

# MATLAB Codes for thesis topic Commodity Derivative Usage in U.S. Non-Financial Firms

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%%
data_count_raw = readtable('count.xlsx');
data_cntCD = table2array(data_count_raw);
toZeros = find(isnan(data_cntCD(:,3)));
data_cntCD(toZeros,3) = 0;
toZeros = find(isnan(data_cntCD(:,4)));
data_cntCD(toZeros,4) = 0;

no_firms = nnz(unique(data_cntCD(:,1)));
no_years = nnz(unique(data_cntCD(:,2)));
add_start = length(data_cntCD(1,:))+1;

a = unique(data_cntCD(:,1));
writematrix(a, 'gvkey_CL.txt');

data_WRDS_raw = readtable('WRDS.xlsx');
data_WRDS = data_WRDS_raw;
data_WRDS(:,2) = [];
data_WRDS = table2array(data_WRDS);
for i = 1 : 22
    toZeros = find(isnan(data_WRDS(:,i)));
    data_WRDS(toZeros,i) = 0;
end

for m = 3:7
    K_1 = find(data_WRDS(:,m) == 0);
    A = unique(data_WRDS(K_1,1));
    n = nnz(A);
    for i = 1 : n
        K_2 = find(data_WRDS(:,1) == A(i));
        K_3 = find(data_WRDS(K_2,m) == 0);
        K_4 = find(data_WRDS(K_2,m) ~= 0);
        if isempty(K_4)
            ReplaceV = mean(data_WRDS(K_2(K_4),m));
            data_WRDS(K_2(K_3),m) = ReplaceV;
        end
    end
end

%
data_Commodity = zeros([no_firms+1,no_years+1]);
data_Commodity(2:end,1) = unique(data_cntCD(:,1));
data_Commodity(1,2:end) = unique(data_cntCD(:,2));
data_set = data_Commodity;

for i = 1 : no_firms
    K_1 = find(data_cntCD(:,1) == data_Commodity(i+1,1));
    data_Commodity(i+1,2:end) = transpose(data_cntCD(K_1,4));
end

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toDelete = find(data_WRDS(:,2) == 2005);
data_WRDS(toDelete,:) = [];
toDelete = find(data_WRDS(:,2) == 2018);
data_WRDS(toDelete,:) = [];
Charac(:,1:2) = data_WRDS(:,1:2);

for i = 1 : length(data_WRDS(:,1))
    K_1 = find(data_cntCD(:,1) == data_WRDS(i,1)); % gvkey
    K_2 = find(data_cntCD(:,2) == data_WRDS(i,2));
    K_1 = intersect(K_1,K_2);
    Charac(i,3:4) = data_cntCD(K_1,3:4);
end

Charac(:,5:9) = zeros();

% Tobin's Q
data_WRDS(:,23) = data_WRDS(:,14) + data_WRDS(:,15) + data_WRDS(:,16);
    % PREF(23) = PTSK(14) + PTSKL(15) + PTSKLV(16)
data_WRDS(:,24) = data_WRDS(:,18) + data_WRDS(:,19) + data_WRDS(:,10) +
data_WRDS(:,23);
    % BE(24) = SEQ(18) + TXDB(19) + ITCB(10) + PREF(23)
data_WRDS(:,25) = data_WRDS(:,4) + data_WRDS(:,7) .* data_WRDS(:,21) -
data_WRDS(:,24);
    % MarketValue(25) = AT(4) + CSHO(7) * PRCC_F(21) - BE(24)
for i = 1 : length(data_WRDS(:,1))
    if data_WRDS(i,3) ~= 0
        Charac(i,5) = log(data_WRDS(i,25) ./ data_WRDS(i,4)); % Tobin's Q
        Temp_TQ(i,1) = data_WRDS(i,25) ./ data_WRDS(i,4);
    end
end

Charac(:,6) = log(data_WRDS(:,4));
Charac(:,7) = data_WRDS(:,8) ./ data_WRDS(:,24);
toZeros = find(isnan(Charac(:,7)));
Charac(toZeros,7) = 0;
toZeros = find(abs(Charac(:,7))>500);
Charac(toZeros,7) = 0;
Charac(:,8) = data_WRDS(:,13) ./ data_WRDS(:,4);
Charac(:,9) = (data_WRDS(:,5) + data_WRDS(:,20)) ./ data_WRDS(:,17) ;
Charac(:,10) = data_WRDS(:,7) ./ data_WRDS(:,17);
no_Charac = length(Charac(1,:))-4;

