



Lucas Mesz

Portfólio Exploratório: Efeitos da Guerra de Atrito e Revelação da Informação

Dissertação de Mestrado

Orientador : Prof. Luiz Eduardo Teixeira Brandão
Co-orientador: Prof. Marco Antônio Guimarães Dias

Conflito

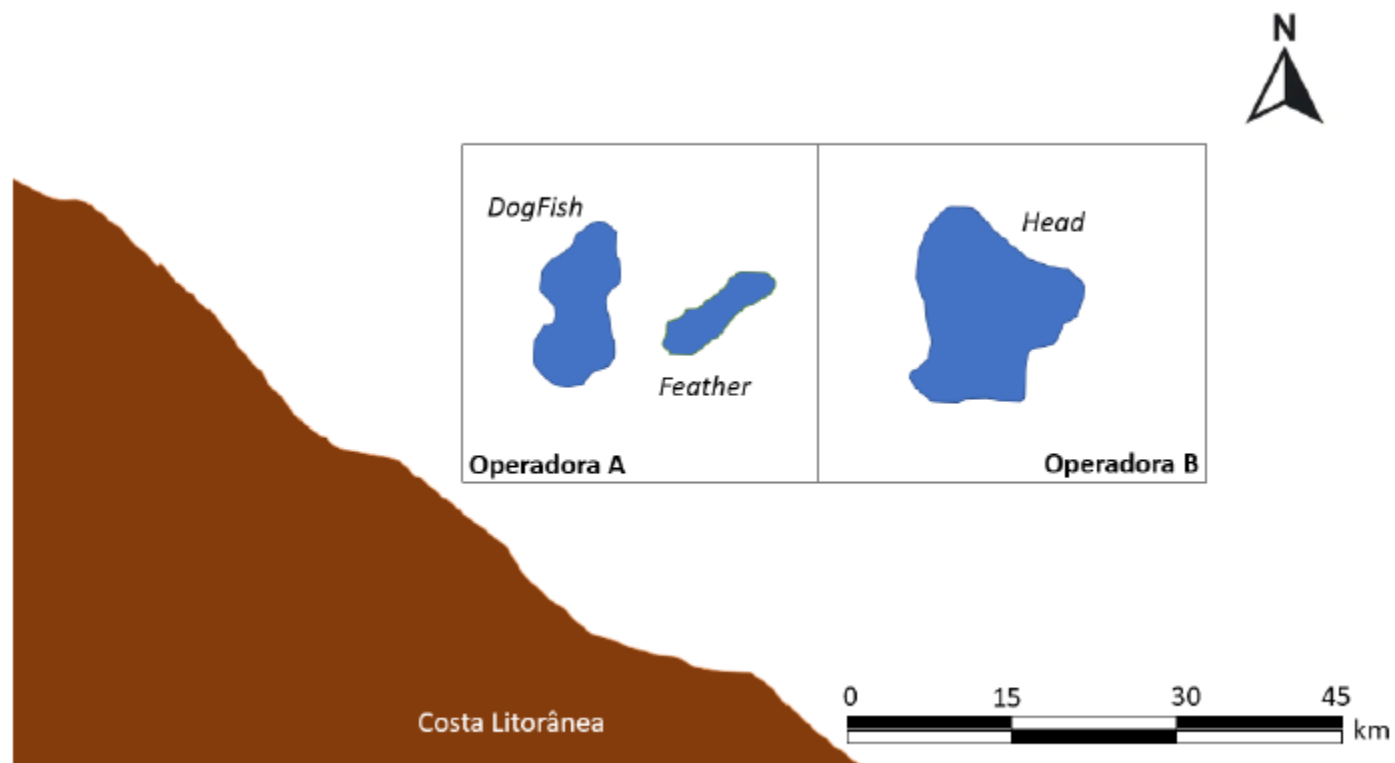


Figura 4.52: Modelo - 2 Blocos - A - DogFish e Feather - B Head

Guerra de Atrito

- Prêmio v
- Custo c
- Ações – Escala, Recua

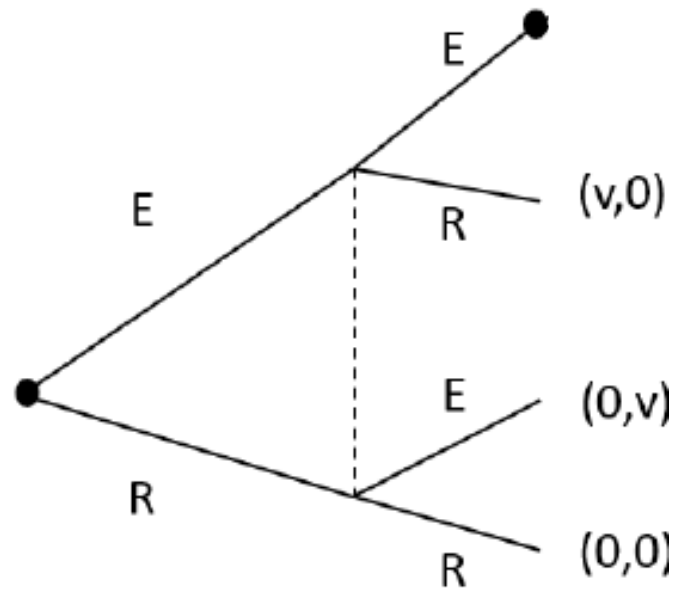
Guerra de Atrito

- Prêmio v
- Custo c
- Ações – Escala, Recua
- Jogo Dinâmico

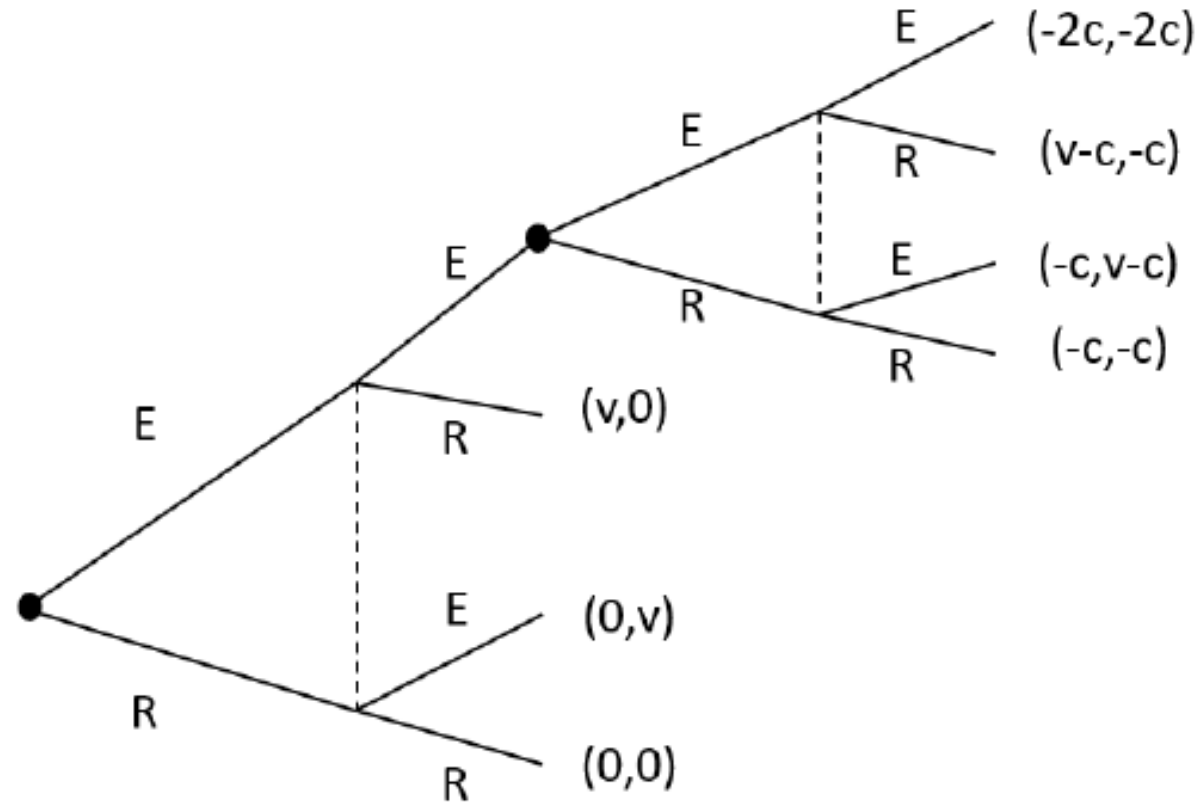
Guerra de Atrito – Modelo Básico

- Prêmio v
- Custo c
- Ações – Escala, Recua
- Jogo Dinâmico
- Jogos Similares :
 - Hawk and Dove
 - Chicken Game

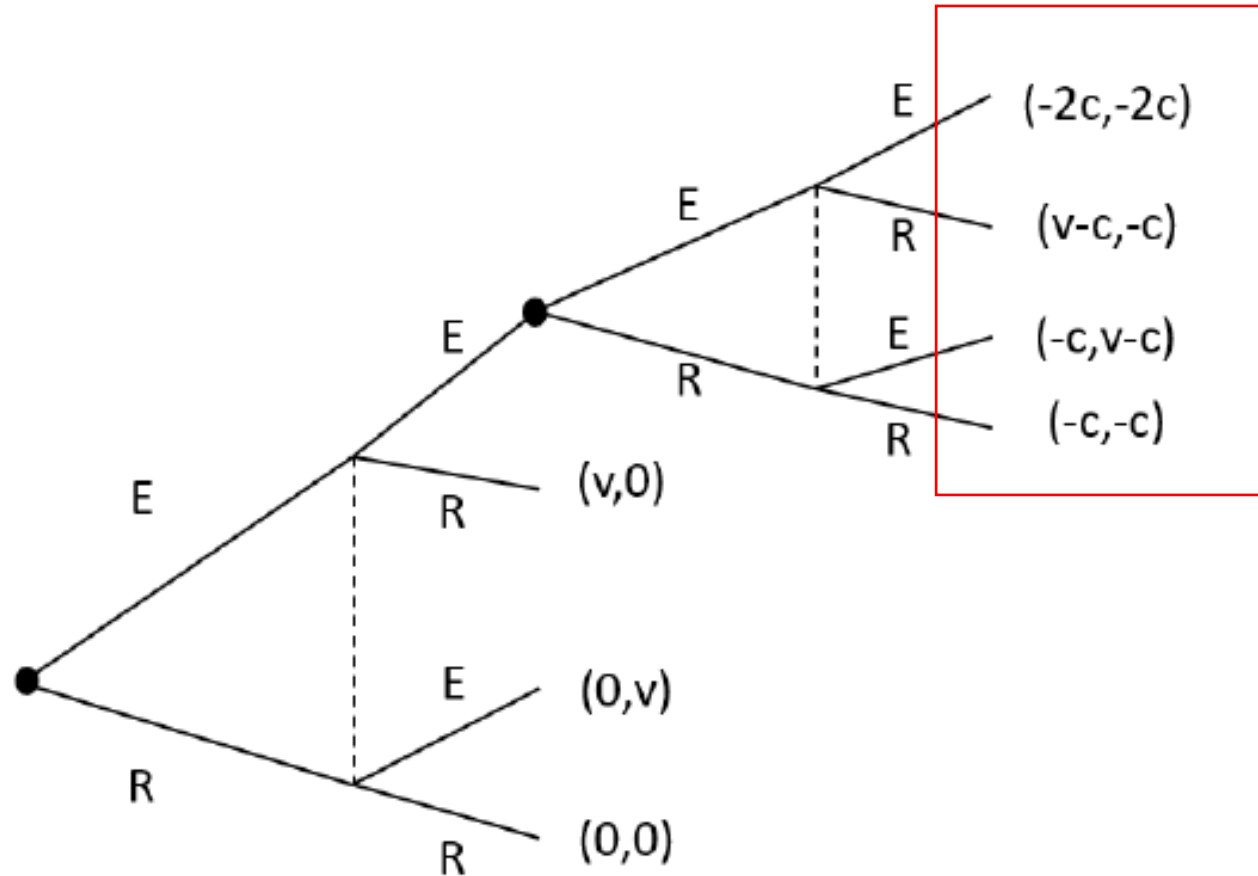
Guerra de Atrito – Modelo Básico



Guerra de Atrito – Modelo Básico



Guerra de Atrito – Modelo Básico



Guerra de Atrito – Modelo Básico

		Jogador 2	
		q	$1 - q$
		Escala	Recua
Jogador 1	p	Escala $-2c ; -2c$	$v - c ; -c$
	$1 - p$	Recua $-c ; v - c$	$-c ; -c$

Tabela 3.3: Subjogo 2 - Guerra de Atrito

Guerra de Atrito – Modelo Básico

		Escala	Recua
Escala	$-c +$	$-c ; -c$	$\underline{v} ; \underline{0}$
Recua		$\underline{0} ; \underline{v}$	$0 ; 0$

Tabela 3.4: Subjogo 2 - Guerra de Atrito - Custo afundado

Guerra de Atrito – Modelo Básico

			Escala	Recua
Escala	$-c$	+	$-c ; -c$	$\underline{v} ; \underline{0}$
Recua			$\underline{0} ; \underline{v}$	$0 ; 0$

Tabela 3.4: Subjogo 2 - Guerra de Atrito - Custo afundado

Guerra de Atrito – Modelo Básico

	Escala	Recua
Escala	$v - c ; -c$	$\underline{v} ; \underline{0}$
Recua	$0 ; \underline{v}$	$0 ; 0$

Tabela 3.5: Subjogo 1 - Guerra de Atrito - $\{E_2, R_2\}$

Guerra de Atrito – Modelo Básico

	Escala	Recua
Escala	$\underline{v - c} ; -c$	$\underline{v} ; \underline{0}$
Recua	$0 ; \underline{v}$	$0 ; 0$

Tabela 3.5: Subjogo 1 - Guerra de Atrito - $\{E_2, R_2\}$

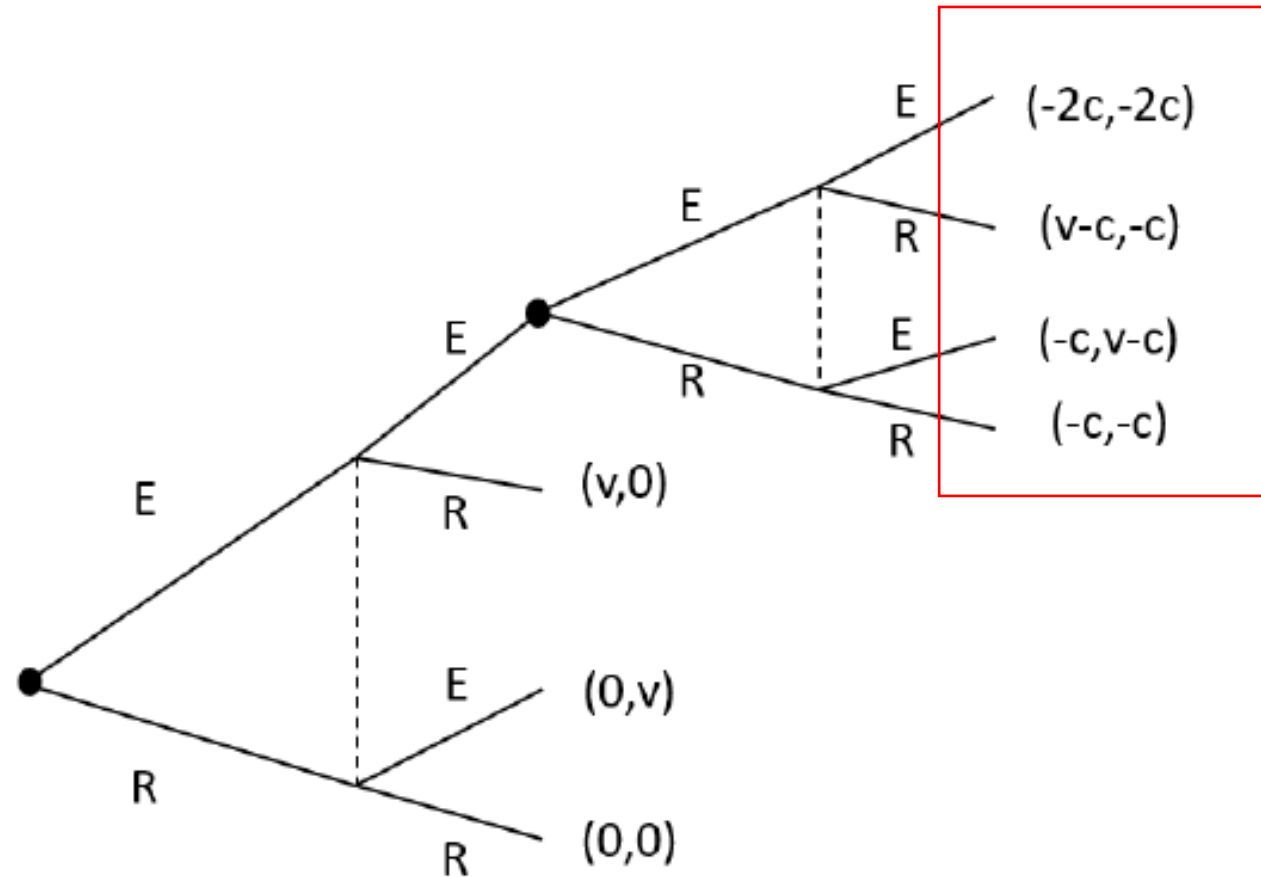
Guerra de Atrito – Modelo Básico

	Escala	Recua
Escala	$\underline{v - c} ; -c$	$\underline{v} ; \underline{0}$
Recua	$0 ; \underline{v}$	$0 ; 0$

Tabela 3.5: Subjogo 1 - Guerra de Atrito - $\{E_2, R_2\}$

$\{E_1, E_2; R_1, R_2\}.$

Guerra de Atrito – Modelo Básico



Guerra de Atrito – Modelo Básico

			Escala	Recua
Escala	$-c$	+	$-c ; -c$	$\underline{v} ; \underline{0}$
Recua			$\underline{0} ; \underline{v}$	$0 ; 0$

Tabela 3.4: Subjogo 2 - Guerra de Atrito - Custo afundado

Guerra de Atrito – Modelo Básico

	Escala	Recua
Escala	$-c ; \underline{v - c}$	$\underline{v} ; 0$
Recua	$\underline{0} ; \underline{v}$	$0 ; 0$

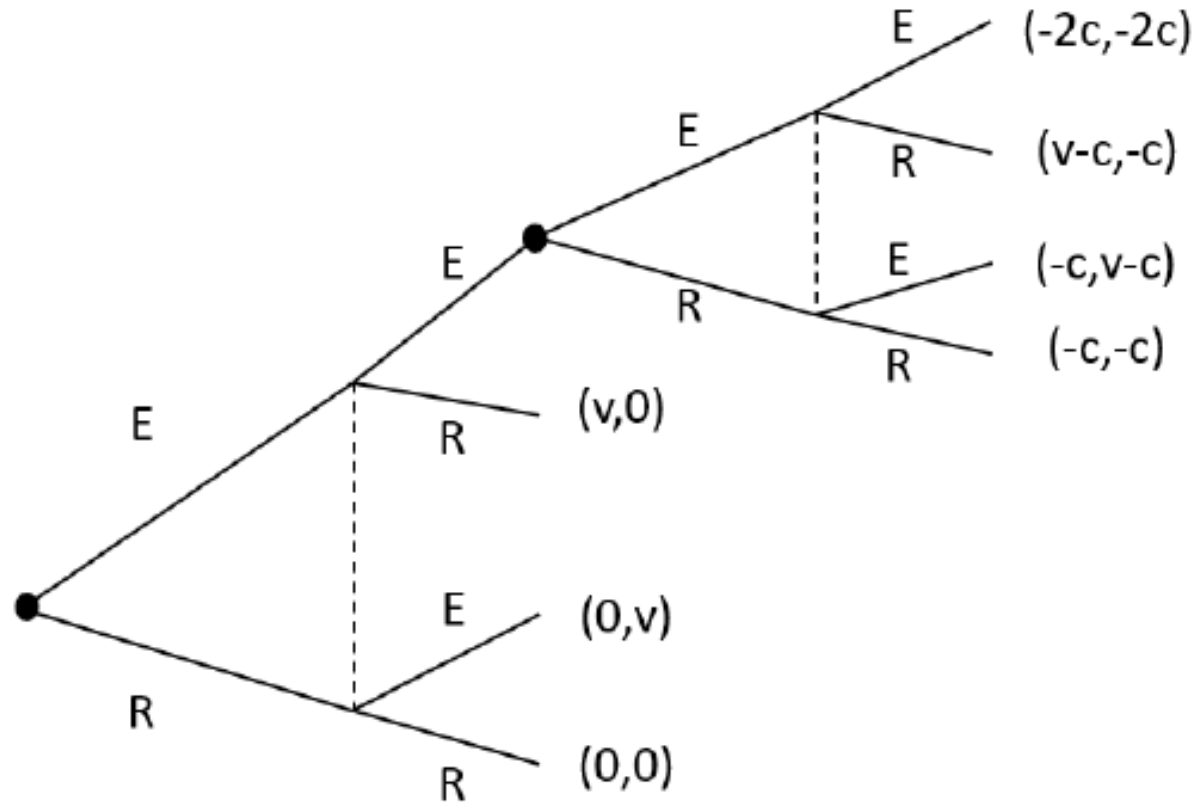
Tabela 3.6: Subjogo 1 - Guerra de Atrito - $\{R_2, E_2\}$

$$\{R_1, R_2; E_1, E_2\}.$$

Guerra de Atrito – Modelo Básico

$\{E_1, E_2; R_1, R_2\}.$

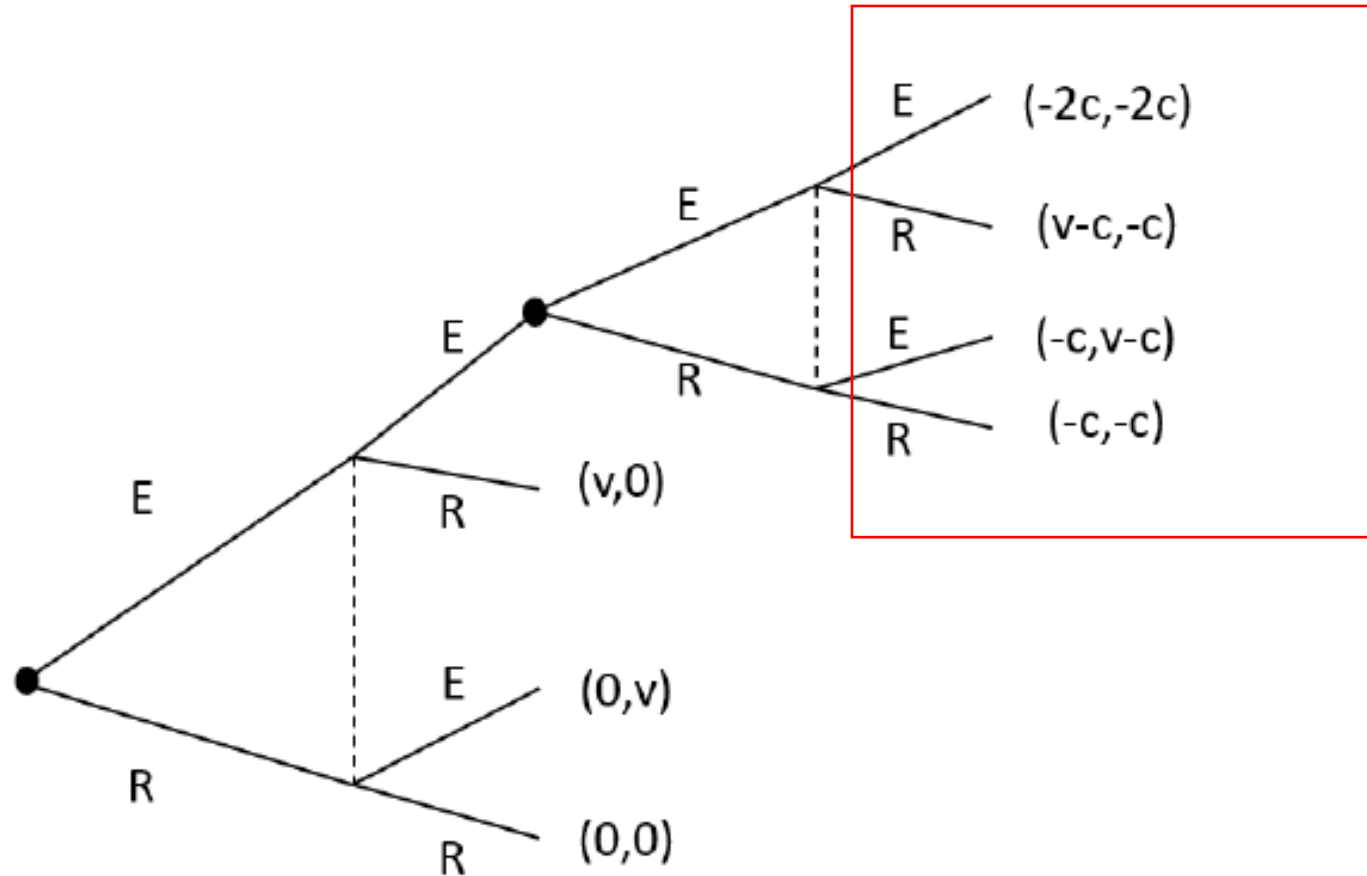
$\{R_1, R_2; E_1, E_2\}.$



Guerra de Atrito – Modelo Básico

$\{E_1, E_2; R_1, R_2\}.$

$\{R_1, R_2; E_1, E_2\}.$



Guerra de Atrito – Modelo Básico

		Jogador 2	
		q Escala	$1 - q$ Recua
Jogador 1	p Escala	$-c + \frac{-c}{2}$	$\frac{v}{2}$
	$1 - p$ Recua	$\frac{0}{2}$	0

Tabela 3.4: Subjogo 2 - Guerra de Atrito - Custo afundado

Guerra de Atrito – Modelo Básico

		Jogador 2	
		q Escala	$1 - q$ Recua
Jogador 1	p Escala	$-c +$	$-c ; -c$
	$1 - p$ Recua		$\underline{0} ; \underline{v}$
			$\underline{v} ; \underline{0}$
			$0 ; 0$

Tabela 3.4: Subjogo 2 - Guerra de Atrito - Custo afundado

$$U2(E) = p^*(-c) + (1 - p^*)v$$

$$U2(R) = p^*0 + (1 - p^*)0$$

Guerra de Atrito – Modelo Básico

		Jogador 2	
		q Escala	$1 - q$ Recua
Jogador 1	p Escala	$-c + \frac{-c}{2}$	$\frac{v}{2}$
	$1 - p$ Recua	$\frac{0}{2}$	0

Tabela 3.4: Subjogo 2 - Guerra de Atrito - Custo afundado

$$0 \leq p^* \leq 1.$$

$$U2(E) = p^*(-c) + (1 - p^*)v$$

$$U2(R) = p^*0 + (1 - p^*)0$$

$$p^* = \frac{v}{v+c}$$

Guerra de Atrito – Modelo Básico

	Escala	Recua
Escala	$-c ; -c$	$v ; 0$
Recua	$0 ; v$	$0 ; 0$

Tabela 3.7: Subjogo 1 - Guerra de Atrito - Estratégia mista

Guerra de Atrito – Modelo Básico

	Escala	Recua
Escala	$-c ; -c$	$v ; 0$
Recua	$0 ; v$	$0 ; 0$

Tabela 3.7: Subjogo 1 - Guerra de Atrito - Estratégia mista

		Escala	Recua
Escala	$-c +$	$-c ; -c$	$\underline{v} ; \underline{0}$
Recua		$\underline{0} ; \underline{v}$	$0 ; 0$

Tabela 3.4: Subjogo 2 - Guerra de Atrito - Custo afundado

Guerra de Atrito

$$\{E_1, E_2; R_1, R_2\}.$$

$$\{R_1, R_2; E_1, E_2\}.$$

$$\{p_1^*, q_1^*; p_2^*, q_2^*\}$$

Guerra de Atrito

$$\{E_1, E_2; R_1, R_2\}.$$

$$\{R_1, R_2; E_1, E_2\}.$$

$$\{p_1^*, q_1^*; p_2^*, q_2^*\}$$

Probabilidade de continuar?

