ECON 439
Final: Extensive Form Games

Kevin Hasker

This exam will start at 15:40 and finish at 17:20.

Answer all questions in the space provided. Points will only be given for work shown.

1. *(15 points)* Please read and sign the following statement:

   I promise that my answers to this test are based on my own work without reference to any notes, books, or the assistance of any other person during the test. I recognize this means I should not use calculators or other electronic devices.

   Name and Surname: _
   Student ID: _
   Signature:

   _

2. *(8 points)* It is a well known fact that almost all professors (like I do) in the Economics department grade on the curve—i.e. the average student gets the average grade (B-/C+ in ECON 439) and then grades are assigned relative to this student. Can Strangelove is a regular student in the Economics department but has started taking his classes in the irregular semesters—i.e. spring semester classes in the following fall, etceteras. Why? I want you to explain why this is a best response for him despite it meaning that it will be harder for him to graduate on time.

3. *(9 points)* Give the definition of a *signal* in economics, and give an example from your life where you are (partially) signalling.

4. *(26 points total)* Consider T period alternating offer bargaining. Let player one's share be s_1 and player 2's share be s_2 where $s_1 \in [0,1]$, $s_2 \in [0,1]$ and $s_1 + s_2 \leq 1$. In odd periods Player 1 makes an offer of (s_1, s_2) and player 2 can either accept the offer and the negotiating terminates or rejects it and move to $t+1$ if $t < T$. In even periods player 2 makes an offer of (s_1, s_2) and player one can either accept it or reject it and move on to period $t+1$ if $t < T$. If $t = T$ then rejection means that both parties get zero. We will consider both T finite and $T = \infty$, where the bargaining may never end. Their common discount factor between periods is $\delta \in (0,1)$. **Assume that the person accepts an offer they are indifferent between accepting and rejecting.**

   (a) *(4 points)* Find the subgame perfect equilibrium when $T = 1$, or player one makes an offer and player 2 can either accept or reject it. **Hint:** the equilibrium in counter-intuitive.

   (b) *(4 points)* Find the subgame perfect equilibrium when $T = 2$, or if player 2 rejects player 1's offer then they can make one counter-offer.

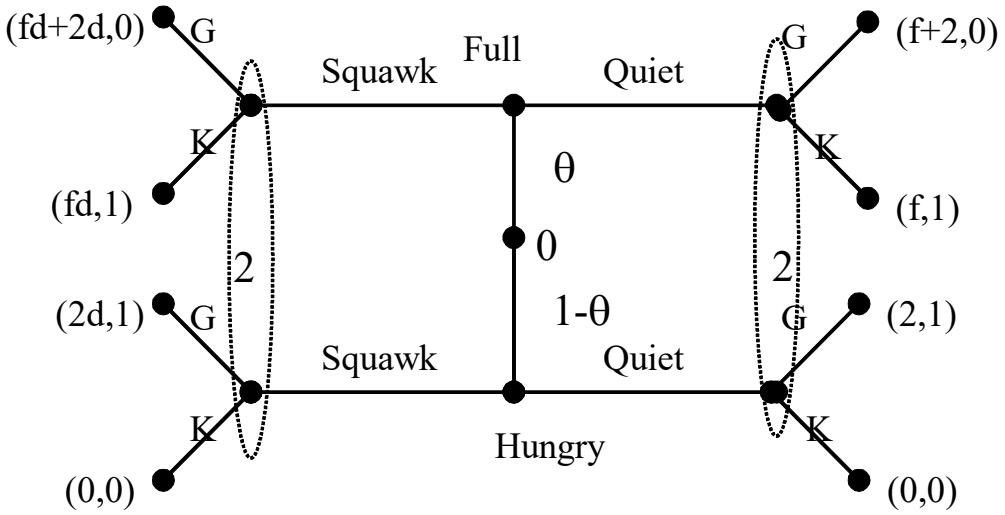
   (c) *(4 points)* Find the subgame perfect equilibrium when $T = 3$.

   (d) *(8 points)* One can show that when $T = \infty$ there is a unique subgame perfect equilibrium, where player one offers $\left(s_1^1, s_2^1\right)$ regardless of the period and player 2 offers $\left(s_1^2, s_2^2\right)$ regardless of the period. Find these steady state values.

