

This analysis uses nationally collected landings data for the for theSouth Atlanticregion, downloaded from the NOAA FOSS site <https://foss.nmfs.noaa.gov/apexfoss/f?p=215:200:.....>.

```
## [[1]]
## [1] "When back calculated, Q_{i,t} did not equal V_{i,t}/PI_{i,t}"
##
## [[2]]
## [1] "When back calculated, Q_{i,t} did not equal V_{i,t}/PI_{i,t}"
##
## [[3]]
## [1] "When back calculated, Q_{i,t} did not equal V_{i,t}/PI_{i,t}"
##
## [[4]]
## [1] "When back calculated, Q_t did not equal V_t/PI_t"
##
## [[5]]
## [1] "When back calculated, ln(Q_t/Q_{t-1}) = did not equal sum( ( frac{R_{i, t} - R_{i, t-1}}{2}) *
##
## [[6]]
## [1] "Out of 118 columns, 300 of species V columns are completely empty, 300 of species Q columns are
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Species in Each category by Common Name

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## $Finfish
## [1] "LAMPREY, SEA " "SHARKS, UNCLASSIFIED **" "SHARKS, UNIDENT
## [5] "SHARK, SAND TIGER " "SHARK, THRESHER " "SHARK, MAKOS **
## [9] "SHARK, LONGFIN MAKO " "SHARK, NURSE " "SHARK, TIGER "
## [13] "SHARK, SMOOTH DOGFISH " "SHARK, DUSKY " "SHARK, BULL "
## [17] "SHARK, BLACKNOSE " "SHARK, SILKY " "SHARK, BLACKTIP
## [21] "SHARK, REEF " "SHARK, SPINNER " "SHARK, FINETOOTH
## [25] "SHARK, LEMON " "SHARK, HAMMERHEAD **" "SHARK, BONNETHE
## [29] "SHARK, SCALLOPED HAMMERHEAD " "SHARK, GREAT HAMMERHEAD " "SHARKS **"
## [33] "SHARK, SPINY DOGFISH " "SHARK, ATLANTIC ANGEL " "RAYS **"
## [37] "SKATES **" "SKATE, CLEARNOSE " "RAY,STINGRAYS *
## [41] "RAYS, BUTTERFLY **" "STURGEONS **" "GARS **"
## [45] "LADYFISH " "EELS **" "EEL, AMERICAN "
## [49] "GREEN MORAY " "SPOTTED MORAY " "BLACKEDGE MORAY
## [53] "EELS, CONGER **" "EEL, CONGER " "SHARPTAIL EEL "
## [57] "SPECKLED WORM EEL " "HERRINGS **" "HERRING GENUS *
## [61] "HERRING, BLUEBACK " "SHAD, HICKORY " "ALEWIFE "
## [65] "MENHADEN **" "MENHADEN, ATLANTIC " "SHAD, GIZZARD "
## [69] "HERRING, ROUND " "HERRING, ATLANTIC THREAD " "SCALED SARDINE
## [73] "PIKES **" "LIZARDFISH FAMILY **" "INSHORE LIZARDF
## [77] "CARP, COMMON " "SUCKERS **" "BUFFALOFISHES *
## [81] "CATFISHES-BULLHEADS **" "CATFISH, BLUE " "CATFISH, CHANNEL
## [85] "CATFISHES, SEA **" "TOADFISHES **" "CLINGFISH FAMIL
## [89] "FROGFISHES **" "SARGASSUMFISH " "OCELLATED FROGF
## [93] "COD, ATLANTIC " "POLLOCK " "HAKES, RED AND V
## [97] "HADDOCK " "HAKE, SILVER " "CUSK-EELS **"
## [101] "BLACK BROTLA " "BATHYONUS **" "FLYINGFISHES **
## [105] "BALLYHOO " "NEEDLEFISH FAMILY **" "NEEDLEFISH, ATL
## [109] "MUMMICHOG " "RED BREAM " "ALFONSIN "
## [113] "BLACKBAR SOLDIERFISH " "BUCKLER DORY " "OPAH "
## [117] "BLUESPOTTED CORNETFISH " "SARGASSUM PIPEFISH " "SEAHORSE GENUS :
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[121] "DWARF SEAHORSE "