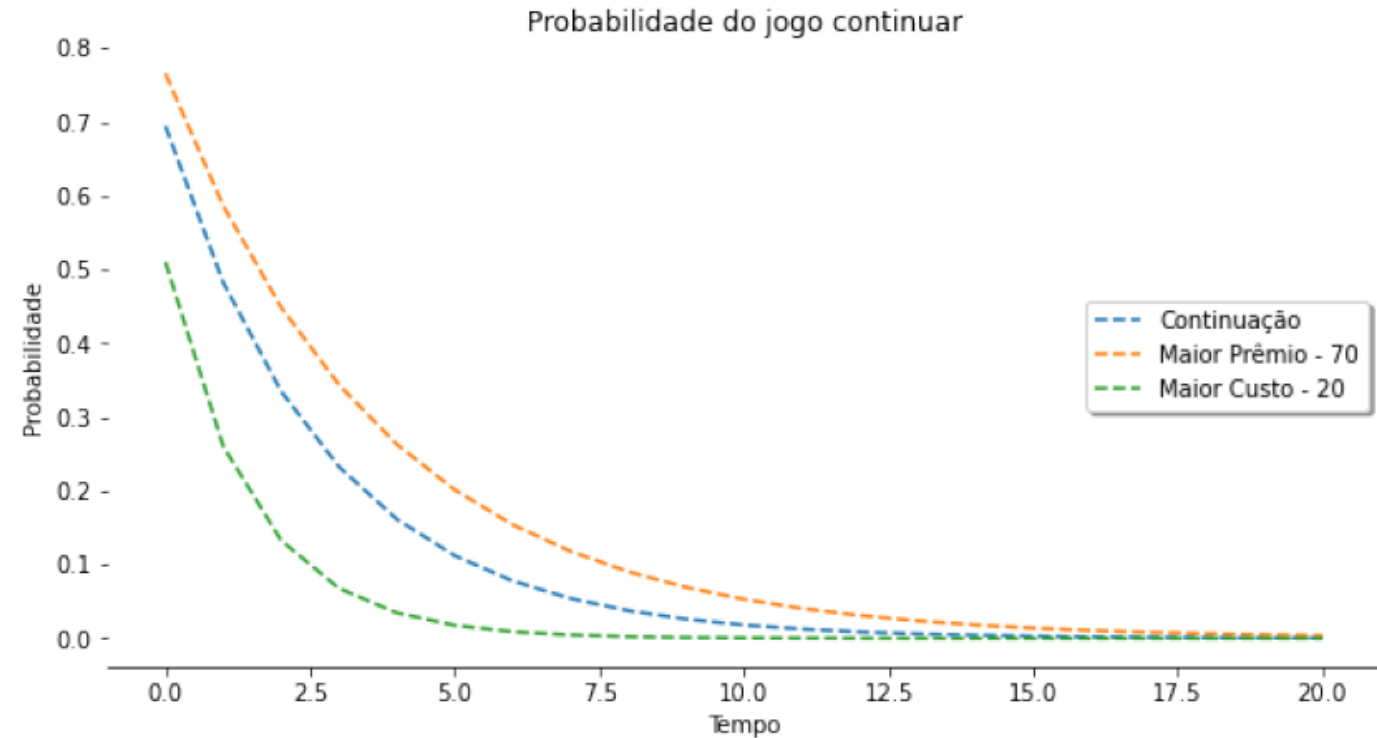
Guerra de Atrito

$$\{E_1, E_2; R_1, R_2\}.$$

$$\{R_1, R_2; E_1, E_2\}.$$

$$\{p_1^*, q_1^*; p_2^*, q_2^*\}$$

p^* para escalar de 83.3%.



Guerra de Atrito – Escolha entre os equilíbrios

$$\{E_1, E_2; R_1, R_2\}.$$

$$\{R_1, R_2; E_1, E_2\}.$$

$$U(s, s)$$

$$\{p_1^*, q_1^*; p_2^*, q_2^*\}$$

p^* para escalar de 83.3%.

Guerra de Atrito – Escolha entre os equilíbrios

$$\{E_1, E_2; R_1, R_2\}.$$

$$\{R_1, R_2; E_1, E_2\}.$$

$$U(s, s) > U(x, s)$$

$$\{p_1^*, q_1^*; p_2^*, q_2^*\}$$

p^* para escalar de 83.3%.

Guerra de Atrito – Escolha entre os equilíbrios

$$\{E_1, E_2; R_1, R_2\}.$$

$$\{R_1, R_2; E_1, E_2\}.$$

$$\{p_1^*, q_1^*; p_2^*, q_2^*\}$$

$$U(s, s) > U(x, s)$$

$$U(s, s) = U(x, s)$$

p^* para escalar de 83.3%.

Guerra de Atrito – Escolha entre os equilíbrios

$$\{E_1, E_2; R_1, R_2\}.$$

$$\{R_1, R_2; E_1, E_2\}.$$

$$\{p_1^*, q_1^*; p_2^*, q_2^*\}$$

$$U(s, s) > U(x, s)$$

$$U(s, s) = U(x, s) \quad e \quad U(s, x) > U(x, x)$$

p^* para escalar de 83.3%.

Guerra de Atrito – Escolha entre os equilíbrios

$$\{E_1, E_2; R_1, R_2\}.$$

$$\{R_1, R_2; E_1, E_2\}.$$

$$\{p_1^*, q_1^*; p_2^*, q_2^*\}$$

$$U(s, s) > U(x, s)$$

$$U(s, s) = U(x, s) \quad e \quad U(s, x) > U(x, x)$$

p^* para escalar de 83.3%.

Equilíbrio estável em jogos
evolucionários

Guerra de Atrito – Escolha entre os equilíbrios

$$\{E_1, E_2; R_1, R_2\}.$$

$$\{R_1, R_2; E_1, E_2\}.$$

$$\{p_1^*, q_1^*; p_2^*, q_2^*\}$$

$$f = Ax$$

$$\phi = fx$$

$$\frac{dx}{dt} = x(f - \phi)$$

p^* para escalar de 83.3%.

$$A = \begin{pmatrix} -c & v \\ 0 & 0 \end{pmatrix}$$

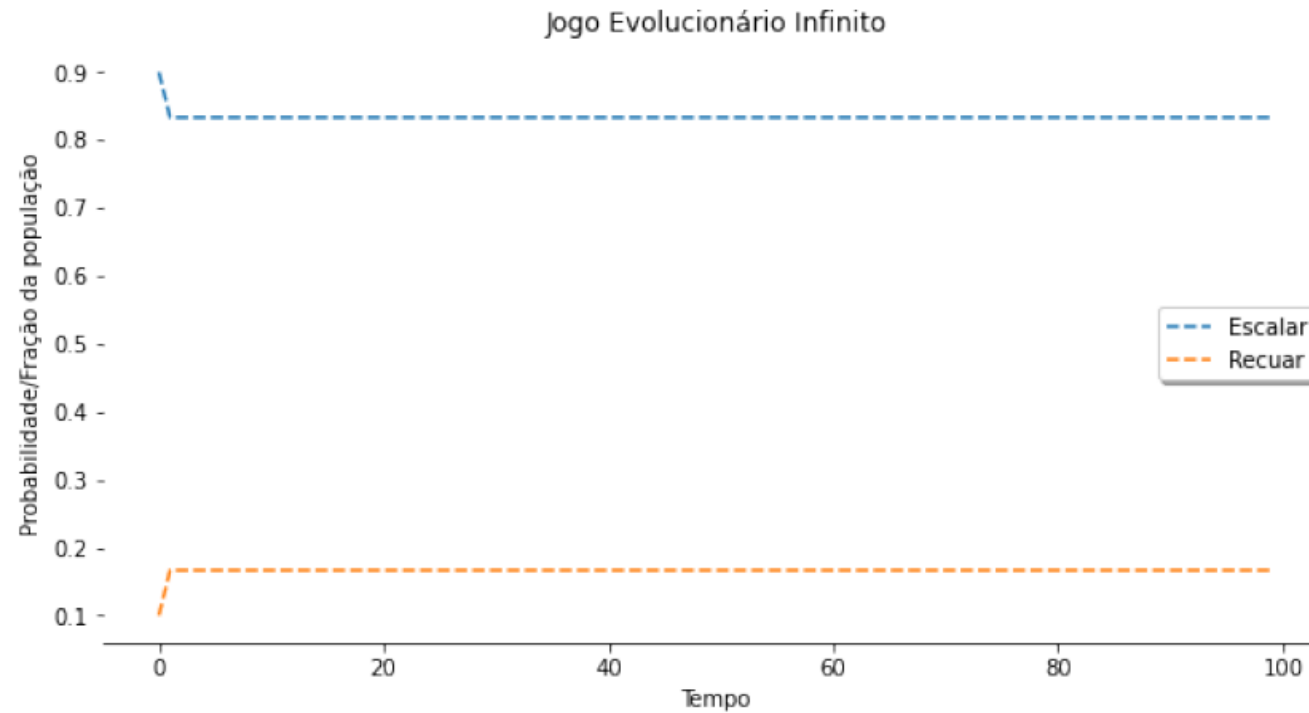
Guerra de Atrito – Escolha entre os equilíbrios

$$\{E_1, E_2; R_1, R_2\}.$$

$$\{R_1, R_2; E_1, E_2\}.$$

$$\{p_1^*, q_1^*; p_2^*, q_2^*\}$$

p^* para escalar de 83.3%.



Guerra de Atrito – Escolha entre os equilíbrios

$$\{E_1, E_2; R_1, R_2\}.$$

$$\{R_1, R_2; E_1, E_2\}.$$

$$\{p_1^*, q_1^*; p_2^*, q_2^*\}$$

$$\frac{dx}{dt} = x(1-x)(fa_x - fb_x)$$

$$\frac{dy}{dt} = y(1-y)(fb_y - fa_y)$$

...

p^* para escalar de 83.3%.

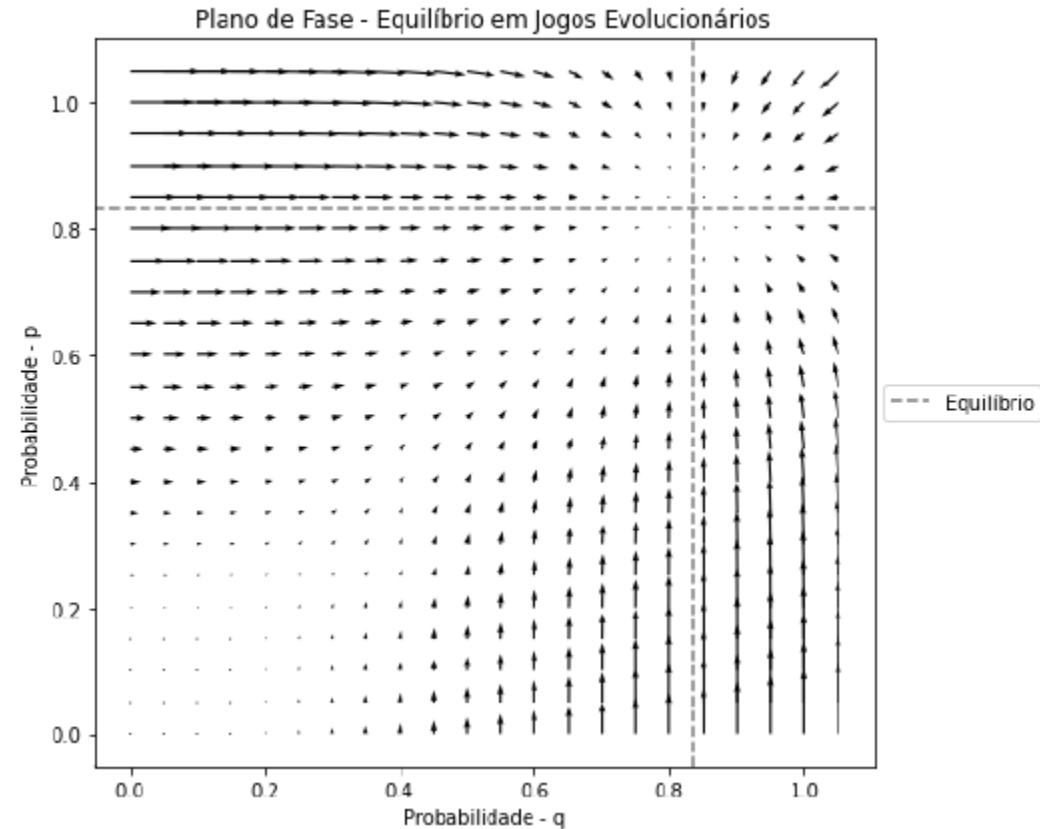
Guerra de Atrito – Escolha entre os equilíbrios

$$\{E_1, E_2; R_1, R_2\}.$$

$$\{R_1, R_2; E_1, E_2\}.$$

$$\{p_1^*, q_1^*; p_2^*, q_2^*\}$$

p^* para escalar de 83.3%.



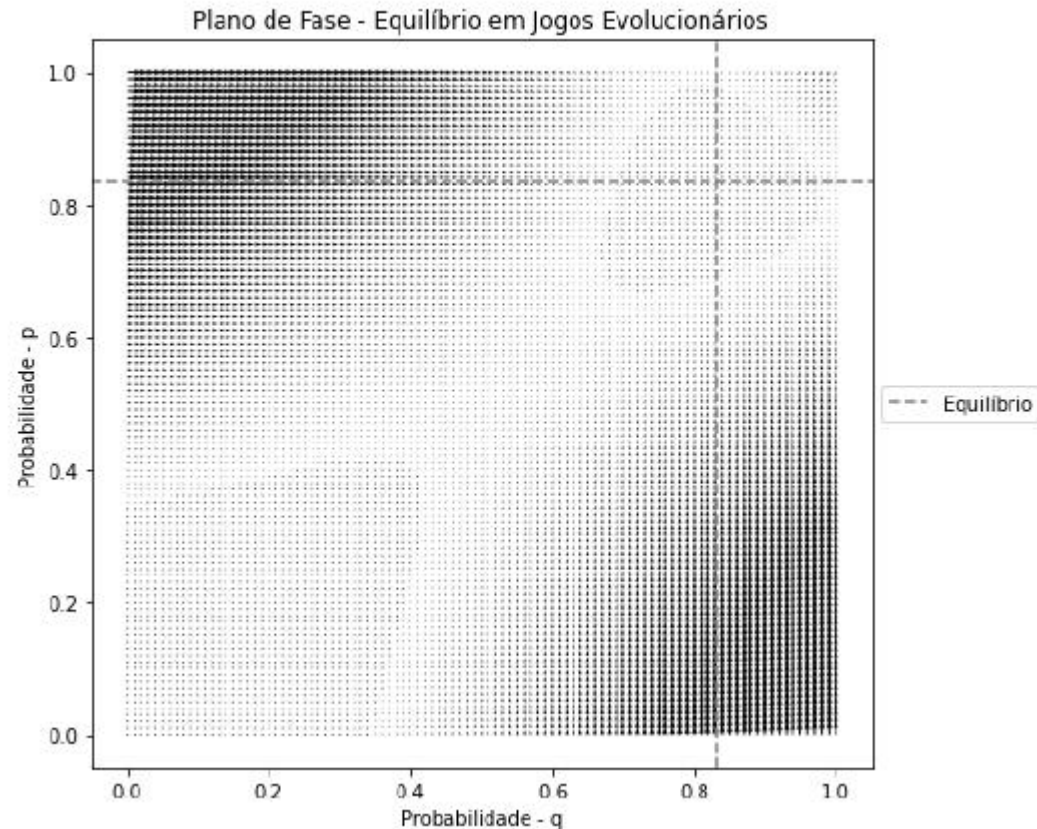
Guerra de Atrito – Escolha entre os equilíbrios

$$\{E_1, E_2; R_1, R_2\}.$$

$$\{R_1, R_2; E_1, E_2\}.$$

$$\{p_1^*, q_1^*; p_2^*, q_2^*\}$$

p^* para escalar de 83.3%.



Guerra de Atrito

			Jogador 2	
			q	$1 - q$
Jogador 1	p	Investe	$S_1; S_2$	$L_1; F_2$
	$1 - p$	Espera	$F_1; L_2$	$W_1; W_2$

Tabela 3.8: Forma normal: Guerra de Atrito

Guerra de Atrito

$S_1; S_2$ $L_1; F_2$
 $F_1; L_2$ $W_1; W_2$

		Jogador 2	
		Investe	Espera
Jogador 1	Investe	$VME_1 ; VME_2$	$VME_1 ; E_{2 1}$
	Espera	$E_{1 2} ; VME_2$	$E_1 - c_1 ; E_2 - c_2$

Tabela 3.9: Forma normal: Payoffs- 2 prospectos

Em que $VME_i = VME_i(P, t)$ e c_i é o custo de espera.