(e) *(3 points)* Compare the subgame perfect equilibrium of this game when $T = \infty$ to experiments with the ultimatum game. Can it explain the most common outcome? Is it a reasonable explanation? Can it explain how the outcome varies across cultures? **If you are unable to find this equilibrium you can base your logic on the equilibrium when $T \in \{1, 2, 3\}$.**

(f) *(3 points)* Explain why we must assume that a person accepts an offer if indifferent in this model, and why it is not a bad assumption. **Note that answering this question does not require answering any of the previous questions.**

5. *(30 points total)* The Sir Phillip Sidney Game: When observing colonies of birds, biologists notice that all the adult birds go out to gathering food and then when they return they feed whichever chick (baby bird) is squawking that is closely enough related to them. The following game summarizes this as a strategic interaction. First nature determines whether a chick is full (F) or hungry (H), it is full with probability $\theta \in (0,1)$. Then the chick either squawks (S) or is quiet (Q), then the adult decides to either give the food (G) or keep it (K). The payoffs recognize that feeding the chicks costs the adult, and ignores the issue of how closely related the birds are. The cost of squawking is a discount of the benefit of being fed, their utility is discounted by $d \in (0,1)$ if they squawk. **For your exam** $f = 3$.



(a) *(4 points)* Write down all of the strategies of the adult (Player 2) and the chick (Player 1).

(b) *(8 points)* Solve the game as if the adults (Player 2) had complete information, then rewrite this using strategies you found in the last part of the question, is it a weak sequential equilibrium? If it is a weak sequential equilibrium specify the beliefs.

(c) *(15 points)* Fill out the following table, in the first column (s_2) should be a strategy of Player 2 (the adult). In the second column should be a Best response for player 1 (the chick) ($BR_1(s_2)$), in the next three columns should be the range for three parameters under which this is an equilibrium. These are the value for d, θ, and $\beta_1(H)$ which are the probability the adult assigns to the chick being hungry when they do what they are not expected to. If these values do not matter then you should leave them blank. Finally if this can be an equilibrium I want you to say whether it is a pooling equilibrium or a separating equilibrium. This answer should be in the last column, under *Type?*. There are more rows than necessary in this table.

s_2____	$BR_1(s_2)$__	d___	θ___	$\beta_1(H)$__	*Type?*_____

(d) *(3 points)* As I mentioned above, the empirical observation is that adults feed (closely related) squawking birds. Which of these equilibria does that make of interest? Recognizing that f is a parameter that might vary, discuss how this variation can explain the empirical observations more clearly, discuss how it should impact other parameters of the model.

6. *(12 points total)* About weak sequential equilibria.

   (a) *(3 points)* Define an *assessment.*

   (b) *(3 points)* Define *consistent beliefs.*

   (c) *(3 points)* Define *sequential rationality.*

   (d) *(3 points)* Define a *weak sequential equilibrium.*

ECON 439
Final: Extensive Form Games

Kevin Hasker

This exam will start at 15:40 and finish at 17:20.

Answer all questions in the space provided. Points will only be given for work shown.

1. *(15 points)* Please read and sign the following statement:

   I promise that my answers to this test are based on my own work without reference to any notes, books, or the assistance of any other person during the test. I recognize this means I should not use calculators or other electronic devices.

   Name and Surname: _
   Student ID: _
   Signature:

   _

2. *(8 points)* It is a well known fact that almost all professors (like I do) in the Economics department grade on the curve—i.e. the average student gets the average grade (B-/C+ in ECON 439) and then grades are assigned relative to this student. Can Strangelove is a regular student in the Economics department but has started taking his classes in the irregular semesters—i.e. spring semester classes in the following fall, etceteras. Why? I want you to explain why this is a best response for him despite it meaning that it will be harder for him to graduate on time.

3. *(9 points)* Give the definition of a *signal* in economics, and give an example from your life where you are (partially) signalling.

4. *(26 points total)* Consider T period alternating offer bargaining. Let player one's share be s_1 and player 2's share be s_2 where $s_1 \in [0,1]$, $s_2 \in [0,1]$ and $s_1 + s_2 \leq 1$. In odd periods Player 1 makes an offer of (s_1, s_2) and player 2 can either accept the offer and the negotiating terminates or rejects it and move to $t+1$ if $t < T$. In even periods player 2 makes an offer of (s_1, s_2) and player one can either accept it or reject it and move on to period $t+1$ if $t < T$. If $t = T$ then rejection means that both parties get zero. We will consider both T finite and $T = \infty$, where the bargaining may never end. Their common discount factor between periods is $\delta \in (0,1)$. **Assume that the person accepts an offer they are indifferent between accepting and rejecting.**

   (a) *(4 points)* Find the subgame perfect equilibrium when $T = 1$, or player one makes an offer and player 2 can either accept or reject it. **Hint:** the equilibrium in counter-intuitive.