%
for i = 5 : length(Charac(1,:))
    K_1 = find(isinf(Charac(:,i)));
    if isempty(K_1)
        K_1 = find(isnan(Charac(:,i)));
        if isempty(K_1)
            else
                K_2 = data_WRDS(K_1,1);
                K_3 = unique(K_2);
                K_4 = find(Charac(:,1) == K_3);
                K_5 = setdiff(K_4,K_1);
                Placed_avg = sum(Charac(K_5,i)) / length(K_5);
                Charac(K_1,i) = Placed_avg;
            end
        else
            K_2 = data_WRDS(K_1,1);
            K_3 = unique(K_2);
            K_4 = find(Charac(:,1) == K_3);
            K_5 = setdiff(K_4,K_1);
            Placed_avg = sum(Charac(K_5,i)) / length(K_5);

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        Charac(K_1,i) = Placed_avg;
    end
end

%
SMRY_tbl2(:,1) = mean(Charac(:,5:10));
SMRY_tbl2(:,2) = median(Charac(:,5:10));
SMRY_tbl2(:,3) = std(Charac(:,5:10));
SMRY_tbl2(:,4) = prctile(Charac(:,5:10),[10]);
SMRY_tbl2(:,5) = prctile(Charac(:,5:10),[90]);

SMRY_Charac = zeros(3,7);
SMRY_Charac(1,1) = skewness(Temp_TQ);
SMRY_Charac(1,2:end) = skewness(Charac(:,5:10));

SMRY_Charac(2,1) = mean(Temp_TQ);
SMRY_Charac(3,1) = median(Temp_TQ);
SMRY_Charac(2,2:end) = mean(Charac(:,5:10));
SMRY_Charac(3,2:end) = median(Charac(:,5:10));

%%
all.Tobin_Q = data_set;
all.Size = data_set;
all.Leverage = data_set;
all.ROA = data_set;
all.InvestG = data_set;
all.CtoS = data_set;

for i = 2 : (no_years+1)
    for j = 2 : (no_firms+1)
        K_1 = find(Charac(:,1) == data_Commodity(j,1));
        K_2 = find(Charac(:,2) == data_Commodity(1,i));
        K_1 = intersect(K_1,K_2);
        all.Tobin_Q(j,i) = Charac(K_1,5);
        all.Size(j,i) = Charac(K_1,6);
        all.Leverage(j,i) = Charac(K_1,7);
        all.ROA(j,i) = Charac(K_1,8);
        all.InvestG(j,i) = Charac(K_1,9);
        all.CtoS(j,i) = Charac(K_1,10);
    end
end

%
Temp = unique(data_WRDS(:,22));
Ind_List(1,:) = Temp;
Ind_List(2,:) = zeros();
for i = 1 : length(Ind_List(1,:))
    Ind{1,i} = data_set;
end

tic
for i = 2 : (no_years+1)
    for j = 2 : (no_firms+1)
        K_1 = find(data_WRDS(:,2) == data_set(1,i));
        K_2 = find(data_WRDS(:,1) == data_set(j,1));
        K_3 = intersect(K_1,K_2);
        K_1 = find(data_WRDS(K_3,22) == Ind_List(1,:));
        Ind{1,K_1}(j,i) = 1;
        Ind_List(2,K_1) = Ind_List(2,K_1) + 1;
    end
end

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end
Ind_List(2,:) = Ind_List(2,+)/12;
sum(Ind_List(2,))
toc
%% Summary of yearly using statistics

SMRY_annual(1,:) = data_Commodity(1,2:end);
SMRY_annual(2,:) = sum(data_Commodity(2:end,2:end));