Guerra de Atrito

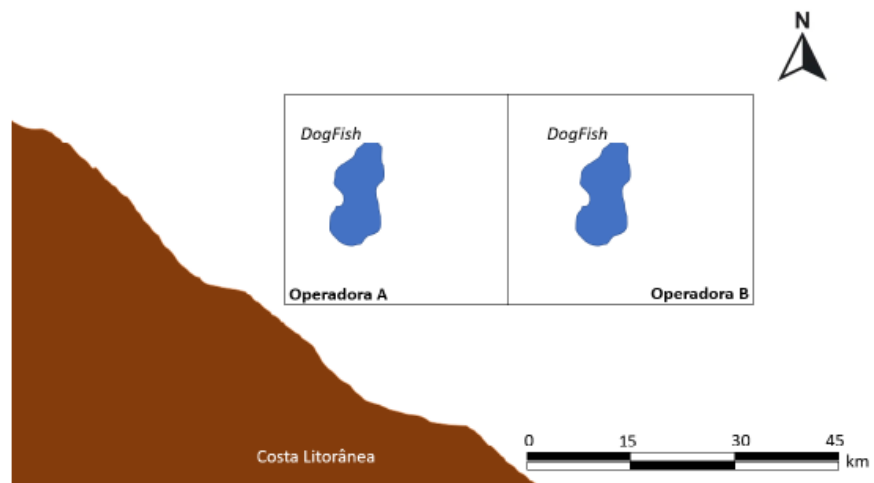


Figura 4.24: Modelo - DogFish x DogFish

Guerra de Atrito

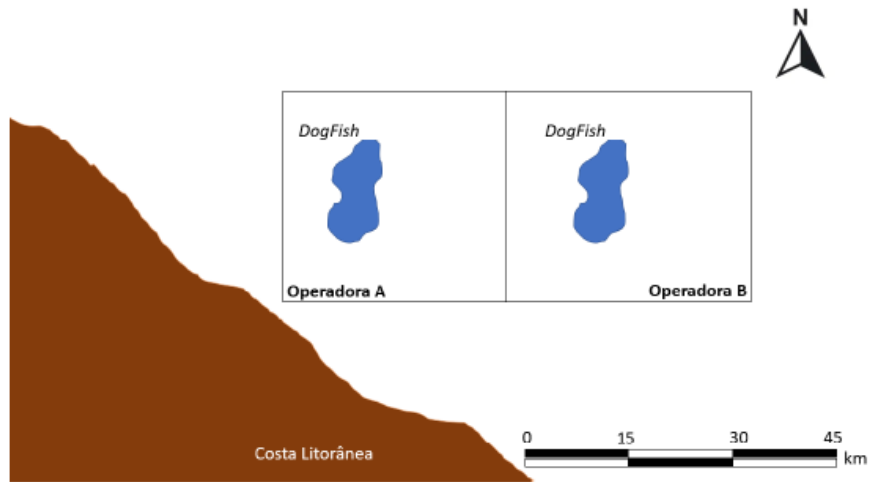


Figura 4.24: Modelo - DogFish x DogFish

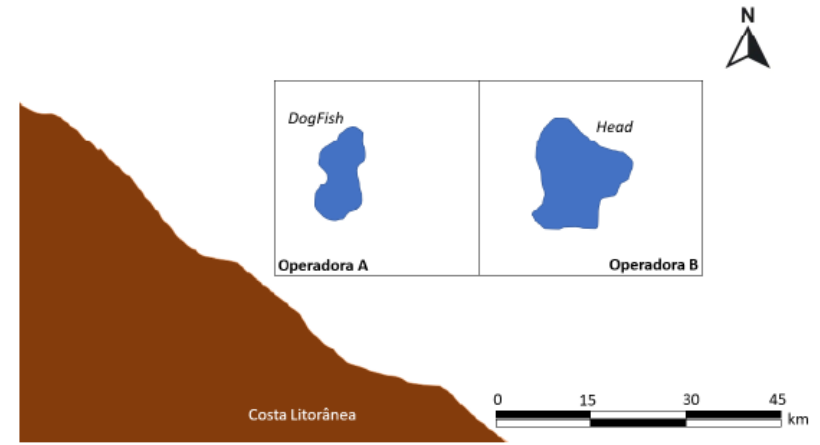


Figura 4.39: Modelo - 2 Blocos - DogFish e Head

Guerra de Atrito

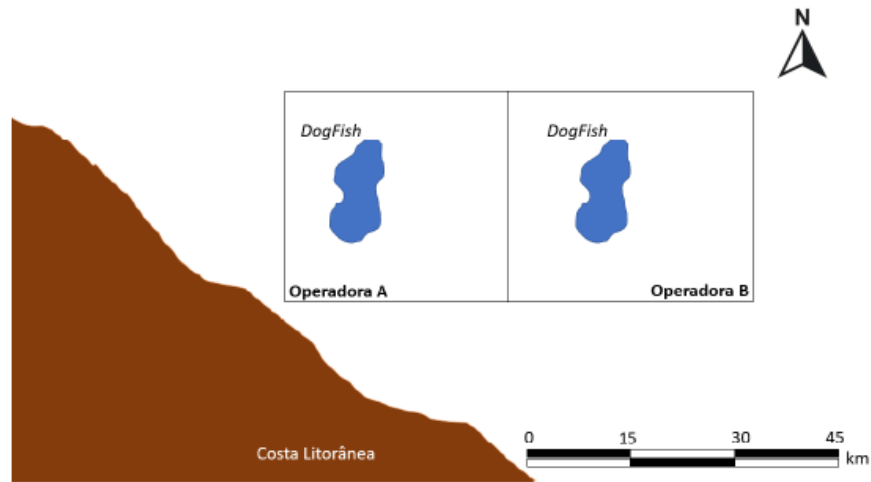


Figura 4.24: Modelo - DogFish x DogFish

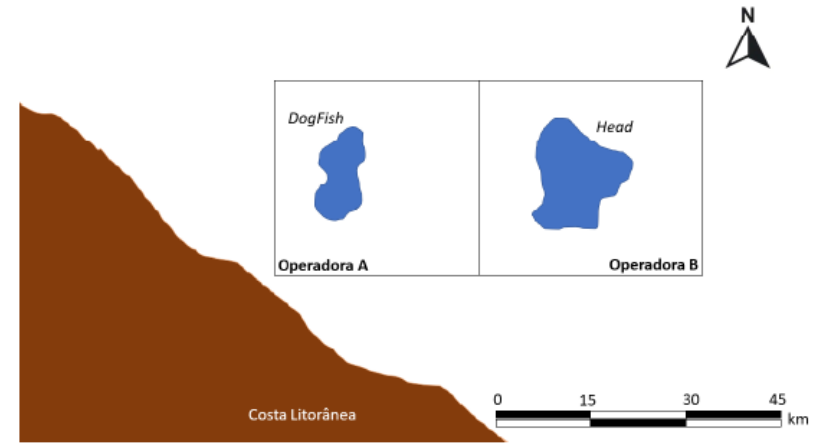


Figura 4.39: Modelo - 2 Blocos - DogFish e Head

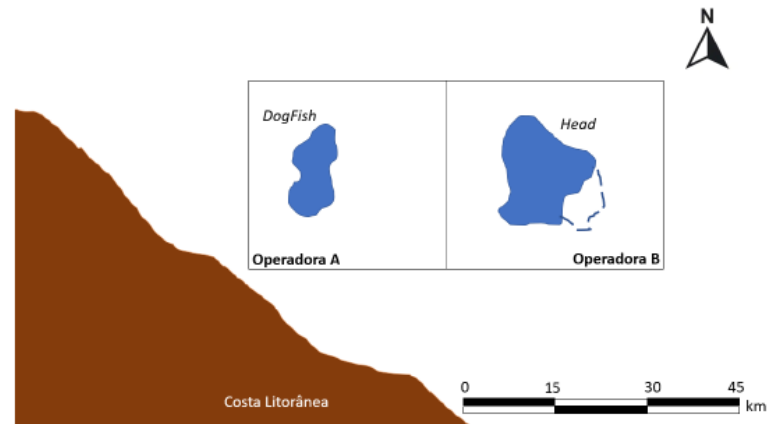


Figura 4.43: Modelo - 2 Blocos - DogFish e Head Expandido

Conflito

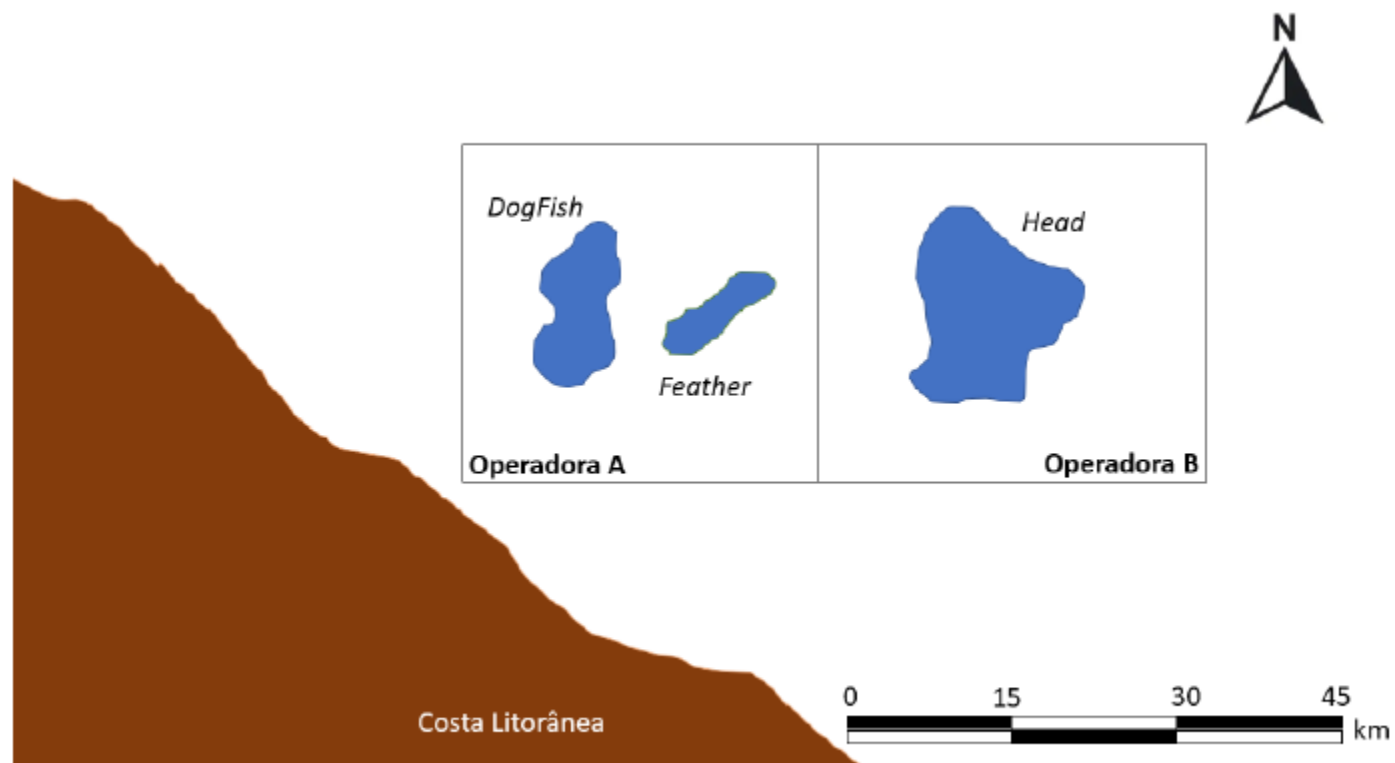


Figura 4.52: Modelo - 2 Blocos - A - DogFish e Feather - B Head

Guerra de Atrito

		Jogador 2	
		Investe	Espera
Jogador 1	Investe	558.23 ; 558.23	558.23 ; <u>583.37</u>
	Espera	<u>583.37</u> ; 558.23	<u>581.28</u> ; <u>581.28</u>

Tabela 4.10: Forma normal: Jogo Simétrico- $P=\$50$, $\rho = 60\%$, $\tau = 3$

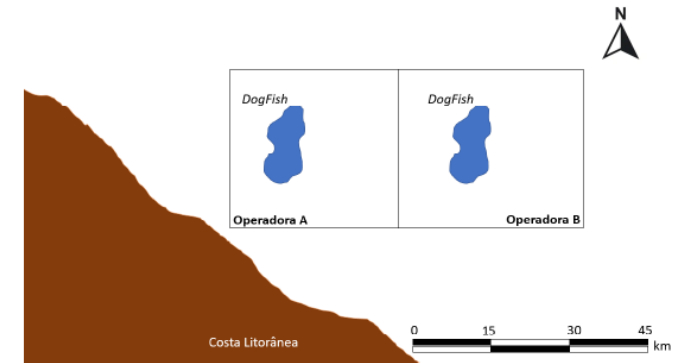


Figura 4.24: Modelo - DogFish x DogFish

Guerra de Atrito

		Jogador 2	
		Investe	Espera
Jogador 1	Investe	558.23 ; 558.23	558.23 ; <u>583.37</u>
	Espera	<u>583.37</u> ; 558.23	<u>581.28</u> ; <u>581.28</u>

Tabela 4.10: Forma normal: Jogo Simétrico- $P=\$50$, $\rho = 60\%$, $\tau = 3$

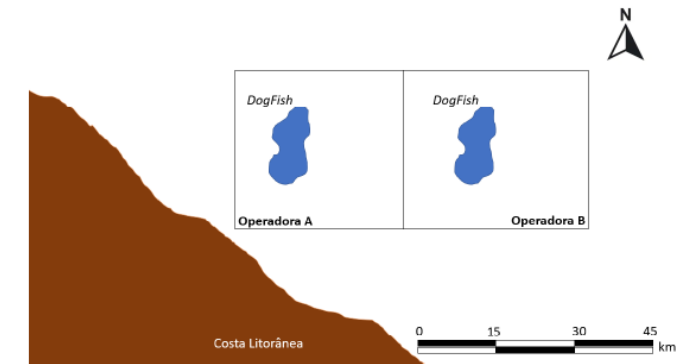
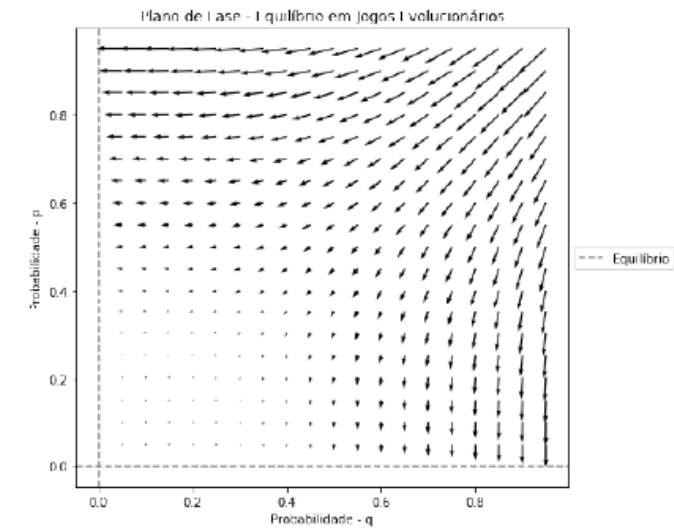
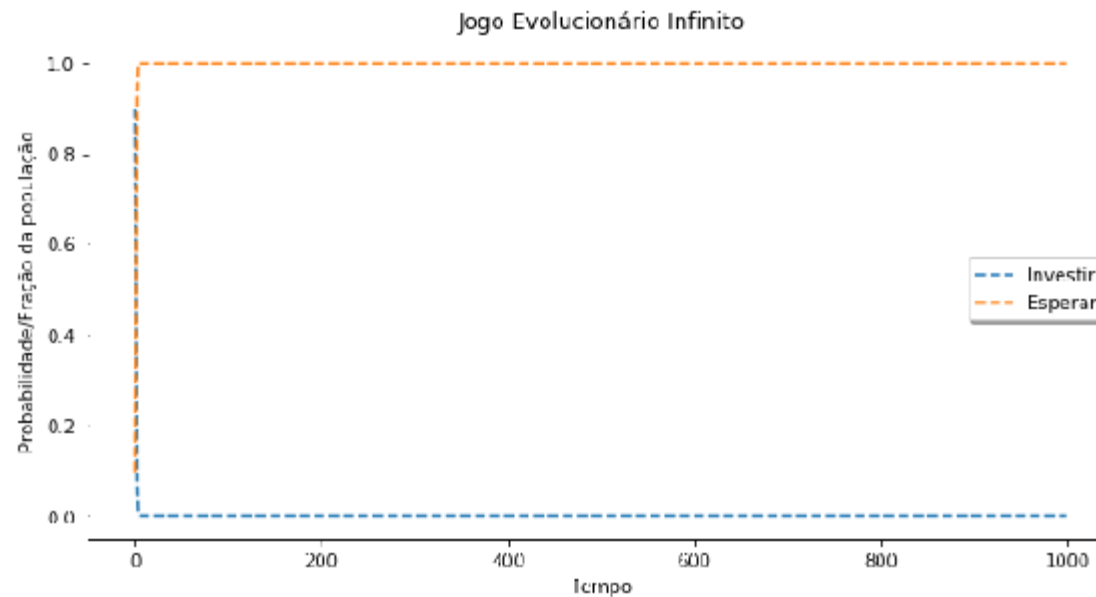


Figura 4.24: Modelo - DogFish x DogFish



Guerra de Atrito

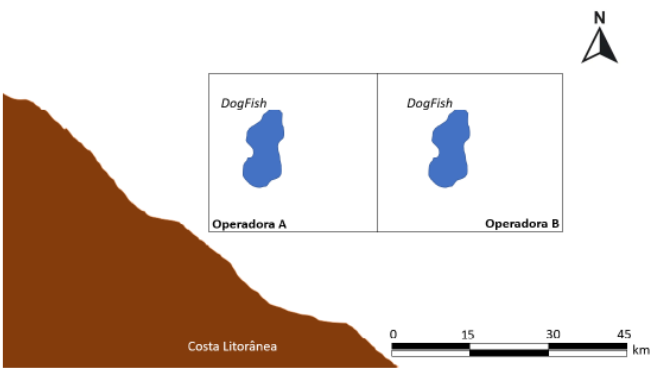


Figura 4.24: Modelo - DogFish x DogFish

		Jogador 2	
		Investe	Espera
Jogador 1	Investe	1281.59 ; 1281.59 <u>1281.59 ; 1282.32</u>	
	Espera	<u>1282.32 ; 1281.59</u>	1278.39 ; 1278.39

Tabela 4.11: Forma normal: Jogo Simétrico - $P=\$72$, $\rho = 60\%$, $\tau = 3$

Guerra de Atrito

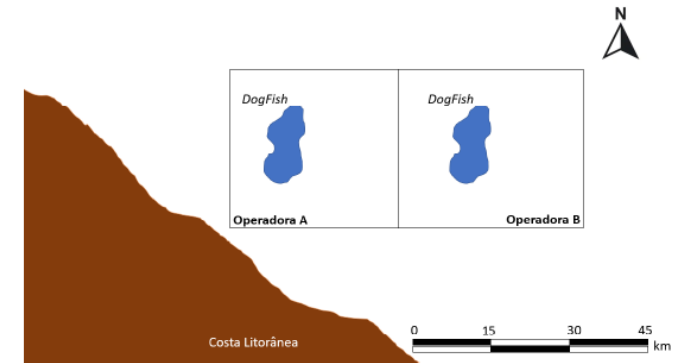


Figura 4.24: Modelo - DogFish x DogFish

		Jogador 2	
		Investe	Espera
Jogador 1	Investe	1281.59 ; 1281.59 <u>1281.59 ; 1282.32</u>	
	Espera	<u>1282.32 ; 1281.59</u>	1278.39 ; 1278.39

Tabela 4.11: Forma normal: Jogo Simétrico - $P = \$72$, $\rho = 60\%$, $\tau = 3$

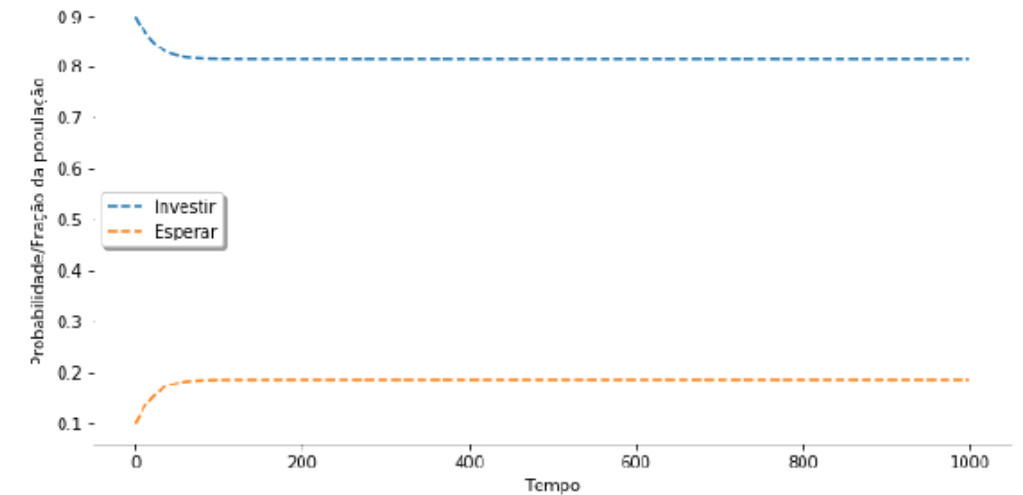


Figura 4.27: Jogo Evolucionário Infinito - \$ 72 o barril

Guerra de Atrito

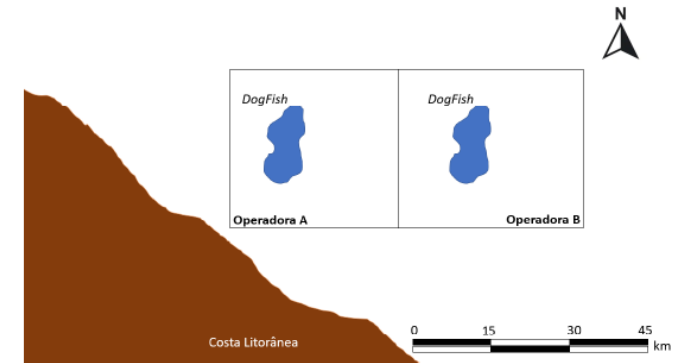
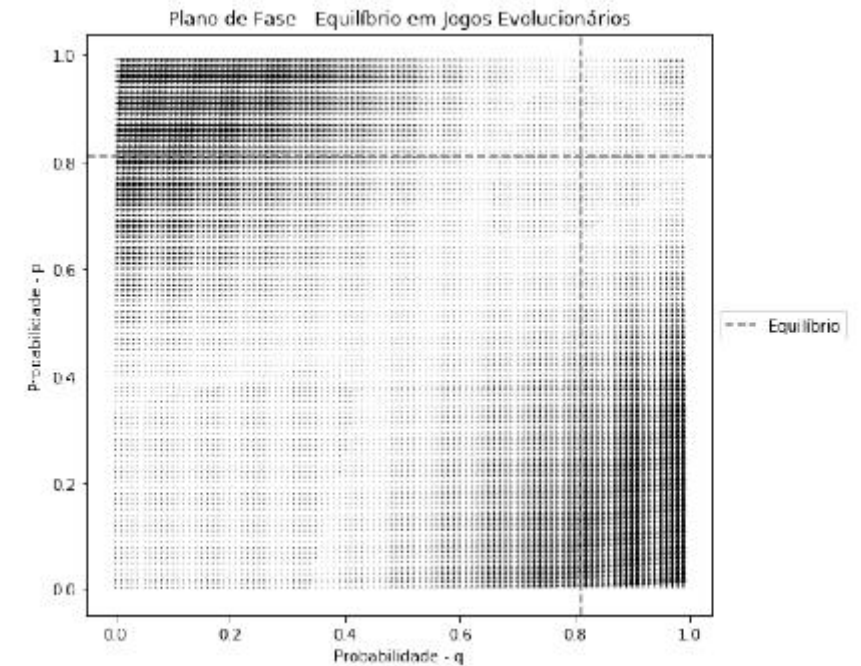


Figura 4.24: Modelo - DogFish x DogFish

		Jogador 2	
		Investe	Espera
Jogador 1	Investe	1281.59 ; 1281.59 <u>1281.59 ; 1282.32</u>	
	Espera	<u>1282.32 ; 1281.59</u>	1278.39 ; 1278.39

Tabela 4.11: Forma normal: Jogo Simétrico - $P=\$72$, $\rho = 60\%$, $\tau = 3$



Guerra de Atrito

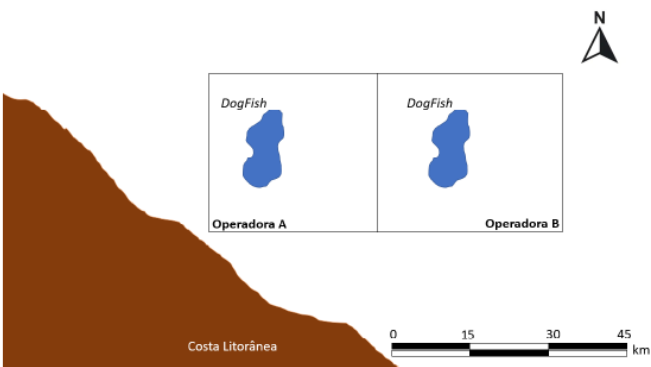


Figura 4.24: Modelo - DogFish x DogFish

		Jogador 2	
		Investe	Espera
Jogador 1	Investe	<u>1557.41</u> ; <u>1557.41</u>	<u>1557.41</u> ; <u>1557.41</u>
	Espera	<u>1557.41</u> ; <u>1557.41</u>	1553.52 ; 1553.52

Tabela 4.12: Forma normal: Jogo Simétrico - $P=\$80$, $\rho = 60\%$, $\tau = 3$

Guerra de Atrito

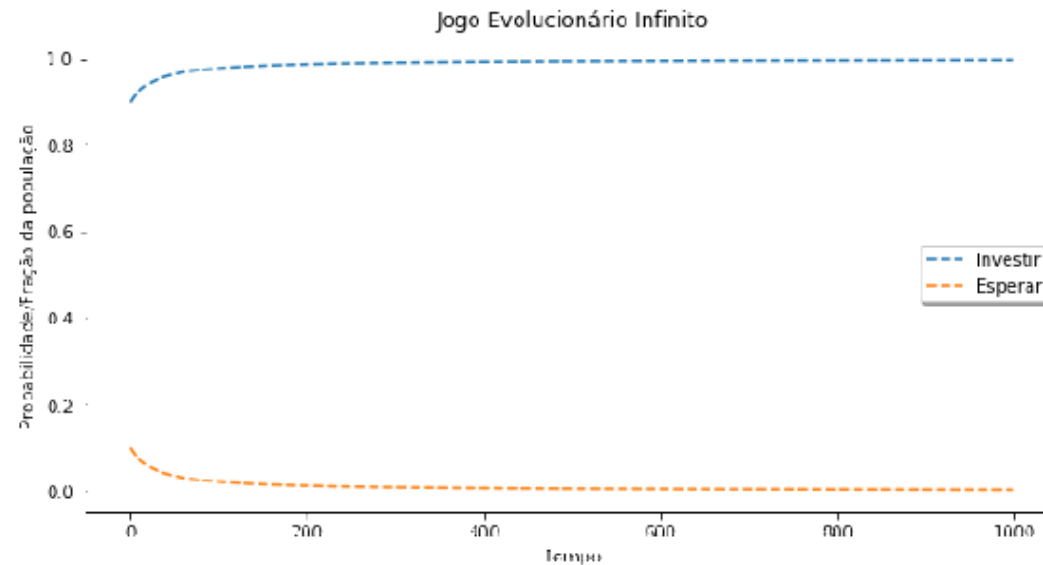


Figura 4.29: Jogo Evolucionário Infinito - \$ 80 o barril

		Jogador 2	
		Investe	Espera
Jogador 1	Investe	<u>1557.41</u> ; <u>1557.41</u>	<u>1557.41</u> ; <u>1557.41</u>
	Espera	<u>1557.41</u> ; <u>1557.41</u>	1553.52 ; 1553.52

