

Econ 512 HW 2

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September 2018

1 Question 1: Result

```
DA =  
    0.4223  
  
>> DB  
  
DB =  
    0.4223  
  
>> D0  
  
D0 =  
    0.1554
```

2 Question 2: Result

```
p_initial =
```

```
1
```

```
1
```

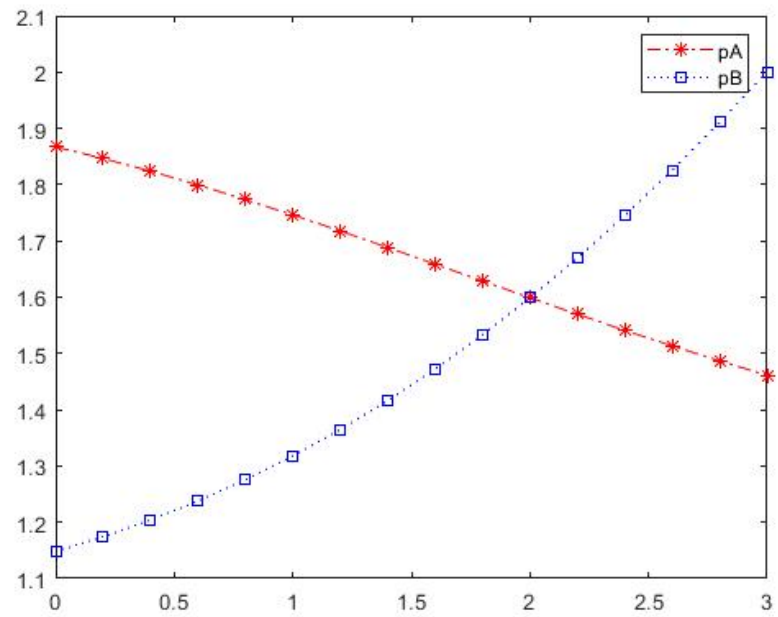
```
>> p
```

```
p =
```

```
1.5989
```

```
1.5989
```

3 Question 5: Result



4 Question 4: Result

$p1 =$

1.5989

$p2 =$

1.5989

5 Question 1: Codes

```
function [DA,DB,D0] = demand(vA,vB,pA,pB);
DA = exp(vA - pA)/(1 + exp(vA - pA)+ exp(vB - pB));
DB = exp(vB - pB)/(1 + exp(vA - pA)+ exp(vB - pB));
D0 = 1/(1 + exp(vA - pA)+ exp(vB - pB));
end
```

```
[DA DB D0] = demand(2,2,1,1);
```

6 Question 2: Codes

```
function [FOCs] = foc(vA,vB,p);
DA = exp(vA - p1)/(1 + exp(vA - p1)+ exp(vB - p2));
DB = exp(vB - p2)/(1 + exp(vA - p1)+ exp(vB - p2));
FOCs = [DA*(1-p(1)) + p(1)*DA^2; DB*(1-p(2)) + p(2)*DB^2]
end
```

```
handle = @(p) foc(2,2,p);
p`initial = [1;1];
p = broyden(handle,p`initial);
```

7 Question 5: Codes

```
clear
vA = 2;
vB = [0:.2:3]';
n = size(vB,1);
final = ones(2,n);
for i = 1:n
    handle = @(p) foc(vA,vB(i),p)
    p`init = [1;1]
    p = broyden(handle,p`init)
    final(:,i) = p
end
```

```
pA = final(1,:);
pB = final(2,:);
plot(vB,pA,'-r*');
hold on
plot(vB,pB,':bs')
legend('pA','pB')
```

8 Question 4: Codes

```
function [FOC`A,FOC`B] = trial(vA,vB,p1,p2)
DA = exp(vA - p1)/(1 + exp(vA - p1)+ exp(vB - p2));
DB = exp(vB - p2)/(1 + exp(vA - p1)+ exp(vB - p2));
FOC`A = DA*(1-p1) + p1*DA^2;
FOC`B = DB*(1-p2) + p2*DB^2
end
```

```
p1 = 1;
p2 = 2;
err = inf;
tol = 1e-10;
while abs(err) > 1e-10
[FOCA,FOCB] = trial(2,2,p1,p2)
err = max(FOC`A,FOC`B)
[DA,DB] = demand(2,2,p1,p2)
p1 = inv(1- DA)
p2 = inv(1 -DB)
end
```

(Please note that I referred to the web for help with a few commands in this document.)