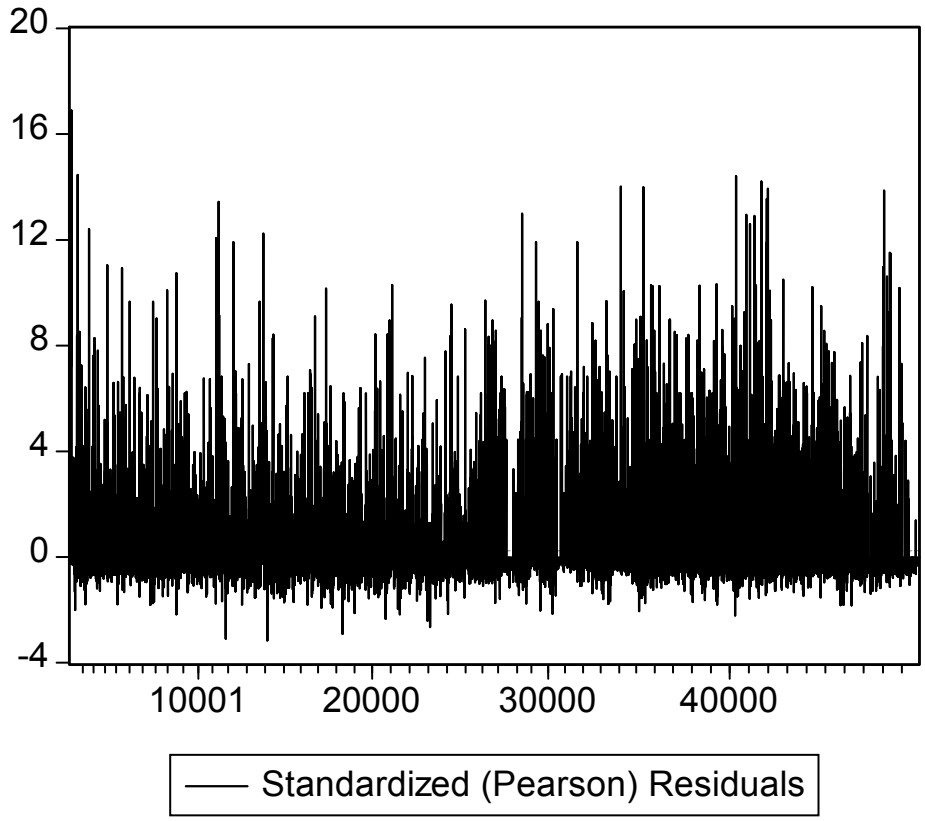
Dependent Variable: CASUALTY
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/27/06 Time: 12:30
Sample: 1 49854 IF EXCESSOB=0 AND ST7_MAX=0 AND OUTLIER=0 AND CAS_FERRIES=0
Included observations: 41009
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	7.E-05	0.0067	4079	4083.85	21	16.1519	4100	1.46097
2	0.0067	0.0109	4061	4063.68	40	37.3179	4101	0.19454
3	0.0109	0.0160	4031	4046.42	70	54.5770	4101	4.41720
4	0.0160	0.0215	4034	4024.63	67	76.3722	4101	1.17196
5	0.0215	0.0291	3974	3997.56	127	103.443	4101	5.50328
6	0.0291	0.0426	3949	3955.05	152	145.950	4101	0.26008
7	0.0426	0.0594	3915	3896.16	186	204.842	4101	1.82419
8	0.0594	0.0999	3777	3785.32	324	315.677	4101	0.23772
9	0.0999	0.1917	3560	3529.82	541	571.183	4101	1.85300
10	0.1918	0.9986	2431	2428.51	1670	1672.49	4101	0.00624
		Total	37811	37811.0	3198	3198.00	41009	16.9292

H-L Statistic:	16.9292	Prob. Chi-Sq(8)	0.0309
Andrews Statistic:	33.2464	Prob. Chi-Sq(10)	0.0002

Dependent Variable: CASUALTY
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/27/06 Time: 12:30
Sample: 1 49854 IF EXCESSOB=0 AND ST7_MAX=0 AND
OUTLIER=0 AND CAS_FERRIES=0
Included observations: 41009
Prediction Evaluation (success cutoff C = 0.078)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	30198	819	31017	37811	3198	41009
P(Dep=1)>C	7613	2379	9992	0	0	0
Total	37811	3198	41009	37811	3198	41009
Correct	30198	2379	32577	37811	0	37811
% Correct	79.87	74.39	79.44	100.00	0.00	92.20
% Incorrect	20.13	25.61	20.56	0.00	100.00	7.80
Total Gain*	-20.13	74.39	-12.76			
Percent Gain**	NA	74.39	-163.66			



Appendix 23: Results of Regressions: Less Serious Casualties

Dependent Variable: CASUALTY
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/27/06 Time: 10:38
Sample: 1 48470 IF EXCESSOB=0 AND ST7_MAX=0 AND
OUTLIER=0 AND CAS_FERRIES=0
Included observations: 39929
Convergence achieved after 8 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-5.662095	0.431350	-13.12645	0.0000
ST1_MAX	0.845100	0.072206	11.70397	0.0000
ST2_MAX	0.824041	0.089573	9.199675	0.0000
ST3_MAX	0.723681	0.099356	7.283716	0.0000
ST5_MAX	0.821732	0.117352	7.002274	0.0000
CLWD_D	0.430677	0.077533	5.554728	0.0000
CLCHGD	-2.029244	0.122660	-16.54367	0.0000
OWCHGD	2.158379	0.076610	28.17358	0.0000
CL_ABS	1.204653	0.295476	4.076985	0.0000
CL_BV	1.457173	0.292212	4.986704	0.0000
CL_CCS	1.311247	0.329339	3.981447	0.0001
CL_CRR	3.706405	0.498327	7.437704	0.0000
CL_DNV	1.402495	0.295897	4.739813	0.0000
CL_GL	1.236372	0.295490	4.184141	0.0000
CL_HEL	2.506026	0.337051	7.435146	0.0000
CL_KRS	1.974537	0.346740	5.694581	0.0000
CL_LR	1.317811	0.287180	4.588793	0.0000
CL_NCL	1.102077	0.284640	3.871832	0.0001
CL_NKK	1.169648	0.293507	3.985080	0.0001
CL_PRS	2.362387	0.416834	5.667447	0.0000
CL_RIN	1.079326	0.380013	2.840238	0.0045
CL_RMS	1.532007	0.318685	4.807282	0.0000
CL_RRR	1.711612	0.561667	3.047382	0.0023
CL_TLL	1.342912	0.514616	2.609543	0.0091
CL_VRS	2.256384	0.495766	4.551311	0.0000
FL_AE	4.149804	0.433652	9.569437	0.0000
FL_AG	1.838566	0.278182	6.609221	0.0000
FL_AN	5.608286	0.725942	7.725529	0.0000
FL_AU	5.631484	0.723772	7.780747	0.0000
FL_BB	4.933665	0.626587	7.873869	0.0000
FL_BE	3.893763	0.766928	5.077092	0.0000
FL_BG	2.685595	0.764053	3.514931	0.0004
FL_BS	1.759789	0.275944	6.377345	0.0000
FL_BZ	2.119129	0.317121	6.682398	0.0000
FL_CA	6.898436	0.567459	12.15672	0.0000
FL_CH	5.370431	0.909441	5.905199	0.0000
FL_CI	-0.620512	0.083064	-7.470320	0.0000
FL_CL	3.994457	0.798261	5.003948	0.0000

FL_CN	0.777765	0.318388	2.442818	0.0146
FL_CY	2.544963	0.333703	7.626440	0.0000
FL_DE	5.972199	0.570626	10.46605	0.0000
FL_DK	3.153448	0.386906	8.150430	0.0000
FL_DZ	1.267793	0.430365	2.945859	0.0032
FL_EE	2.484665	0.581987	4.269282	0.0000
FL_EG	2.697314	0.473018	5.702354	0.0000
FL_ES	3.974581	0.506615	7.845370	0.0000
FL_FI	6.080535	0.741642	8.198752	0.0000
FL_FR	4.397584	0.605152	7.266913	0.0000
FL_FO	7.237445	1.059427	6.831470	0.0000
FL_GI	2.484202	0.676733	3.670873	0.0002
FL_GR	3.742477	0.314934	11.88337	0.0000
FL_HK	3.350857	0.556536	6.020920	0.0000
FL_IE	5.284034	0.654636	8.071714	0.0000
FL_IM	5.420643	0.650410	8.334199	0.0000
FL_IN	3.044888	0.363502	8.376536	0.0000
FL_IR	1.197281	0.364148	3.287893	0.0010
FL_IT	3.305025	0.403428	8.192352	0.0000
FL_JP	5.178334	0.436476	11.86395	0.0000
FL_KH	2.007363	0.292492	6.862967	0.0000
FL_KR	2.740739	0.366186	7.484554	0.0000
FL_KW	3.304806	0.540381	6.115694	0.0000
FL_LR	1.044934	0.258157	4.047670	0.0001
FL_LU	4.551713	0.803656	5.663762	0.0000
FL_MA	1.587842	0.533334	2.977199	0.0029
FL_MH	3.340688	0.611796	5.460458	0.0000
FL_MT	5.942110	0.556128	10.68479	0.0000
FL_MY	2.382863	0.358829	6.640672	0.0000
FL_NIS	6.008787	0.626406	9.592484	0.0000
FL_NL	5.154772	0.581143	8.870055	0.0000
FL_NO	5.967297	0.626447	9.525626	0.0000
FL_NZ	5.648706	0.969468	5.826603	0.0000
FL_PA	1.200002	0.202225	5.933991	0.0000
FL_PT	2.273818	0.523192	4.346050	0.0000
FL_RO	1.583088	0.473523	3.343211	0.0008
FL_RU	0.975368	0.298556	3.266955	0.0011
FL_SE	5.650561	0.675426	8.365922	0.0000
FL_SG	4.701044	0.647508	7.260205	0.0000
FL_ST	2.780440	0.428527	6.488363	0.0000
FL_TR	0.756630	0.298769	2.532494	0.0113
FL_UK	6.162960	0.587306	10.49361	0.0000
FL_US	4.881812	0.484951	10.06662	0.0000
FL_VC	1.452105	0.243401	5.965899	0.0000
FL_VU	1.599494	0.479847	3.333343	0.0009
OW_EMN	1.929815	0.191901	10.05632	0.0000
OW_IOR	2.442122	0.214462	11.38722	0.0000
OW_OOR	2.777308	0.225334	12.32530	0.0000
OW_TMN	2.641438	0.181311	14.56851	0.0000
LI_FLRET	-0.180436	0.016916	-10.66689	0.0000
SY_BE	2.213023	0.344335	6.426948	0.0000

SY_BG	1.707687	0.274525	6.220527	0.0000
SY_BR	1.964688	0.313022	6.276508	0.0000
SY_CA	1.475623	0.298032	4.951221	0.0000
SY_CN	1.262579	0.176012	7.173265	0.0000
SY_DE	1.230984	0.124598	9.879638	0.0000
SY_DK	1.377129	0.192021	7.171746	0.0000
SY_ES	1.301859	0.196971	6.609412	0.0000
SY_FI	1.207492	0.216578	5.575336	0.0000
SY_FR	1.248108	0.265603	4.699141	0.0000
SY_GR	2.469552	0.309820	7.970914	0.0000
SY_HR	1.527037	0.242211	6.304571	0.0000
SY_IT	1.522639	0.234637	6.489328	0.0000
SY_JP	0.919026	0.108796	8.447201	0.0000
SY_KR	1.283047	0.131561	9.752507	0.0000
SY_NL	1.105055	0.161741	6.832242	0.0000
SY_NO	1.664099	0.162979	10.21050	0.0000
SY_OT	2.544598	0.236796	10.74596	0.0000
SY_PL	1.156815	0.201514	5.740614	0.0000
SY_PT	1.609993	0.389076	4.137992	0.0000
SY_RO	1.314498	0.213359	6.160954	0.0000
SY_RU	0.654423	0.217621	3.007165	0.0026
SY_SE	0.937418	0.325276	2.881918	0.0040
SY_TR	1.640065	0.277260	5.915255	0.0000
SY_UK	1.407815	0.181451	7.758633	0.0000
SY_US	1.483511	0.231454	6.409538	0.0000
AMSA_S	-0.159485	0.027889	-5.718667	0.0000
PMOU_S	0.053558	0.008707	6.151326	0.0000
USCG_S	0.046780	0.010379	4.507163	0.0000

Mean dependent var	0.053044	S.D. dependent var	0.224124
S.E. of regression	0.201377	Akaike info criterion	0.316690
Sum squared resid	1614.486	Schwarz criterion	0.341874
Log likelihood	-6205.550	Hannan-Quinn criter.	0.324662
Restr. log likelihood	-8280.589	Avg. log likelihood	-0.155415
LR statistic (116 df)	4150.079	McFadden R-squared	0.250591
Probability(LR stat)	0.000000		

Obs with Dep=0	37811	Total obs	39929
Obs with Dep=1	2118		

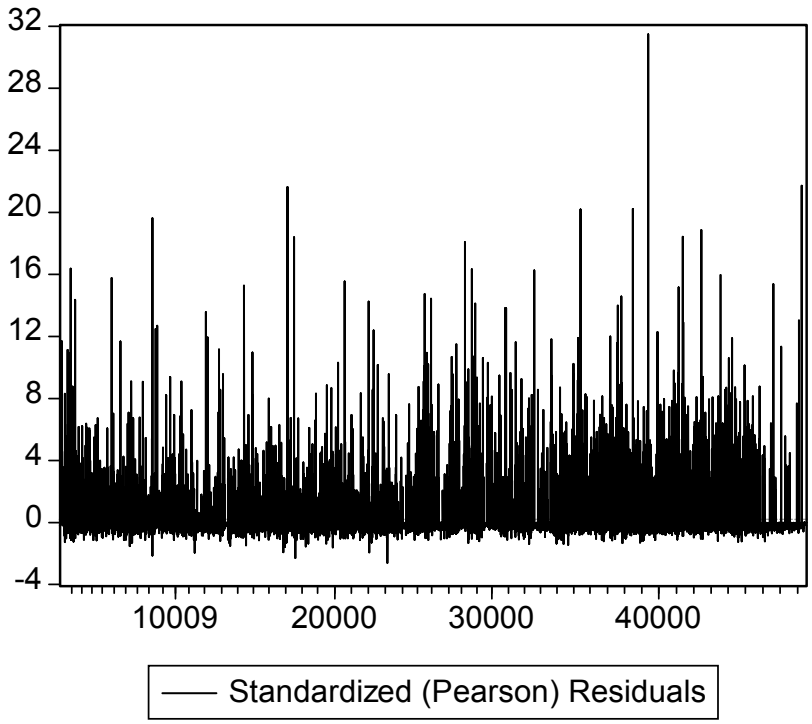
Dependent Variable: CASUALTY
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/27/06 Time: 10:38
Sample: 1 48470 IF EXCESSOB=0 AND ST7_MAX=0 AND OUTLIER=0 AND CAS_FERRIES=0
Included observations: 39929
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