   (b) *(4 points)* Find the subgame perfect equilibrium when $T = 2$, or if player 2 rejects player 1's offer then they can make one counter-offer.

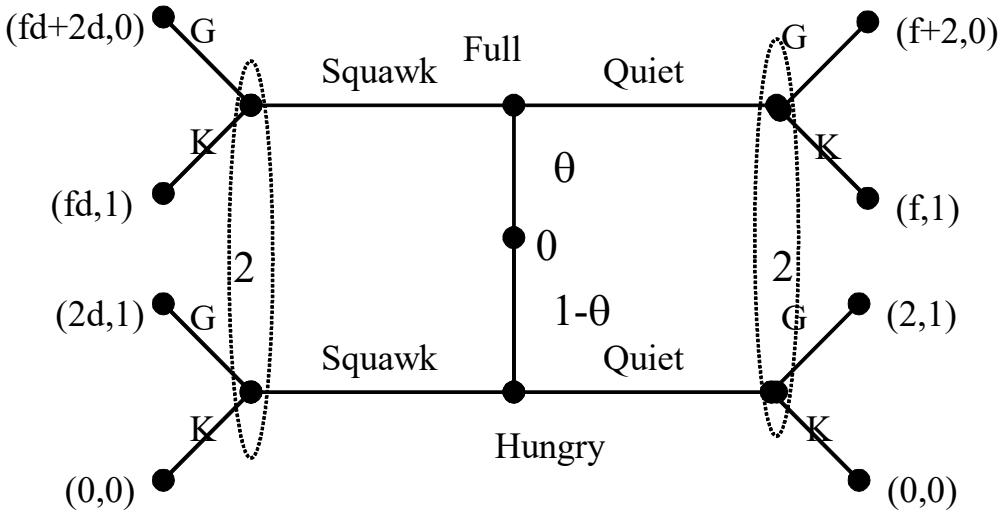
   (c) *(4 points)* Find the subgame perfect equilibrium when $T = 3$.

   (d) *(8 points)* One can show that when $T = \infty$ there is a unique subgame perfect equilibrium, where player one offers $\left(s_1^1, s_2^1\right)$ regardless of the period and player 2 offers $\left(s_1^2, s_2^2\right)$ regardless of the period. Find these steady state values.

(e) *(3 points)* Compare the subgame perfect equilibrium of this game when $T = \infty$ to experiments with the ultimatum game. Can it explain the most common outcome? Is it a reasonable explanation? Can it explain how the outcome varies across cultures? **If you are unable to find this equilibrium you can base your logic on the equilibrium when $T \in \{1, 2, 3\}$.**

(f) *(3 points)* Explain why we must assume that a person accepts an offer if indifferent in this model, and why it is not a bad assumption. **Note that answering this question does not require answering any of the previous questions.**

5. *(30 points total)* The Sir Phillip Sidney Game: When observing colonies of birds, biologists notice that all the adult birds go out to gathering food and then when they return they feed whichever chick (baby bird) is squawking that is closely enough related to them. The following game summarizes this as a strategic interaction. First nature determines whether a chick is full (F) or hungry (H), it is full with probability $\theta \in (0,1)$. Then the chick either squawks (S) or is quiet (Q), then the adult decides to either give the food (G) or keep it (K). The payoffs recognize that feeding the chicks costs the adult, and ignores the issue of how closely related the birds are. The cost of squawking is a discount of the benefit of being fed, their utility is discounted by $d \in (0,1)$ if they squawk. **For your exam** $f = 1$.



(a) *(4 points)* Write down all of the strategies of the adult (Player 2) and the chick (Player 1).

(b) *(8 points)* Solve the game as if the adults (Player 2) had complete information, then rewrite this using strategies you found in the last part of the question, is it a weak sequential equilibrium? If it is a weak sequential equilibrium specify the beliefs.