 ## [125] "SCORPIONFISH, SPOTTED "
 ## [129] "SEAROBINS **"
 ## [133] "PERCH, WHITE "
 ## [137] "SEA BASS, BANK "
 ## [141] "HIND, SPECKLED "
 ## [145] "GROUPE, MISTY "
 ## [149] "CONEY "
 ## [153] "GROUPE, BLACK "
 ## [157] "GROUPE, TIGER "
 ## [161] "BUTTER HAMLET "
 ## [165] "CREOLE-FISH "
 ## [169] "HARLEQUIN BASS "
 ## [173] "SOAPFISH GENUS **"
 ## [177] "BIGEYE "
 ## [181] "TWO SPOT CARDINALFISH "
 ## [185] "TILEFISH, ANCHOR "
 ## [189] "TILEFISH, SAND "
 ## [193] "SHARKSUCKER "
 ## [197] "JACK, CREVALLE "
 ## [201] "BAR JACK "
 ## [205] "MOONFISH, ATLANTIC "
 ## [209] "JACK, ALMACO "
 ## [213] "SCADS **"
 ## [217] "DOLPHINFISH "
 ## [221] "SNAPPER, MUTTON "
 ## [225] "SNAPPER, DOG "
 ## [229] "SNAPPER, SILK "
 ## [233] "SNAPPER, VERMILION "
 ## [237] "IRISH POMPAÑO "
 ## [241] "GRUNT, FRENCH "
 ## [245] "PORKFISH "
 ## [249] "PINFISH "
 ## [253] "PORGY, JOLTHEAD "
 ## [257] "PORGY, LITTLEHEAD "
 ## [261] "SILVER SEATROUT "
 ## [265] "SPOT "
 ## [269] "DRUM, RED "
 ## [273] "REEF CROAKER "
 ## [277] "GLASSY SWEEPER "
 ## [281] "SPOTFIN BUTTERFLYFISH "
 ## [285] "LONGSNOUT BUTTERFLYFISH "
 ## [289] "BLUE ANGELFISH "
 ## [293] "DAMSELFISH FAMILY **"
 ## [297] "BROWN CHROMIS "
 ## [301] "POMFRETS, UNCLASSIFIED **"
 ## [305] "MULLET, WHITE "
 ## [309] "TAUTOG "
 ## [313] "SLIPPERY DICK "
 ## [317] "PUDDINGWIFE (WRASSE) "
 ## [321] "BLUE PARROTFISH "
 ## [325] "QUEEN PARROTFISH "
 ## [329] "YELLOWHEAD JAWFISH "
 ## [333] "COMBTOOTH BLENNY FAMILY **"

"SCORPIONFISHES **"
 "REEF SCORPIONFISH "
 "LINGCOD "
 "BASS, STRIPED "
 "BASS, ROCK SEA "
 "GROUPE, YELLOWEDGE "
 "GROUPE, WARSAW "
 "MARBLED GROUPE "
 "GROUPE, YELLOWMOUTH "
 "SAND PERCH "
 "WRASSE BASS "
 "LANTERN BASS "
 "CHALK BASS "
 "SUNFISHES **"
 "GLASSEYE SNAPPER "
 "PERCH, YELLOW "
 "TILEFISH, BLUELINE "
 "BLUEFISH "
 "JACKS **"
 "JACK, HORSE-EYE "
 "BUMPER, ATLANTIC "
 "AMBERJACK **"
 "RUDDERFISH, BANDED "
 "SCAD, ROUND "
 "SNAPPERS **"
 "SNAPPER, SCHOOLMASTER "
 "SNAPPER, MAHOGANY "
 "SNAPPER, BLACK "
 "WENCHMAN "
 "GRUNTS **"
 "GRUNT, COTTONWICK "
 "SCUPS OR PORGIES **"
 "SHEEPSHEAD "
 "PORGY, SAUCEREYE "
 "PORGY, RED "
 "SEATROUT, WEAKFISH "
 "KINGFISHES **"
 "JACKKNIFE-FISH "
 "GOATFISHES **"
 "SEA CHUBS **"
 "FOUREYE BUTTERFLYFISH "
 "CHERUBFISH "
 "GRAY ANGELFISH "
 "SERGEANT MAJOR "
 "PURPLE REEFFISH "
 "BIGSCALE POMFRET "
 "BARRACUDAS **"