Quantile of Risk			Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	1.E-05	0.0020	3991	3987.56	1	4.43652	3992	2.66488
2	0.0020	0.0047	3974	3979.50	19	13.4998	3993	2.24851
3	0.0047	0.0083	3962	3966.64	31	26.3609	3993	0.82183
4	0.0083	0.0135	3946	3950.09	47	42.9095	3993	0.39417
5	0.0135	0.0204	3912	3927.14	81	65.8568	3993	3.54046
6	0.0204	0.0319	3877	3889.60	116	103.400	3993	1.57617
7	0.0319	0.0479	3814	3834.32	179	158.676	3993	2.71099
8	0.0479	0.0741	3773	3758.92	220	234.076	3993	0.89910
9	0.0742	0.1210	3626	3607.65	367	385.351	3993	0.96730
10	0.1210	0.9941	2936	2909.57	1057	1083.43	3993	0.88507
		Total	37811	37811.0	2118	2118.00	39929	16.7085

H-L Statistic:	16.7085	Prob. Chi-Sq(8)	0.0333
Andrews Statistic:	74.1985	Prob. Chi-Sq(10)	0.0000

Dependent Variable: CASUALTY
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 04/27/06 Time: 10:38
Sample: 1 48470 IF EXCESSOB=0 AND ST7_MAX=0 AND OUTLIER=0 AND CAS_FERRIES=0
Included observations: 39929
Prediction Evaluation (success cutoff C = 0.053)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	28769	542	29311	0	0	0
P(Dep=1)>C	9042	1576	10618	37811	2118	39929
Total	37811	2118	39929	37811	2118	39929
Correct	28769	1576	30345	0	2118	2118
% Correct	76.09	74.41	76.00	0.00	100.00	5.30
% Incorrect	23.91	25.59	24.00	100.00	0.00	94.70
Total Gain*	76.09	-25.59	70.69			
Percent Gain**	76.09	NA	74.65			


32
28
24
20
16
12
8
4
0
-4
10009
20000
30000
40000
Standardized (Pearson) Residuals

Appendix 24: Results of Regression: Fishing Fleet (above 400gt)

Dependent Variable: CASUALTY
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/04/06 Time: 18:28
Sample: 1 6666 IF FISH_CAS=0 AND OUTLIER2=0
Included observations: 6289
Convergence achieved after 7 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-4.453866	0.152841	-29.14046	0.0000
CLWD_D	10.25721	1.915184	5.355734	0.0000
OWCHGD	5.227738	0.602226	8.680697	0.0000
CL_BV	0.738830	0.354451	2.084435	0.0371
CL_CCO	3.299891	1.137701	2.900490	0.0037
FL_BZ	1.647911	0.563364	2.925124	0.0034
FL_CA	2.611569	0.458237	5.699162	0.0000
FL_DE	3.018409	0.792268	3.809832	0.0001
FL_FR	2.375173	0.451581	5.259680	0.0000
FL_GR	3.620932	0.807403	4.484664	0.0000
FL_NL	2.664820	0.358722	7.428656	0.0000
FL_NO	1.483681	0.337163	4.400490	0.0000
FL_US	1.304832	0.413060	3.158942	0.0016
OW_UNKN	-2.714024	0.398907	-6.803655	0.0000
SY_UN	7.812672	0.993658	7.862533	0.0000
PSC_INSP	-6.007325	1.416856	-4.239897	0.0000

Mean dependent var	0.025441	S.D. dependent var	0.157474
S.E. of regression	0.124985	Akaike info criterion	0.147310
Sum squared resid	97.99257	Schwarz criterion	0.164474
Log likelihood	-447.2170	Hannan-Quinn criter.	0.153257
Restr. log likelihood	-745.3686	Avg. log likelihood	-0.071111
LR statistic (15 df)	596.3032	McFadden R-squared	0.400006
Probability(LR stat)	0.000000		

Obs with Dep=0	6129	Total obs	6289
Obs with Dep=1	160		

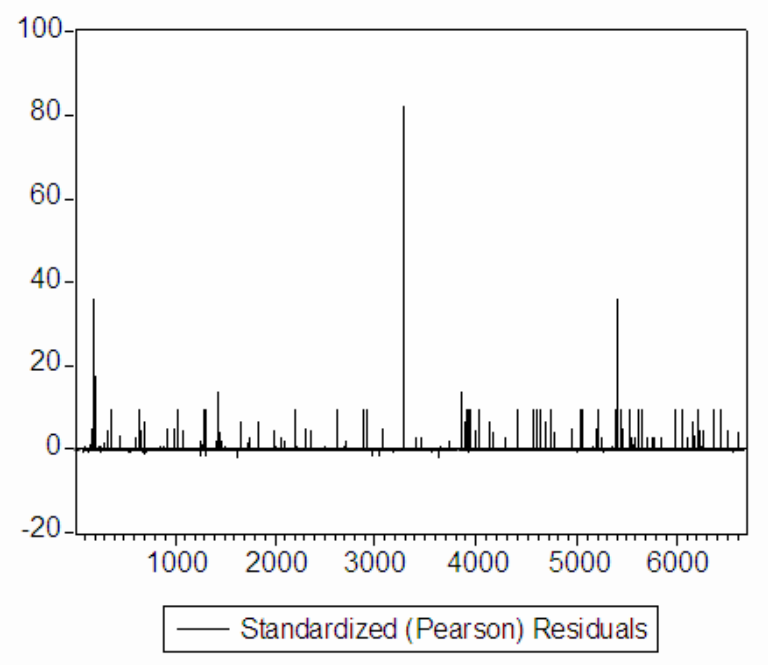
Dependent Variable: CASUALTY
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/04/06 Time: 18:28
Sample: 1 6666 IF FISH_CAS=0 AND OUTLIER2=0
Included observations: 6289
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1			Total HL
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	2.E-06	0.0008	626	627.588	2	0.41164	628	6.13297
2	0.0008	0.0008	628	628.515	1	0.48455	629	0.54873
3	0.0008	0.0034	629	628.161	0	0.83897	629	0.84009
4	0.0034	0.0115	623	623.076	6	5.92412	629	0.00098
5	0.0115	0.0115	625	621.767	4	7.23333	629	1.46212
6	0.0115	0.0115	617	621.767	12	7.23333	629	3.17772
7	0.0115	0.0115	625	621.767	4	7.23333	629	1.46212
8	0.0115	0.0115	624	621.767	5	7.23333	629	0.69757
9	0.0115	0.0411	612	615.415	17	13.5855	629	0.87713
10	0.0411	1.0000	520	519.178	109	109.822	629	0.00745
		Total	6129	6129.00	160	160.000	6289	15.2069

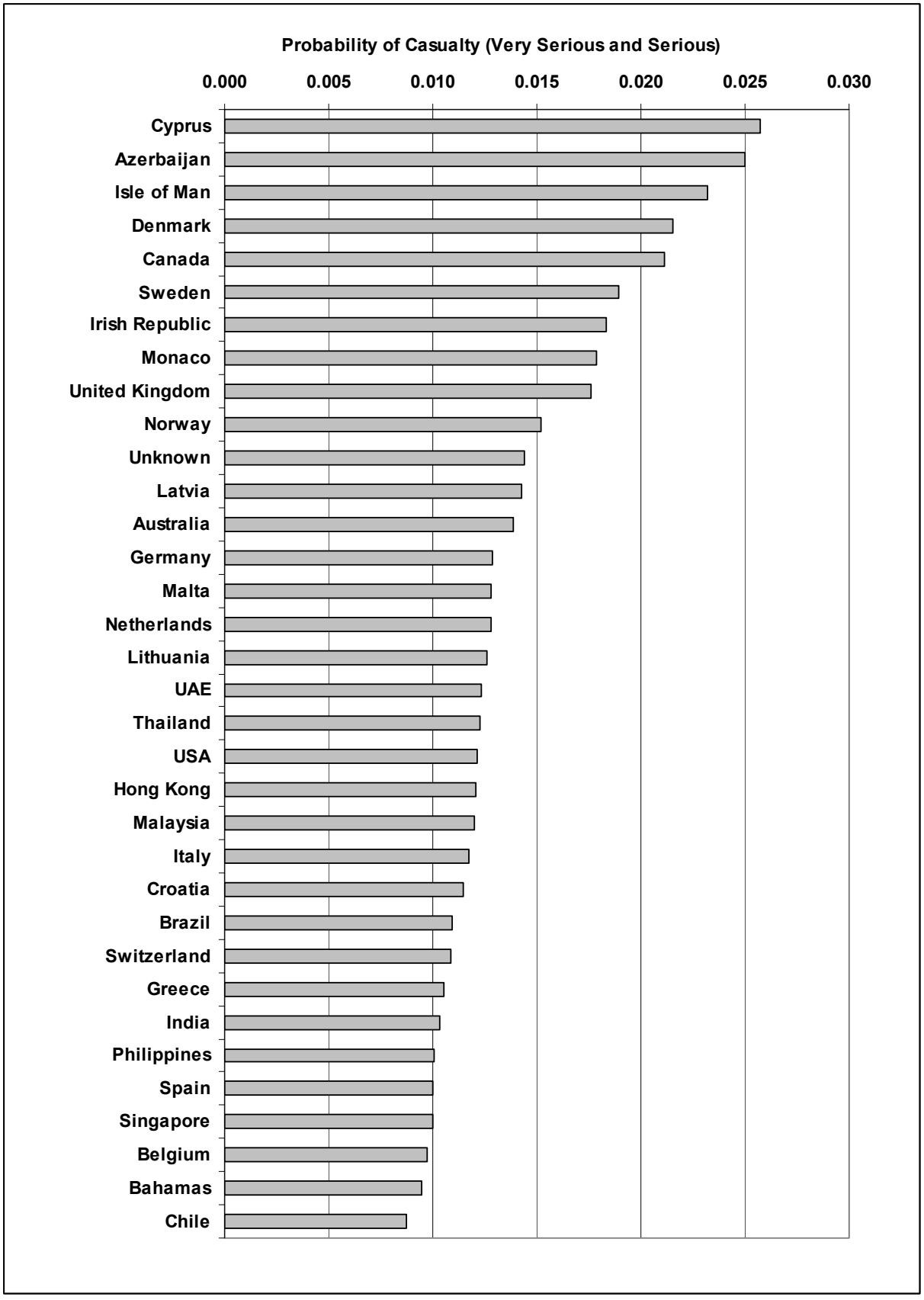
H-L Statistic:	15.2069	Prob. Chi-Sq(8)	0.0552
Andrews Statistic:	456.6065	Prob. Chi-Sq(10)	0.0000

Dependent Variable: CASUALTY
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/04/06 Time: 18:28
Sample: 1 6666 IF FISH_CAS=0 AND OUTLIER2=0
Included observations: 6289
Prediction Evaluation (success cutoff C = 0.025)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	5515	46	5561	0	0	0
P(Dep=1)>C	614	114	728	6129	160	6289
Total	6129	160	6289	6129	160	6289
Correct	5515	114	5629	0	160	160
% Correct	89.98	71.25	89.51	0.00	100.00	2.54
% Incorrect	10.02	28.75	10.49	100.00	0.00	97.46
Total Gain*	89.98	-28.75	86.96			
Percent Gain**	89.98	NA	89.23			


100
80
60
40
20
0
-20
1000
2000
3000
4000
5000
6000
Standardized (Pearson) Residuals

Appendix 25: Probability of Casualty per DoC Country of Residence



Appendix 26: LM-Test Type I (Very Serious) and Type II Models

Type I: Very Serious Casualties - Age

Dependent Variable: BRMR_Y
Method: Least Squares
Date: 05/30/06 Time: 17:18
Sample: 1 6007 IF ST5_MAX=0 AND CMOU_AV=0
Included observations: 5826

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAC	3.816158	2.248451	1.697239	0.0897
ST3_MAX*FAC	-0.688024	0.594013	-1.158263	0.2468
LNAGE*FAC	0.856866	0.472976	1.811650	0.0701
LNTON*FAC	-0.342561	0.191535	-1.788503	0.0737
OWCHD*FAC	-0.459591	0.345862	-1.328829	0.1840
RS_2S*FAC	0.691854	0.415730	1.664189	0.0961
RS_3S*FAC	0.883220	0.549765	1.606540	0.1082
RS_4S*FAC	1.328754	0.836747	1.588000	0.1123
RS_5S*FAC	1.275832	1.062454	1.200835	0.2299
VMOU_AV*FAC	1.042776	0.671201	1.553597	0.1203
CL_CRR*FAC	-1.752671	1.456234	-1.203565	0.2288
CL_RIP*FAC	-2.790060	1.865696	-1.495453	0.1349
CL_RNR*FAC	-3.035841	1.982525	-1.531301	0.1257
FL_AG*FAC	-1.002843	0.662349	-1.514070	0.1301
FL_BB*FAC	-1.377179	1.395092	-0.987160	0.3236
FL_BR*FAC	-2.577928	1.834607	-1.405166	0.1600
FL_DK*FAC	-0.843540	0.706944	-1.193220	0.2328
FL_KR*FAC	-1.396368	1.033025	-1.351728	0.1765
FL_LT*FAC	-1.874441	1.325640	-1.413989	0.1574
FL_TR*FAC	-0.956142	0.640660	-1.492433	0.1356
C_1800S*FAC	-0.344962	0.286488	-1.204106	0.2286
LI_OWRET*FAC	-0.067387	0.051240	-1.315138	0.1885
OW_OUK*FAC	-2.249439	1.318023	-1.706677	0.0879
LNAGE*(-XB)*FAC	-0.224472	0.116523	-1.926428	0.0541