Commodity.Tobin_Q = data_set;
Commodity.Size = data_set;
Commodity.Leverage = data_set;
Commodity.ROA = data_set;
Commodity.InvestG = data_set;
Commodity.CtoS = data_set;

for i = 2 : (no_years+1)
    K_1 = find(data_Commodity(:,i) == 1);
    Commodity.Tobin_Q(K_1,i) = all.Tobin_Q(K_1,i);
    Commodity.Size(K_1,i) = all.Size(K_1,i);
    Commodity.Leverage(K_1,i) = all.Leverage(K_1,i);
    Commodity.ROA(K_1,i) = all.ROA(K_1,i);
    Commodity.InvestG(K_1,i) = all.InvestG(K_1,i);
    Commodity.CtoS(K_1,i) = all.CtoS(K_1,i);
end
NoCommodity.Tobin_Q = data_set;
NoCommodity.Size = data_set;
NoCommodity.Leverage = data_set;
NoCommodity.ROA = data_set;
NoCommodity.InvestG = data_set;
NoCommodity.CtoS = data_set;

for i = 2 : (no_years+1)
    K_1 = find(data_Commodity(:,i) == 0);
    NoCommodity.Tobin_Q(K_1,i) = all.Tobin_Q(K_1,i);
    NoCommodity.Size(K_1,i) = all.Size(K_1,i);
    NoCommodity.Leverage(K_1,i) = all.Leverage(K_1,i);
    NoCommodity.ROA(K_1,i) = all.ROA(K_1,i);
    NoCommodity.InvestG(K_1,i) = all.InvestG(K_1,i);
    NoCommodity.CtoS(K_1,i) = all.CtoS(K_1,i);
end

SMRY_annual(4,:) = sum(Commodity.Tobin_Q(2:end,2:end)) ./ SMRY_annual(2,);
SMRY_annual(5,:) = sum(all.Tobin_Q(2:end,2:end)) / no_firms;
SMRY_annual(6,:) = SMRY_annual(4,)/ SMRY_annual(5,);

for i = 1 : no_years
    K_1 = find(Commodity.Tobin_Q(:,i+1) ~= 0);
    temp = Commodity.Tobin_Q(K_1(2:end),i+1);
    SMRY_annual(7,i) = median(temp); end

SMRY_annual(8,:) = median(all.Tobin_Q(2:end,2:end)); SMRY_annual(9,:) =
SMRY_annual(7,)/ SMRY_annual(8,);
pct_annual = prctile(all.Tobin_Q(2:end,2:end),[10 90]);
pct_all = prctile(Charac(:,3),[10 90]);

%%
n = 1;
for i = add_start : (add_start+no_Charac-1)
    K_1 = find(Charac(:,4) == 1);
    PremiumorNot_All(n,1) = mean(Charac(K_1,i));

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K_2 = find(Charac(:,4) == 0);
PremiumorNot_All(n,2) = mean(Charac(K_2,i));
[h,p,ci,stats] = ttest2( Charac(K_1,i) , Charac(K_2,i) );
PremiumorNot_All(n,3:4) = [stats.tstat,p];
n = n + 1;
end

n = 1;
for i = add_start : (add_start+no_Charac-1)
K_1 = find(Charac(:,4) == 1);
PremiumorNot_All_Median(n,1) = median(Charac(K_1,i));
K_2 = find(Charac(:,4) == 0);
PremiumorNot_All_Median(n,2) = median(Charac(K_2,i));
[p,h,stats] = ranksum( Charac(K_1,i) , Charac(K_2,i) );
PremiumorNot_All_Median(n,3:4) = [p,stats.zval];
n = n + 1;
end

PremiumorNot_Annual(1,:) = SMRY_annual(1,:);
for i = 2 : (no_years+1)
K_1 = find(data_Commodity(:,i) == 1);
K_2 = find(data_Commodity(:,i) == 0);