(c) *(15 points)* Fill out the following table, in the first column (s_2) should be a strategy of Player 2 (the adult). In the second column should be a Best response for player 1 (the chick) ($BR_1(s_2)$), in the next three columns should be the range for three parameters under which this is an equilibrium. These are the value for d, θ, and $\beta_1(H)$ which are the probability the adult assigns to the chick being hungry when they do what they are not expected to. If these values do not matter then you should leave them blank. Finally if this can be an equilibrium I want you to say whether it is a pooling equilibrium or a separating equilibrium. This answer should be in the last column, under *Type?*. There are more rows than necessary in this table.

s_2____	$BR_1(s_2)$ __	d___	θ___	$\beta_1(H)$ __	*Type?*_____

(d) *(3 points)* As I mentioned above, the empirical observation is that adults feed (closely related) squawking birds. Which of these equilibria does that make of interest? Recognizing that f is a parameter that might vary, discuss how this variation can explain the empirical observations more clearly, discuss how it should impact other parameters of the model.

6. *(12 points total)* About weak sequential equilibria.

   (a) *(3 points)* Define an *assessment.*

   (b) *(3 points)* Define *consistent beliefs.*

   (c) *(3 points)* Define *sequential rationality.*

   (d) *(3 points)* Define a *weak sequential equilibrium.*

ECON 439
Final: Extensive Form Games

Kevin Hasker

This exam will start at 15:40 and finish at 17:20.

Answer all questions in the space provided. Points will only be given for work shown.

1. *(15 points)* Please read and sign the following statement:

   I promise that my answers to this test are based on my own work without reference to any notes, books, or the assistance of any other person during the test. I recognize this means I should not use calculators or other electronic devices.

   Name and Surname: _
   Student ID: _
   Signature:

   _

2. *(8 points)* It is a well known fact that almost all professors (like I do) in the Economics department grade on the curve—i.e. the average student gets the average grade (B-/C+ in ECON 439) and then grades are assigned relative to this student. Can Strangelove is a regular student in the Economics department but has started taking his classes in the irregular semesters—i.e. spring semester classes in the following fall, etceteras. Why? I want you to explain why this is a best response for him despite it meaning that it will be harder for him to graduate on time.

3. *(9 points)* Give the definition of a *signal* in economics, and give an example from your life where you are (partially) signalling.

4. *(26 points total)* Consider T period alternating offer bargaining. Let player one's share be s_1 and player 2's share be s_2 where $s_1 \in [0,1]$, $s_2 \in [0,1]$ and $s_1 + s_2 \leq 1$. In odd periods Player 1 makes an offer of (s_1, s_2) and player 2 can either accept the offer and the negotiating terminates or rejects it and move to $t+1$ if $t < T$. In even periods player 2 makes an offer of (s_1, s_2) and player one can either accept it or reject it and move on to period $t+1$ if $t < T$. If $t = T$ then rejection means that both parties get zero. We will consider both T finite and $T = \infty$, where the bargaining may never end. Their common discount factor between periods is $\delta \in (0,1)$. **Assume that the person accepts an offer they are indifferent between accepting and rejecting.**

   (a) *(4 points)* Find the subgame perfect equilibrium when $T = 1$, or player one makes an offer and player 2 can either accept or reject it. **Hint:** the equilibrium in counter-intuitive.

   (b) *(4 points)* Find the subgame perfect equilibrium when $T = 2$, or if player 2 rejects player 1's offer then they can make one counter-offer.

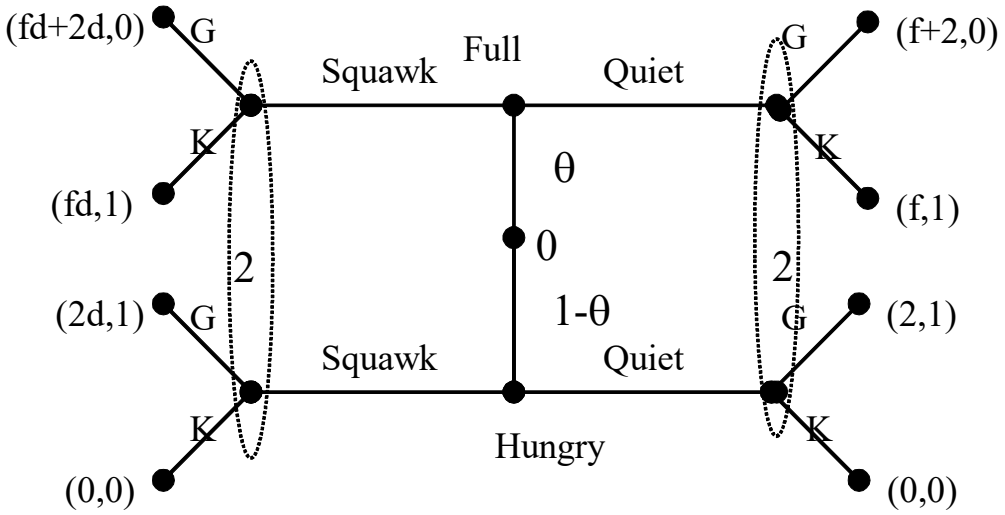
   (c) *(4 points)* Find the subgame perfect equilibrium when $T = 3$.