R-squared	0.000619	Mean dependent var	0.004756
Adjusted R-squared	-0.003342	S.D. dependent var	1.069765
S.E. of regression	1.071551	Akaike info criterion	2.980202
Sum squared resid	6661.980	Schwarz criterion	3.007679
Log likelihood	-8657.329	Durbin-Watson stat	2.062138

Type I: Very Serious Casualties - Tonnage

Dependent Variable: BRMR_Y
Method: Least Squares
Date: 05/30/06 Time: 17:21
Sample: 1 6007 IF ST5_MAX=0 AND CMOU_AV=0
Included observations: 5826

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAC	-4.277321	2.510763	-1.703594	0.0885
ST3_MAX*FAC	1.262280	0.822057	1.535514	0.1247
LNAGE*FAC	-0.302720	0.227535	-1.330430	0.1834
LNTON*FAC	0.107195	0.091181	1.175628	0.2398
OWCHD*FAC	0.615127	0.411925	1.493297	0.1354
RS_2S*FAC	-0.875860	0.510625	-1.715272	0.0863
RS_3S*FAC	-1.219137	0.715719	-1.703375	0.0886
RS_4S*FAC	-2.330176	1.326461	-1.756687	0.0790
RS_5S*FAC	-2.911103	1.756744	-1.657102	0.0976
VMOU_AV*FAC	-1.207598	0.754851	-1.599782	0.1097
CL_CRR*FAC	1.966090	1.544596	1.272883	0.2031
CL_RIP*FAC	3.119344	2.033283	1.534142	0.1250
CL_RNR*FAC	3.425904	2.182950	1.569392	0.1166
FL_AG*FAC	1.187037	0.752388	1.577692	0.1147
FL_BB*FAC	1.578585	1.462801	1.079153	0.2806
FL_BR*FAC	3.345773	2.177136	1.536777	0.1244
FL_DK*FAC	1.070293	0.794926	1.346404	0.1782
FL_KR*FAC	1.899741	1.249839	1.519988	0.1286
FL_LT*FAC	2.178138	1.466937	1.484821	0.1376
FL_TR*FAC	1.070821	0.698779	1.532416	0.1255
C_1800S*FAC	0.445996	0.325958	1.368263	0.1713
LI_OWRET*FAC	0.085394	0.058852	1.450997	0.1468
OW_OUK*FAC	2.841596	1.629914	1.743403	0.0813
LNTON*(-XB)*FAC	0.099291	0.052795	1.880703	0.0601

R-squared	0.000589	Mean dependent var	0.004756
Adjusted R-squared	-0.003372	S.D. dependent var	1.069765
S.E. of regression	1.071567	Akaike info criterion	2.980232
Sum squared resid	6662.180	Schwarz criterion	3.007709
Log likelihood	-8657.416	Durbin-Watson stat	2.062354

Type II: Combined Model - Age

Dependent Variable: BRMR_Y
Method: Least Squares
Date: 06/23/06 Time: 14:45
Sample: 1 52150
Included observations: 52150

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAC	0.802483	0.542158	1.480166	0.1388
ST1_MAX*FAC	-0.055114	0.104687	-0.526465	0.5986
ST3_MAX*FAC	-0.191784	0.160979	-1.191359	0.2335
ST4_MAX*FAC	-0.065201	0.123207	-0.529198	0.5967
ST5_MAX*FAC	-0.464292	0.276618	-1.678459	0.0933
LNAGE*FAC	0.282333	0.142524	1.980942	0.0476
LNTON*FAC	-0.101391	0.059035	-1.717479	0.0859
ST_CHDGC*FAC	-0.112992	0.085962	-1.314434	0.1887
RS_2S*FAC	0.231018	0.130246	1.773708	0.0761
RS_3S*FAC	0.260911	0.151103	1.726713	0.0842
RS_4S*FAC	0.495869	0.268861	1.844333	0.0651
RS_5S*FAC	0.618580	0.374182	1.653152	0.0983
DH*FAC	-0.072933	0.138917	-0.525011	0.5996
LNTIMEBW*FAC	-0.024097	0.025575	-0.942221	0.3461
CL_BV*FAC	0.076292	0.101528	0.751431	0.4524
CL_HEL*FAC	0.465924	0.628728	0.741058	0.4587
FL_AG*FAC	-0.103477	0.130718	-0.791607	0.4286
FL_BH*FAC	-0.488965	1.499745	-0.326032	0.7444
FL_BS*FAC	-0.074702	0.126477	-0.590642	0.5548
FL_CA*FAC	-0.660126	0.471895	-1.398884	0.1619
FL_DE*FAC	-0.159733	0.254910	-0.626624	0.5309
FL_GI*FAC	-0.219494	0.356653	-0.615428	0.5383
FL_IM*FAC	-0.123927	0.280042	-0.442530	0.6581
FL_KR*FAC	-0.212736	0.422223	-0.503848	0.6144
FL_RU*FAC	0.280691	0.304270	0.922507	0.3563
FL_ST*FAC	-0.413538	0.622629	-0.664181	0.5066
OW_EMN*FAC	0.065538	0.085435	0.767110	0.4430
C_0400S3*FAC	0.135533	0.264393	0.512620	0.6082
C_0700S1*FAC	-0.011850	0.012397	-0.955919	0.3391
C_0900S3*FAC	-0.019664	0.028536	-0.689103	0.4908
C_1200S1*FAC	0.013908	0.018527	0.750688	0.4528
C_1200S4*FAC	-0.032308	0.041020	-0.787596	0.4309
C_1400S2*FAC	-0.010947	0.010645	-1.028362	0.3038
C_2000S1*FAC	0.026954	0.037100	0.726527	0.4675
C_2500S1*FAC	-0.010139	0.020403	-0.496968	0.6192
C_2500S4*FAC	-0.029720	0.045217	-0.657285	0.5110
AMSA_AV*FAC	0.093556	0.175380	0.533446	0.5937
IMOU_AV*FAC	0.322921	0.286854	1.125730	0.2603
USCG_AV*FAC	0.084551	0.132922	0.636097	0.5247
VMOU_AV*FAC	0.181581	0.181086	1.002733	0.3160
LNAGE*(-XB)*FAC	-0.078366	0.037127	-2.110739	0.0348

R-squared	0.000082	Mean dependent var	0.001891
Adjusted R-squared	-0.000685	S.D. dependent var	1.048421
S.E. of regression	1.048780	Akaike info criterion	2.933919
Sum squared resid	57316.80	Schwarz criterion	2.940886
Log likelihood	-76460.94	Durbin-Watson stat	1.887829

Type II: Combined Model - Tonnage

Dependent Variable: BRMR_Y
Method: Least Squares
Date: 06/23/06 Time: 14:58
Sample: 1 52150
Included observations: 52150

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAC	2.987090	0.785241	3.804041	0.0001
ST1_MAX*FAC	-0.330938	0.126530	-2.615490	0.0089
ST3_MAX*FAC	-1.077770	0.280147	-3.847152	0.0001
ST4_MAX*FAC	-0.352821	0.144016	-2.449881	0.0143
ST5_MAX*FAC	-2.316394	0.555976	-4.166355	0.0000
LNAGE*FAC	0.231532	0.072305	3.202158	0.0014
LNTON*FAC	-0.102351	0.041544	-2.463670	0.0138
ST_CHDGC*FAC	-0.386258	0.111065	-3.477756	0.0005
RS_2S*FAC	0.832613	0.203191	4.097681	0.0000
RS_3S*FAC	1.026036	0.250359	4.098260	0.0000
RS_4S*FAC	2.478482	0.582044	4.258239	0.0000
RS_5S*FAC	3.527098	0.839988	4.198987	0.0000
DH*FAC	-0.405185	0.163390	-2.479868	0.0131
LNTIMEBW*FAC	-0.092060	0.031103	-2.959834	0.0031
CL_BV*FAC	0.360533	0.125722	2.867708	0.0041
CL_HEL*FAC	1.538719	0.685903	2.243348	0.0249
FL_AG*FAC	-0.391809	0.150727	-2.599454	0.0093
FL_BH*FAC	-2.286643	1.571232	-1.455319	0.1456
FL_BS*FAC	-0.355356	0.146125	-2.431865	0.0150
FL_CA*FAC	-2.396406	0.652358	-3.673452	0.0002
FL_DE*FAC	-0.865098	0.313730	-2.757458	0.0058
FL_GI*FAC	-0.945998	0.404004	-2.341556	0.0192
FL_IM*FAC	-0.605664	0.306863	-1.973725	0.0484
FL_KR*FAC	-0.955816	0.464660	-2.057024	0.0397
FL_RU*FAC	0.829785	0.333065	2.491365	0.0127
FL_ST*FAC	-1.339052	0.665643	-2.011667	0.0443
OW_EMN*FAC	0.250449	0.098071	2.553740	0.0107
C_0400S3*FAC	0.530983	0.283772	1.871159	0.0613
C_0700S1*FAC	-0.038521	0.014136	-2.725026	0.0064
C_0900S3*FAC	-0.047446	0.029072	-1.632007	0.1027
C_1200S1*FAC	0.042411	0.019848	2.136750	0.0326
C_1200S4*FAC	-0.114117	0.046151	-2.472673	0.0134
C_1400S2*FAC	-0.041536	0.013294	-3.124297	0.0018
C_2000S1*FAC	0.086310	0.040039	2.155647	0.0311
C_2500S1*FAC	-0.031763	0.021117	-1.504164	0.1325

C_2500S4*FAC	-0.094432	0.048091	-1.963593	0.0496
AMSA_AV*FAC	0.474735	0.201463	2.356430	0.0185
IMOU_AV*FAC	1.207106	0.367651	3.283291	0.0010
USCG_AV*FAC	0.245800	0.138647	1.772845	0.0763
VMOU_AV*FAC	0.755109	0.235039	3.212695	0.0013
LNTON*(-XB)*FAC	-0.096752	0.022141	-4.369893	0.0000

R-squared	0.000363	Mean dependent var	0.001891
Adjusted R-squared	-0.000404	S.D. dependent var	1.048421
S.E. of regression	1.048633	Akaike info criterion	2.933638
Sum squared resid	57300.70	Schwarz criterion	2.940605
Log likelihood	-76453.61	Durbin-Watson stat	1.888229

Appendix 27: Matching Models: Type I Models

6 months- Very Serious

Dependent Variable: TOTALCAS
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/30/06 Time: 16:23
Sample: 1 6007 IF ST5_MAX=0 AND CMOU_AV=0
Included observations: 5826
Convergence achieved after 7 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-8.131409	0.966171	-8.416118	0.0000
ST3_MAX	1.315392	0.456566	2.881057	0.0040
LNAGE	-0.366059	0.119815	-3.055207	0.0022
LNTON	0.475650	0.065115	7.304805	0.0000
OWCHD	0.702768	0.245771	2.859440	0.0042
RS_2S	-1.001358	0.194661	-5.144104	0.0000
RS_3S	-1.344727	0.287850	-4.671626	0.0000
RS_4S	-2.499658	0.408670	-6.116572	0.0000
RS_5S	-3.005631	0.765229	-3.927752	0.0001
VMOU_AV	-1.381298	0.353008	-3.912941	0.0001
CL_CRR	2.738680	0.775992	3.529261	0.0004
CL_RIP	4.005732	0.909348	4.405061	0.0000
CL_RNR	4.173554	0.903595	4.618832	0.0000
FL_AG	1.488832	0.390656	3.811107	0.0001
FL_BB	2.060601	0.785528	2.623204	0.0087
FL_BR	3.683345	1.176175	3.131631	0.0017
FL_DK	1.325811	0.509765	2.600825	0.0093
FL_KR	2.127879	0.777016	2.738528	0.0062
FL_LT	2.762602	0.868769	3.179903	0.0015
FL_TR	1.381422	0.366013	3.774246	0.0002
C_1800S	0.503767	0.174895	2.880395	0.0040
LI_OWRET	0.102830	0.034406	2.988733	0.0028
OW_OUK	3.363223	0.570478	5.895451	0.0000

Mean dependent var	0.027635	S.D. dependent var	0.163938
S.E. of regression	0.157107	Akaike info criterion	0.218708
Sum squared resid	143.2335	Schwarz criterion	0.245040
Log likelihood	-614.0955	Hannan-Quinn criter.	0.227866
Restr. log likelihood	-736.5324	Avg. log likelihood	-0.105406
LR statistic (22 df)	244.8738	McFadden R-squared	0.166234
Probability(LR stat)	0.000000		

Obs with Dep=0	5665	Total obs	5826
Obs with Dep=1	161		

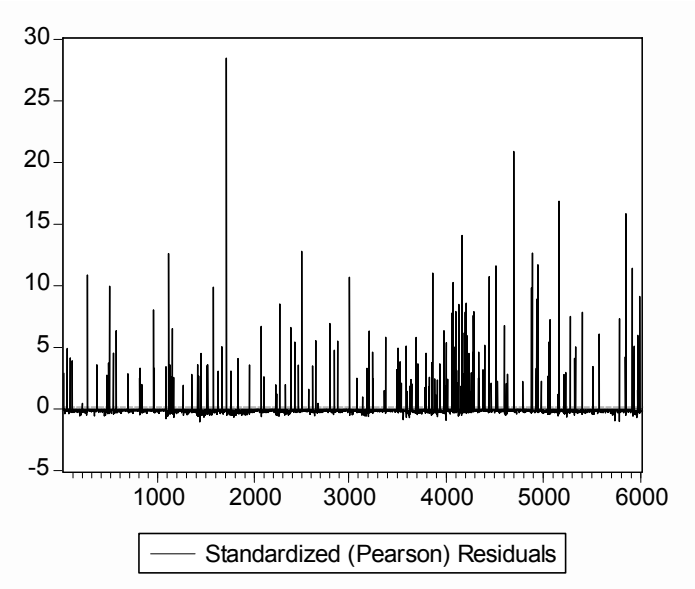
Dependent Variable: TOTALCAS
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/30/06 Time: 16:23
Sample: 1 6007 IF ST5_MAX=0 AND CMOU_AV=0
Included observations: 5826
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	0.0003	0.0027	580	581.031	2	0.96937	582	1.09758
2	0.0027	0.0048	581	580.811	2	2.18867	583	0.01633
3	0.0048	0.0065	578	578.706	4	3.29357	582	0.15238
4	0.0065	0.0090	576	578.525	7	4.47538	583	1.43518
5	0.0090	0.0129	577	576.723	6	6.27668	583	0.01233
6	0.0129	0.0185	570	572.990	12	9.01004	582	1.00782
7	0.0185	0.0243	575	570.580	8	12.4197	583	1.60702
8	0.0243	0.0370	567	564.260	15	17.7401	582	0.43655
9	0.0370	0.0658	562	553.671	21	29.3294	583	2.49081
10	0.0662	0.8278	499	507.703	84	75.2971	583	1.15507
		Total	5665	5665.00	161	161.000	5826	9.41107