Tabela 4.12: Forma normal: Jogo Simétrico - $P=\$80$, $\rho = 60\%$, $\tau = 3$

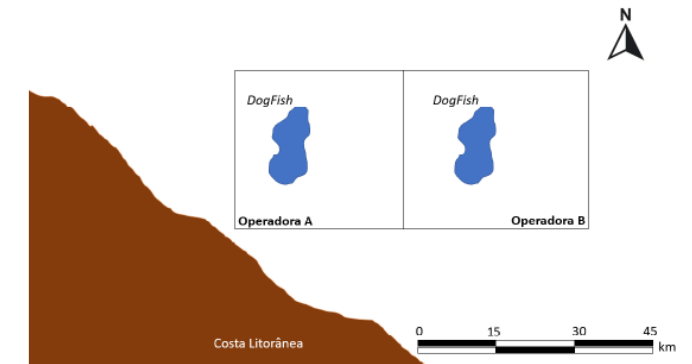


Figura 4.24: Modelo - DogFish x DogFish

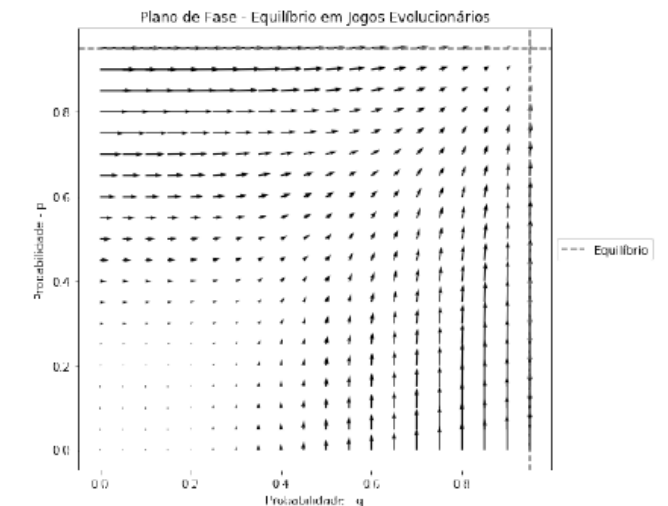


Figura 4.30: Jogo Evolucionário - Plano de Fase - Simétrico - \$ 80 o barril

Guerra de Atrito

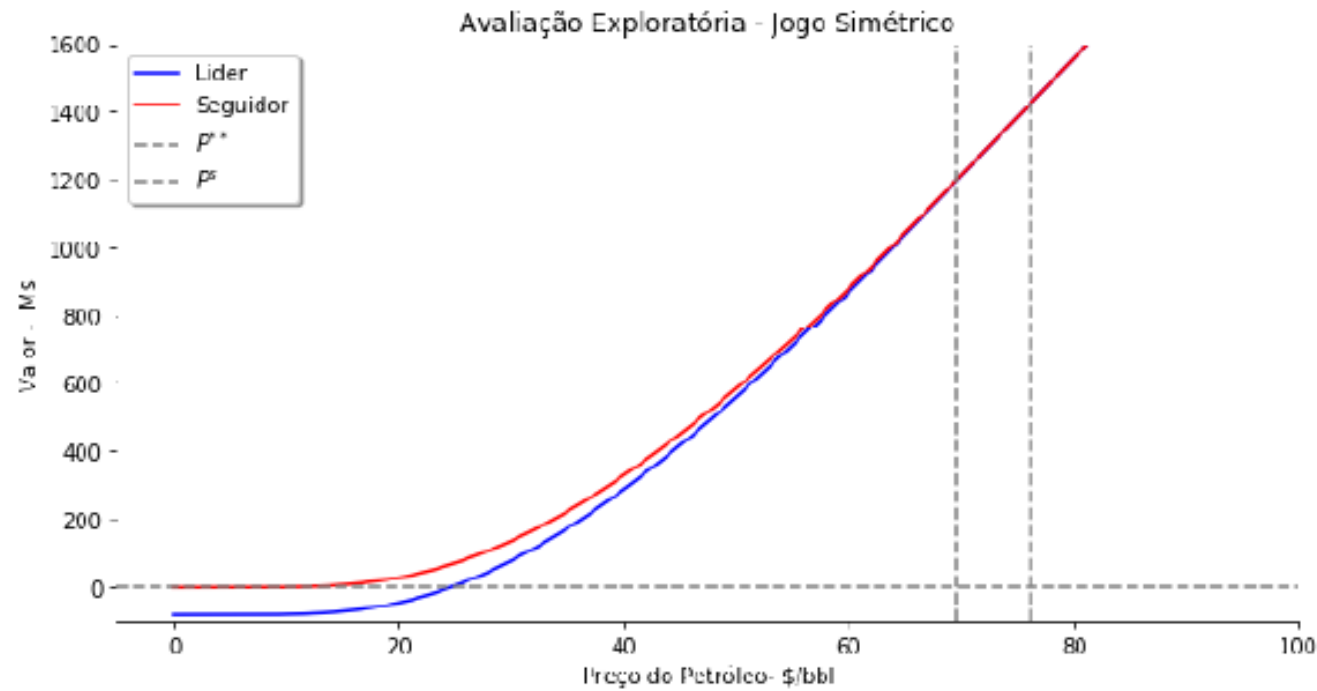


Figura 4.31: Guerra de Atrito: DogFish x DogFish - $\rho = 60\%$

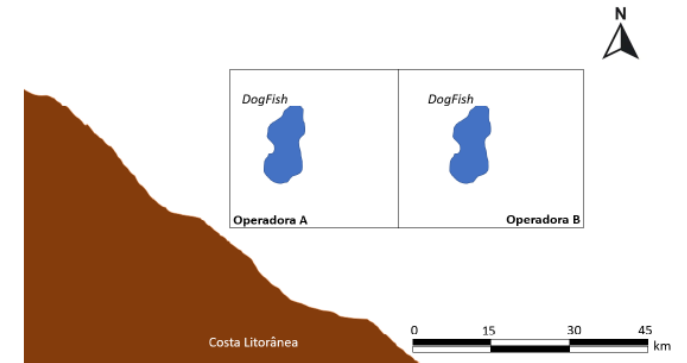


Figura 4.24: Modelo - DogFish x DogFish

Guerra de Atrito

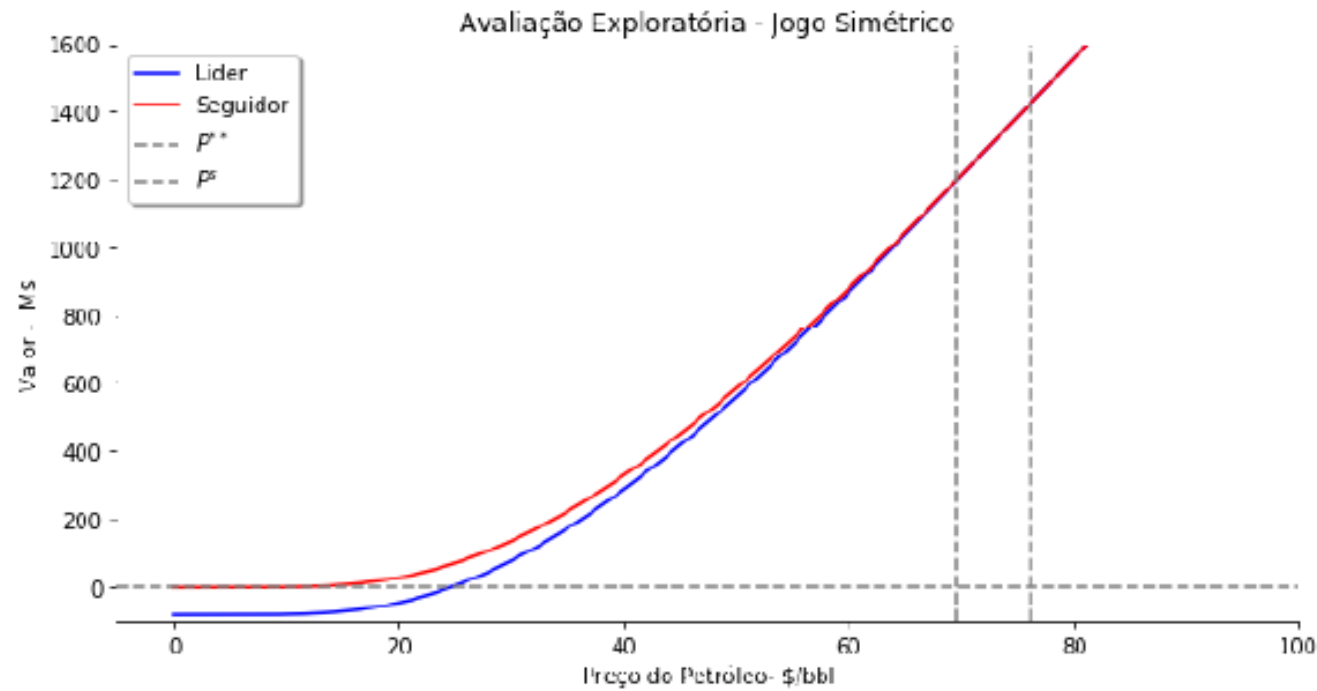


Figura 4.31: Guerra de Atrito: DogFish x DogFish - $\rho = 60\%$

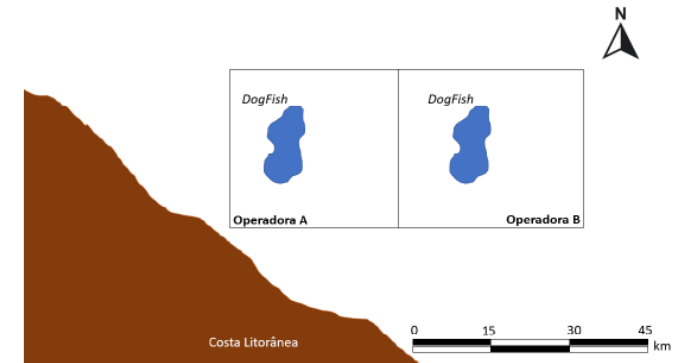


Figura 4.24: Modelo - DogFish x DogFish

Guerra de Atrito

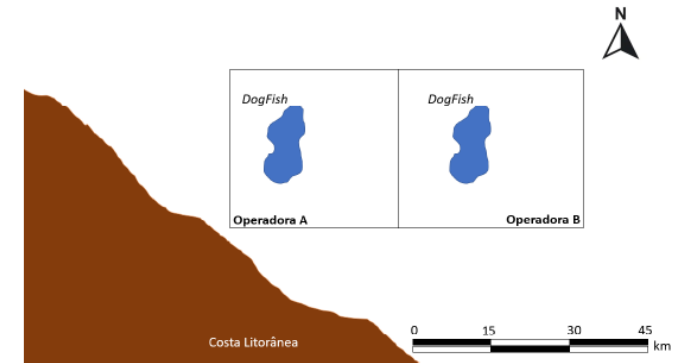
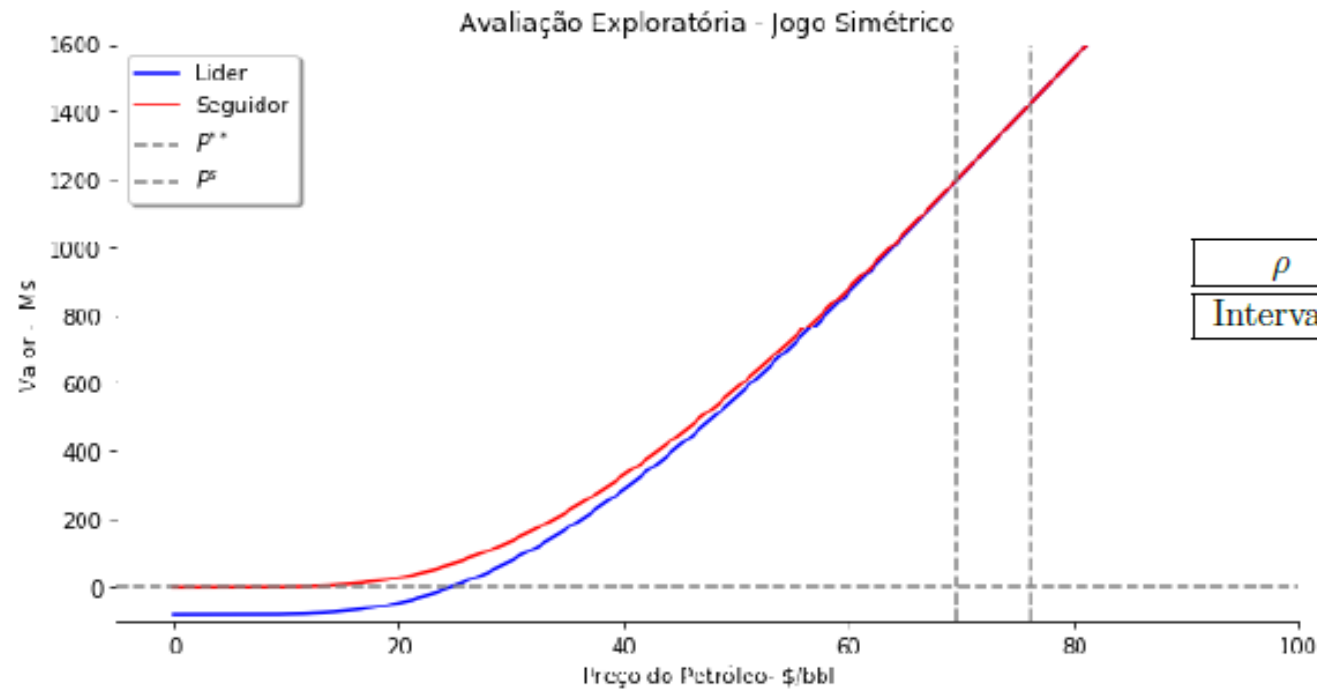


Figura 4.24: Modelo - DogFish x DogFish



ρ	30%	60%	80%
Intervalo]69.63, 71.5]]69.63, 76.25]]69.63, 87.50]

Figura 4.31: Guerra de Atrito: DogFish x DogFish - $\rho = 60\%$

Guerra de Atrito

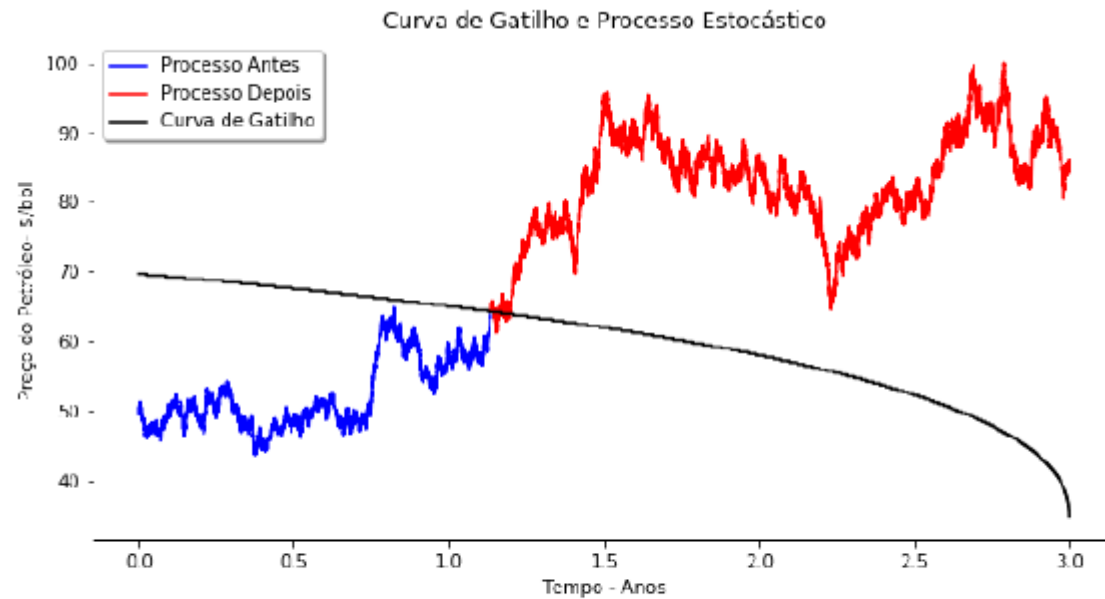


Figura 4.33: Simulação de Monte Carlo e Gatilho

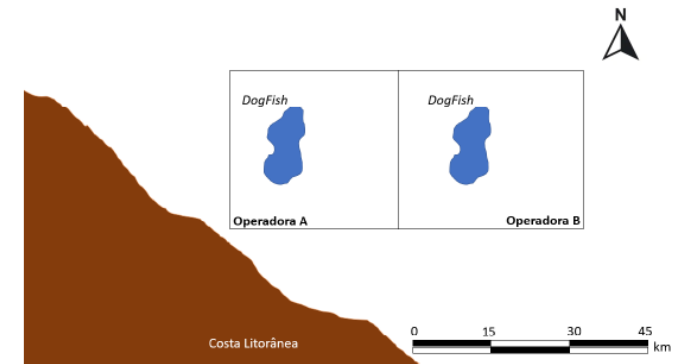


Figura 4.24: Modelo - DogFish x DogFish

Guerra de Atrito

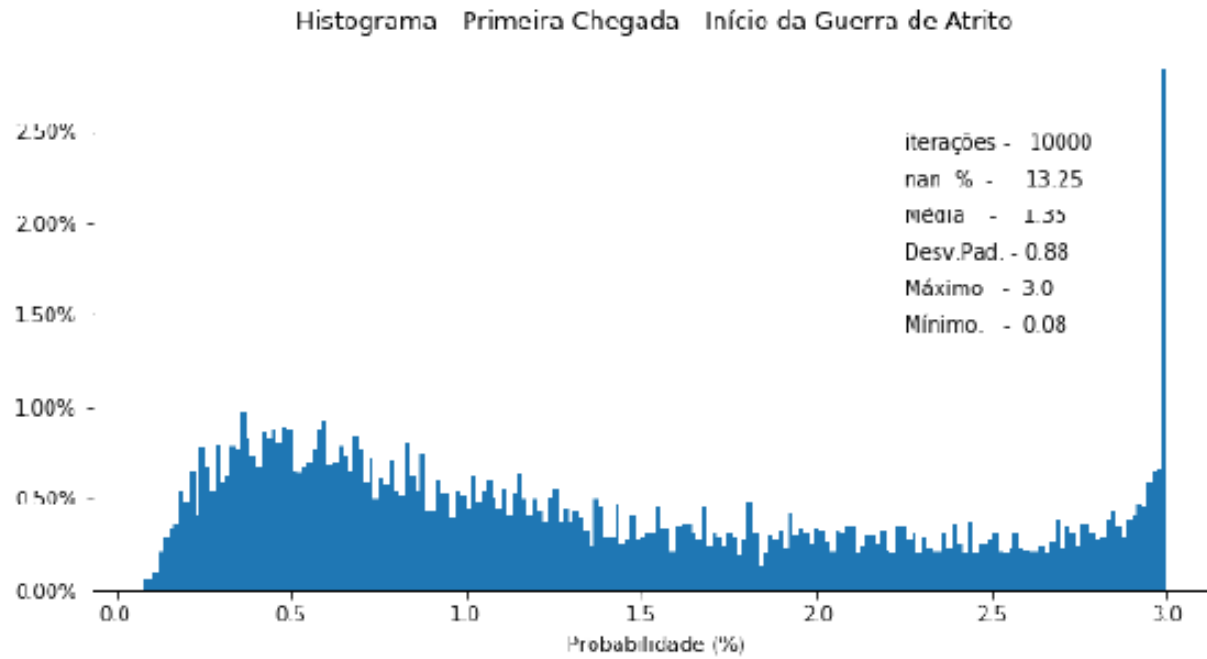


Figura 4.34: Histograma - Início da Guerra de Atrito

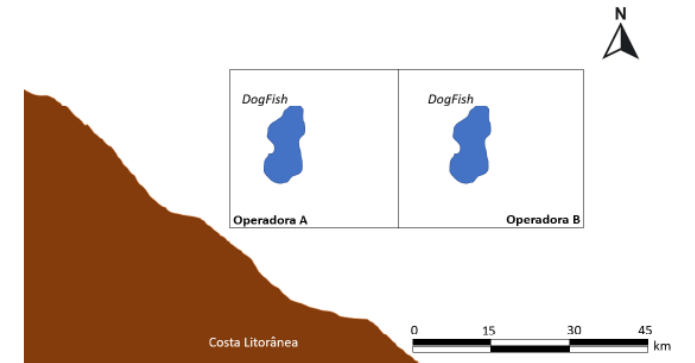


Figura 4.24: Modelo - DogFish x DogFish

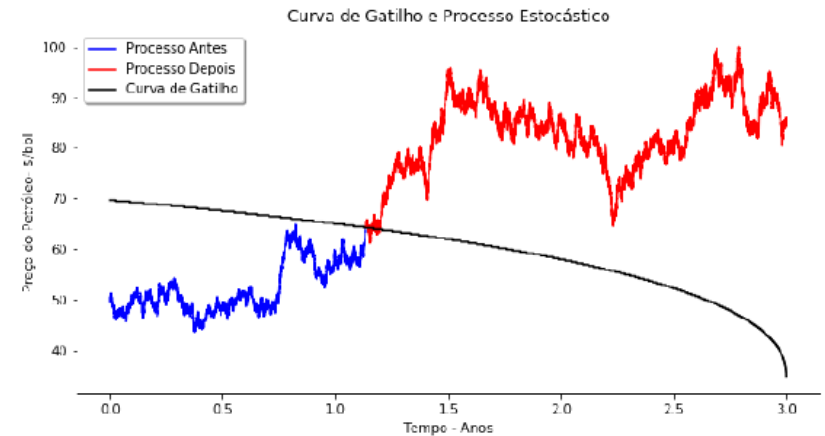


Figura 4.33: Simulação de Monte Carlo e Gatilho

Guerra de Atrito

		Jogador 2	
		q	$1 - q$
Jogador 1	p	Investe	Espera
	$1 - p$	Espera	
		$S_1; S_2$	$L_1; F_2$
		$F_1; L_2$	$W_1; W_2$

Tabela 3.8: Forma normal: Guerra de Atrito

		Jogador 2	
		Investe	Espera
Jogador 1	Investe	1	2
	Espera	3	4

Tabela 4.14: Simbologia dos Quadrantes

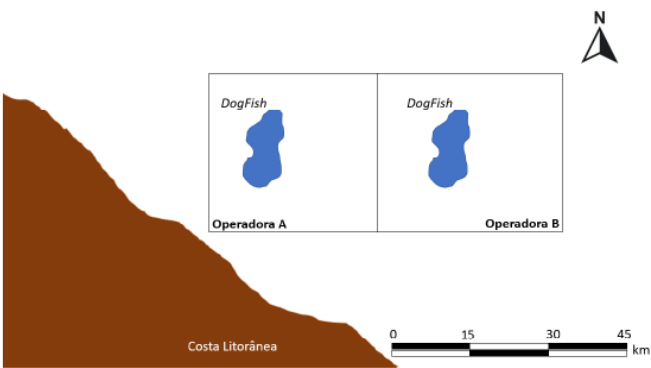


Figura 4.24: Modelo - DogFish x DogFish

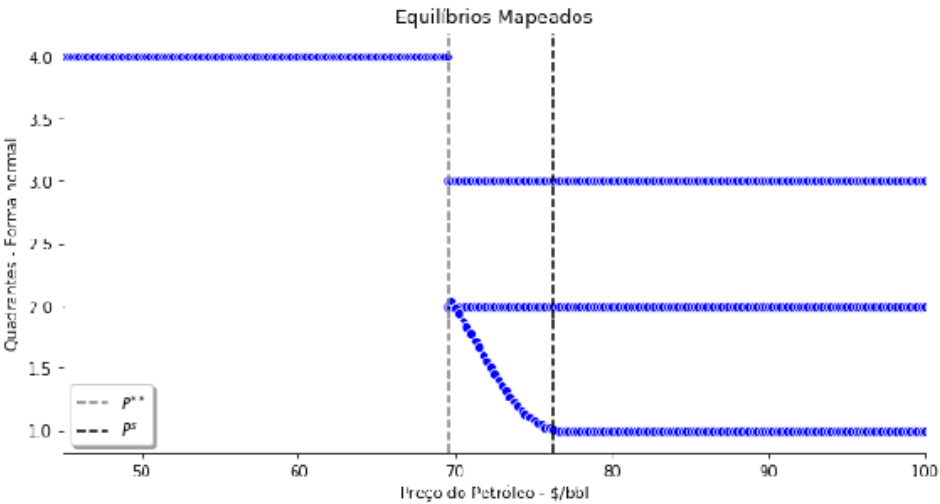


Figura 4.35: Equilíbrios Mapeados - Jogo Simétrico

Guerra de Atrito

ρ	30%	60%	80%
Intervalo]69.63, 71.5]]69.63, 76.25]]69.63, 87.50]

Capítulo 4. Resultados

111

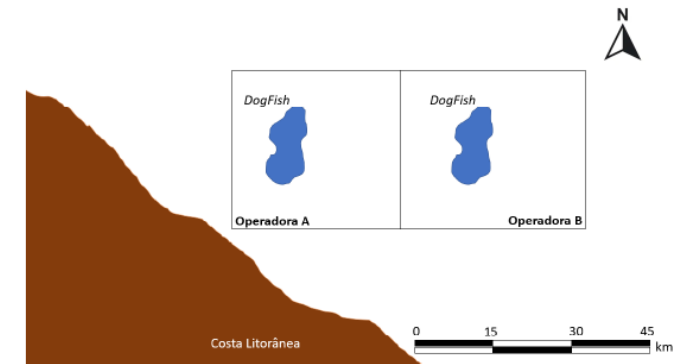


Figura 4.24: Modelo - DogFish x DogFish

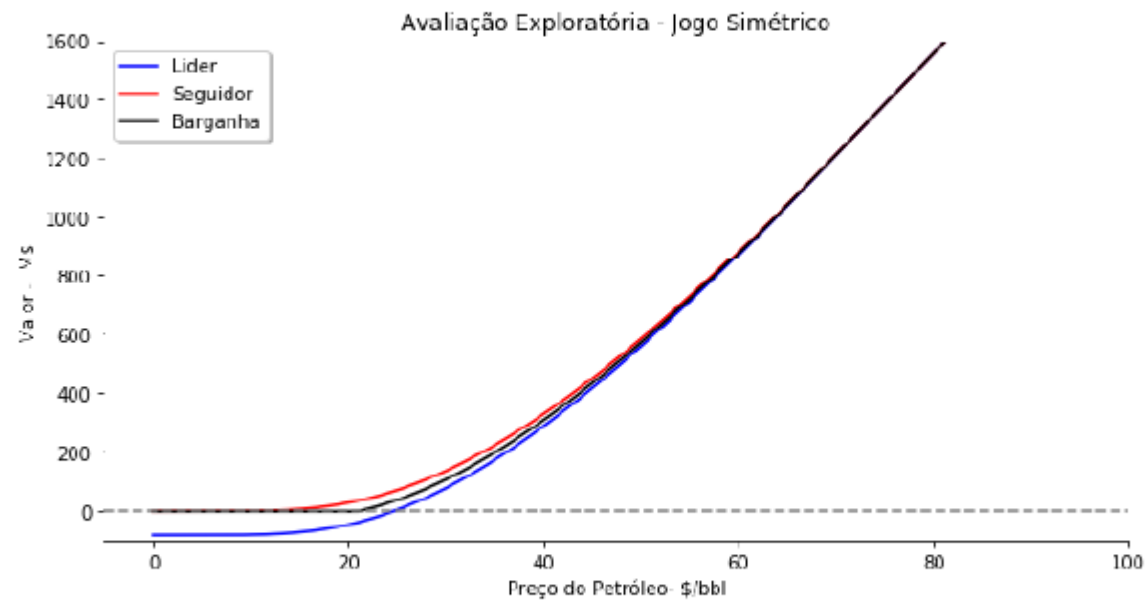


Figura 4.36: Barganha Cooperativa: DogFish x DogFish - $\rho = 60\%$

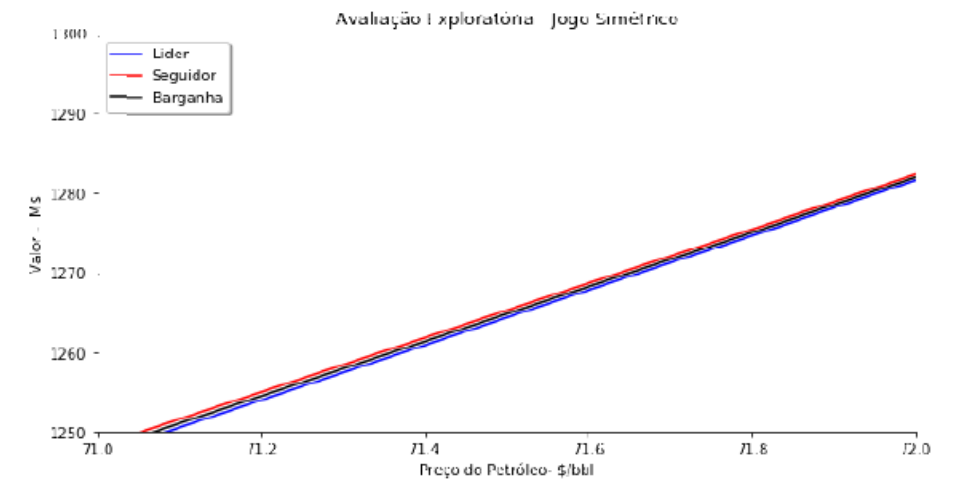


Figura 4.37: Detalhe - Barganha: DogFish x DogFish - $\rho = 60\%$

Guerra de Atrito

ρ	30%	60%	80%
Intervalo]69.63, 71.5]]69.63, 76.25]]69.63, 87.50]

	D_i		
$P(\$/bbl)$	50	72	80
$\rho = 60\%$	570.80	1281.95	1557.41
$\rho = 80\%$	572.67	1283.65	1557.91