   (d) *(8 points)* One can show that when $T = \infty$ there is a unique subgame perfect equilibrium, where player one offers $\left(s_1^1, s_2^1\right)$ regardless of the period and player 2 offers $\left(s_1^2, s_2^2\right)$ regardless of the period. Find these steady state values.

(e) *(3 points)* Compare the subgame perfect equilibrium of this game when $T = \infty$ to experiments with the ultimatum game. Can it explain the most common outcome? Is it a reasonable explanation? Can it explain how the outcome varies across cultures? **If you are unable to find this equilibrium you can base your logic on the equilibrium when $T \in \{1, 2, 3\}$.**

(f) *(3 points)* Explain why we must assume that a person accepts an offer if indifferent in this model, and why it is not a bad assumption. **Note that answering this question does not require answering any of the previous questions.**

5. *(30 points total)* The Sir Phillip Sidney Game: When observing colonies of birds, biologists notice that all the adult birds go out to gathering food and then when they return they feed whichever chick (baby bird) is squawking that is closely enough related to them. The following game summarizes this as a strategic interaction. First nature determines whether a chick is full (F) or hungry (H), it is full with probability $\theta \in (0,1)$. Then the chick either squawks (S) or is quiet (Q), then the adult decides to either give the food (G) or keep it (K). The payoffs recognize that feeding the chicks costs the adult, and ignores the issue of how closely related the birds are. The cost of squawking is a discount of the benefit of being fed, their utility is discounted by $d \in (0,1)$ if they squawk. **For your exam** $f = 4$.



(a) *(4 points)* Write down all of the strategies of the adult (Player 2) and the chick (Player 1).

(b) *(8 points)* Solve the game as if the adults (Player 2) had complete information, then rewrite this using strategies you found in the last part of the question, is it a weak sequential equilibrium? If it is a weak sequential equilibrium specify the beliefs.

(c) *(15 points)* Fill out the following table, in the first column (s_2) should be a strategy of Player 2 (the adult). In the second column should be a Best response for player 1 (the chick) ($BR_1(s_2)$), in the next three columns should be the range for three parameters under which this is an equilibrium. These are the value for d, θ, and $\beta_1(H)$ which are the probability the adult assigns to the chick being hungry when they do what they are not expected to. If these values do not matter then you should leave them blank. Finally if this can be an equilibrium I want you to say whether it is a pooling equilibrium or a separating equilibrium. This answer should be in the last column, under *Type?*. There are more rows than necessary in this table.

s_2____	$BR_1(s_2)$ __	d___	θ___	$\beta_1(H)$ __	*Type?*_____

(d) *(3 points)* As I mentioned above, the empirical observation is that adults feed (closely related) squawking birds. Which of these equilibria does that make of interest? Recognizing that f is a parameter that might vary, discuss how this variation can explain the empirical observations more clearly, discuss how it should impact other parameters of the model.

6. *(12 points total)* About weak sequential equilibria.

   (a) *(3 points)* Define an *assessment.*

   (b) *(3 points)* Define *consistent beliefs.*

   (c) *(3 points)* Define *sequential rationality.*

   (d) *(3 points)* Define a *weak sequential equilibrium.*

ECON 439
Final: Extensive Form Games

Kevin Hasker

This exam will start at 15:40 and finish at 17:20.

Answer all questions in the space provided. Points will only be given for work shown.

1. *(15 points)* Please read and sign the following statement:

   I promise that my answers to this test are based on my own work without reference to any notes, books, or the assistance of any other person during the test. I recognize this means I should not use calculators or other electronic devices.

   Name and Surname: _
   Student ID: _
   Signature:

   _

2. *(8 points)* It is a well known fact that almost all professors (like I do) in the Economics department grade on the curve—i.e. the average student gets the average grade (B-/C+ in ECON 439) and then grades are assigned relative to this student. Can Strangelove is a regular student in the Economics department but has started taking his classes in the irregular semesters—i.e. spring semester classes in the following fall, etceteras. Why? I want you to explain why this is a best response for him despite it meaning that it will be harder for him to graduate on time.