% Tobin_Q
PremiumorNot_Annual(2:3,i-1) =
[mean(all.Tobin_Q(K_1,i)),mean(all.Tobin_Q(K_2,i))];
[h,p,ci,stats] = ttest2( all.Tobin_Q(K_1,i) , all.Tobin_Q(K_2,i) );
PremiumorNot_Annual(4:5,i-1) = [stats.tstat,p];
% Size
PremiumorNot_Annual(6:7,i-1) =
[mean(all.Size(K_1,i)),mean(all.Size(K_2,i))];
[h,p,ci,stats] = ttest2( all.Size(K_1,i) , all.Size(K_2,i) );
PremiumorNot_Annual(8:9,i-1) = [stats.tstat,p];
% Leverage
PremiumorNot_Annual(10:11,i-1) =
[mean(all.Leverage(K_1,i)),mean(all.Leverage(K_2,i))];
[h,p,ci,stats] = ttest2( all.Leverage(K_1,i) , all.Leverage(K_2,i) );
PremiumorNot_Annual(12:13,i-1) = [stats.tstat,p];
% ROA
PremiumorNot_Annual(14:15,i-1) =
[mean(all.ROA(K_1,i)),mean(all.ROA(K_2,i))];
[h,p,ci,stats] = ttest2( all.ROA(K_1,i) , all.ROA(K_2,i) );
PremiumorNot_Annual(16:17,i-1) = [stats.tstat,p];
% Investment Growth
PremiumorNot_Annual(18:19,i-1) =
[mean(all.InvestG(K_1,i)),mean(all.InvestG(K_2,i))];
[h,p,ci,stats] = ttest2( all.InvestG(K_1,i) , all.InvestG(K_2,i) );
PremiumorNot_Annual(20:21,i-1) = [stats.tstat,p];
% Cash to Sale Ratio
PremiumorNot_Annual(22:23,i-1) =
[mean(all.CtoS(K_1,i)),mean(all.CtoS(K_2,i))];
[h,p,ci,stats] = ttest2( all.CtoS(K_1,i) , all.CtoS(K_2,i) );
PremiumorNot_Annual(24:25,i-1) = [stats.tstat,p];
end
PremiumorNot_Annual(:,end+1) = mean(PremiumorNot_Annual(:,1:end),2);

PremiumorNot_Annual_Median(1,:) = SMRY_annual(1,:);
for i = 2 : (no_years+1)

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K_1 = find(data_Commodity(:,i) == 1);
K_2 = find(data_Commodity(:,i) == 0);

% Tobin_Q
PremiumorNot_Annual_Median(2:3,i-1) =
[median(all.Tobin_Q(K_1,i)),median(all.Tobin_Q(K_2,i))];
[p,h,stats] = ranksum( all.Tobin_Q(K_1,i) , all.Tobin_Q(K_2,i) );
PremiumorNot_Annual_Median(4:5,i-1) = [p,stats.zval];
% Size
PremiumorNot_Annual_Median(6:7,i-1) =
[median(all.Size(K_1,i)),median(all.Size(K_2,i))];
[p,h,stats]= ranksum( all.Size(K_1,i) , all.Size(K_2,i) );
PremiumorNot_Annual_Median(8:9,i-1) = [p,stats.zval];
% Leverage
PremiumorNot_Annual_Median(10:11,i-1) =
[median(all.Leverage(K_1,i)),median(all.Leverage(K_2,i))];
[p,h,stats] = ranksum( all.Leverage(K_1,i) , all.Leverage(K_2,i) );
PremiumorNot_Annual_Median(12:13,i-1) = [p,stats.zval];
% ROA
PremiumorNot_Annual_Median(14:15,i-1) =
[median(all.ROA(K_1,i)),median(all.ROA(K_2,i))];
[p,h,stats] = ranksum( all.ROA(K_1,i) , all.ROA(K_2,i) );
PremiumorNot_Annual_Median(16:17,i-1) = [p,stats.zval];
% Investment Growth
PremiumorNot_Annual_Median(18:19,i-1) =
[median(all.InvestG(K_1,i)),median(all.InvestG(K_2,i))];
[p,h,stats] = ranksum( all.InvestG(K_1,i) , all.InvestG(K_2,i) );
PremiumorNot_Annual_Median(20:21,i-1) = [p,stats.zval];
% Cash to Sale Ratio
PremiumorNot_Annual_Median(22:23,i-1) =
[median(all.CtoS(K_1,i)),median(all.CtoS(K_2,i))];
[p,h,stats]= ranksum( all.CtoS(K_1,i) , all.CtoS(K_2,i) );
PremiumorNot_Annual_Median(24:25,i-1) = [p,stats.zval];
end