H-L Statistic:	9.4111	Prob. Chi-Sq(8)	0.3088
Andrews Statistic:	11.4298	Prob. Chi-Sq(10)	0.3250

Dependent Variable: TOTALCAS
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/30/06 Time: 16:23
Sample: 1 6007 IF ST5_MAX=0 AND CMOU_AV=0
Included observations: 5826
Prediction Evaluation (success cutoff C = 0.0276)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	4188	46	4234	0	0	0
P(Dep=1)>C	1477	115	1592	5665	161	5826
Total	5665	161	5826	5665	161	5826
Correct	4188	115	4303	0	161	161
% Correct	73.93	71.43	73.86	0.00	100.00	2.76
% Incorrect	26.07	28.57	26.14	100.00	0.00	97.24
Total Gain*	73.93	-28.57	71.10			
Percent Gain**	73.93	NA	73.12			



6m – Serious

Dependent Variable: TOTALCAS
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/24/06 Time: 12:58
Sample: 1 46522 IF CMOU_AV=0
Included observations: 45486
Convergence achieved after 10 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-6.623591	0.376920	-17.57294	0.0000
ST3_MAX	0.826772	0.118911	6.952848	0.0000
ST4_MAX	0.423335	0.108020	3.919047	0.0001
ST5_MAX	2.082840	0.169789	12.26720	0.0000
LNAGE	-0.300454	0.049777	-6.035965	0.0000
LNTON	0.428150	0.034595	12.37602	0.0000
ST_CHDGC	0.474506	0.069366	6.840660	0.0000
CLWD_D	-0.199273	0.069145	-2.881952	0.0040
RS_2S	-0.961319	0.074250	-12.94713	0.0000
RS_3S	-1.153201	0.083478	-13.81449	0.0000
RS_4S	-2.749773	0.130410	-21.08558	0.0000
RS_5S	-3.905507	0.239559	-16.30290	0.0000
DH	0.368804	0.136463	2.702595	0.0069
AMSA_AV	-0.566170	0.169921	-3.331960	0.0009
IMOU_AV	-1.560759	0.248083	-6.291277	0.0000
VMOU_AV	-0.632282	0.160008	-3.951565	0.0001
LNTIMEBW	0.152592	0.021536	7.085344	0.0000
CL_DNV	0.360955	0.095647	3.773807	0.0002
CL_GL	0.849893	0.084105	10.10520	0.0000
FL_AL	-5.142419	2.116853	-2.429275	0.0151
FL_BM	1.132910	0.407502	2.780133	0.0054
FL_BS	0.388054	0.125488	3.092348	0.0020
FL_CA	2.683677	0.304742	8.806386	0.0000

FL_CH	1.550844	0.623005	2.489295	0.0128
FL_GI	0.889458	0.381067	2.334125	0.0196
FL_IM	0.697365	0.264829	2.633263	0.0085
FL_KY	0.776826	0.318833	2.436467	0.0148
FL_PL	1.738386	0.529635	3.282236	0.0010
FL_ST	2.112332	0.567356	3.723114	0.0002
FL_UK	0.716200	0.220370	3.249991	0.0012
C_0700S	0.033536	0.007677	4.368208	0.0000
C_1400S	0.031815	0.007447	4.272185	0.0000
C_2000S	-0.072425	0.024310	-2.979266	0.0029
C_2500S	0.039248	0.014616	2.685257	0.0072

Mean dependent var	0.029943	S.D. dependent var	0.170433
S.E. of regression	0.165060	Akaike info criterion	0.232922
Sum squared resid	1238.337	Schwarz criterion	0.239444
Log likelihood	-5263.344	Hannan-Quinn criter.	0.234974
Restr. log likelihood	-6119.911	Avg. log likelihood	-0.115713
LR statistic (33 df)	1713.135	McFadden R-squared	0.139964
Probability(LR stat)	0.000000		

Obs with Dep=0	44124	Total obs	45486
Obs with Dep=1	1362		

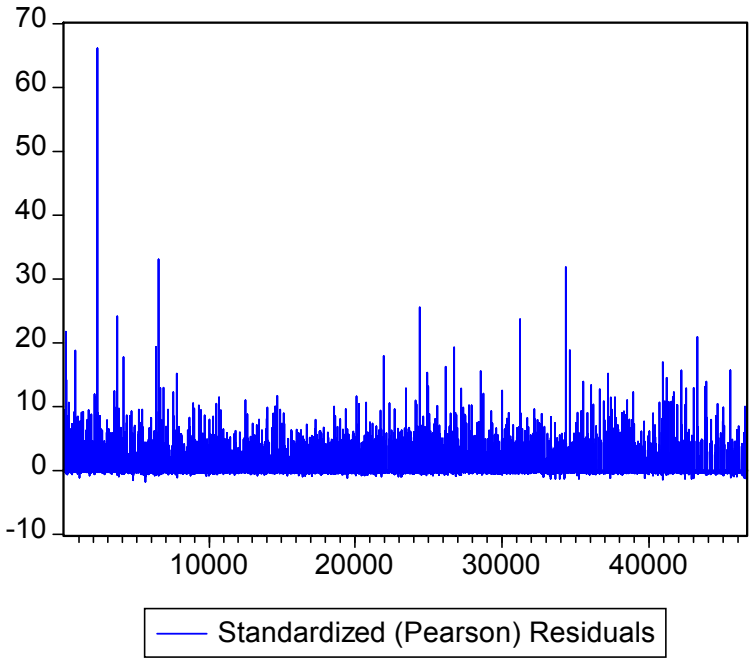
Dependent Variable: TOTALCAS
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/24/06 Time: 12:58
Sample: 1 46522 IF CMOU_AV=0
Included observations: 45486
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	2.E-05	0.0030	4536	4539.72	12	8.27936	4548	1.67505
2	0.0030	0.0057	4532	4529.42	17	19.5801	4549	0.34145
3	0.0057	0.0090	4517	4514.78	31	33.2180	4548	0.14918
4	0.0090	0.0121	4503	4500.98	46	48.0207	4549	0.08593
5	0.0121	0.0171	4480	4483.19	69	65.8108	4549	0.15682
6	0.0171	0.0237	4462	4455.75	86	92.2514	4548	0.43239
7	0.0237	0.0311	4428	4425.24	121	123.760	4549	0.06327
8	0.0311	0.0433	4380	4381.88	168	166.119	4548	0.02210
9	0.0433	0.0670	4306	4307.20	243	241.798	4549	0.00631
10	0.0670	0.8432	3980	3985.84	569	563.163	4549	0.06905
		Total	44124	44124.0	1362	1362.00	45486	3.00156

H-L Statistic:	3.0016	Prob. Chi-Sq(8)	0.9343
Andrews Statistic:	3.3017	Prob. Chi-Sq(10)	0.9734

Dependent Variable: TOTALCAS
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/24/06 Time: 12:58
Sample: 1 46522 IF CMOU_AV=0
Included observations: 45486
Prediction Evaluation (success cutoff C = 0.029943)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	30886	363	31249	0	0	0
P(Dep=1)>C	13238	999	14237	44124	1362	45486
Total	44124	1362	45486	44124	1362	45486
Correct	30886	999	31885	0	1362	1362
% Correct	70.00	73.35	70.10	0.00	100.00	2.99
% Incorrect	30.00	26.65	29.90	100.00	0.00	97.01
Total Gain*	70.00	-26.65	67.10			
Percent Gain**	70.00	NA	69.18			



6 month - Less Serious

Dependent Variable: TOTALCAS
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/22/06 Time: 12:04
Sample: 1 28008 IF CMOU_AV=0
Included observations: 27411
Convergence achieved after 10 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-7.425953	0.355822	-20.86983	0.0000
ST3_MAX	0.462733	0.136248	3.396253	0.0007
ST4_MAX	0.443063	0.116058	3.817600	0.0001
ST5_MAX	1.733403	0.184055	9.417846	0.0000
DET_AMSA	0.764803	0.191423	3.995350	0.0001
LNTON	0.337702	0.037472	9.012093	0.0000
OWCHD	0.277172	0.102161	2.713082	0.0067
ST_CHDGC	0.579459	0.084296	6.874060	0.0000
AMSA_AV	-0.973242	0.233935	-4.160317	0.0000
IMOU_AV	-1.545097	0.355240	-4.349452	0.0000
VMOU_AV	-0.494673	0.205342	-2.409021	0.0160
LNTIMEBW	0.114478	0.025498	4.489647	0.0000
RS_3S	-0.306589	0.099377	-3.085114	0.0020
RS_4S	-0.365418	0.100622	-3.631608	0.0003
RS_5S	-0.493139	0.147355	-3.346597	0.0008
CL_INC	2.281758	0.920734	2.478194	0.0132
CL_LR	0.250316	0.099454	2.516892	0.0118
FL_BB	1.022071	0.380614	2.685325	0.0072
FL_BH	4.362188	1.385884	3.147585	0.0016
FL_CA	2.533080	0.443200	5.715434	0.0000
FL_EG	1.934990	0.435610	4.442022	0.0000
FL_GE	-3.507990	1.084069	-3.235948	0.0012
FL_IR	1.136576	0.388430	2.926079	0.0034
FL_SY	-3.049523	1.054591	-2.891665	0.0038
FL_UK	0.818191	0.240268	3.405333	0.0007
C_0900S	0.024972	0.007878	3.170072	0.0015
C_1400S	0.023392	0.010582	2.210591	0.0271
C_1700S	0.047355	0.015966	2.965966	0.0030
OW_TMN	0.285909	0.086792	3.294167	0.0010

Mean dependent var	0.031374	S.D. dependent var	0.174330
S.E. of regression	0.171646	Akaike info criterion	0.260000
Sum squared resid	806.7374	Schwarz criterion	0.268695
Log likelihood	-3534.435	Hannan-Quinn criter.	0.262802
Restr. log likelihood	-3823.486	Avg. log likelihood	-0.128942
LR statistic (28 df)	578.1021	McFadden R-squared	0.075599
Probability(LR stat)	0.000000		

Obs with Dep=0	26551	Total obs	27411
Obs with Dep=1	860		

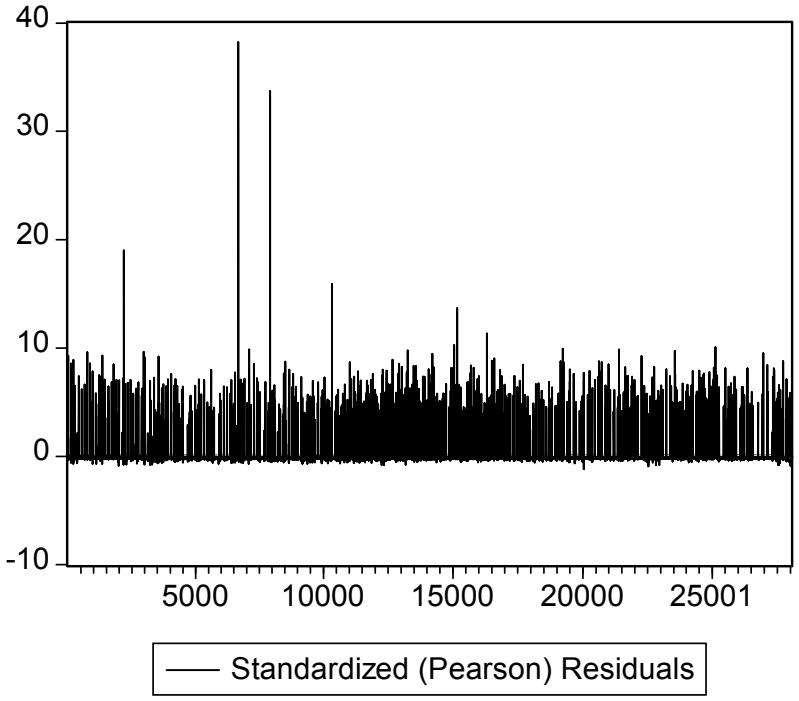
Dependent Variable: TOTALCAS
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/22/06 Time: 12:04
Sample: 1 28008 IF CMOU_AV=0
Included observations: 27411
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	2.E-05	0.0095	2735	2728.26	6	12.7367	2741	3.57983
2	0.0095	0.0140	2706	2707.51	35	33.4913	2741	0.06881
3	0.0140	0.0168	2710	2698.70	31	42.2964	2741	3.06429
4	0.0168	0.0199	2693	2690.90	48	50.0994	2741	0.08961
5	0.0199	0.0235	2679	2681.69	62	59.3053	2741	0.12514
6	0.0235	0.0282	2674	2670.29	67	70.7110	2741	0.19991
7	0.0282	0.0345	2630	2656.03	111	84.9708	2741	8.22864
8	0.0345	0.0426	2635	2636.12	106	104.883	2741	0.01236
9	0.0426	0.0580	2599	2606.74	142	134.265	2741	0.46857
10	0.0580	0.8180	2490	2474.76	252	267.241	2742	0.96305
		Total	26551	26551.0	860	860.000	27411	16.8002