3. *(9 points)* Give the definition of a *signal* in economics, and give an example from your life where you are (partially) signalling.

4. *(26 points total)* Consider T period alternating offer bargaining. Let player one's share be s_1 and player 2's share be s_2 where $s_1 \in [0,1]$, $s_2 \in [0,1]$ and $s_1 + s_2 \leq 1$. In odd periods Player 1 makes an offer of (s_1, s_2) and player 2 can either accept the offer and the negotiating terminates or rejects it and move to $t+1$ if $t < T$. In even periods player 2 makes an offer of (s_1, s_2) and player one can either accept it or reject it and move on to period $t+1$ if $t < T$. If $t = T$ then rejection means that both parties get zero. We will consider both T finite and $T = \infty$, where the bargaining may never end. Their common discount factor between periods is $\delta \in (0,1)$. **Assume that the person accepts an offer they are indifferent between accepting and rejecting.**

   (a) *(4 points)* Find the subgame perfect equilibrium when $T = 1$, or player one makes an offer and player 2 can either accept or reject it. **Hint:** the equilibrium in counter-intuitive.

   (b) *(4 points)* Find the subgame perfect equilibrium when $T = 2$, or if player 2 rejects player 1's offer then they can make one counter-offer.

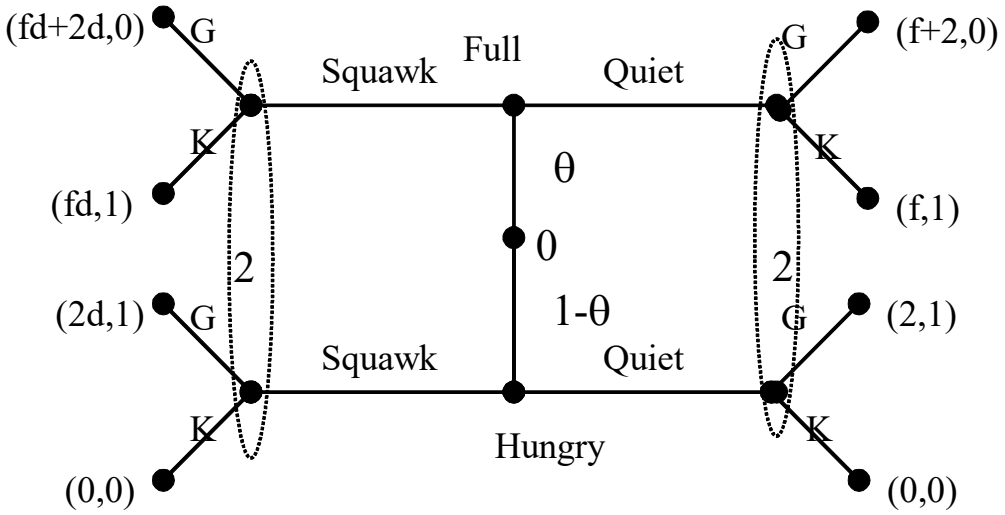
   (c) *(4 points)* Find the subgame perfect equilibrium when $T = 3$.

   (d) *(8 points)* One can show that when $T = \infty$ there is a unique subgame perfect equilibrium, where player one offers $\left(s_1^1, s_2^1\right)$ regardless of the period and player 2 offers $\left(s_1^2, s_2^2\right)$ regardless of the period. Find these steady state values.

(e) *(3 points)* Compare the subgame perfect equilibrium of this game when $T = \infty$ to experiments with the ultimatum game. Can it explain the most common outcome? Is it a reasonable explanation? Can it explain how the outcome varies across cultures? **If you are unable to find this equilibrium you can base your logic on the equilibrium when $T \in \{1, 2, 3\}$.**

(f) *(3 points)* Explain why we must assume that a person accepts an offer if indifferent in this model, and why it is not a bad assumption. **Note that answering this question does not require answering any of the previous questions.**

5. *(30 points total)* The Sir Phillip Sidney Game: When observing colonies of birds, biologists notice that all the adult birds go out to gathering food and then when they return they feed whichever chick (baby bird) is squawking that is closely enough related to them. The following game summarizes this as a strategic interaction. First nature determines whether a chick is full (F) or hungry (H), it is full with probability $\theta \in (0,1)$. Then the chick either squawks (S) or is quiet (Q), then the adult decides to either give the food (G) or keep it (K). The payoffs recognize that feeding the chicks costs the adult, and ignores the issue of how closely related the birds are. The cost of squawking is a discount of the benefit of being fed, their utility is discounted by $d \in (0,1)$ if they squawk. **For your exam** $f = 2$.