 "SPOTFIN HOGFISH "
 "YELLOWHEAD WRASSE "
 "HOGFISH "
 "MIDNIGHT PARROTFISH "
 "REDBAND PARROTFISH "
 "DUSKY JAWFISH "
 "FLORIDA BLENNY "

"REDFISH, ACADIA"
 "LIONFISHES **"
 "SNOOK "
 "BASSES, MIXED S"
 "GROUPE, GOLIATH"
 "HIND, RED "
 "GROUPE, SNOWY "
 "MUTTON HAMLET "
 "SCAMP "
 "SAND PERCH, DWARF"
 "PEPPERMINT BASS "
 "BELTED SANDFISH "
 "SERRANUS SCRIBA"
 "CRAPPIE **"
 "CARDINALFISH FA"
 "TILEFISHES **"
 "TILEFISH, GOLDF"
 "COBIA "
 "POMPAÑO, AFRICA"
 "RUNNER, BLUE "
 "SCAD, BIGEYE "
 "AMBERJACK, GREY"
 "POMPAÑO, FLORIDA"
 "RUNNER, RAINBOW"
 "SNAPPER, CUBERA"
 "SNAPPER, BLACKFIN"
 "SNAPPER CARIBBEAN"
 "SNAPPER, QUEEN"
 "TRIPLETAIL "
 "GRUNT, TOMTATE"
 "GRUNT, SAILORS C"
 "SCUP "
 "PINFISH, SPOTTED"
 "PORGY, WHITEBON"
 "SEATROUTS **"
 "SEATROUT, SAND"
 "CROAKER, ATLANTIC"
 "SPOTTED DRUM "
 "YELLOW GOATFISH "
 "SPADEFISH, ATLANTIC"
 "REEF BUTTERFLYFISH"
 "QUEEN ANGELFISH "
 "FRENCH ANGELFISH "
 "BLUE CHROMIS "
 "YELLOWTAIL DAMSEL"
 "MULLET **"
 "BARRACUDA GENUS "
 "SPANISH HOGFISH "
 "CLOWN WRASSE "
 "BLUEHEAD "
 "RAINBOW PARROTFISH"
 "STOPLIGHT PARROTFISH"
 "STARGAZER FAMILY"
 "BARRED BLENNY "

## [337] "SAILFIN BLENNY "	"HAIRY BLENNY "	"SADDLED BLENNY "
## [341] "MARBLED BLENNY "	"WRASSE BLENNY "	"GOBY FAMILY **"
## [345] "SLEEPER FAMILY **"	"SURGEONFISHES **"	"OCEAN SURGEON "
## [349] "BLUE TANG "	"BONEFISH "	"OILFISH "
## [353] "CUTLASSFISH, ATLANTIC "	"TUNA, SKIPJACK "	"TUNA, LITTLE TUNA "
## [357] "MACKEREL (SCOMBER) **"	"MACKEREL, CHUB "	"MACKEREL, ATLANTIC "
## [361] "TUNA, ALBACORE "	"TUNA, BLUEFIN "	"TUNA, YELLOWFIN "
## [365] "TUNA, BIGEYE "	"MACKEREL, KING AND CERO **"	"MACKEREL, KING "
## [369] "MACKEREL, CERO "	"WAHOO "	"SWORDFISH "
## [373] "SAILFISH "	"MARLIN, BLUE "	"BARRELFISH "
## [377] "HARVESTFISH "	"BUTTERFISH "	"GULF BUTTERFISH "
## [381] "FLOUNDERS **"	"FLOUNDER, SUMMER "	"FLOUNDER, GULF "
## [385] "FLOUNDER, WITCH "	"FLOUNDER, WINTER "	"FLOUNDER, YELLOW "
## [389] "UNICORN FILEFISH "	"SCRAWLED FILEFISH "	"TRIGGERFISH, GRAY "
## [393] "FILEFISH, PYGMY "	"WHITESPOTTED FILEFISH "	"ORANGESPOTTED FILEFISH "
## [397] "BLACK DURGON "	"FILEFISH **"	"BOXFISHES **"
## [401] "SPOTTED TRUNKFISH "	"SCRAWLED COWFISH "	"HONEYCOMB COWFISH "
## [405] "PUFFER GENUS **"	"PUFFER, NORTHERN "	"SOUTHERN PUFFERFISH "
## [409] "BURRFISH GENUS **"	"PORCUPINEFISH "	"BALLONFISH "
## [413] "OPHIDIIFORMS **"	"ANCHOVIES **"	"SPADEFISHES **"
## [417] "SKATE, WINTER "	"WHITE GRUNT "	"XYRICHTYS **"
## [421] "STRIPED PARROTFISH "	"BEAUGREGORY "	"LONGFIN DAMSELFISH "
## [425] "BICOLOR DAMSELFISH "	"DUSKY DAMSELFISH "	"THREESpot DAMSELFISH "
## [429] "YELLOW STINGRAY "	"DEEPWATER SQUIRRELFISH "	"REEF SQUIRRELFISH "
## [433] "TIGER GOBY "	"NEON GOBY "	"PIPEFISHES **"
## [437] "HIGH-HAT "	"BANK BUTTERFLYFISH "	"GUYANA BUTTERFLYFISH "
##		
## \$Shellfish		
## [1] "MOLLUSKS **"	"SNAILS **"	"TROCHIDAE **"
## [6] "NERITIDAE **"	"MESOGASTROPODA **"	"PERIWINKLES **"
## [11] "SNAILS (CONCHS) **"	"FLORIDA FIGHTING CONCH "	"MILK CONCH "
## [16] "MEASLED COWRIE "	"FLAMINGO TONGUE "	"SNAIL, MOON **"
## [21] "TRITON, ANGULAR "	"MURICIDAE **"	"MELONGENIDAE **"
## [26] "WHELK, LIGHTNING "	"WHELK, CHanneled "	"CROWN CONCH "
## [31] "MUDSNAIL, EASTERN "	"TRUE TULIP "	"HORSE CONCH "
## [36] "TURBINELLIDAE **"	"FLORIDA MITER "	"CONUS **"
## [41] "FLORIDA REGAL DORIS "	"POLYPLACOPHORA **"	"CLAMS OR BIVALVES **"
## [46] "PINNIDAE **"	"SCALLOPS **"	"SCALLOP, SEA "
## [51] "LIONS-PAW SCALLOP "	"OYSTER, ATLANTIC THORNY "	"FILECLAM, SPINY "
## [56] "CLAM, ATLANTIC RANGIA "	"CLAM, QUAHOG **"	"CLAM, NORTHERN QUAHOG "
## [61] "ANGELWING "	"TEUTHIDA **"	"SQUIDS **"
## [66] "OCTOPUS **"	"COMMON OCTOPUS "	"OCTOPUS, ATLANTIC PYGMY "
## [71] "CRAB, HORSESHOE "	"CRUSTACEANS **"	"CRABS **"
## [76] "SHRIMP, PENAEID **"	"PENAEUS **"	"PRAWN, GIANT TIGER "
## [81] "SHRIMP, ROCK **"	"SHRIMP, ROCK "	"SHRIMP, PEDERSON CLEANER "
## [86] "SHRIMP, PEPPERMINT "	"SHRIMP, CLEANER "	"SHRIMP, GOLDEN CORAL "
## [91] "LOBSTER, CARIBBEAN SPINY "	"SPOTTED SPINY LOBSTER "	"LOBSTER, SLIPPER **"
## [96] "POLKADOTTED HERMIT "	"CRAB, SPOTTED PORCELAIN "	"CRABS, SAND **"
## [101] "THINSTRIPE HERMIT "	"TRICOLOR HERMIT "	"STAREYE HERMIT "
## [106] "CRABS, TRUE **"	"CRABS, BOX **"	"LIBINIA **"
## [111] "CRAB, YELLOWLINE ARROW "	"CRAB, FALSE ARROW "	"MITHRAX **"
## [116] "CRAB, GREEN CLINGING "	"MITHRACULUS RUBER "	"CRAB, JONAH "
## [121] "CRAB, FLORIDA STONE CLAWS "	"CRAB, REDFINGER RUBBLE "	"CRAB, NIMBLE SPRAY "
## [126] "STARS, OTHER SEA **"	"SPINY SEA STAR "	"STARS, BRITTLE **"

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## [131] "SCALY BRITTLE STAR "          "STAR, SERPENT BRITTLE "      "SEA URCHINS, UNCLASSIFIED **"
## [136] "GREEN SEA URCHIN "            "ROCK BORING URCHIN "        "BISCUITS, SEA **"
## [141] "DOLLARS, OTHER SAND **"       "KEYHOLE SAND DOLLAR **"     "DOLLAR, NOTCHED SAND "
## [146] "FEATHER STARS **"            "PAGUROIDEA **"              "SHRIMP, BROWN "
## [151] "RANELLIDAE **"               "TURBINIDAE **"              "LETTUCE SLUG "
## [156] "CRAB, FURCATE SPIDER "
##
## $Other
## [1] "WITHHELD FOR CONFIDENTIALITY "      "ULOTRICHAELES **"           "HAI
## [4] "PENICILLUS **"                     "CAULERPACEAE **"           "BR
## [7] "CORALLINACEAE **"                  "FORAMS **"                  "SP
## [10] "SPONGES **"                        "HIPPOSPONGIA **"           "HAI
## [13] "JELLYFISH **"                      "JAMAICAN CASSIOPEA "       "ST
## [16] "JELLYFISH, CANNONBALL "            "CORALS **"                  "DE
## [19] "GROOVED-BLADE SEA WHIP "           "PENS/PANSIES, SEA **"      "PA
## [22] "GREEN SEA MAT "                    "CORALLIMORPHARIA **"       "CO
## [25] "FLORIDA CORALLIMORPHARIAN "         "ACTINIIDAE **"             "AN
## [28] "RINGED ANEMONE "                   "RED BEADED ANEMONE "       "SU
## [31] "MARINE WORM **"                     "AMPHINOMIDAE **"           "SA
## [34] "SERPULIDAE **"                     "SPIROBRANCHUS GIGANTEUS "  "BR
## [37] "SESSILE TUNICATES **"              "FINFISH **"                 "DO
## [40] "CONEY "                             "GRAYSBY, OTHER "           "JA
## [43] "GRUNT, WHITE "                     "SPADEFISHES **"            "MA
## [46] "HARVESTFISH "                      "FROGS **"                   "TU
## [49] "TURTLE, SNAPPING "                  "TURTLE, TERRAPIN "         "TU
## [52] "TURTLE, GREEN SEA "                 "TURTLE, SOFT-SHELL **"     "SP
## [55] "SPONGE, GRASS "                     "SPONGE, SHEEPSWOOL "       "PL
## [58] "SHELLFISH,UNCLASSIFIED,MARINE,ORNAMENTAL **" "ALLIGATOR, AMERICAN "      "SP
## [61] "PLANEHEAD FILEFISH "                "DISCOSOMA **"              " "

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Where are there negative values?

X	Tsn	Year	State	AFS.Name	Pounds	Dollars	Collection	Confidentiality	category.tax
51314	165647	2014	New Jersey	MUMMICHOG	-321	-4494	Commercial	Public	Actinopteryg
72470	168791	2014	Connecticut	DOLPHINFISH	-1	-2	Commercial	Public	Actinopteryg

Where are there negative values?

X	Tsn	Year	State	AFS.Name	Pounds	Dollars	Collection	Confidentiality
429	11272	2017	Rhode Island	SEAWEED, KELP **	-1	7390	Commercial	Public
6543	79916	2015	New York	MUSSEL, SLIPPERSHELL	-1	NA	Commercial	Public
8386	81495	2010	Maryland	CLAM, QUAHOG **	-29	1506	Commercial	Public
25465	160502	2009	Virginia	SHARK, BONNETHEAD	-5	1011	Commercial	Public
28827	161030	2007	New Jersey	FINFISH **	-8	NA	Commercial	Public
51314	165647	2014	New Jersey	MUMMICHOG	-321	-4494	Commercial	Public
72470	168791	2014	Connecticut	DOLPHINFISH	-1	-2	Commercial	Public
92811	172412	2014	Connecticut	MACKEREL, CHUB	-1	NA	Commercial	Public
111150	551570	2017	Connecticut	SHRIMP, BROWN	-1	229	Commercial	Public