H-L Statistic:	16.8002	Prob. Chi-Sq(8)	0.0323
Andrews Statistic:	36.3934	Prob. Chi-Sq(10)	0.0001

Dependent Variable: TOTALCAS
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/22/06 Time: 12:04
Sample: 1 28008 IF CMOU_AV=0
Included observations: 27411
Prediction Evaluation (success cutoff C = 0.03137)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	17708	313	18021	0	0	0
P(Dep=1)>C	8843	547	9390	26551	860	27411
Total	26551	860	27411	26551	860	27411
Correct	17708	547	18255	0	860	860
% Correct	66.69	63.60	66.60	0.00	100.00	3.14
% Incorrect	33.31	36.40	33.40	100.00	0.00	96.86
Total Gain*	66.69	-36.40	63.46			
Percent Gain**	66.69	NA	65.52			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Standardized (Pearson) Residuals

Appendix 28: Matching Models: Type II Model

Very Serious and Serious Combined

Dependent Variable: TOTALCAS
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 06/22/06 Time: 22:52
Sample: 1 52150
Included observations: 52150
Convergence achieved after 7 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-6.459764	0.417999	-15.45403	0.0000
ST1_MAX	0.310843	0.104659	2.970046	0.0030
ST3_MAX	1.152232	0.124555	9.250785	0.0000
ST4_MAX	0.348282	0.114469	3.042589	0.0023
ST5_MAX	2.446845	0.163026	15.00895	0.0000
LNAGE	-0.274650	0.045661	-6.015006	0.0000
LNTON	0.453563	0.038683	11.72519	0.0000
ST_CHDGC	0.466394	0.066705	6.991895	0.0000
RS_2S	-0.979696	0.068677	-14.26520	0.0000
RS_3S	-1.183811	0.080034	-14.79134	0.0000
RS_4S	-2.771417	0.122720	-22.58320	0.0000
RS_5S	-3.879339	0.226207	-17.14952	0.0000
DH	0.439719	0.131212	3.351204	0.0008
LNTIMEBW	0.110732	0.019175	5.774709	0.0000
CL_BV	-0.424477	0.090092	-4.711605	0.0000
CL_HEL	-1.864871	0.571568	-3.262727	0.0011
FL_AG	0.472199	0.119882	3.938857	0.0001
FL_BH	2.534354	0.988805	2.563048	0.0104
FL_BS	0.373358	0.117892	3.166960	0.0015
FL_CA	2.664072	0.321357	8.290062	0.0000
FL_DE	0.962096	0.228742	4.206037	0.0000
FL_GI	1.086758	0.355024	3.061083	0.0022
FL_IM	0.699019	0.263999	2.647808	0.0081
FL_KR	1.039287	0.399637	2.600580	0.0093
FL_RU	-1.114659	0.263470	-4.230681	0.0000
FL_ST	1.704192	0.538017	3.167544	0.0015
OW_EMN	-0.282571	0.076981	-3.670639	0.0002
C_0400S3	-0.614959	0.222312	-2.766198	0.0057
C_0700S1	0.049588	0.010973	4.518925	0.0000
C_0900S3	0.065725	0.021861	3.006474	0.0026
C_1200S1	-0.052770	0.015964	-3.305644	0.0009
C_1200S4	0.126155	0.034439	3.663143	0.0002
C_1400S2	0.046748	0.007643	6.116191	0.0000
C_2000S1	-0.111775	0.030128	-3.709996	0.0002
C_2500S1	0.041474	0.016796	2.469206	0.0135
C_2500S4	0.119394	0.041185	2.898938	0.0037
AMSA_AV	-0.518260	0.165448	-3.132458	0.0017

IMOU_AV	-1.419812	0.232253	-6.113200	0.0000
USCG_AV	-0.318479	0.122117	-2.607979	0.0091
VMOU_AV	-0.826658	0.146462	-5.644186	0.0000

Mean dependent var	0.029530	S.D. dependent var	0.169289
S.E. of regression	0.164276	Akaike info criterion	0.232897
Sum squared resid	1406.275	Schwarz criterion	0.239694
Log likelihood	-6032.783	Hannan-Quinn criter.	0.235022
Restr. log likelihood	-6941.441	Avg. log likelihood	-0.115681
LR statistic (39 df)	1817.316	McFadden R-squared	0.130903
Probability(LR stat)	0.000000		

Obs with Dep=0	50610	Total obs	52150
Obs with Dep=1	1540		

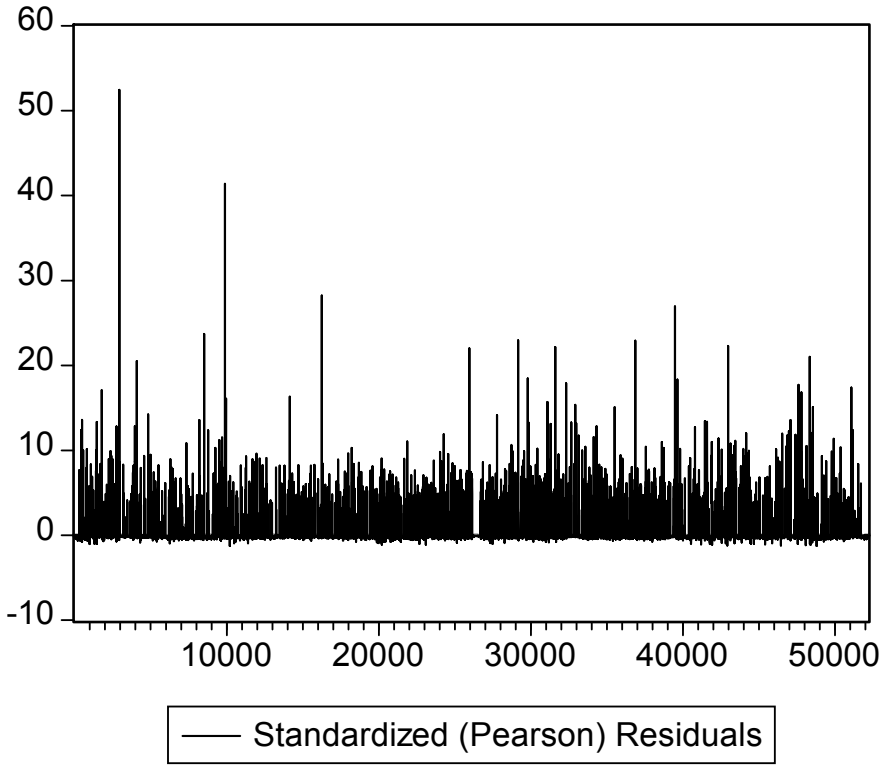
Dependent Variable: TOTALCAS
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 06/22/06 Time: 22:52
Sample: 1 52150
Included observations: 52150
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	6.E-05	0.0033	5199	5205.17	16	9.82815	5215	3.88310
2	0.0033	0.0060	5194	5190.64	21	24.3634	5215	0.46650
3	0.0060	0.0088	5183	5176.89	32	38.1117	5215	0.98731
4	0.0088	0.0129	5155	5159.00	60	56.0044	5215	0.28815
5	0.0129	0.0179	5122	5135.88	93	79.1166	5215	2.47380
6	0.0179	0.0241	5106	5105.95	109	109.048	5215	2.2E-05
7	0.0241	0.0314	5089	5071.09	126	143.914	5215	2.29310
8	0.0314	0.0428	5037	5023.94	178	191.059	5215	0.92656
9	0.0428	0.0657	4932	4941.12	283	273.880	5215	0.32054
10	0.0657	0.9732	4593	4600.33	622	614.675	5215	0.09896
		Total	50610	50610.0	1540	1540.00	52150	11.7380

H-L Statistic:	11.7380	Prob. Chi-Sq(8)	0.1633
Andrews Statistic:	10.9579	Prob. Chi-Sq(10)	0.3608

Dependent Variable: TOTALCAS
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 06/22/06 Time: 22:52
Sample: 1 52150
Included observations: 52150
Prediction Evaluation (success cutoff C = 0.0295)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	34858	423	35281	0	0	0
P(Dep=1)>C	15752	1117	16869	50610	1540	52150
Total	50610	1540	52150	50610	1540	52150
Correct	34858	1117	35975	0	1540	1540
% Correct	68.88	72.53	68.98	0.00	100.00	2.95
% Incorrect	31.12	27.47	31.02	100.00	0.00	97.05
Total Gain*	68.88	-27.47	66.03			
Percent Gain**	68.88	NA	68.04			



Appendix 29: LM Test: Type III Models

Fire/Explosion
Tonnage

Dependent Variable: BRMR_Y
Method: Least Squares
Date: 05/31/06 Time: 11:15
Sample: 1 6218 IF CMOU_AV=0 AND ST3_MAX=0
Included observations: 5675

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAC	3.096052	2.851226	1.085867	0.2776
ST1_MAX*FAC	0.926331	0.853471	1.085369	0.2778
ST2_MAX*FAC	0.960204	0.895525	1.072225	0.2837
ST4_MAX*FAC	0.876841	0.827890	1.059127	0.2896
LNTON*FAC	-0.155338	0.158336	-0.981067	0.3266
OW_EMN*FAC	0.844088	0.798600	1.056959	0.2906
OW_TMN*FAC	0.437090	0.435238	1.004255	0.3153
OW_IOR*FAC	1.154002	1.129190	1.021973	0.3068
ST_CHDGC*FAC	-0.320626	0.331008	-0.968636	0.3328
IMOU_AV*FAC	1.161316	1.198474	0.968995	0.3326
VMOU_AV*FAC	0.899939	0.908426	0.990657	0.3219
LNTIMEBW*FAC	-0.111826	0.115127	-0.971331	0.3314
FL_BG*FAC	-1.617296	1.595029	-1.013960	0.3106
C_1400S*FAC	-0.035910	0.036208	-0.991770	0.3214
C_1800S*FAC	-0.234127	0.241923	-0.967776	0.3332
LNTON*(-XB)*FAC	-0.083227	0.073513	-1.132148	0.2576

R-squared	0.000226	Mean dependent var	-0.000103
Adjusted R-squared	-0.002424	S.D. dependent var	0.988561
S.E. of regression	0.989758	Akaike info criterion	2.820103
Sum squared resid	5543.674	Schwarz criterion	2.838834
Log likelihood	-7986.041	Durbin-Watson stat	1.953133

Wrecked/Stranded/Grounded
Age

Dependent Variable: BRMR_Y
Method: Least Squares
Date: 05/30/06 Time: 22:13
Sample: 1 19131 IF CMOU_AV=0 AND ST5_MAX=0 AND
ST5_MAX=0
Included observations: 18600

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAC	0.156277	0.192608	0.811375	0.4172
ST1_MAX*FAC	0.071050	0.031129	2.282418	0.0225
ST2_MAX*FAC	0.067233	0.029557	2.274659	0.0229

DET_AMSA*FAC	-0.040433	0.049176	-0.822201	0.4110
LNTON*FAC	-0.018231	0.018131	-1.005513	0.3147
LNAGE*FAC	0.085997	0.039433	2.180819	0.0292
OWCHD*FAC	-0.028728	0.023295	-1.233213	0.2175
ST_CHDGC*FAC	-0.041397	0.030272	-1.367487	0.1715
AMSA_AV*FAC	0.083611	0.072560	1.152301	0.2492
IMOU_AV*FAC	0.125406	0.081172	1.544942	0.1224
CL_LR*FAC	-0.045160	0.025192	-1.792631	0.0730
FL_BM*FAC	-0.259467	0.177691	-1.460216	0.1442
FL_IM*FAC	-0.040411	0.075706	-0.533781	0.5935
FL_RU*FAC	0.097281	0.083196	1.169301	0.2423
FL_UK*FAC	-0.121256	0.068763	-1.763386	0.0779
C_0700S*FAC	-0.001538	0.002164	-0.711027	0.4771
C_1000S*FAC	-0.019906	0.017924	-1.110590	0.2668
C_1400S*FAC	-0.003465	0.002365	-1.465588	0.1428
LNAGE*(-XB)*FAC	-0.027083	0.013742	-1.970839	0.0488

R-squared	0.000587	Mean dependent var	-1.48E-13
Adjusted R-squared	-0.000381	S.D. dependent var	0.160131
S.E. of regression	0.160161	Akaike info criterion	-0.824248
Sum squared resid	476.6338	Schwarz criterion	-0.816249
Log likelihood	7684.509	Durbin-Watson stat	1.906424

Tonnage

Dependent Variable: BRMR_Y
Method: Least Squares
Date: 05/30/06 Time: 22:18
Sample: 1 19131 IF CMOU_AV=0 AND ST5_MAX=0 AND ST5_MAX=0
Included observations: 18600

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAC	0.785217	0.341382	2.300111	0.0215
ST1_MAX*FAC	0.137705	0.043500	3.165632	0.0015
ST2_MAX*FAC	0.164673	0.051731	3.183255	0.0015
DET_AMSA*FAC	-0.147034	0.068045	-2.160819	0.0307
LNTON*FAC	-0.000483	0.010015	-0.048235	0.9615
LNAGE*FAC	-0.050594	0.024485	-2.066275	0.0388
OWCHD*FAC	-0.074916	0.031244	-2.397808	0.0165
ST_CHDGC*FAC	-0.112035	0.044446	-2.520706	0.0117
AMSA_AV*FAC	0.293536	0.117397	2.500373	0.0124
IMOU_AV*FAC	0.289128	0.110300	2.621290	0.0088
CL_LR*FAC	-0.099497	0.035234	-2.823880	0.0047
FL_BM*FAC	-0.558821	0.224304	-2.491351	0.0127
FL_IM*FAC	-0.202903	0.103530	-1.959851	0.0500
FL_RU*FAC	0.206305	0.097293	2.120447	0.0340
FL_UK*FAC	-0.331594	0.114365	-2.899429	0.0037
C_0700S*FAC	-0.004267	0.002503	-1.705048	0.0882
C_1000S*FAC	-0.048190	0.022207	-2.170057	0.0300