(a) *(4 points)* Write down all of the strategies of the adult (Player 2) and the chick (Player 1).

(b) *(8 points)* Solve the game as if the adults (Player 2) had complete information, then rewrite this using strategies you found in the last part of the question, is it a weak sequential equilibrium? If it is a weak sequential equilibrium specify the beliefs.

(c) *(15 points)* Fill out the following table, in the first column (s_2) should be a strategy of Player 2 (the adult). In the second column should be a Best response for player 1 (the chick) ($BR_1(s_2)$), in the next three columns should be the range for three parameters under which this is an equilibrium. These are the value for d, θ, and $\beta_1(H)$ which are the probability the adult assigns to the chick being hungry when they do what they are not expected to. If these values do not matter then you should leave them blank. Finally if this can be an equilibrium I want you to say whether it is a pooling equilibrium or a separating equilibrium. This answer should be in the last column, under *Type?*. There are more rows than necessary in this table.

s_2____	$BR_1(s_2)$ __	d___	θ___	$\beta_1(H)$ __	*Type?*_____

(d) *(3 points)* As I mentioned above, the empirical observation is that adults feed (closely related) squawking birds. Which of these equilibria does that make of interest? Recognizing that f is a parameter that might vary, discuss how this variation can explain the empirical observations more clearly, discuss how it should impact other parameters of the model.

6. *(12 points total)* About weak sequential equilibria.

   (a) *(3 points)* Define an *assessment.*

   (b) *(3 points)* Define *consistent beliefs.*

   (c) *(3 points)* Define *sequential rationality.*

   (d) *(3 points)* Define a *weak sequential equilibrium.*

ECON 439
Final: Extensive Form Games

Kevin Hasker

This exam will start at 15:40 and finish at 17:20.

Answer all questions in the space provided. Points will only be given for work shown.

1. *(15 points)* Please read and sign the following statement:

   I promise that my answers to this test are based on my own work without reference to any notes, books, or the assistance of any other person during the test. I recognize this means I should not use calculators or other electronic devices.

   Name and Surname: _
   Student ID: _
   Signature:

   _

2. *(8 points)* It is a well known fact that almost all professors (like I do) in the Economics department grade on the curve—i.e. the average student gets the average grade (B-/C+ in ECON 439) and then grades are assigned relative to this student. Can Strangelove is a regular student in the Economics department but has started taking his classes in the irregular semesters—i.e. spring semester classes in the following fall, etceteras. Why? I want you to explain why this is a best response for him despite it meaning that it will be harder for him to graduate on time.

3. *(9 points)* Give the definition of a *signal* in economics, and give an example from your life where you are (partially) signalling.

4. *(26 points total)* Consider T period alternating offer bargaining. Let player one's share be s_1 and player 2's share be s_2 where $s_1 \in [0,1]$, $s_2 \in [0,1]$ and $s_1 + s_2 \leq 1$. In odd periods Player 1 makes an offer of (s_1, s_2) and player 2 can either accept the offer and the negotiating terminates or rejects it and move to $t+1$ if $t < T$. In even periods player 2 makes an offer of (s_1, s_2) and player one can either accept it or reject it and move on to period $t+1$ if $t < T$. If $t = T$ then rejection means that both parties get zero. We will consider both T finite and $T = \infty$, where the bargaining may never end. Their common discount factor between periods is $\delta \in (0,1)$. **Assume that the person accepts an offer they are indifferent between accepting and rejecting.**

   (a) *(4 points)* Find the subgame perfect equilibrium when $T = 1$, or player one makes an offer and player 2 can either accept or reject it. **Hint:** the equilibrium in counter-intuitive.

   (b) *(4 points)* Find the subgame perfect equilibrium when $T = 2$, or if player 2 rejects player 1's offer then they can make one counter-offer.