PremiumorNot_Ind_All(1:2,:) = Ind_List(1:2,:);
for i = 1 : length(Ind_List(1,:))
    K_1 = find(data_WRDS(:,22)==Ind_List(1,i));
    K_2 = find(Charac(:,4)==1);
    K_3 = find(Charac(:,4)==0);
    L_1 = intersect(K_1,K_2);
    L_2 = intersect(K_1,K_3);
    PremiumorNot_Ind_All(3:4,i) = [nnz(unique(data_WRDS(L_1,1))) ,
nnz(unique(data_WRDS(L_2,1)))];
    n = 5;
    m = 6;
    for j = 5 : (5+no_Charac-1)
        PremiumorNot_Ind_All(n:m,i) =
[mean(Charac(L_1,j)),mean(Charac(L_2,j))];
        [h,p,ci,stats] = ttest2( Charac(L_1,j) , Charac(L_2,j) );
        n = n + 2;
        m = m + 2;
        PremiumorNot_Ind_All(n:m,i) = [stats.tstat,p];
        n = n + 2;
        m = m + 2;
    end

    toZeros = find(isnan(PremiumorNot_Ind_All(:,i)));
    PremiumorNot_Ind_All(toZeros,i) = 0;
    toZeros = find(isnan(PremiumorNot_Ind_All(:,i)));
    PremiumorNot_Ind_All(toZeros,i) = 0;

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end

for i = 1 : length(Ind_List(1,:))
    for j = 1 : no_years
        K_1 = find(Ind{1,i}{:,j+1} == 1);
        K_2 = find(Ind{1,i}{:,j+1} == 0);

        Ind_List(j+2,i) = mean(all.Tobin_Q(K_1,j+1));
        Ind_List(j+2+no_years,i) = mean(all.Tobin_Q(K_2,j+1));
    end
end

Reg_Pool_Y(:,1) = Charac(:,5);
Reg_Pool_X = Charac(:,4:10);
Reg_Pool_X(:,2) = [];

Reg_Pool = fitlm(Reg_Pool_X,Reg_Pool_Y);

Reg_FixedEff_Y = Reg_Pool_Y(2:end,1) - Reg_Pool_Y(1:end-1,1);
Reg_FixedEff_X = Reg_Pool_X(2:end,:) - Reg_Pool_X(1:end-1,:);
Reg_FixedEff = fitlm(Reg_FixedEff_X,Reg_FixedEff_Y);

N = 10; T = length(data_Commodity(1,:)) - 1;
k = no_Charac + 1;
RSS_R_F = Reg_Pool.Rsquared.Adjusted;
RSS_U_F = Reg_FixedEff.Rsquared.Adjusted;
F_stat_TE = ( (RSS_R_F - RSS_U_F) / RSS_U_F ) * ( (N-1)/((T-1)*N-k) );
F_critical = finv(0.95,(N-1),((T-1)*N-k));

RE_Y = Charac(:,5);
RE_X(:,1:7) = Charac(:,4:10);
RE_X(:,2) = [];
for i = 1: no_years-1
    temp = zeros(size(data_WRDS(:,1)));
    K_1 = find(data_WRDS(:,2) == (2005 + i));
    temp(K_1,1) = 1;
    RE_X(:,6+i) = temp;
end
Reg_RE = fitlm(RE_X,RE_Y);
RSS_U_E = Reg_Pool.Rsquared.Adjusted;
RSS_R_E = Reg_RE.Rsquared.Adjusted;
F_stat_RE = ( (RSS_R_E - RSS_U_E) / RSS_U_E ) * ( (N-1)/((T-1)*N-k) );

for i = 1 : no_years
    K_1 = find(Charac(:,2) == data_Commodity(1,i+1));
    Reg_Annual_Y(:,1) = Charac(K_1,5);
    Reg_Annual_X = Charac(K_1,4:10);
    Reg_Annual_X(:,2) = [];
    Reg_Annual_Modle = fitlm(Reg_Annual_X,Reg_Annual_Y);
    Reg_Annual{1,i} = Reg_Annual_Modle.Coefficients;
    Reg_Annual{2,i} = Reg_Annual_Modle.Rsquared.Ordinary;
end

for i = 1 : no_years
    n = 1;
    for j = 1 : (no_Charac+1)
        Reg_Annual_SMRY(n,i) = Reg_Annual{1,i}(j,1);
        n = n + 1;
        Reg_Annual_SMRY(n,i) = Reg_Annual{1,i}(j,4);
    end
end