C_1400S*FAC	-0.005912	0.002623	-2.254248	0.0242
LNTON*(-XB)*FAC	-0.023044	0.007890	-2.920527	0.0035

R-squared	0.000837	Mean dependent var	-1.48E-13
Adjusted R-squared	-0.000131	S.D. dependent var	0.160131
S.E. of regression	0.160141	Akaike info criterion	-0.824498
Sum squared resid	476.5147	Schwarz criterion	-0.816499
Log likelihood	7686.833	Durbin-Watson stat	1.906463

Collision/Contact
Age

Dependent Variable: BRMR_Y
Method: Least Squares
Date: 05/30/06 Time: 21:48
Sample: 1 23254 IF CMOU_AV=0 AND ST6_MAX=0
Included observations: 22329

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAC	-0.607202	0.854825	-0.710323	0.4775
ST1_MAX*FAC	-0.318448	0.384232	-0.828789	0.4072
ST2_MAX*FAC	-0.320912	0.386051	-0.831268	0.4058
ST3_MAX*FAC	-0.269751	0.360442	-0.748389	0.4542
ST4_MAX*FAC	-0.263790	0.343996	-0.766841	0.4432
LNTON*FAC	0.073409	0.089489	0.820313	0.4120
LNAGE*FAC	-0.168408	0.177503	-0.948758	0.3428
C_0900S*FAC	0.006767	0.011950	0.566276	0.5712
C_2100S*FAC	-0.062268	0.144537	-0.430810	0.6666
C_2500S*FAC	0.013557	0.024830	0.545995	0.5851
ST_CHDGC*FAC	0.127889	0.158941	0.804632	0.4210
AMSA_AV*FAC	-0.142339	0.278291	-0.511476	0.6090
IMOU_AV*FAC	-0.212939	0.387633	-0.549331	0.5828
VMOU_AV*FAC	-0.155418	0.290754	-0.534533	0.5930
CL_BV*FAC	0.082962	0.176251	0.470703	0.6379
CL_DNV*FAC	0.085382	0.179435	0.475835	0.6342
CL_GL*FAC	0.107528	0.178628	0.601969	0.5472
CL_LR*FAC	0.153876	0.201849	0.762333	0.4459
CL_NKK*FAC	0.082130	0.172115	0.477181	0.6332
CL_TLL*FAC	0.324735	0.526211	0.617119	0.5372
FL_GI*FAC	0.174485	0.469608	0.371555	0.7102
FL_KY*FAC	0.172906	0.441715	0.391441	0.6955
LNAGE*(-XB)*FAC	0.066550	0.066316	1.003527	0.3156

R-squared	0.000045	Mean dependent var	-8.31E-05
Adjusted R-squared	-0.000941	S.D. dependent var	1.005635
S.E. of regression	1.006108	Akaike info criterion	2.851085
Sum squared resid	22579.31	Schwarz criterion	2.859339
Log likelihood	-31807.94	Durbin-Watson stat	1.908377

Tonnage

Dependent Variable: BRMR_Y
Method: Least Squares
Date: 05/30/06 Time: 21:53
Sample: 1 23254 IF CMOU_AV=0 AND ST6_MAX=0
Included observations: 22329

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAC	2.398870	1.656344	1.448292	0.1475
ST1_MAX*FAC	1.094541	0.736331	1.486480	0.1372
ST2_MAX*FAC	1.181894	0.790078	1.495921	0.1347
ST3_MAX*FAC	0.836628	0.589076	1.420239	0.1556
ST4_MAX*FAC	0.920799	0.632245	1.456396	0.1453
LNTON*FAC	-0.038124	0.057078	-0.667932	0.5042
LNAGE*FAC	-0.250617	0.171200	-1.463880	0.1432
C_0900S*FAC	-0.019789	0.016100	-1.229150	0.2190
C_2100S*FAC	0.197589	0.182151	1.084754	0.2780
C_2500S*FAC	-0.036984	0.031614	-1.169868	0.2421
ST_CHDGC*FAC	-0.427042	0.290532	-1.469865	0.1416
AMSA_AV*FAC	0.595048	0.451329	1.318435	0.1874
IMOU_AV*FAC	0.730147	0.570624	1.279559	0.2007
VMOU_AV*FAC	0.632690	0.475423	1.330793	0.1833
CL_BV*FAC	-0.259189	0.228034	-1.136622	0.2557
CL_DNV*FAC	-0.312453	0.255567	-1.222587	0.2215
CL_GL*FAC	-0.368885	0.276907	-1.332160	0.1828
CL_LR*FAC	-0.551158	0.377899	-1.458480	0.1447
CL_NKK*FAC	-0.260178	0.225627	-1.153133	0.2489
CL_TLL*FAC	-0.966813	0.747382	-1.293599	0.1958
FL_GI*FAC	-0.649875	0.604051	-1.075861	0.2820
FL_KY*FAC	-0.650373	0.583329	-1.114933	0.2649
LNTON*(-XB)*FAC	-0.070640	0.045418	-1.555322	0.1199

R-squared	0.000108	Mean dependent var	-8.31E-05
Adjusted R-squared	-0.000878	S.D. dependent var	1.005635
S.E. of regression	1.006076	Akaike info criterion	2.851021
Sum squared resid	22577.88	Schwarz criterion	2.859276
Log likelihood	-31807.23	Durbin-Watson stat	1.908578

Deck Related First Events

Age

Dependent Variable: BRMR_Y
Method: Least Squares
Date: 05/31/06 Time: 11:56
Sample: 1 8357 IF CMOU_AV=0 AND ST5_MAX=0 AND ST6_MAX=0
Included observations: 7771

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAC	-0.290573	0.216955	-1.339323	0.1805
LNTON*FAC	0.025859	0.022878	1.130328	0.2584
LNAGE*FAC	-0.009030	0.039642	-0.227785	0.8198
C_1200S*FAC	0.004655	0.004407	1.056280	0.2909
C_1900S*FAC	-0.014794	0.040770	-0.362858	0.7167
ST_CHDGC*FAC	0.016218	0.034417	0.471229	0.6375
CLWD_D*FAC	-0.005494	0.032465	-0.169214	0.8656
IMOU_AV*FAC	0.048569	0.158642	0.306157	0.7595
VMOU_AV*FAC	-0.067803	0.085471	-0.793284	0.4276
RS_INSP*FAC	0.007430	0.081195	0.091504	0.9271
CL_BV*FAC	-0.032141	0.074734	-0.430070	0.6672
FL_AG*FAC	0.030087	0.064500	0.466470	0.6409
FL_BB*FAC	0.050082	0.142663	0.351048	0.7256
FL_NL*FAC	0.021603	0.077449	0.278936	0.7803
FL_NS*FAC	0.086400	0.084777	1.019147	0.3082
FL_TR*FAC	0.036180	0.066581	0.543392	0.5869
LNAGE*(-XB)*FAC	0.006771	0.013590	0.498216	0.6183

R-squared	0.000889	Mean dependent var	-5.87E-15
Adjusted R-squared	-0.001173	S.D. dependent var	0.167372
S.E. of regression	0.167470	Akaike info criterion	-0.733835
Sum squared resid	217.4713	Schwarz criterion	-0.718613
Log likelihood	2868.315	Durbin-Watson stat	1.876014

Tonnage

Dependent Variable: BRMR_Y
Method: Least Squares
Date: 05/31/06 Time: 11:59
Sample: 1 8357 IF CMOU_AV=0 AND ST5_MAX=0 AND ST6_MAX=0
Included observations: 7771

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAC	0.243312	0.259581	0.937325	0.3486
LNTON*FAC	-0.000256	0.013579	-0.018828	0.9850
LNAGE*FAC	-0.026940	0.025254	-1.066760	0.2861
C_1200S*FAC	-0.002612	0.004222	-0.618543	0.5362
C_1900S*FAC	-0.065274	0.039404	-1.656540	0.0977
ST_CHDGC*FAC	-0.041784	0.035867	-1.164981	0.2441
CLWD_D*FAC	-0.060170	0.033416	-1.800643	0.0718

IMOU_AV*FAC	0.297172	0.163836	1.813835	0.0697
VMOU_AV*FAC	0.066930	0.091390	0.732356	0.4640
RS_INSP*FAC	0.153095	0.081322	1.882578	0.0598
CL_BV*FAC	0.087826	0.075419	1.164509	0.2443
FL_AG*FAC	-0.071357	0.065929	-1.082338	0.2791
FL_BB*FAC	-0.170930	0.148684	-1.149616	0.2503
FL_NL*FAC	-0.093856	0.079392	-1.182190	0.2372
FL_NS*FAC	-0.047023	0.085780	-0.548183	0.5836
FL_TR*FAC	-0.072301	0.067188	-1.076098	0.2819
LNTON*(-XB)*FAC	-0.009672	0.004756	-2.033650	0.0420

R-squared	0.001389	Mean dependent var	-5.87E-15
Adjusted R-squared	-0.000671	S.D. dependent var	0.167372
S.E. of regression	0.167428	Akaike info criterion	-0.734336
Sum squared resid	217.3624	Schwarz criterion	-0.719114
Log likelihood	2870.262	Durbin-Watson stat	1.875529

Engine Related First Events
Age

Dependent Variable: BRMR_Y
Method: Least Squares
Date: 05/30/06 Time: 22:37
Sample: 1 27079
Included observations: 27079

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAC	-0.344573	0.960055	-0.358910	0.7197
ST1_MAX*FAC	-0.032034	0.122330	-0.261862	0.7934
ST5_MAX*FAC	0.101521	0.297301	0.341476	0.7327
DET_AMSA*FAC	0.037739	0.235424	0.160302	0.8726
DET_USCG*FAC	-0.024448	0.153848	-0.158911	0.8737
LNTON*FAC	0.023245	0.069450	0.334698	0.7379
LNAGE*FAC	-0.074277	0.182448	-0.407113	0.6839
ST_CHDGC*FAC	0.037491	0.118671	0.315921	0.7521
PMOU_AV*FAC	0.060002	0.210048	0.285660	0.7751
USCG_AV*FAC	0.052137	0.239443	0.217745	0.8276
LNTIMEBW*FAC	0.006542	0.036453	0.179454	0.8576
CL_DNV*FAC	0.022422	0.130787	0.171442	0.8639
CL_GL*FAC	0.017996	0.110230	0.163257	0.8703
CL_LR*FAC	0.025808	0.123779	0.208497	0.8348
FL_BB*FAC	0.075488	0.432535	0.174524	0.8615
FL_PA*FAC	-0.025606	0.151126	-0.169438	0.8655
FL_RU*FAC	-0.117518	0.471316	-0.249341	0.8031
FL_UK*FAC	0.049978	0.252050	0.198284	0.8428
C_0400S*FAC	-0.010052	0.046209	-0.217534	0.8278
C_0700S*FAC	0.003550	0.012477	0.284545	0.7760
C_1400S*FAC	0.005211	0.015244	0.341821	0.7325
C_1700S*FAC	0.003106	0.019009	0.163398	0.8702

C_2000S*FAC	-0.005667	0.034924	-0.162260	0.8711
LNAGE*(-XB)*FAC	0.026194	0.061081	0.428831	0.6680

R-squared	0.000003	Mean dependent var	-0.001900
Adjusted R-squared	-0.000847	S.D. dependent var	0.978978
S.E. of regression	0.979392	Akaike info criterion	2.797117
Sum squared resid	25951.41	Schwarz criterion	2.804391
Log likelihood	-37847.57	Durbin-Watson stat	1.883404

Tonnage

Dependent Variable: BRMR_Y
Method: Least Squares
Date: 05/30/06 Time: 22:40
Sample: 1 27079
Included observations: 27079

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAC	0.853480	1.717190	0.497021	0.6192
ST1_MAX*FAC	0.066313	0.159747	0.415112	0.6781
ST5_MAX*FAC	-0.305586	0.612350	-0.499038	0.6178
DET_AMSA*FAC	-0.094761	0.283948	-0.333725	0.7386
DET_USCG*FAC	0.053150	0.175453	0.302928	0.7619
LNTON*FAC	0.005418	0.044641	0.121376	0.9034
LNAGE*FAC	-0.035126	0.088393	-0.397381	0.6911
ST_CHDGC*FAC	-0.075092	0.164709	-0.455907	0.6485
PMOU_AV*FAC	-0.143957	0.317143	-0.453919	0.6499
USCG_AV*FAC	-0.163142	0.374440	-0.435696	0.6631
LNTIMEBW*FAC	-0.015314	0.044233	-0.346205	0.7292
CL_DNV*FAC	-0.056625	0.161666	-0.350260	0.7261
CL_GL*FAC	-0.044178	0.132478	-0.333471	0.7388
CL_LR*FAC	-0.067887	0.169143	-0.401362	0.6882
FL_BB*FAC	-0.156483	0.495927	-0.315536	0.7524
FL_PA*FAC	0.074478	0.199063	0.374145	0.7083
FL_RU*FAC	0.209400	0.554915	0.377355	0.7059
FL_UK*FAC	-0.162426	0.383074	-0.424007	0.6716
C_0400S*FAC	0.021103	0.056743	0.371903	0.7100
C_0700S*FAC	-0.007265	0.016757	-0.433557	0.6646
C_1400S*FAC	-0.010685	0.022442	-0.476127	0.6340
C_1700S*FAC	-0.007054	0.022168	-0.318189	0.7503
C_2000S*FAC	0.013391	0.041267	0.324493	0.7456
LNTON*(-XB)*FAC	-0.019114	0.036613	-0.522060	0.6016

R-squared	0.000006	Mean dependent var	-0.001900
Adjusted R-squared	-0.000844	S.D. dependent var	0.978978
S.E. of regression	0.979391	Akaike info criterion	2.797114
Sum squared resid	25951.33	Schwarz criterion	2.804387
Log likelihood	-37847.52	Durbin-Watson stat	1.883431