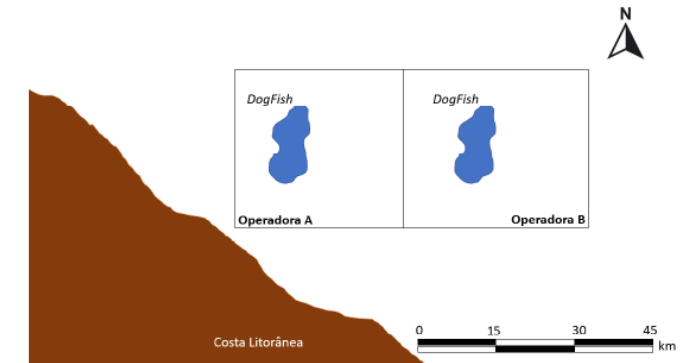


Figura 4.24: Modelo - DogFish x DogFish

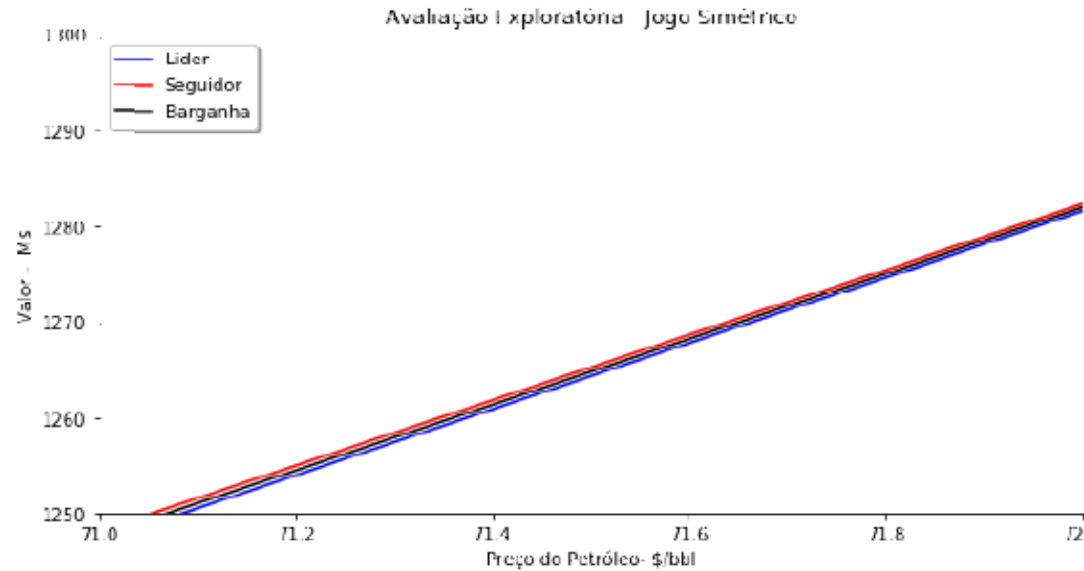


Figura 4.37: Detalhe - Barganha: DogFish x DogFish - $\rho = 60\%$

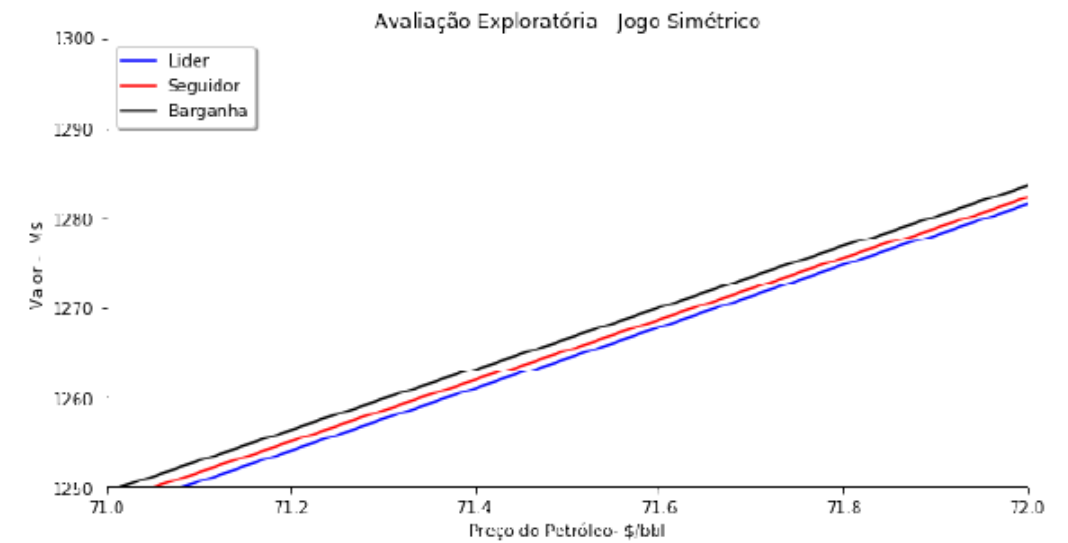


Figura 4.38: Detalhe - Barganha: DogFish x DogFish - $\rho = 80\%$

Guerra de Atrito

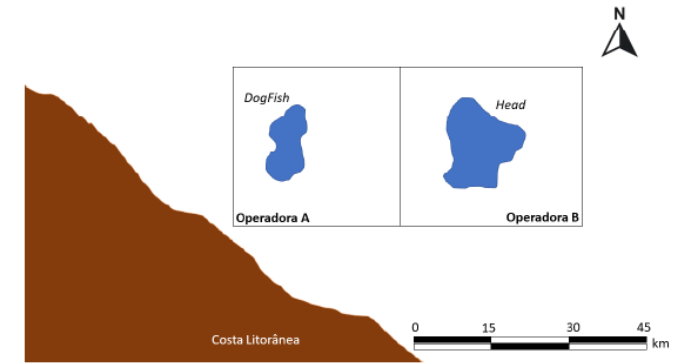
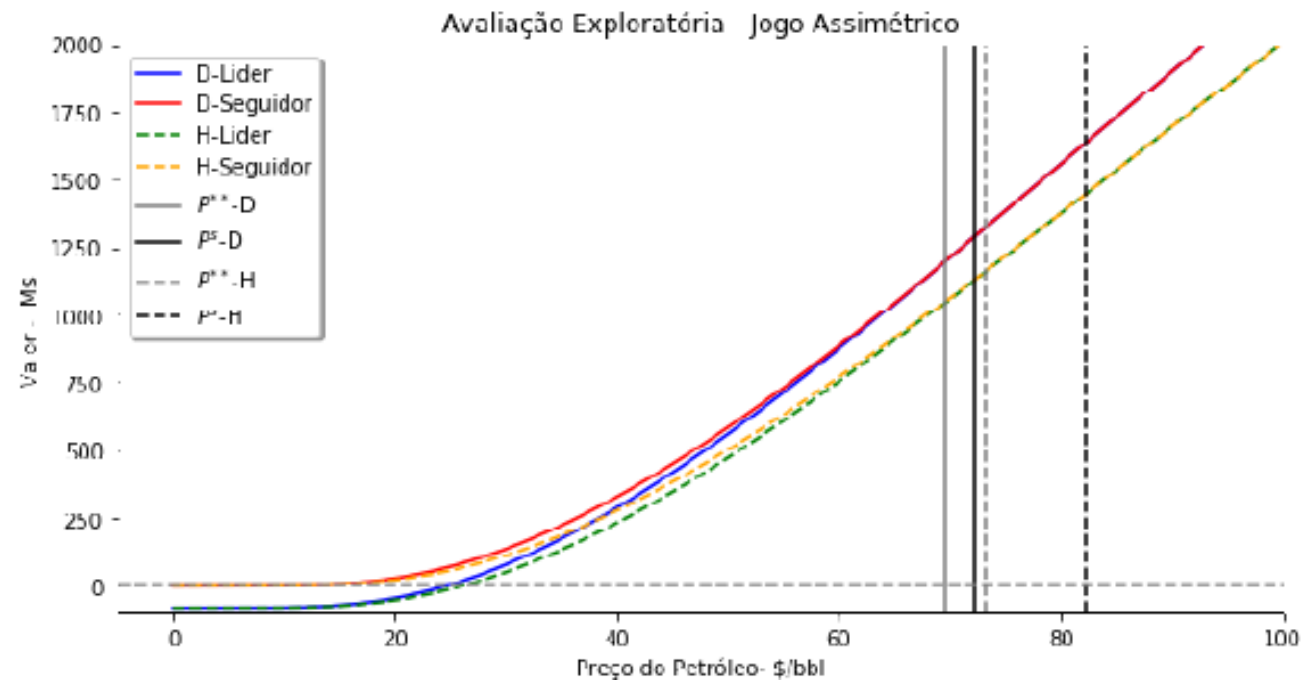


Figura 4.39: Modelo - 2 Blocos - DogFish e Head

Capítulo 4. Resultados

115



Guerra de Atrito

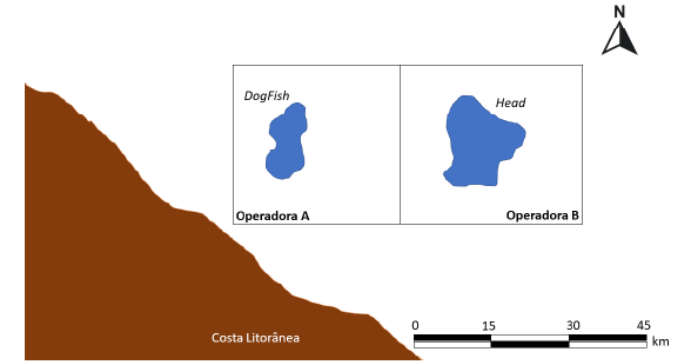
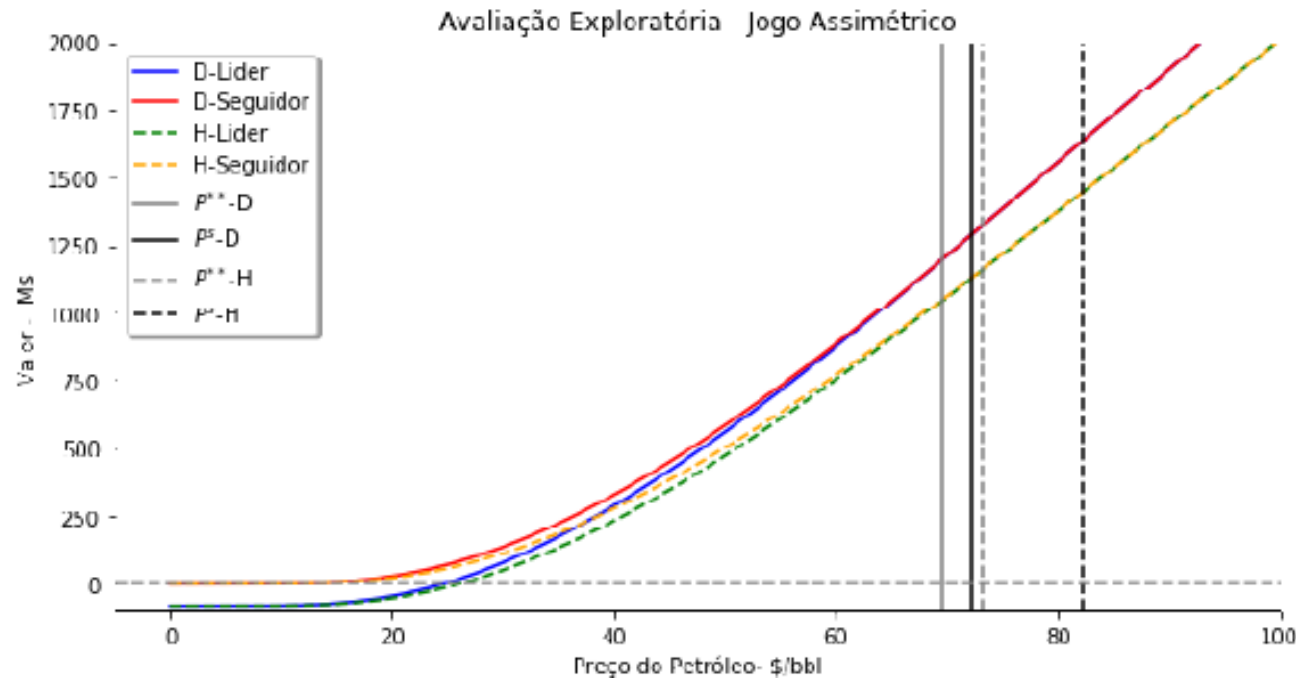


Figura 4.39: Modelo - 2 Blocos - DogFish e Head

Capítulo 4. Resultados

115



Definição:

- $[0; 69.62[- [0; P^{**}(D)[$
- $[69.62; 72.25[- [P^{**}(D); P^s(D)[$
- $[72.25; 73.12[- [P^s(D); P^{**}(H)[$
- $[73.12; 82.25[- [P^{**}(H); P^s(H)[$
- $[82.25; \infty[- [P^s(H); \infty[$

Guerra de Atrito

		Jogador 2	
		Investe	Espera
Jogador 1	Investe	1	2
	Espera	3	4

Tabela 4.14: Simbologia dos Quadrantes

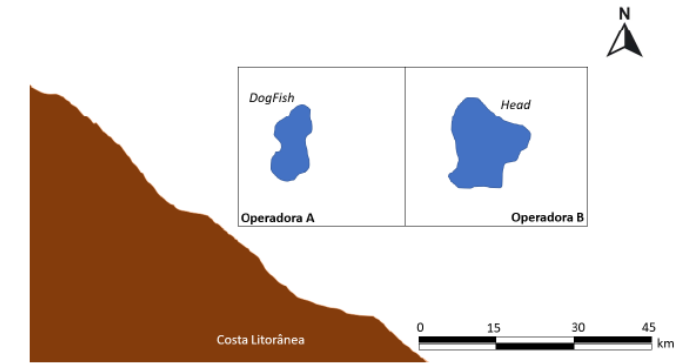
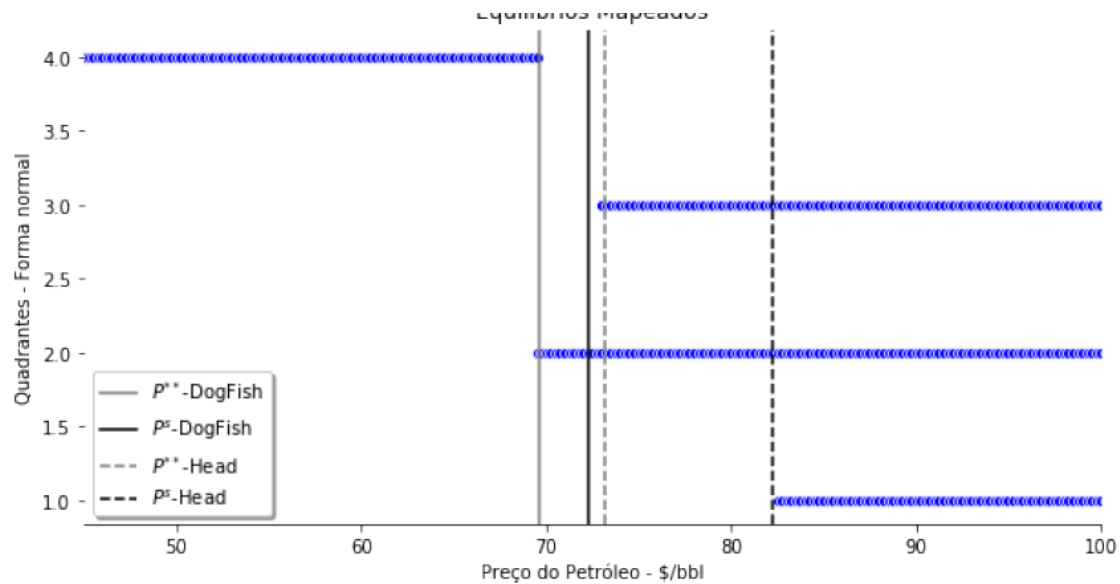


Figura 4.39: Modelo - 2 Blocos - DogFish e Head

Região

- $[0; 69.62[- [0; P^{**}(D)[$
- $[69.62; 72.25[- [P^{**}(D); P^s(D)[$
- $[72.25; 73.12[- [P^s(D); P^{**}(H)[$
- $[73.12; 82.25[- [P^{**}(H); P^s(H)[$
- $[82.25; \infty[- [P^s(H); \infty[$

Guerra de Atrito

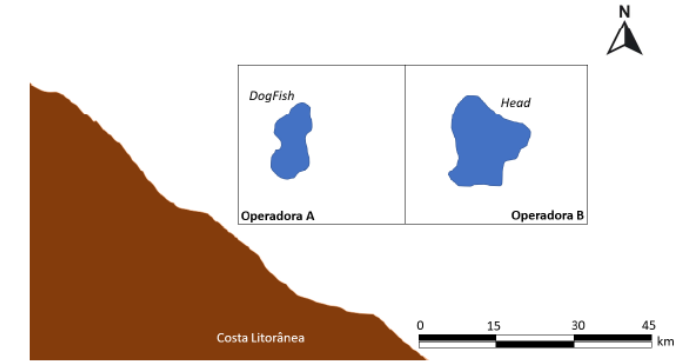


Figura 4.39: Modelo - 2 Blocos - DogFish e Head

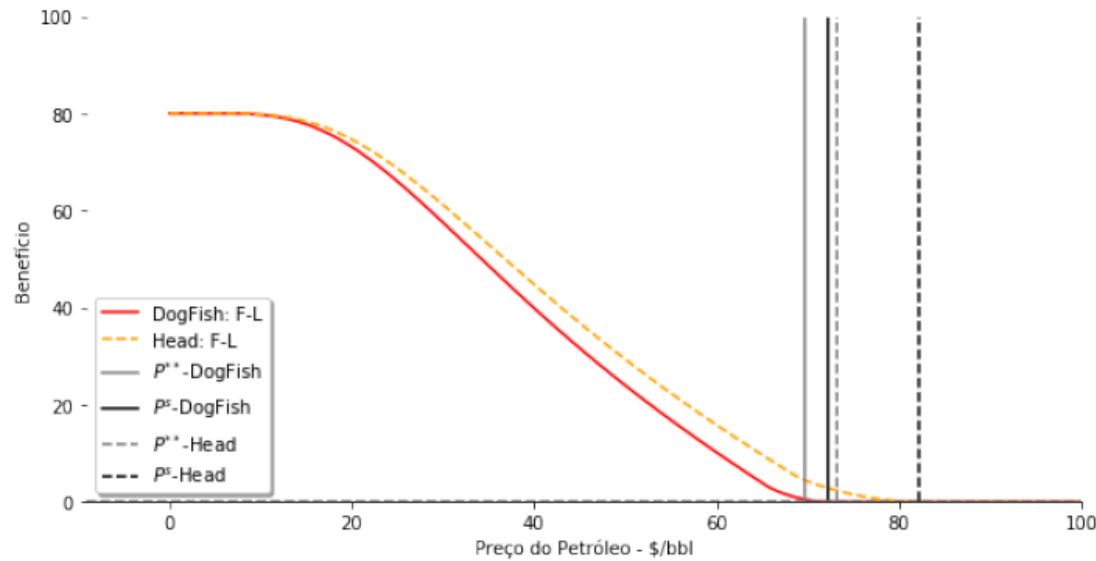


Figura 4.41: Jogo Assimétrico: Benefício da Espera

Jogo assimétrico:

- $[0; 69.62[- [0; P^{**}(D)[$
- $[69.62; 72.25[- [P^{**}(D); P^s(D)[$
- $[72.25; 73.12[- [P^s(D); P^{**}(H)[$
- $[73.12; 82.25[- [P^{**}(H); P^s(H)[$
- $[82.25; \infty[- [P^s(H); \infty[$

Guerra de Atrito

15
% B

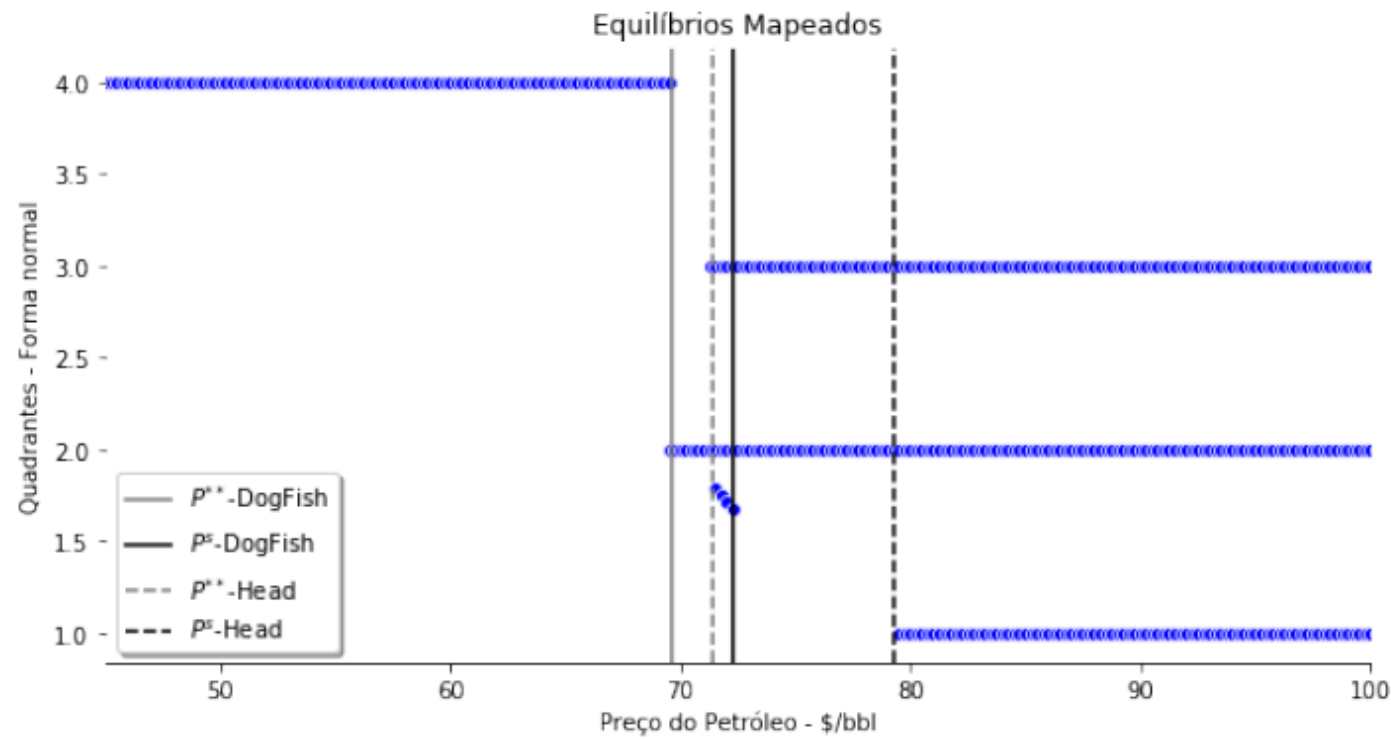
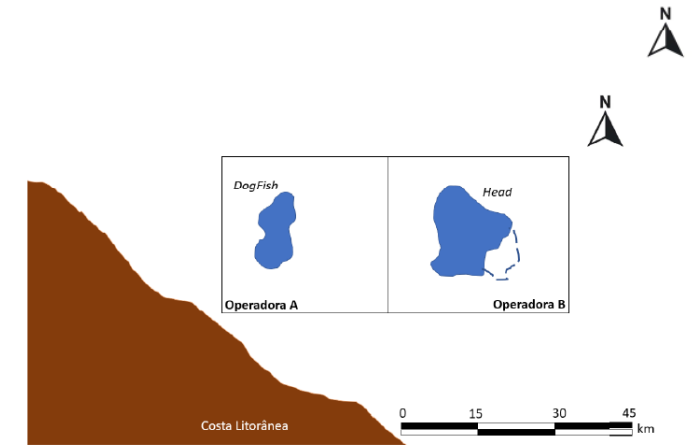