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        n = n + 1;
    end
    Reg_Annual_SMRY(15,i) = Reg_Annual(2,i);
end

for i = 1 : length(Ind_List(1,:))
    K_1 = find(data_WRDS(:,22) == Ind_List(1,i));
    Reg_Ind_Y{1,i}(:,1) = Charac(K_1,5);
    Reg_Ind_X{1,i} = Charac(K_1,4:10);
    Reg_Ind_X{1,i}(:,2) = [];
    Reg_Ind_Modle = fitlm(Reg_Ind_X{1,i},Reg_Ind_Y{1,i});
    Reg_Ind{1,i} = table2array(Reg_Ind_Modle.Coefficients);
    Reg_Ind{2,i} = Reg_Ind_Modle.Rsquared.Ordinary;
    Reg_Ind_SMRY(1,i) = Reg_Ind_Modle.NumObservations;
end

for i = 1 : length(Ind_List(1,:))
    n = 2;
    for j = 1 : (no_Charac+1)
        Reg_Ind_SMRY(n,i) = Reg_Ind{1,i}(j,1);
        n = n + 1;
        Reg_Ind_SMRY(n,i) = Reg_Ind{1,i}(j,4);
        n = n + 1;
    end
    Reg_Ind_SMRY(16,i) = cell2mat(Reg_Ind(2,i));
end

%%

data_Price_raw = readtable('Price.xlsx');
data_Price = table2array(data_Price_raw);
data_Price(:,11) = sum(data_Price(:,10:end),2);
data_Price(:,12:end) = [];

data_DPrice = data_Price;
data_DPrice(2:end,2:end) = data_DPrice(2:end,2:end) - data_DPrice(1:(end-1),2:end);
data_DPrice(1,:) = [];

data_PM = data_DPrice;
for i = 1 : no_years
    K_1 = find(data_PM(i,:) > 0);
    K_2 = find(data_PM(i,:) < 0);
    data_PM(i,K_1(2:end)) = 1;
    data_PM(i,K_2) = 0;
end

K_1 = find(data_PM(:,2) == 1);
n_1 = 1;
m_1 = 0;
for i = 1 : length(K_1)
    L_1 = find(Charac(:,2) == data_PM(K_1(i)));
    m_1 = m_1 + length(L_1);
    Idx_U(n_1:m_1,1) = L_1;
    n_1 = m_1 + 1;
end
K_2 = find(data_PM(:,2) == 0);
n_2 = 1;

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m_2 = 0;
for i = 1 : length(K_2)
    L_2 = find(Charac(:,2) == data_PM(K_2(i)));
    m_2 = m_2 + length(L_2);
    Idx_D(n_2:m_2,1) = L_2;
    n_2 = m_2 + 1;
end

Using = find(Charac(:,4) == 1);
NotUsing = find(Charac(:,4) == 0);

K_1 = intersect(Idx_U,Using);
K_2 = intersect(Idx_U,NotUsing);
n = 1;
m = 2;
for i = 1 : no_Charac
    SMRY_PriceMove_All_Up(n:m,i) =
[mean(Charac(K_1,i+4)),mean(Charac(K_2,i+4))];
    [h,p,ci,stats] = ttest2( Charac(K_1,i+4) , Charac(K_2,i+4) );
    n = n + 2;
    m = m + 2;
    SMRY_PriceMove_All_Up(n:m,i) = [stats.tstat,p];
    n = 1;
    m = 2;
end

K_1 = intersect(Idx_D,Using);
K_2 = intersect(Idx_D,NotUsing);
n = 1;
m = 2;
for i = 1 : no_Charac
    SMRY_PriceMove_All_Down(n:m,i) =
[mean(Charac(K_1,i+4)),mean(Charac(K_2,i+4))];
    [h,p,ci,stats] = ttest2( Charac(K_1,i+4) , Charac(K_2,i+4) );
    n = n + 2;
    m = m + 2;
    SMRY_PriceMove_All_Down(n:m,i) = [stats.tstat,p];
    n = 1;
    m = 2;
end

%%
data_IndividualCom_Count_Raw = readtable('Commodity_count.xlsx');
data_IndividualCom_Count = table2array(data_IndividualCom_Count_Raw);
for i = 1 : length(data_IndividualCom_Count(1,:))
    toZeros = find(isnan(data_IndividualCom_Count(:,i)));
    data_IndividualCom_Count(toZeros,i) = 0;
end

a = sum(data_IndividualCom_Count(:,8:10),2);
toOnes = find(a ~= 0);
data_IndividualCom_Count(toOnes,8) = 1;
data_IndividualCom_Count(:,9:10) = [];