Appendix 30: Matching Models: Type III Models

Fire/Explosion

Dependent Variable: DFIRE
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/31/06 Time: 11:07
Sample: 1 6218 IF CMOU_AV=0 AND ST3_MAX=0
Included observations: 5675
Convergence achieved after 8 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-7.229885	0.921698	-7.844097	0.0000
ST1_MAX	-1.223850	0.242689	-5.042883	0.0000
ST2_MAX	-1.228998	0.289421	-4.246398	0.0000
ST4_MAX	-1.160351	0.316853	-3.662111	0.0003
LNTON	0.539948	0.092407	5.843167	0.0000
OW_EMN	-1.124903	0.285198	-3.944286	0.0001
OW_TMN	-0.589246	0.205808	-2.863080	0.0042
OW_IOR	-1.492678	0.468662	-3.184981	0.0014
ST_CHDGC	0.439970	0.175683	2.504344	0.0123
IMOU_AV	-1.510359	0.607167	-2.487552	0.0129
VMOU_AV	-1.095074	0.453933	-2.412411	0.0158
LNTIMEBW	0.150324	0.048607	3.092675	0.0020
FL_BG	1.994803	0.701750	2.842612	0.0045
C_1400S	0.048602	0.016427	2.958722	0.0031
C_1800S	0.284939	0.119094	2.392545	0.0167

Mean dependent var	0.033656	S.D. dependent var	0.180359
S.E. of regression	0.176983	Akaike info criterion	0.273701
Sum squared resid	177.2886	Schwarz criterion	0.291262
Log likelihood	-761.6271	Hannan-Quinn criter.	0.279817
Restr. log likelihood	-835.5356	Avg. log likelihood	-0.134207
LR statistic (14 df)	147.8170	McFadden R-squared	0.088456
Probability(LR stat)	0.000000		

Obs with Dep=0	5484	Total obs	5675
Obs with Dep=1	191		

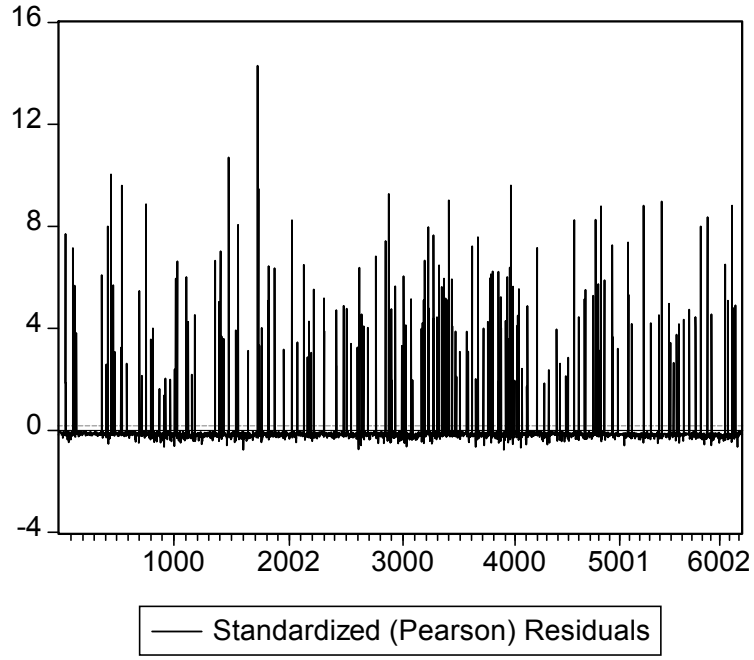
Dependent Variable: DFIRE
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/31/06 Time: 11:07
Sample: 1 6218 IF CMOU_AV=0 AND ST3_MAX=0
Included observations: 5675
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	0.0002	0.0082	566	564.446	1	2.55361	567	0.94949
2	0.0082	0.0123	560	562.022	8	5.97841	568	0.69087
3	0.0123	0.0157	555	559.019	12	7.98093	567	2.05283
4	0.0157	0.0183	563	558.303	5	9.69703	568	2.31465
5	0.0184	0.0238	554	555.318	13	11.6820	567	0.15182
6	0.0238	0.0293	553	552.916	15	15.0838	568	0.00048
7	0.0293	0.0371	546	548.234	21	18.7657	567	0.27512
8	0.0372	0.0466	550	544.349	18	23.6514	568	1.40903
9	0.0467	0.0679	530	535.587	37	31.4132	567	1.05190
10	0.0679	0.5048	507	503.806	61	64.1940	568	0.17916
		Total	5484	5484.00	191	191.000	5675	9.07536

H-L Statistic:	9.0754	Prob. Chi-Sq(8)	0.3360
Andrews Statistic:	13.4956	Prob. Chi-Sq(10)	0.1973

Dependent Variable: DFIRE
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/31/06 Time: 11:07
Sample: 1 6218 IF CMOU_AV=0 AND ST3_MAX=0
Included observations: 5675
Prediction Evaluation (success cutoff C = 0.03365)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	3654	64	3718	0	0	0
P(Dep=1)>C	1830	127	1957	5484	191	5675
Total	5484	191	5675	5484	191	5675
Correct	3654	127	3781	0	191	191
% Correct	66.63	66.49	66.63	0.00	100.00	3.37
% Incorrect	33.37	33.51	33.37	100.00	0.00	96.63
Total Gain*	66.63	-33.51	63.26			
Percent Gain**	66.63	NA	65.46			



Wrecked/Stranded/Grounded

Dependent Variable: DWSG
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/26/06 Time: 18:59
Sample: 1 19131 IF CMOU_AV=0 AND ST5_MAX=0 AND ST5_MAX=0
Included observations: 18600
Convergence achieved after 8 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-7.733199	0.717113	-10.78379	0.0000
ST1_MAX	-0.531549	0.164562	-3.230080	0.0012
ST2_MAX	-0.600987	0.137824	-4.360537	0.0000
DET_AMSA	0.684428	0.246508	2.776491	0.0055
LNTON	0.414156	0.063435	6.528846	0.0000
LNAGE	0.264708	0.076264	3.470938	0.0005
OWCHD	0.339034	0.119542	2.836110	0.0046
ST_CHDGC	0.604921	0.112651	5.369877	0.0000
AMSA_AV	-1.337353	0.352355	-3.795474	0.0001
IMOU_AV	-1.296433	0.370949	-3.494909	0.0005
CL_LR	0.396235	0.125791	3.149952	0.0016
FL_BM	2.314809	0.984986	2.350095	0.0188
FL_IM	1.095883	0.437259	2.506258	0.0122
FL_RU	-1.188837	0.409279	-2.904710	0.0037
FL_UK	1.386813	0.357793	3.876016	0.0001
C_0700S	0.023768	0.011421	2.081060	0.0374
C_1000S	0.263622	0.086601	3.044095	0.0023

C_1400S	0.022311	0.011088	2.012256	0.0442

Mean dependent var	0.026989	S.D. dependent var	0.162056
S.E. of regression	0.160204	Akaike info criterion	0.232718
Sum squared resid	476.9137	Schwarz criterion	0.240296
Log likelihood	-2146.278	Hannan-Quinn criter.	0.235206
Restr. log likelihood	-2308.547	Avg. log likelihood	-0.115391
LR statistic (17 df)	324.5370	McFadden R-squared	0.070290
Probability(LR stat)	0.000000		

Obs with Dep=0	18098	Total obs	18600
Obs with Dep=1	502		

Dependent Variable: DWSG
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/26/06 Time: 18:59
Sample: 1 19131 IF CMOU_AV=0 AND ST5_MAX=0 AND ST5_MAX=0
Included observations: 18600
Prediction Evaluation (success cutoff C = 0.02698)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	12135	179	12314	0	0	0
P(Dep=1)>C	5963	323	6286	18098	502	18600
Total	18098	502	18600	18098	502	18600
Correct	12135	323	12458	0	502	502
% Correct	67.05	64.34	66.98	0.00	100.00	2.70
% Incorrect	32.95	35.66	33.02	100.00	0.00	97.30
Total Gain*	67.05	-35.66	64.28			
Percent Gain**	67.05	NA	66.06			

Dependent Variable: DWSG

Method: ML - Binary Logit (Quadratic hill climbing)

Date: 05/26/06 Time: 18:59

Sample: 1 19131 IF CMOU_AV=0 AND ST5_MAX=0 AND ST5_MAX=0

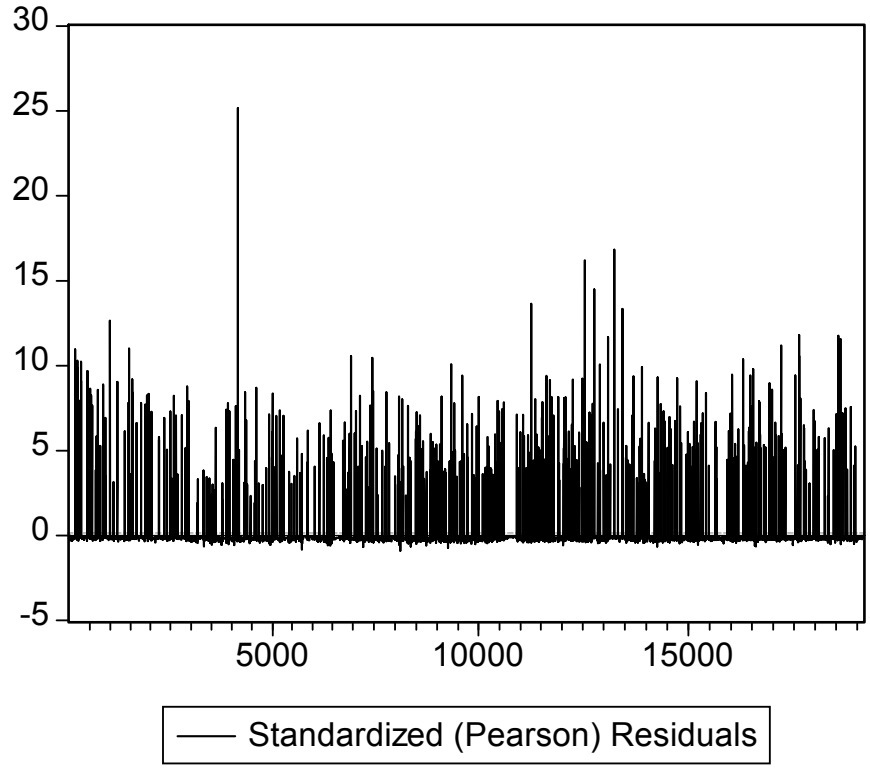
Included observations: 18600

Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests

Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	0.0003	0.0076	1849	1852.20	11	7.79651	1860	1.32182
2	0.0076	0.0119	1833	1841.11	27	18.8918	1860	3.51564
3	0.0119	0.0139	1846	1835.88	14	24.1208	1860	4.30236
4	0.0139	0.0163	1830	1832.06	30	27.9425	1860	0.15381
5	0.0163	0.0193	1828	1827.05	32	32.9470	1860	0.02771
6	0.0193	0.0236	1825	1820.28	35	39.7250	1860	0.57426
7	0.0236	0.0293	1809	1811.04	51	48.9649	1860	0.08687
8	0.0293	0.0374	1808	1798.52	52	61.4755	1860	1.51041
9	0.0374	0.0535	1783	1776.79	77	83.2099	1860	0.48514
10	0.0535	0.4445	1687	1703.07	173	156.926	1860	1.79813
		Total	18098	18098.0	502	502.000	18600	13.7762

H-L Statistic:	13.7762	Prob. Chi-Sq(8)	0.0878
Andrews Statistic:	19.5736	Prob. Chi-Sq(10)	0.0336



Collision/Contact

Dependent Variable: DCOCO
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/26/06 Time: 17:44
Sample: 1 23254 IF CMOU_AV=0 AND ST6_MAX=0
Included observations: 22329
Convergence achieved after 6 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-7.067282	0.664045	-10.64278	0.0000
ST1_MAX	-1.621938	0.225563	-7.190606	0.0000
ST2_MAX	-1.711995	0.220717	-7.756526	0.0000
ST3_MAX	-1.241333	0.245229	-5.061941	0.0000
ST4_MAX	-1.341532	0.225556	-5.947671	0.0000
LNTON	0.416932	0.058917	7.076635	0.0000
LNAGE	0.362874	0.055431	6.546457	0.0000
C_0900S	0.031497	0.008968	3.512042	0.0004
C_2100S	-0.309480	0.121664	-2.543730	0.0110
C_2500S	0.062421	0.023477	2.658779	0.0078
ST_CHDGC	0.680648	0.097255	6.998552	0.0000
AMSA_AV	-0.853452	0.230808	-3.697669	0.0002
IMOU_AV	-1.170421	0.334437	-3.499672	0.0005
VMOU_AV	-0.915033	0.229946	-3.979340	0.0001
CL_BV	0.394910	0.157638	2.505171	0.0122
CL_DNV	0.470664	0.160140	2.939085	0.0033
CL_GL	0.583936	0.142099	4.109364	0.0000
CL_LR	0.829407	0.133258	6.224067	0.0000
CL_NKK	0.411940	0.154476	2.666698	0.0077
CL_TLL	1.652974	0.428944	3.853593	0.0001
FL_GI	1.052753	0.438834	2.398978	0.0164
FL_KY	1.019645	0.400478	2.546071	0.0109

Mean dependent var	0.030812	S.D. dependent var	0.172812
S.E. of regression	0.170507	Akaike info criterion	0.258502
Sum squared resid	648.5264	Schwarz criterion	0.266397
Log likelihood	-2864.040	Hannan-Quinn criter.	0.261071
Restr. log likelihood	-3071.429	Avg. log likelihood	-0.128265
LR statistic (21 df)	414.7769	McFadden R-squared	0.067522
Probability(LR stat)	0.000000		