Figura 4.44: Equilíbrios Mapeados - Jogo Assimétrico - B_{Head} 15% maior

Guerra de Atrito

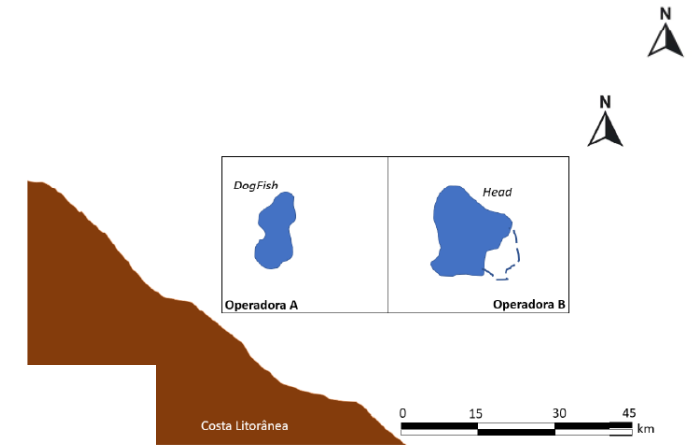
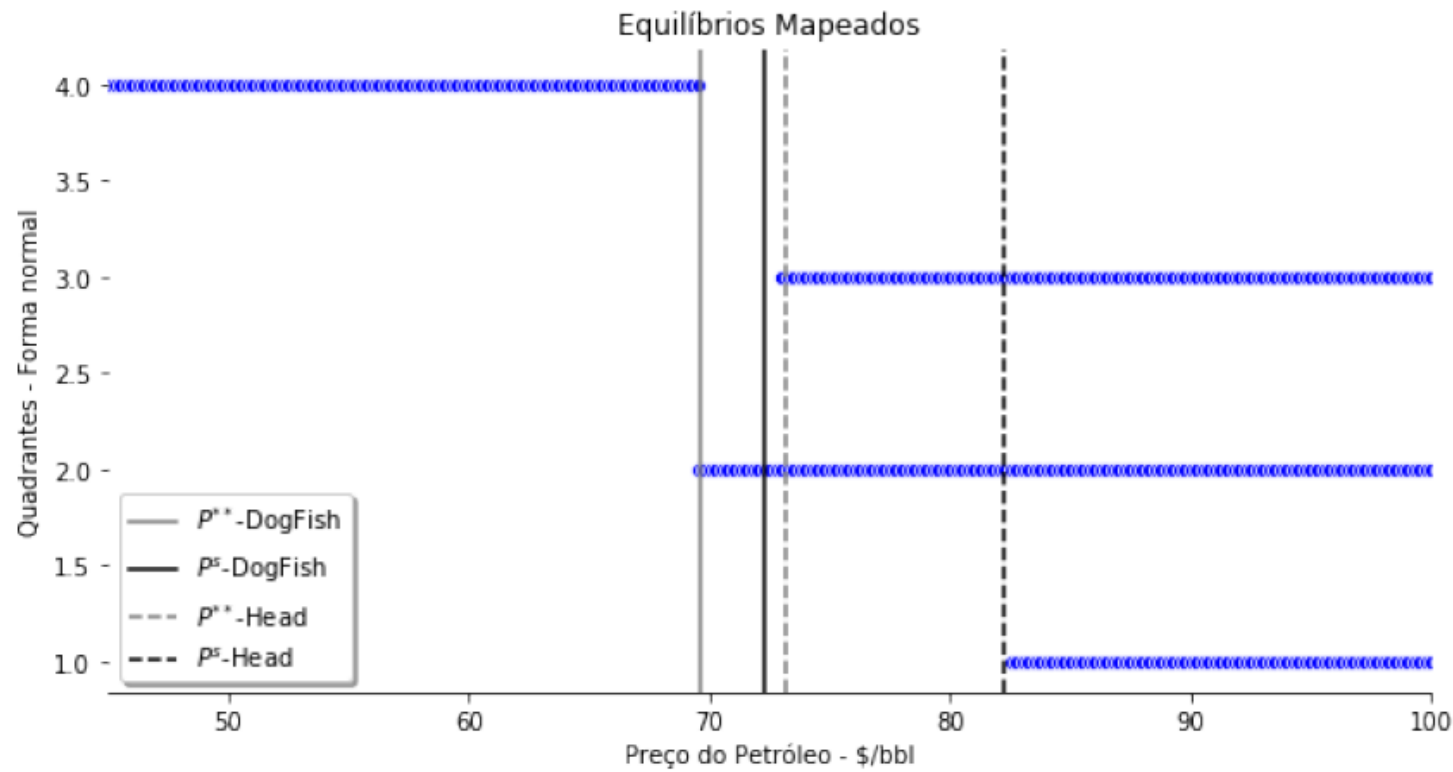
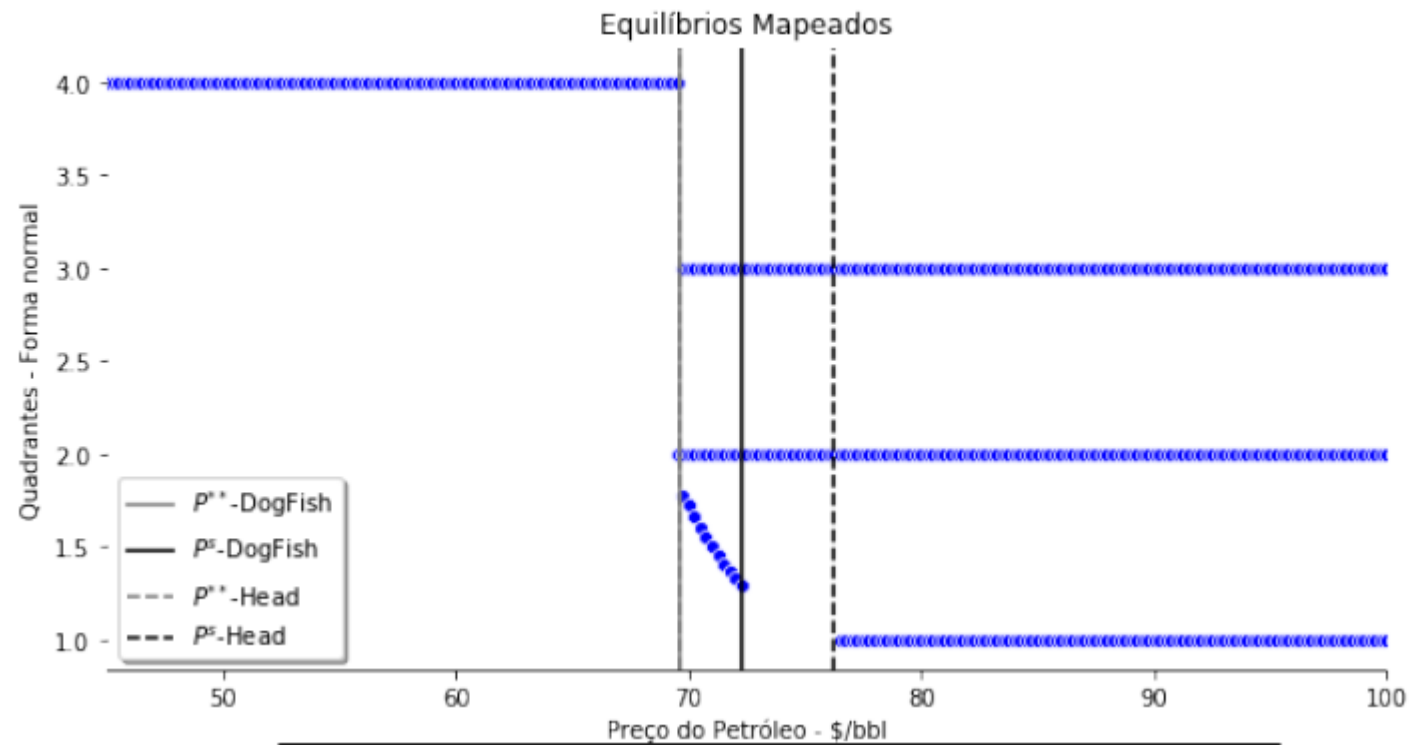
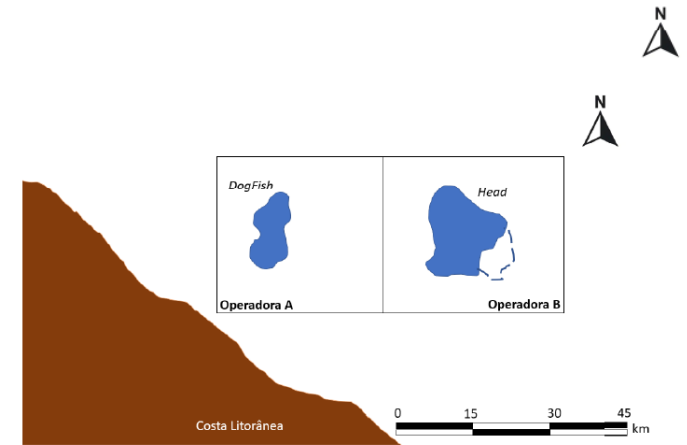


Figura 4.44: Equilíbrios Mapeados - Jogo Assimétrico - B_{Head} 15% maior

Guerra de Atrito

37
% B



Guerra de Atrito

37
% B

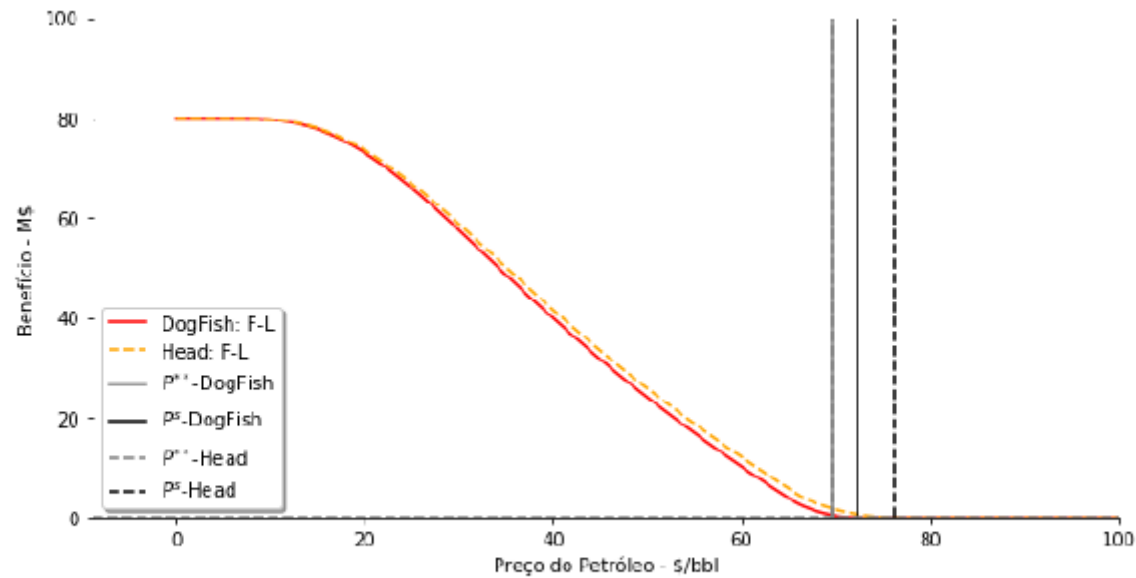


Figura 4.47: Jogo Assimétrico: Benefício da Espera - B_{Head} 37% maior

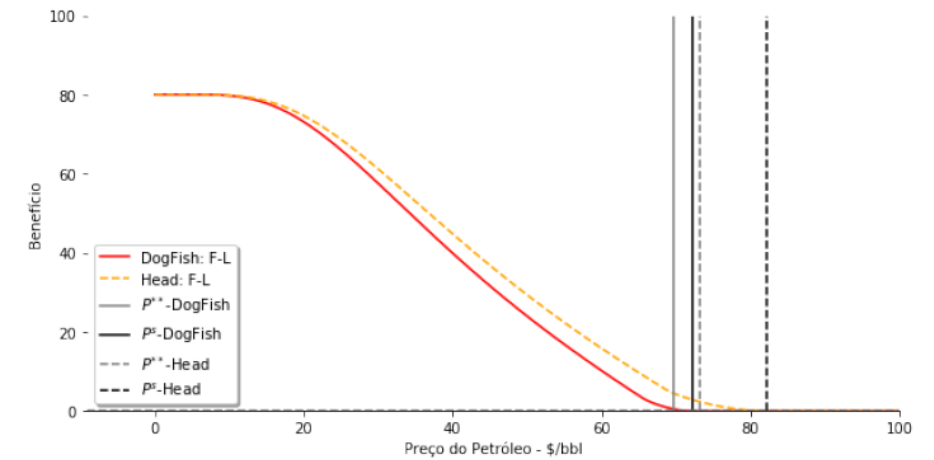
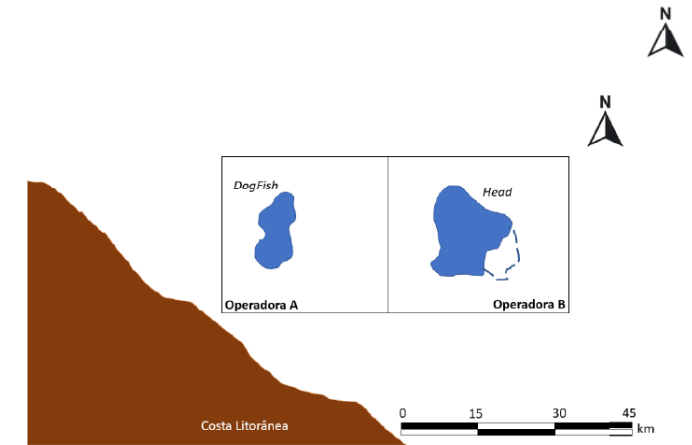


Figura 4.41: Jogo Assimétrico: Benefício da Espera

Guerra de Atrito

37
% B

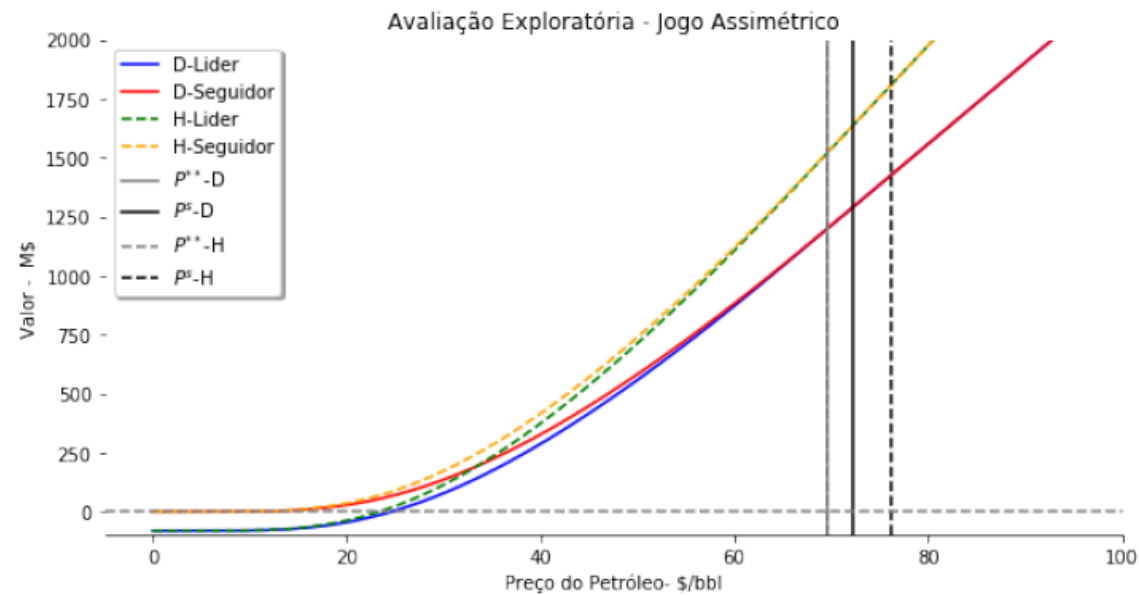
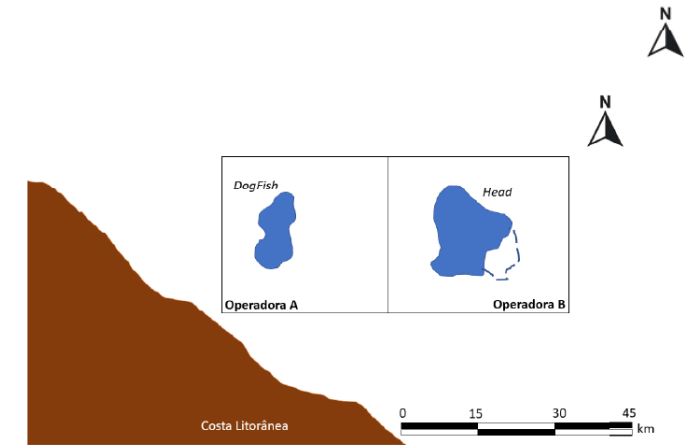
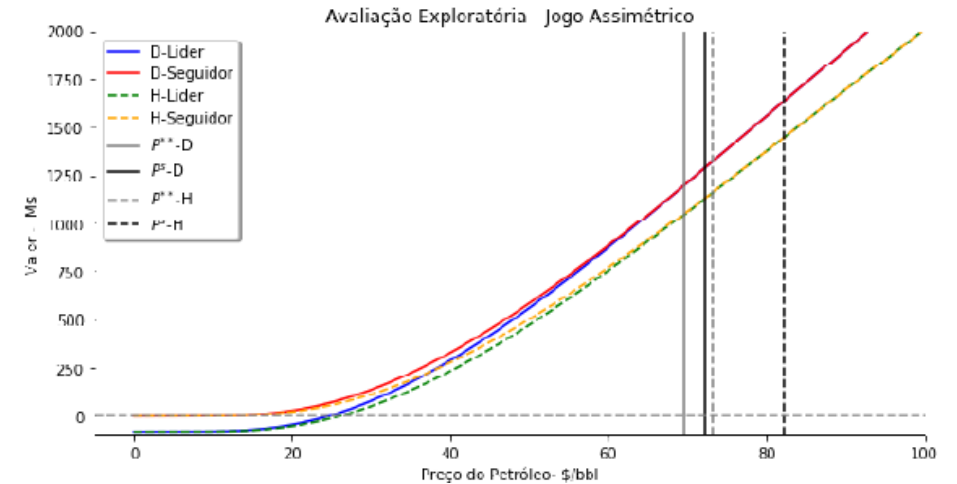


Figura 4.46: J. Assimétrico: Preço x Valor - DogFish e Head - B_{Head} 37% ma

Capítulo 4. Resultados

115



Guerra de Atrito

37
% B

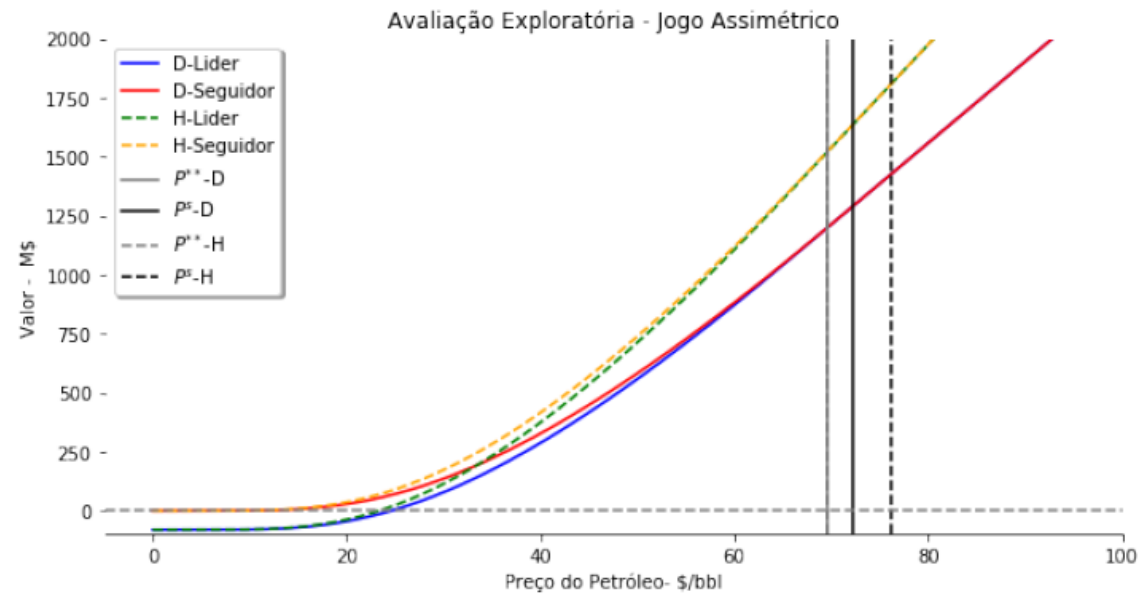
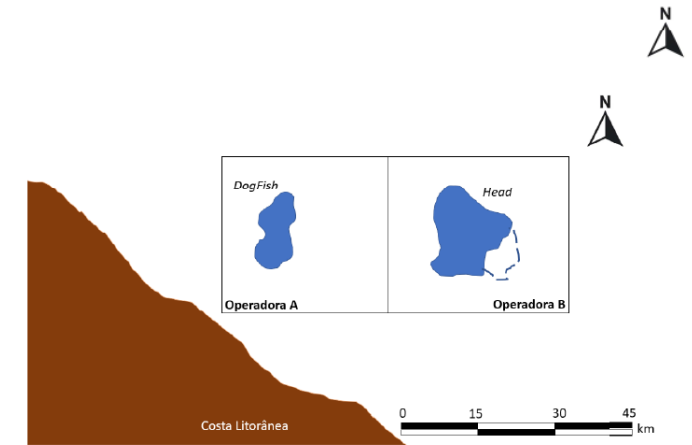
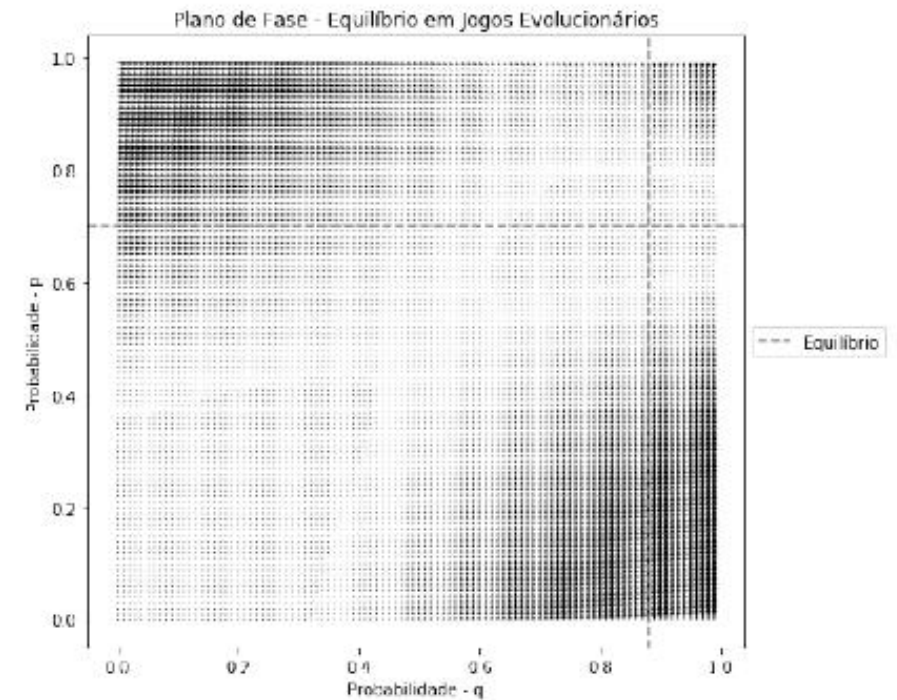


Figura 4.46: J. Assimétrico: Preço x Valor - DogFish e Head - B_{Head} 37% maior



Guerra de Atrito

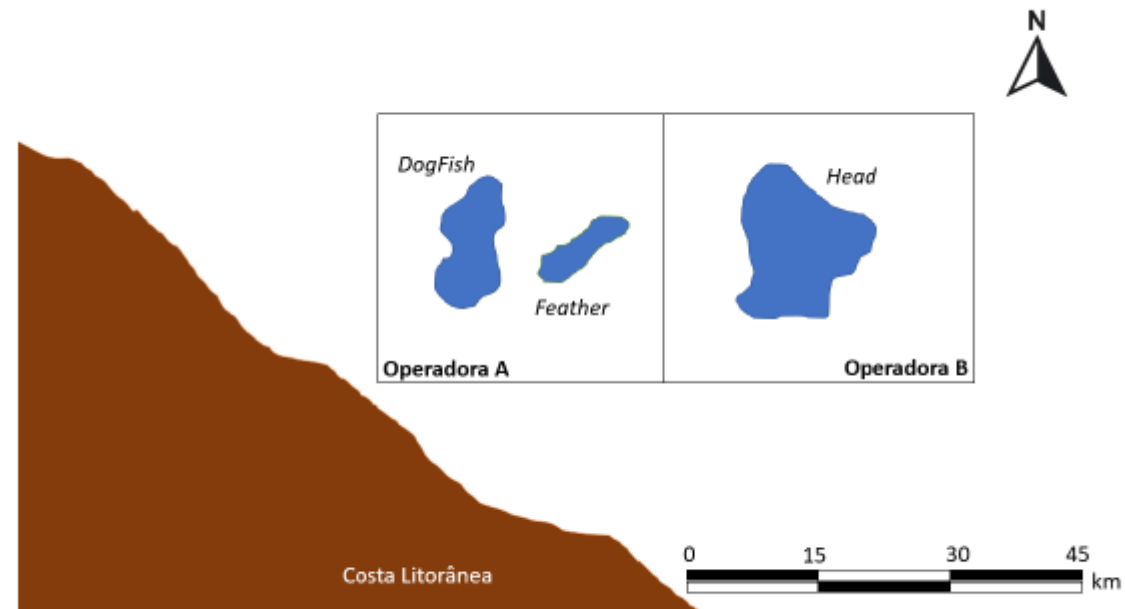


Figura 4.52: Modelo - 2 Blocos - A - DogFish e Feather - B Head

Guerra de Atrito

		Jogador 2	
		Investe	Espera
Jogador 1	Investe	$VME_{\pi_1} ; VME_2$	$VME_{\pi_1} ; E_{2 1}$
	Espera	$\Pi_{1 2} ; VME_2$	$\Pi_1 - c_1 ; E_2 - c_2$

Tabela 4.22: Forma normal: Payoffs no caso de Portfólio

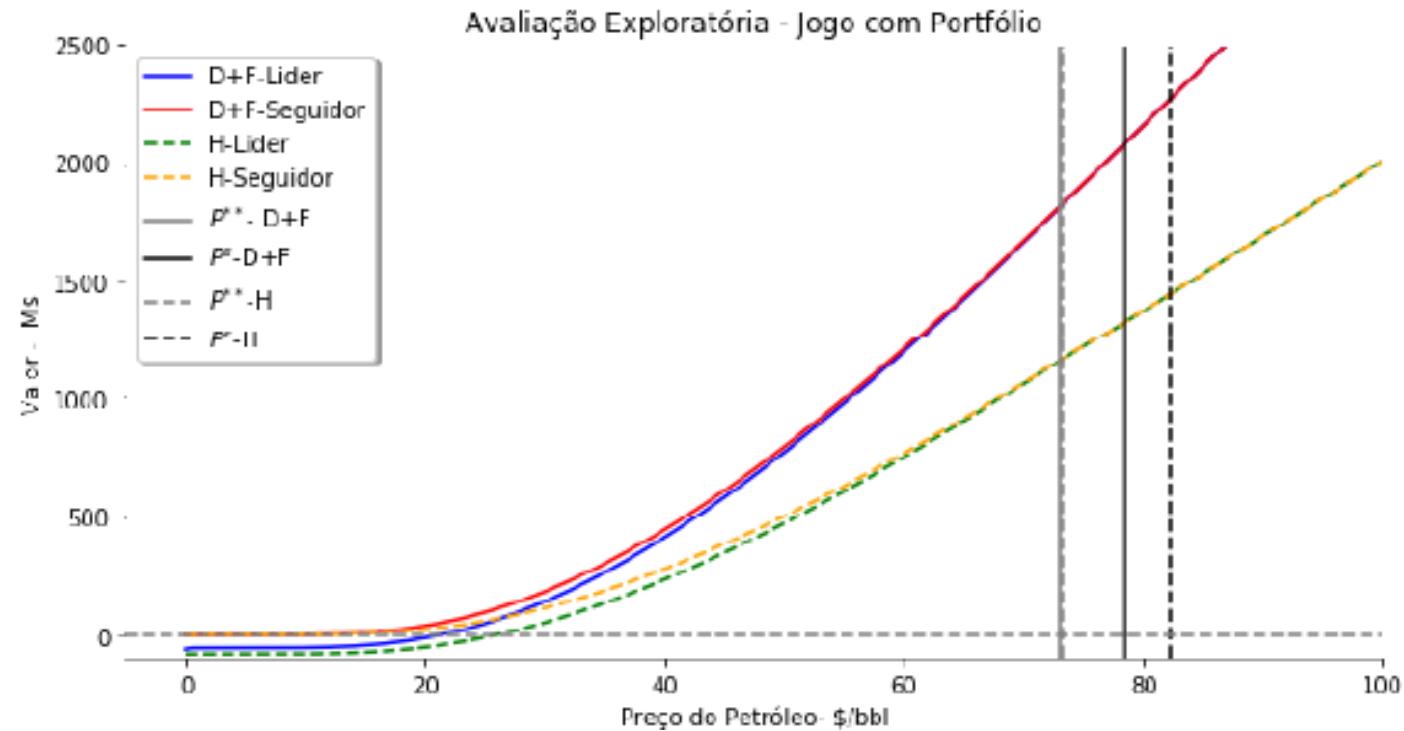
		Jogador 2	
		Investe	Espera
Jogador 1	Investe	$VME_1 ; VME_2$	$VME_1 ; E_{2 1}$
	Espera	$E_{1 2} ; VME_2$	$E_1 - c_1 ; E_2 - c_2$

Tabela 3.9: Forma normal: Payoffs- 2 prospectos

Em que $VME_i = VME_i(P, t)$ e c_i é o custo de espera.