Specific_List = Ind_List(1,:);
for i = 1 : length(Ind_List(1,:))
    n = 2;
    for j = 5 : length(data_IndividualCom_Count(1,:))
        K_1 = find(data_WRDS(:,22) == Ind_List(1,i));
        L_1 = find(data_IndividualCom_Count(:,j) == 1);
        L_2 = find(data_IndividualCom_Count(:,j) == 0);
        K_1 = intersect(K_1,L_1);
    end
end

```

```

K_2 = intersect(K_1,L_2);

Specific_List(n,i) = nnz(Charac(K_1,5))/(nnz(Charac(K_1,5)) +
nnz(Charac(K_2,5)));
Specific_List(n+1,i) = mean(Charac(K_1,5));
Specific_List(n+2,i) = mean(Charac(K_2,5));

[h,p,ci,stats] = ttest2( Charac(K_1,5) , Charac(K_2,5) );
Specific_List(n+3:n+4,i) = [stats.tstat,p];
n = n + 5;
end
toZeros = find(isnan(Specific_List(:,i)));
Specific_List(toZeros,i) = 0;
end

%%

Correlation = corrcoef(Charac(:,5:10));

%%

Sens(:,1) = log (( data_WRDS(:,7) .* data_WRDS(:,21) + data_WRDS(:,8) +
data_WRDS(:,11) - data_WRDS(:,3) + data_WRDS(:,9) ) ./ data_WRDS(:,4));

K_1 = find(isnan(Sens(:,1)));
Sens(K_1,1) = 0;
Sens(:,2) = data_WRDS(:,24) ./ data_WRDS(:,25);
K_1 = find(isnan(Sens(:,2)));
Sens(K_1,2) = 0;
Sens(:,3) = data_WRDS(:,25) ./ data_WRDS(:,17);
K_1 = find(isnan(Sens(:,3)));
Sens(K_1,3) = 0;
K_1 = find(Sens(:,3) > 500);
Sens(K_1,3) = 0;

K_1 = find(Charac(:,5) ~= 0);
temp = corrcoef([Charac(:,5) Sens]);
SMRY_Sen(:,1) = temp(:,1);

SMRY_Sen(1,2) = mean(Charac(K_1,5));
SMRY_Sen(2:4,2) = mean(Sens);

SMRY_Sen(1,3) = median(Charac(K_1,5));
SMRY_Sen(2:4,3) = median(Sens);

SMRY_Sen(1,4) = std(Charac(K_1,5));
SMRY_Sen(2:4,4) = std(Sens);

SMRY_Sen(1,5) = prctile(Charac(K_1,5),[10]);
SMRY_Sen(2:4,5) = prctile(Sens,[10]);

SMRY_Sen(1,6) = prctile(Charac(K_1,5),[90]);
SMRY_Sen(2:4,6) = prctile(Sens,[90]);

Sen_Reg_Y = Sens(:,1);
Sen_Reg = fitlm(Reg_Pool_X,Sen_Reg_Y);

```

```

%%
Plot_X = PremiumorNot_Annual(1,1:end-1);
Plot_Y = transpose(data_DPrice(:,2:3));
figure(4)
yyaxis left
plot(Plot_X,Plot_Y);
xlim([2006 2017]);
xlabel('Times');
ylabel('Annual Returns');
yyaxis right
Plot_YY(1,:) = sum(NoCommodity.Tobin_Q(2:end,2:end)) ./ (no_firms -
SMRY_annual(2,:));
Plot_YY(2,:) = SMRY_annual(7,:);
plot(Plot_X,Plot_YY);
ylabel('Annual Tobin^S Q');
legend('the All Commodities Index','the Energy Commodities Index','Tobin^S
Q (non-users firm)','Tobin^S Q (user firm)');

figure(6)
K_1 = find(Charac(:,4) == 1);
histogram(Charac(:,5));
title('the Histogram of Users Tobin Q');

figure(7)
K_2 = find(Charac(:,4) == 0);
histogram(Charac(K_2,5));
title('the Histogram of Non-Users Tobin Q');

```