Obs with Dep=0	21641	Total obs	22329
Obs with Dep=1	688		

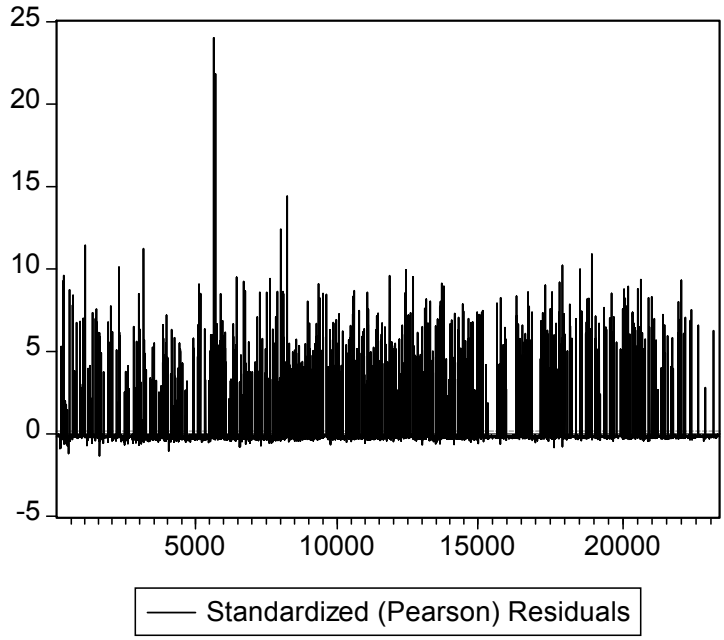
Dependent Variable: DCOCO
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/26/06 Time: 17:44
Sample: 1 23254 IF CMOU_AV=0 AND ST6_MAX=0
Included observations: 22329
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	0.0009	0.0109	2219	2215.81	13	16.1947	2232	0.63482
2	0.0109	0.0138	2198	2205.22	35	27.7845	2233	1.89744
3	0.0138	0.0166	2208	2199.10	25	33.8971	2233	2.37127
4	0.0166	0.0195	2197	2192.80	36	40.1987	2233	0.44659
5	0.0195	0.0228	2181	2185.96	52	47.0371	2233	0.53490
6	0.0228	0.0268	2177	2177.76	56	55.2437	2233	0.01062
7	0.0268	0.0328	2160	2166.71	73	66.2922	2233	0.69950
8	0.0328	0.0420	2152	2150.31	81	82.6904	2233	0.03588
9	0.0420	0.0592	2125	2122.02	108	110.984	2233	0.08444
10	0.0592	0.7821	2024	2025.32	209	207.677	2233	0.00929
		Total	21641	21641.0	688	688.000	22329	6.72475

H-L Statistic:	6.7247	Prob. Chi-Sq(8)	0.5666
Andrews Statistic:	8.3372	Prob. Chi-Sq(10)	0.5959

Dependent Variable: DCOCO
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/26/06 Time: 17:44
Sample: 1 23254 IF CMOU_AV=0 AND ST6_MAX=0
Included observations: 22329
Prediction Evaluation (success cutoff C = 0.030811)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	14693	265	14958	0	0	0
P(Dep=1)>C	6948	423	7371	21641	688	22329
Total	21641	688	22329	21641	688	22329
Correct	14693	423	15116	0	688	688
% Correct	67.89	61.48	67.70	0.00	100.00	3.08
% Incorrect	32.11	38.52	32.30	100.00	0.00	96.92
Total Gain*	67.89	-38.52	64.62			
Percent Gain**	67.89	NA	66.67			



Deck Related First Events

Dependent Variable: DDECK
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/31/06 Time: 11:33
Sample: 1 8357 IF CMOU_AV=0 AND ST5_MAX=0 AND ST6_MAX=0
Included observations: 7771
Convergence achieved after 8 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-8.198026	0.948578	-8.642441	0.0000
LNTON	0.536441	0.073247	7.323709	0.0000
LNAGE	0.360412	0.111891	3.221106	0.0013
C_1200S	0.070160	0.017665	3.971639	0.0001
C_1900S	0.514635	0.174084	2.956239	0.0031
ST_CHDGC	0.540449	0.164759	3.280230	0.0010
CLWD_D	0.532854	0.151507	3.517021	0.0004
IMOU_AV	-2.336155	0.581131	-4.020016	0.0001
VMOU_AV	-1.206711	0.455764	-2.647665	0.0081
RS_INSP	-1.434488	0.353287	-4.060399	0.0000
CL_BV	-1.182662	0.355922	-3.322807	0.0009
FL_AG	0.972321	0.329541	2.950534	0.0032
FL_BB	2.191105	0.693409	3.159903	0.0016
FL_NL	1.125001	0.384359	2.926955	0.0034
FL_NS	1.296348	0.393428	3.295003	0.0010
FL_TR	1.040046	0.308477	3.371548	0.0007

Mean dependent var	0.029983	S.D. dependent var	0.170552
S.E. of regression	0.167993	Akaike info criterion	0.251942
Sum squared resid	218.8597	Schwarz criterion	0.266268

Log likelihood	-962.9202	Hannan-Quinn criter.	0.256853
Restr. log likelihood	-1046.629	Avg. log likelihood	-0.123912
LR statistic (15 df)	167.4185	McFadden R-squared	0.079980
Probability(LR stat)	0.000000		

Obs with Dep=0	7538	Total obs	7771
Obs with Dep=1	233		

Dependent Variable: DDECK

Method: ML - Binary Logit (Quadratic hill climbing)

Date: 05/31/06 Time: 11:33
Sample: 1 8357 IF CMOU_AV=0 AND ST5_MAX=0 AND ST6_MAX=0

Included observations: 7771

Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests

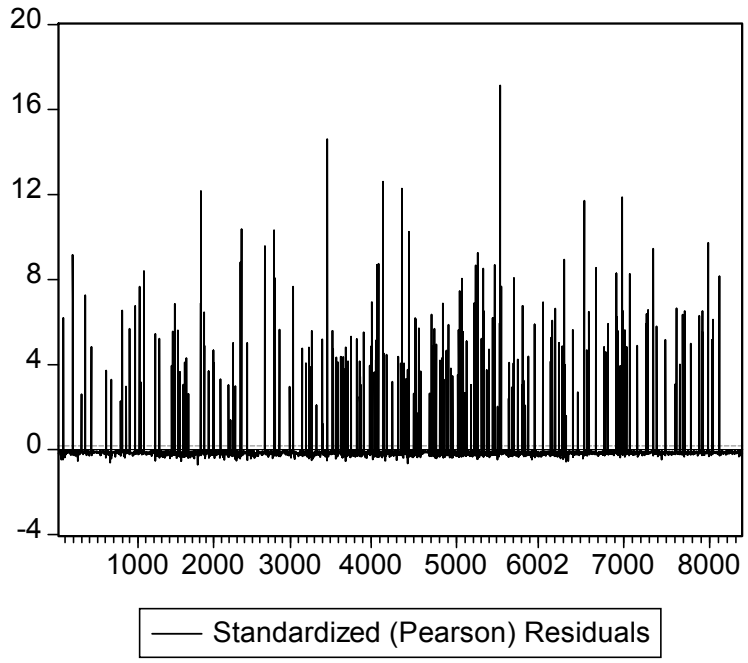
Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	0.0002	0.0061	775	774.733	2	2.26670	777	0.03147
2	0.0061	0.0107	768	770.295	9	6.70473	777	0.79259
3	0.0107	0.0140	764	767.428	13	9.57184	777	1.24311
4	0.0140	0.0179	766	764.724	11	12.2764	777	0.13484
5	0.0179	0.0217	767	761.587	10	15.4128	777	1.93941
6	0.0217	0.0267	756	758.216	21	18.7836	777	0.26801
7	0.0267	0.0347	753	753.325	24	23.6751	777	0.00460
8	0.0347	0.0442	744	746.604	33	30.3958	777	0.23220
9	0.0443	0.0618	738	736.172	39	40.8275	777	0.08634
10	0.0619	0.3995	707	704.915	71	73.0854	778	0.06568
		Total	7538	7538.00	233	233.000	7771	4.79825

H-L Statistic:	4.7982	Prob. Chi-Sq(8)	0.7789
Andrews Statistic:	9.2049	Prob. Chi-Sq(10)	0.5128

Dependent Variable: DDECK
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/31/06 Time: 11:33
Sample: 1 8357 IF CMOU_AV=0 AND ST5_MAX=0 AND ST6_MAX=0
Included observations: 7771
Prediction Evaluation (success cutoff C = 0.02998)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	4934	75	5009	0	0	0
P(Dep=1)>C	2604	158	2762	7538	233	7771
Total	7538	233	7771	7538	233	7771
Correct	4934	158	5092	0	233	233
% Correct	65.46	67.81	65.53	0.00	100.00	3.00
% Incorrect	34.54	32.19	34.47	100.00	0.00	97.00
Total Gain*	65.46	-32.19	62.53			
Percent Gain**	65.46	NA	64.46			



Engine Related First Events

Dependent Variable: DENG
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/26/06 Time: 17:03
Sample: 1 27079
Included observations: 27079
Convergence achieved after 8 iterations
QML (Huber/White) standard errors & covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-8.147009	0.576580	-14.12989	0.0000
ST1_MAX	-0.414850	0.115153	-3.602603	0.0003
ST5_MAX	1.583319	0.189842	8.340188	0.0000
DET_AMSA	0.520215	0.212531	2.447720	0.0144
DET_USCG	-0.316929	0.116563	-2.718949	0.0065
LNTON	0.322429	0.050952	6.328103	0.0000
LNAGE	0.183819	0.058603	3.136709	0.0017
ST_CHDGC	0.466723	0.084339	5.533884	0.0000
PMOU_AV	0.822478	0.157007	5.238488	0.0000
USCG_AV	0.854522	0.207726	4.113693	0.0000
LNTIMEBW	0.093861	0.027306	3.437371	0.0006
CL_DNV	0.327837	0.126642	2.588692	0.0096
CL_GL	0.264476	0.106413	2.485374	0.0129
CL_LR	0.362008	0.110516	3.275622	0.0011
FL_BB	1.033412	0.403574	2.560653	0.0104
FL_PA	-0.393960	0.145391	-2.709660	0.0067
FL_RU	-1.432597	0.386218	-3.709297	0.0002
FL_UK	0.921571	0.236530	3.896206	0.0001
C_0400S	-0.124567	0.039619	-3.144153	0.0017
C_0700S	0.043168	0.009199	4.692785	0.0000
C_1400S	0.064510	0.010054	6.416617	0.0000
C_1700S	0.044865	0.017112	2.621925	0.0087
C_2000S	-0.080135	0.031397	-2.552318	0.0107

Mean dependent var	0.030245	S.D. dependent var	0.171263
S.E. of regression	0.168400	Akaike info criterion	0.250030
Sum squared resid	767.2715	Schwarz criterion	0.257000
Log likelihood	-3362.283	Hannan-Quinn criter.	0.252278
Restr. log likelihood	-3671.702	Avg. log likelihood	-0.124166
LR statistic (22 df)	618.8387	McFadden R-squared	0.084271
Probability(LR stat)	0.000000		

Obs with Dep=0	26260	Total obs	27079
Obs with Dep=1	819		

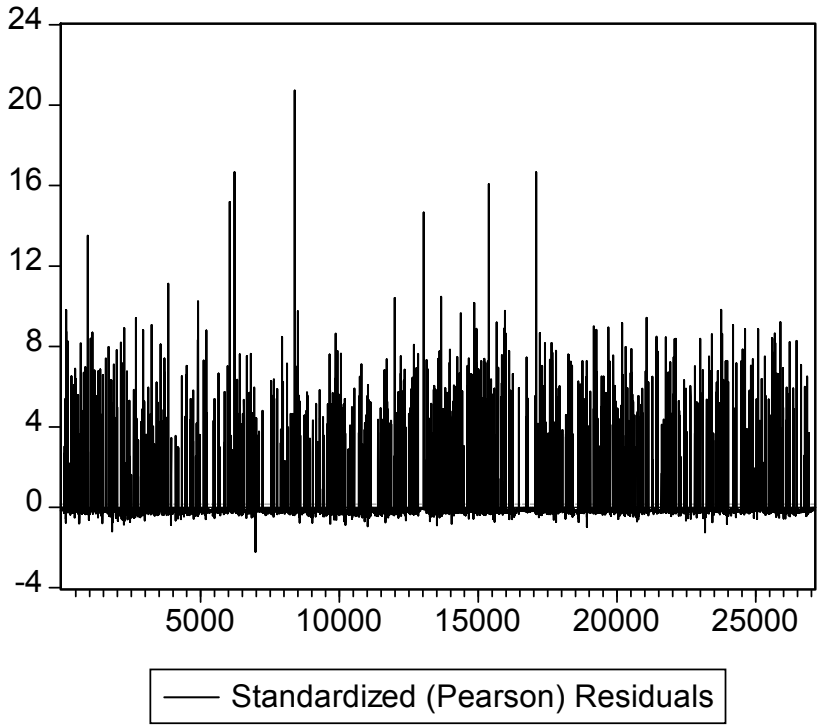
Dependent Variable: DENG
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/26/06 Time: 17:03
Sample: 1 27079
Included observations: 27079
Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests
Grouping based upon predicted risk (randomize ties)

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	0.0003	0.0071	2700	2696.19	7	10.8127	2707	1.34978
2	0.0071	0.0127	2682	2680.16	26	27.8400	2708	0.12287
3	0.0127	0.0161	2673	2668.63	35	39.3694	2708	0.49210
4	0.0161	0.0190	2661	2660.75	47	47.2456	2708	0.00130
5	0.0190	0.0223	2651	2652.45	57	55.5454	2708	0.03889
6	0.0223	0.0266	2650	2642.24	58	65.7631	2708	0.93923
7	0.0266	0.0319	2622	2629.35	86	78.6508	2708	0.70726
8	0.0319	0.0405	2616	2611.29	92	96.7052	2708	0.23741
9	0.0405	0.0571	2562	2579.13	146	128.867	2708	2.39163
10	0.0571	0.9919	2443	2439.80	265	268.201	2708	0.04239
		Total	26260	26260.0	819	819.000	27079	6.32286

H-L Statistic:	6.3229	Prob. Chi-Sq(8)	0.6111
Andrews Statistic:	22.1248	Prob. Chi-Sq(10)	0.0145

Dependent Variable: DENG
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 05/26/06 Time: 17:03
Sample: 1 27079
Included observations: 27079
Prediction Evaluation (success cutoff C = 0.031)

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	18308	303	18611	26260	819	27079
P(Dep=1)>C	7952	516	8468	0	0	0
Total	26260	819	27079	26260	819	27079
Correct	18308	516	18824	26260	0	26260
% Correct	69.72	63.00	69.52	100.00	0.00	96.98
% Incorrect	30.28	37.00	30.48	0.00	100.00	3.02
Total Gain*	-30.28	63.00	-27.46			
Percent Gain**	NA	63.00	-907.94			


24
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Standardized (Pearson) Residuals