Guerra de Atrito

- $[0; \sim 73.0[$ - $[0; P^{**}(D + F)$ e $P^{**}(H)[$
- $[\sim 73.0; 78.5[$ - $[P^{**}(D + F)$ e $P^{**}(H); P^s(D + F)[$
- $[78.5; 82.25[$ - $[P^s(D + F); P^s(H)[$
- $[82.25; \infty[$ - $[P^s(H); \infty[$



Guerra de Atrito

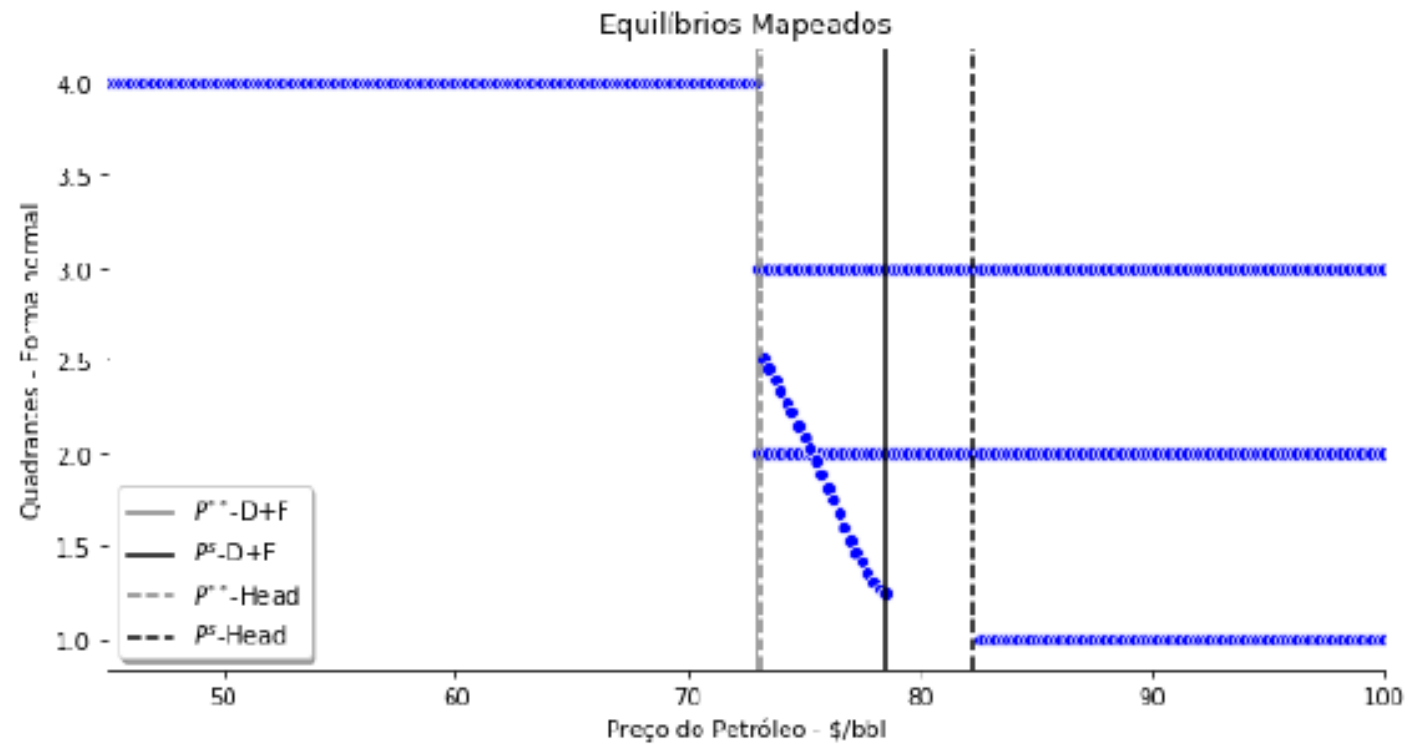


Figura 4.55: Equilíbrios Mapeados - Jogo $\Pi(D + F)$ e *Head*

Guerra de Atrito

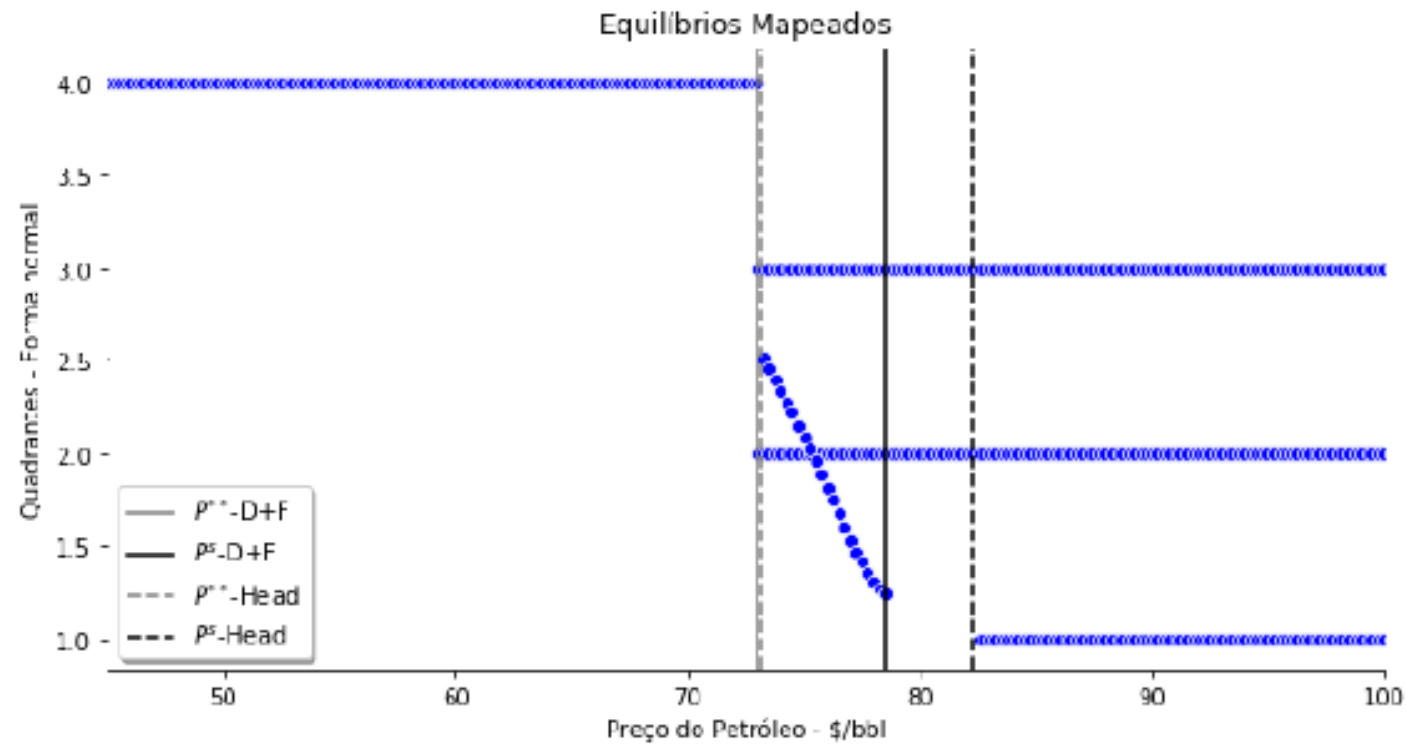


Figura 4.55: Equilíbrios Mapeados - Jogo $\Pi(D + F)$ e *Head*

Guerra de Atrito

Guerra de Atrito

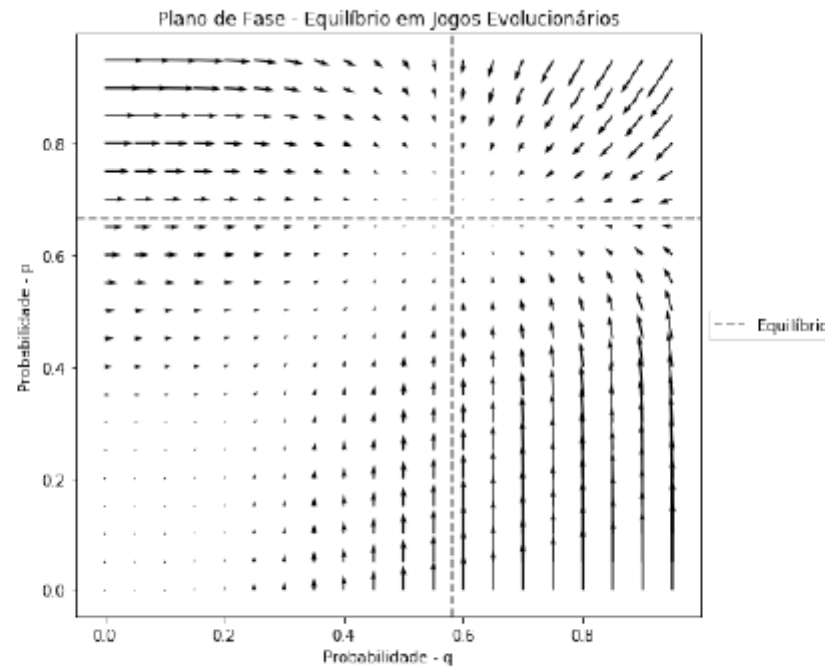


Figura 4.56: Jogo Evolucionário - Plano de Fase - Portfólio -\$ 75 o barril

Guerra de Atrito

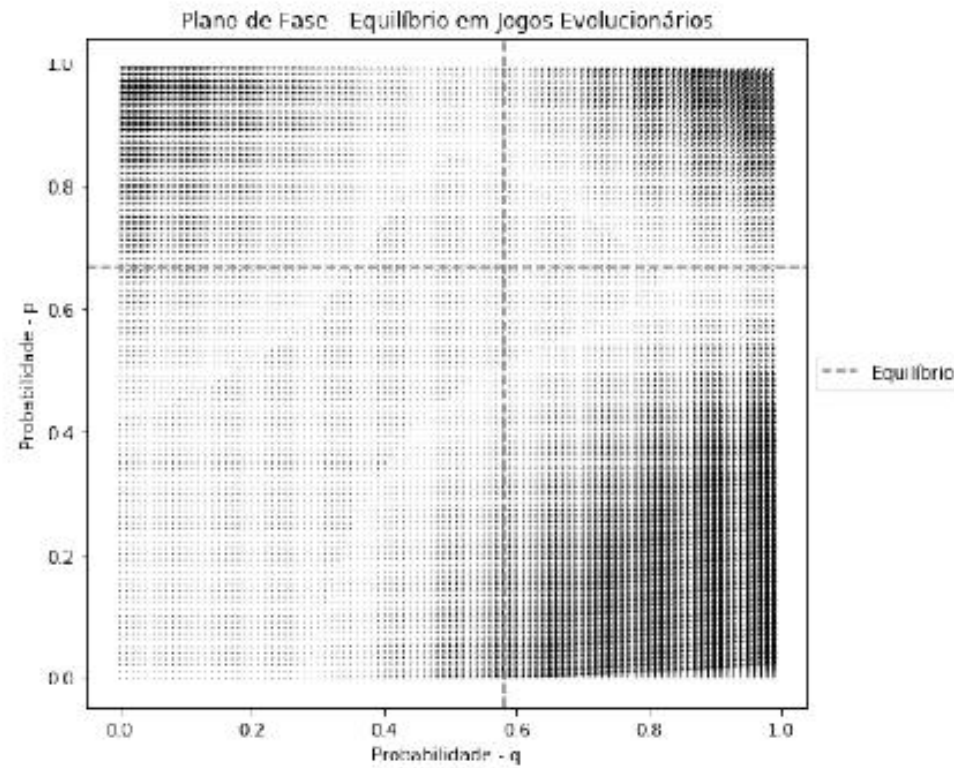


Figura 4.57: J. Evol. - Plano de Fase - Portfólio - \$ 75- Maior Densidade

Guerra de Atrito - Barganha

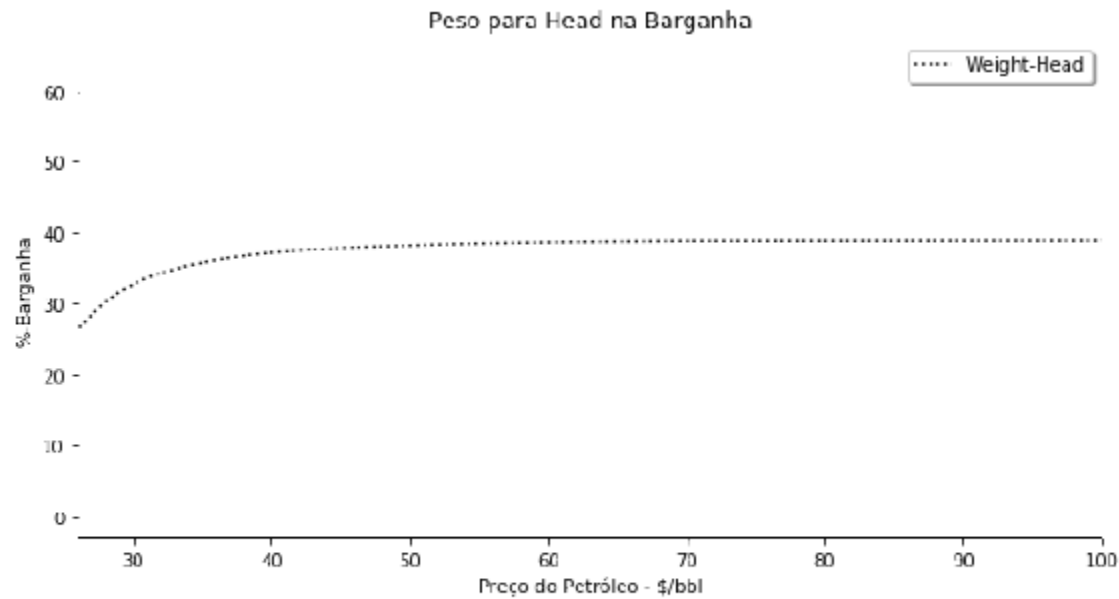


Figura 4.58: Peso na Barganha: DogFish -Feather- Head

$$w_i = \frac{1}{2} + \frac{(d_i - d_j)}{2B}$$

$$w_i = 1 - w_j$$

Guerra de Atrito - Barganha

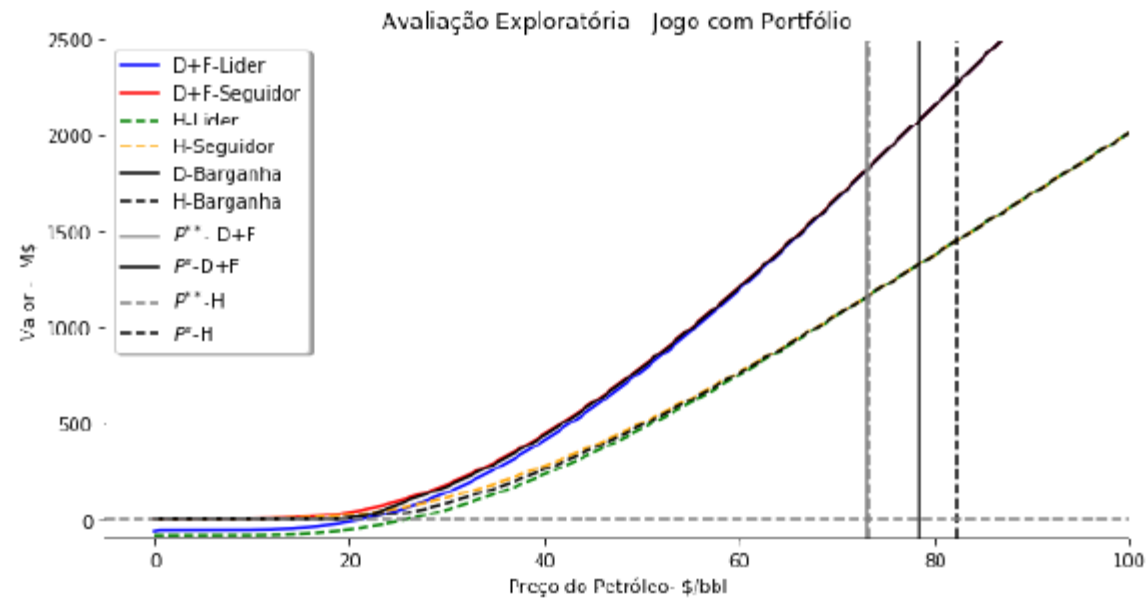


Figura 4.59: Barganha: Preço x Valor - $\Pi(D + F)$, *Head* e $\Pi(D + F + H)$

Guerra de Atrito - Barganha

ρ	DogFish	Feather	Head
DogFish	1	—	—
Feather	0.6	1	—
Head	0.5	0.6	1

Tabela 4.4: Correlação dos prospectos da bacia

ρ	DogFish	Feather	Head
DogFish	1	—	—
Feather	0.7	1	—
Head	0.6	0.7	1

Tabela 4.27: Correlação dos prospectos - Interação pelo Negócio

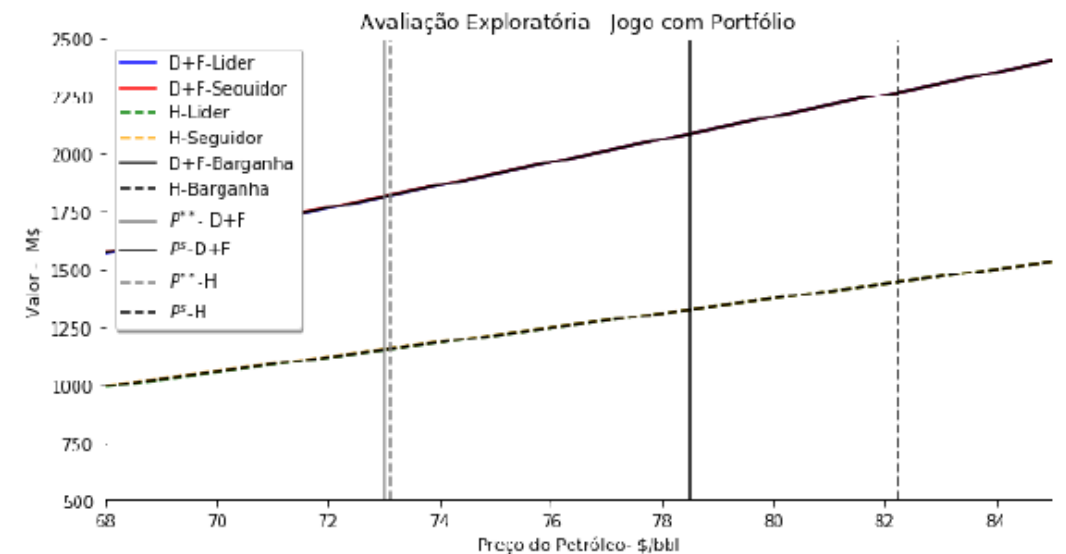


Figura 4.60: Barganha detalhe: Preço x Valor - $\Pi(D+F)$, $Head$ e $\Pi(D+F+H)$

Guerra de Atrito - Barganha

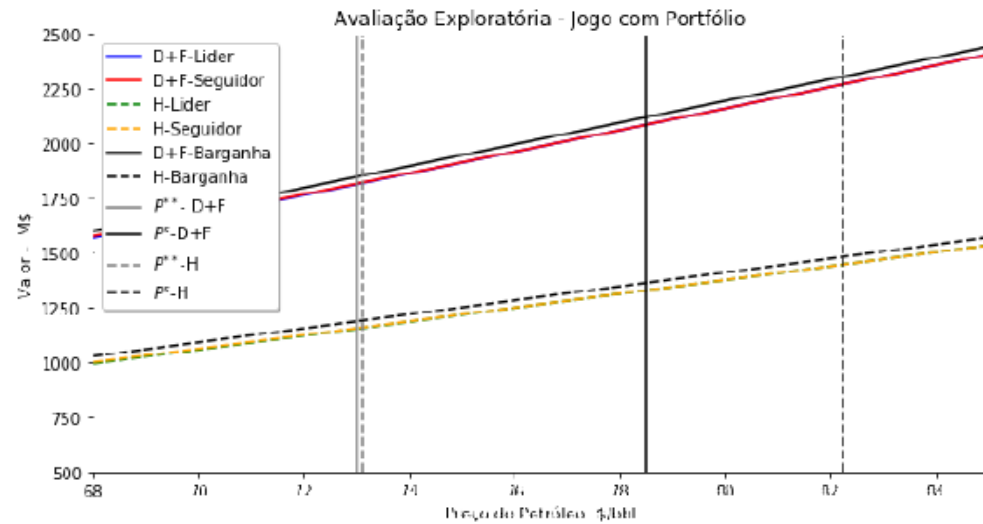


Figura 4.61: Barganha detalhe: Correlação elevada - $\Pi(D + F)$, *Head* e $\Pi(D + F + H)$

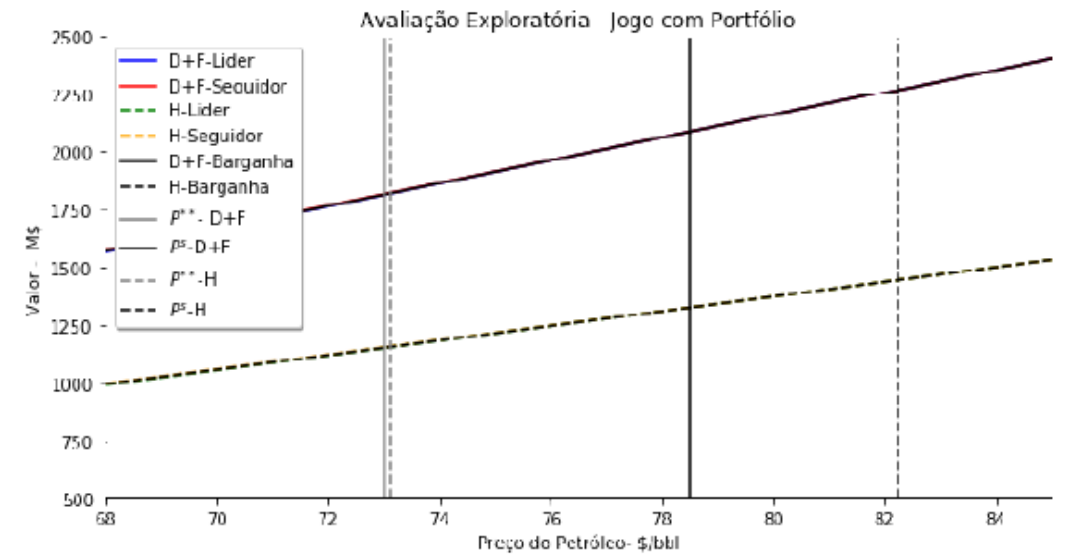


Figura 4.60: Barganha detalhe: Preço x Valor - $\Pi(D + F)$, *Head* e $\Pi(D + F + H)$

Anexos

Possible seismic hydrocarbon indicators in offshore Cyprus and Lebanon

Per Helge Semb

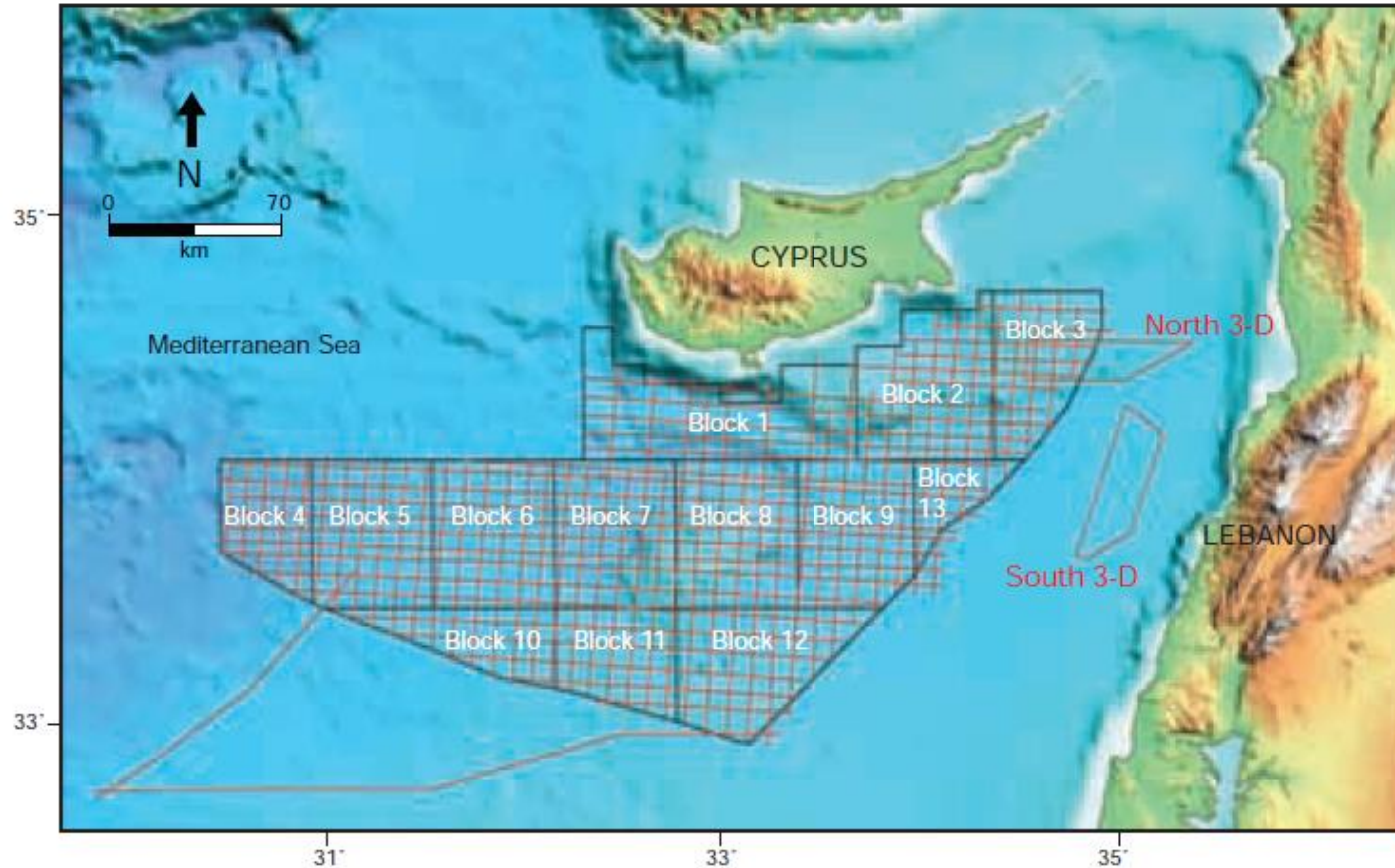


Figure 2: Exploration blocks 1 to 13 in offshore Cyprus, Mediterranean Sea, are shown together with the location of the 2006 PGS multi-client 2-D seismic survey in the offshore of Cyprus. Two 3-D surveys were also acquired in 2006 and 2007 in offshore Cyprus and Lebanon.