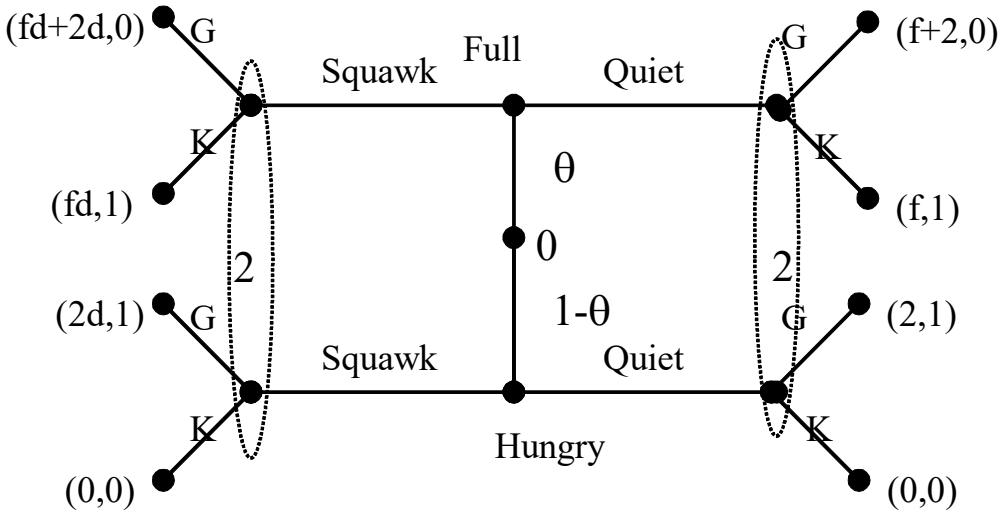
   (c) *(4 points)* Find the subgame perfect equilibrium when $T = 3$.

   (d) *(8 points)* One can show that when $T = \infty$ there is a unique subgame perfect equilibrium, where player one offers $\left(s_1^1, s_2^1\right)$ regardless of the period and player 2 offers $\left(s_1^2, s_2^2\right)$ regardless of the period. Find these steady state values.

(e) *(3 points)* Compare the subgame perfect equilibrium of this game when $T = \infty$ to experiments with the ultimatum game. Can it explain the most common outcome? Is it a reasonable explanation? Can it explain how the outcome varies across cultures? **If you are unable to find this equilibrium you can base your logic on the equilibrium when $T \in \{1, 2, 3\}$.**

(f) *(3 points)* Explain why we must assume that a person accepts an offer if indifferent in this model, and why it is not a bad assumption. **Note that answering this question does not require answering any of the previous questions.**

5. *(30 points total)* The Sir Phillip Sidney Game: When observing colonies of birds, biologists notice that all the adult birds go out to gathering food and then when they return they feed whichever chick (baby bird) is squawking that is closely enough related to them. The following game summarizes this as a strategic interaction. First nature determines whether a chick is full (F) or hungry (H), it is full with probability $\theta \in (0,1)$. Then the chick either squawks (S) or is quiet (Q), then the adult decides to either give the food (G) or keep it (K). The payoffs recognize that feeding the chicks costs the adult, and ignores the issue of how closely related the birds are. The cost of squawking is a discount of the benefit of being fed, their utility is discounted by $d \in (0,1)$ if they squawk. **For your exam** $f = 5$.



(a) *(4 points)* Write down all of the strategies of the adult (Player 2) and the chick (Player 1).

(b) *(8 points)* Solve the game as if the adults (Player 2) had complete information, then rewrite this using strategies you found in the last part of the question, is it a weak sequential equilibrium? If it is a weak sequential equilibrium specify the beliefs.

(c) *(15 points)* Fill out the following table, in the first column (s_2) should be a strategy of Player 2 (the adult). In the second column should be a Best response for player 1 (the chick) ($BR_1(s_2)$), in the next three columns should be the range for three parameters under which this is an equilibrium. These are the value for d, θ, and $\beta_1(H)$ which are the probability the adult assigns to the chick being hungry when they do what they are not expected to. If these values do not matter then you should leave them blank. Finally if this can be an equilibrium I want you to say whether it is a pooling equilibrium or a separating equilibrium. This answer should be in the last column, under *Type?*. There are more rows than necessary in this table.

s_2____	$BR_1(s_2)$ __	d___	θ___	$\beta_1(H)$ __	*Type?*_____

(d) *(3 points)* As I mentioned above, the empirical observation is that adults feed (closely related) squawking birds. Which of these equilibria does that make of interest? Recognizing that f is a parameter that might vary, discuss how this variation can explain the empirical observations more clearly, discuss how it should impact other parameters of the model.

6. *(12 points total)* About weak sequential equilibria.

   (a) *(3 points)* Define an *assessment.*

   (b) *(3 points)* Define *consistent beliefs.*

   (c) *(3 points)* Define *sequential rationality.*

   (d) *(3 points)* Define a *weak sequential equilibrium.*