Possible seismic hydrocarbon indicators in offshore Cyprus and Lebanon

Per Helge Semb

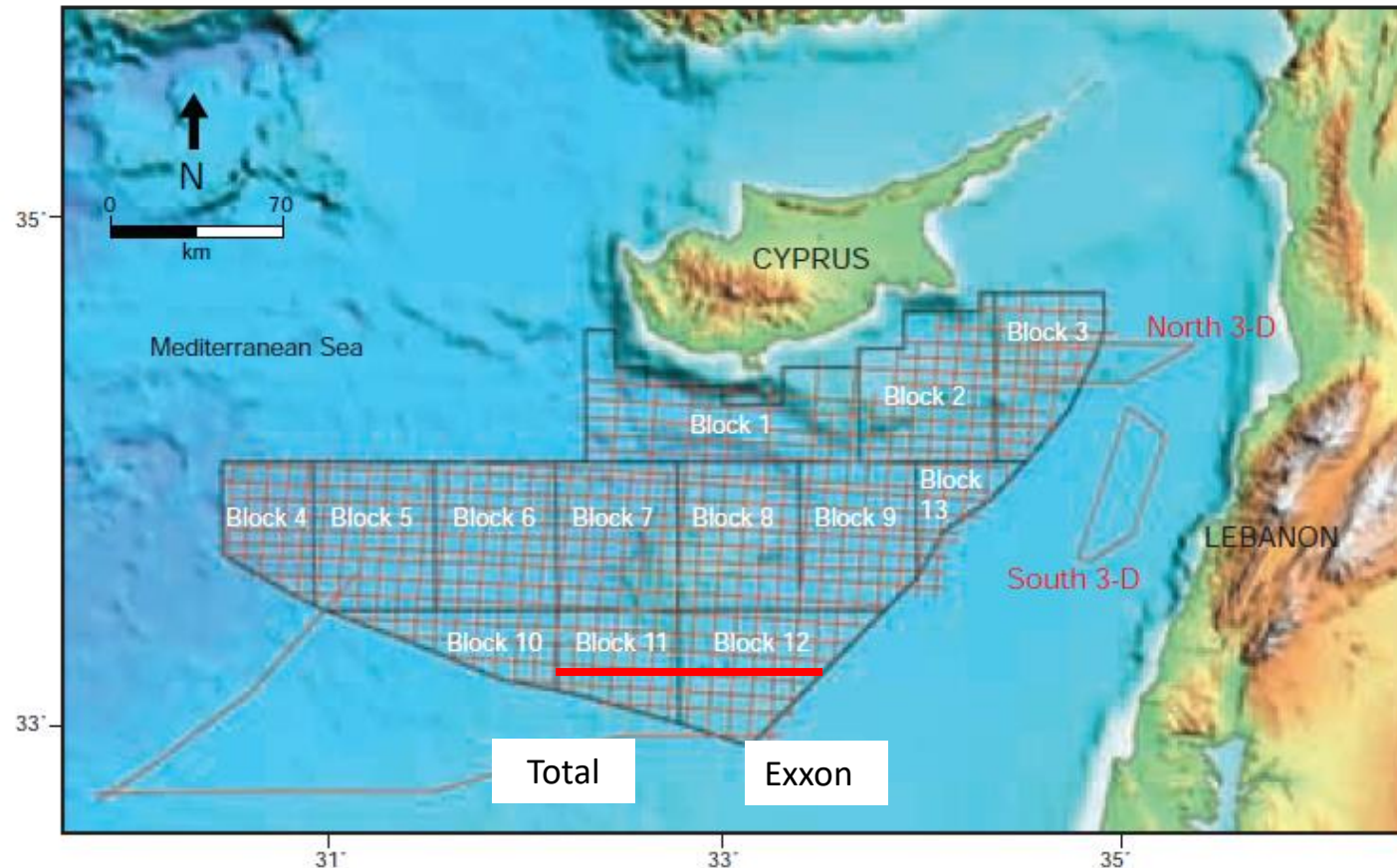


Figure 2: Exploration blocks 1 to 13 in offshore Cyprus, Mediterranean Sea, are shown together with the location of the 2006 PGS multi-client 2-D seismic survey in the offshore of Cyprus. Two 3-D surveys were also acquired in 2006 and 2007 in offshore Cyprus and Lebanon.

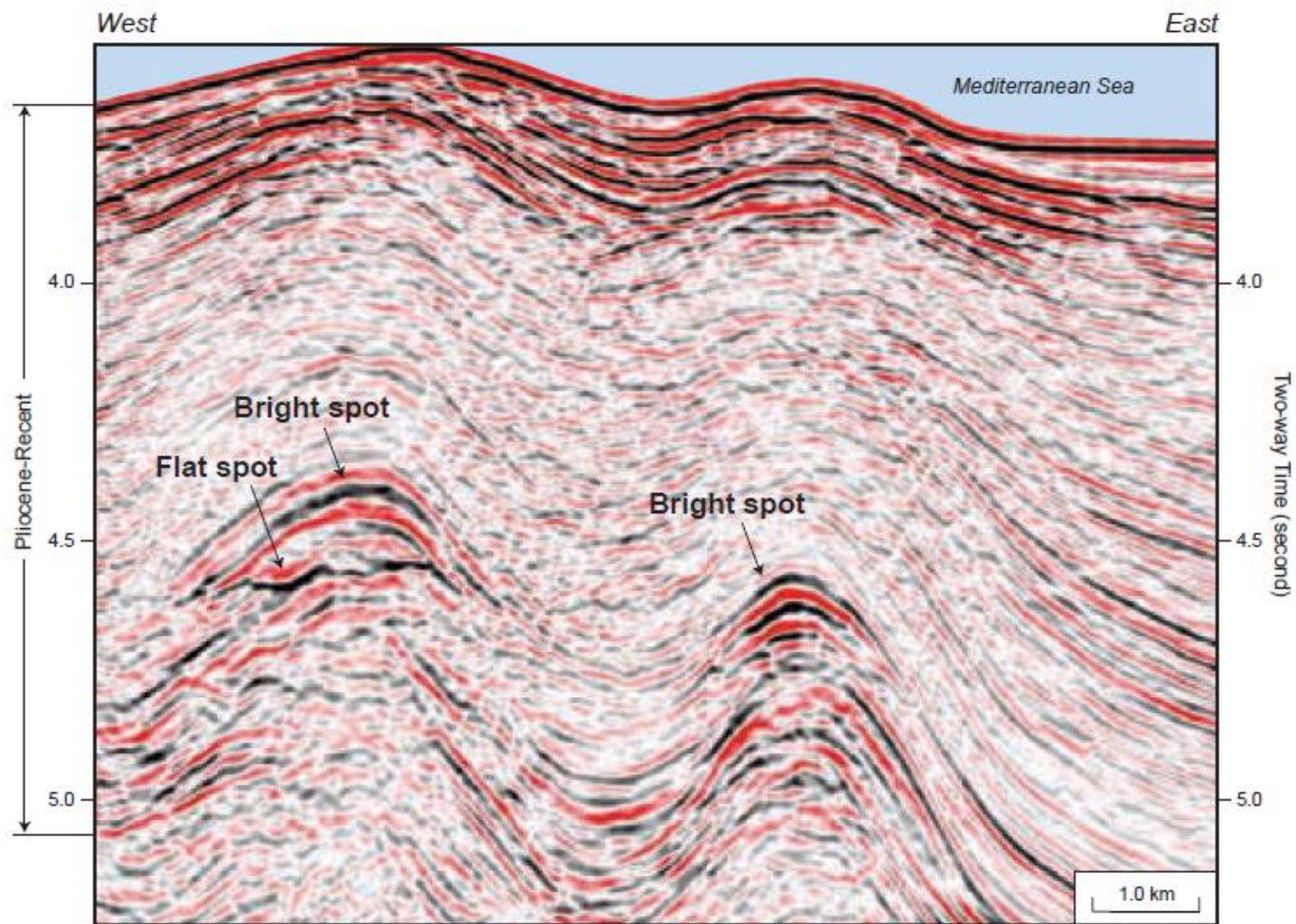
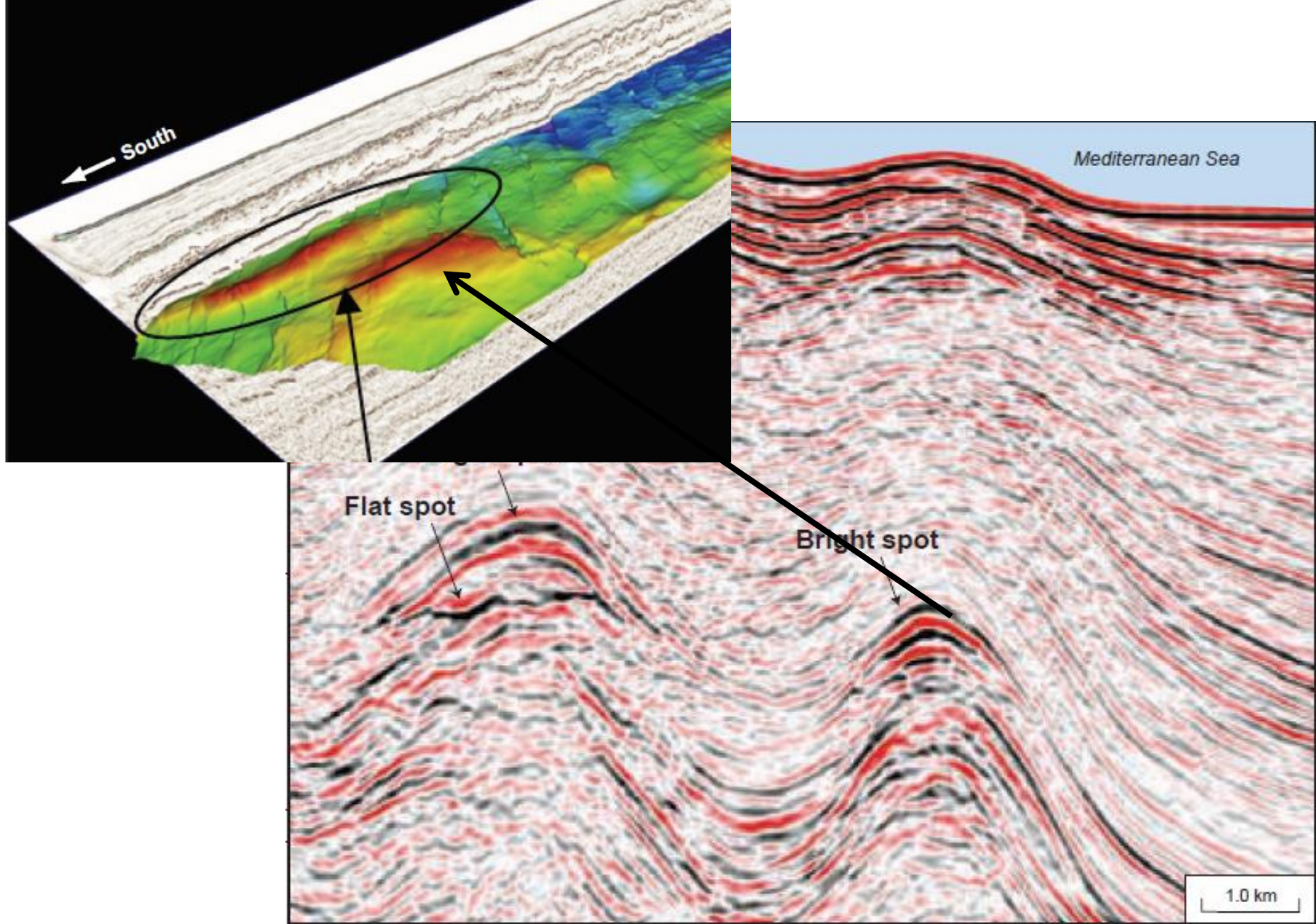


Figure 6: Seismic flat spot and two bright spots identified in the PGS 2-D in offshore Cyprus. These DHIs are believed to occur in the same interval as in Shell's discovery in the Nile Delta



Estimam Para as duas oportunidades:

Volume (B)

Qualidade de produção, do óleo, do reservatório (q)

Fator de Sucesso (FC)

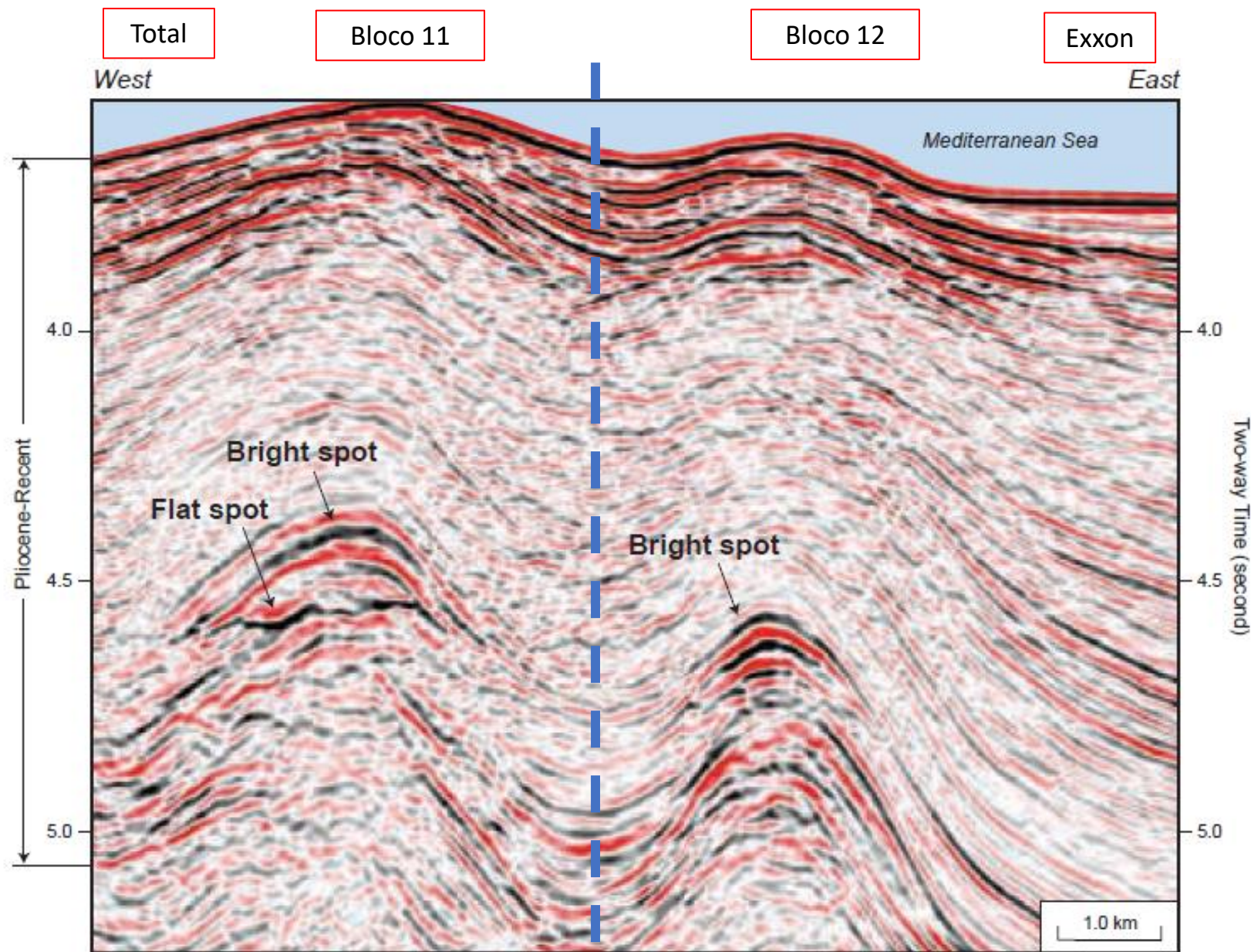
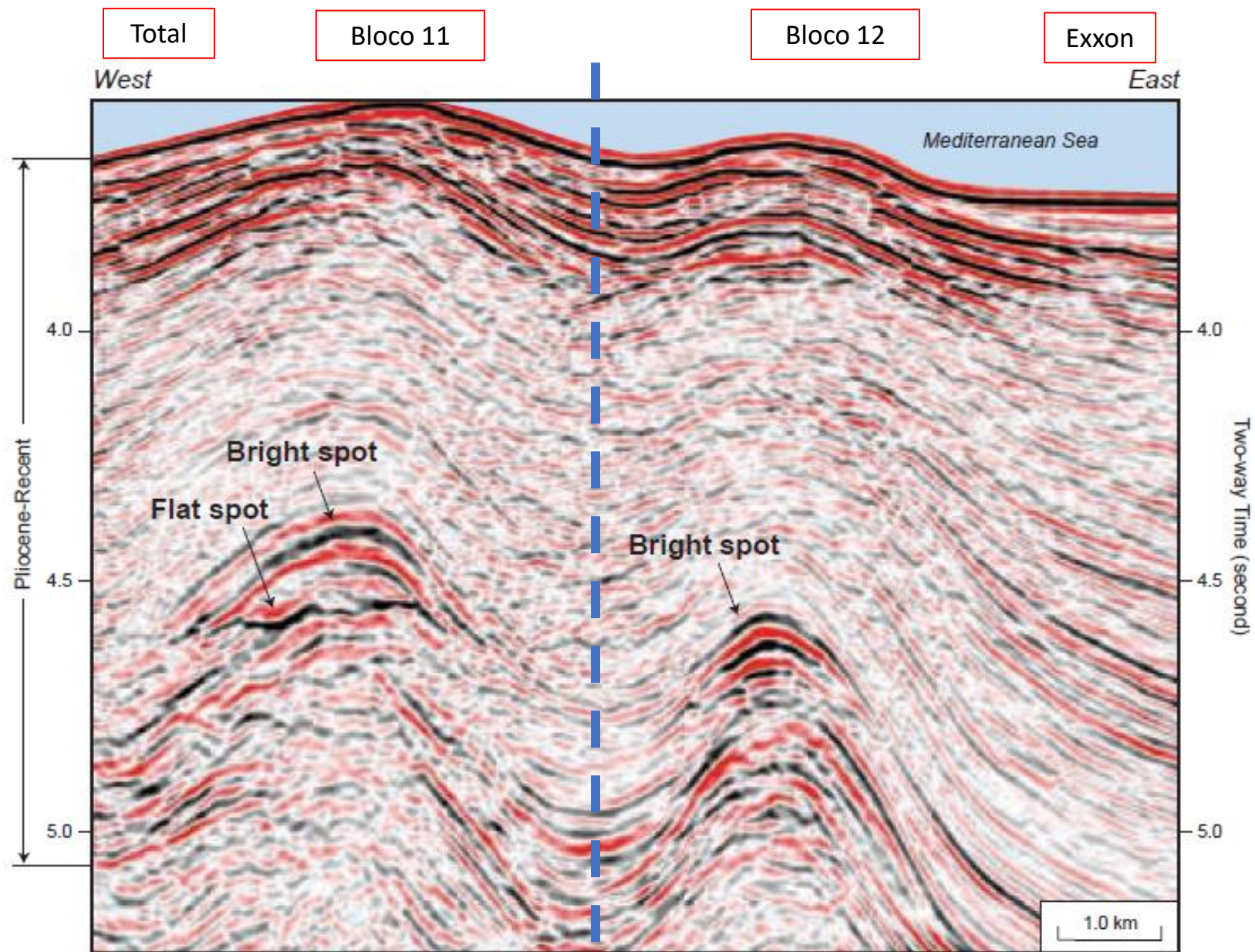


Figure 6: Seismic flat spot and two bright spots identified in the PGS 2-D in offshore Cyprus. These DHIs are believed to occur in the same interval as in Shell's discovery in the Nile Delta

Caso Total Perfurar antes (Líder):

Fator de Sucesso da Exxon vai alterar, pois haverá informação do sucesso ou fracasso

Isso acontece pois há correlação entre as oportunidades

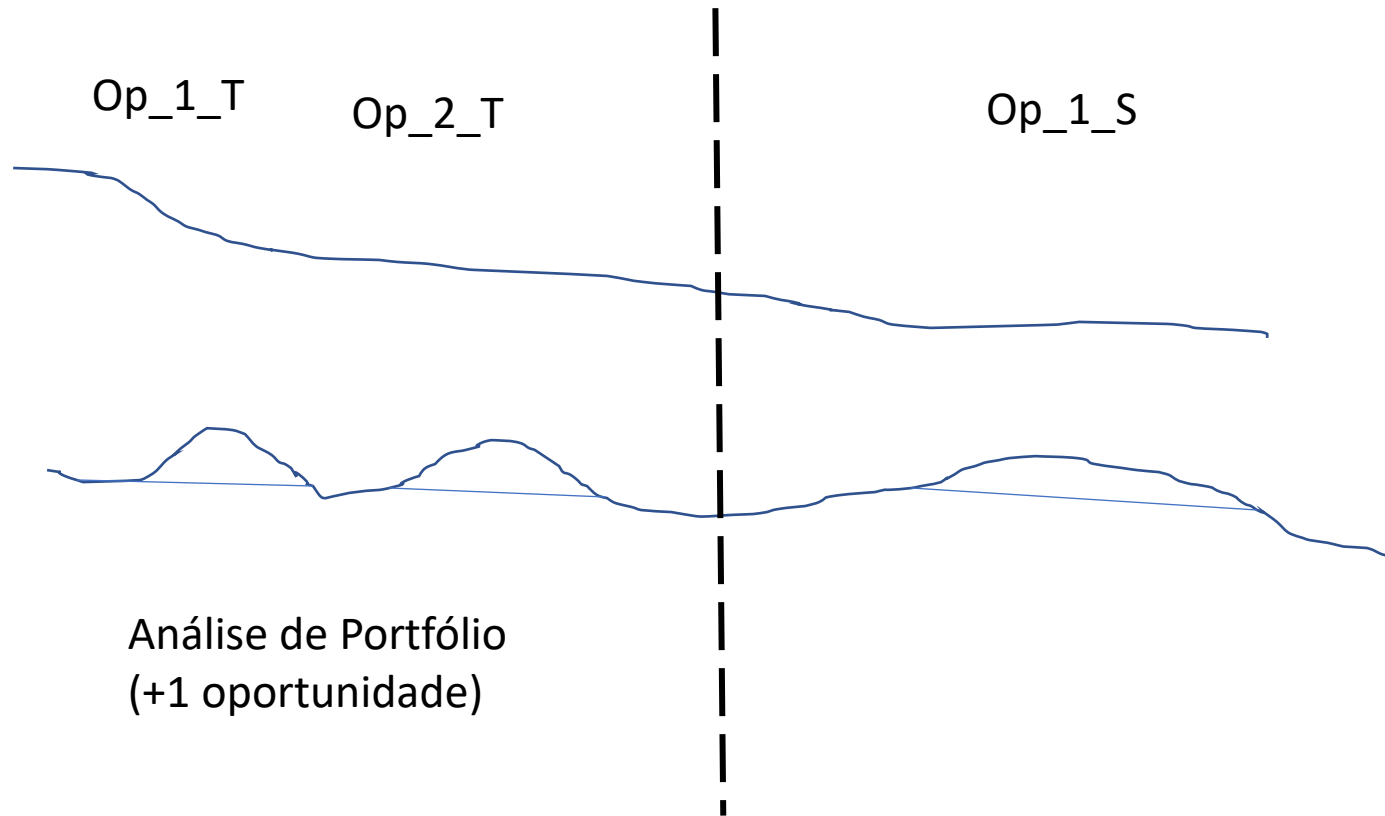


Incerteza:

- Preço do Petróleo (P)
- Incerteza Técnica (FC)
- Incerteza Estratégica (Atrito entre Exxon xTotal)

Figure 6: Seismic flat spot and two bright spots identified in the PGS 2-D in offshore Cyprus. These DHIs are believed to occur in the same interval as in Shell's discovery in the Nile Delta

Apresentação do Problema da Dissertação



Parâmetros

Endógenos:

- $B[1 : n]$ - Volume Recuperável (bbl)
- $q[1 : n]$ - Qualidade da Reserva (%)
- $FC[1 : n]$ - Fator de Chance dos prospectos (%)
- $\rho[n \times n]$ - Matriz de correlação dos prospectos (%)
- $dummy_1[1 : n]$ - Dummy de propriedade [0,1]
- I_w - Investimento no poço pioneiro (MM\$)
- I_d - Investimento em desenvolvimento - função do Volume Recuperável (MM\$)

Parâmetros

Exógenos:

- $P(\alpha, \sigma)$ - hiperparâmetros dos Preço do petróleo (%a.a, %a.a.)
- δ - taxa de conveniência (%a.a)
- r - Taxa livre de risco (%a.a.)
- τ - Tempo do contrato de exploração - comum em todos os blocos (anos)