fl – – s n *

ff Vn
p q
ffi o x
s – VTx o Yq bn—Tffiw
V l V V

v YZTZXXd

Abstract

T
Vfl
T V
u V— U
T
V
T U
o U T
V
w f T T T T U
V
vqx o f vYZTvY[TvYb

*— v m Tw n Tn s Ty fl Tff –
V

1 Introduction

u T

V— –

q m V u z u T

V u T P QT

—

Vr T] XUaiX o

T V—

T k m

T

V o T

k

— T

k — T

T U U

T Vu T

T V’ U

T

T T V

— T

T V

m T T

V m T

T

V p w PYed[Q

V u T

V–

V t T

V

—

V U

Vm T

V—

T T

P QY

u T

T T

V — U

T T

Z

V

— U

Vu

T T

T Vt T

Vu T

T

Vm

V u

T

T U

V

V— o U

T P n

Ffi TZXXaQQ T

V

fi

T

V’ T

V

T

T

V y

T U U V

T

V u T m – ’ y

T T

Vt T ffiw

V fi

T

P

QV—

V

— V– Z

[

Vu
T U
T T
V – [T
V–]
V T
T o U Vu U
T
V— V

2 A Simple Model

— ’ Vn r PYe[XQT
p Vr
T
Vu T T
V
t U
V u U
V
— T U
T V p
Vn PYecXQ
U– m m
U U V n PYec] Q
P Q U u U
T U u T
Vy T PZXXdQ

U Vq

g T

V

— U

T P Q Vm T

r U

Vfi J U

J T

T J U J] V—

T U

T Vt T

V– T

V T

Uz y Vx u_B

T $u_B + \rho_B$

V— Tρ_B

V– T u_G

ρ_G

Vfi

$u_B > u_G$ $u_B + \rho_B > u_G + \rho_G$Vr T$u_B < u_G + \rho_G$,

V

x r V

T

V—

$$U(r) = u_B + \min\{r, 1\}\,\rho_B. \qquad \text{PYQ}$$

$$V(r) = u_G + \min\left\{\frac{1}{r}, 1\right\}\rho_G. \qquad \text{PZQ}$$

— T T

VV Vfi T

T Vfi

T c

Vu T T
U Vfi T
T c T V–
T $V(r)$. n
T
T $\frac{1}{2}\{U(r) + V(r)\}$, T$c$. –

$U(r) - V(r)\} \geq 2c$, P[Q

V
u T T U
Vu T T
$U(r) - c$, c V n U
T $\frac{1}{2}\{U(r) + V(r)\}$. u

T
T
Vt T Pc)
T
T V
—
T Vu c
$p > 0.5$, $\frac{2c}{2p-1}$ $2c$ P
P[QV
— T c T $2c \geq$
$U(1) - V(1)$, r 1V— T
T T
V —
$\frac{U(1)-V(1)}{2}$, c.
z $r < 1$,

] —
Vm T T
P Q V—
V

T

V

x $2c < U(1) - V(1)$V u T $r = 1$

T

Vm T $r^* \in (0,1)$,

T

f

$$U(r^*) - V(r^*) = 2c. \qquad \text{P}]\text{Q}$$

— f

T $V(r^*)$

$U(r^*)$. u c. n

$U(.)$ $V(.)$,

$$1 - r^* = \frac{(u_B + \rho_B) - (u_G + \rho_G) - 2c}{\rho_B}. \qquad \text{PaQ}$$

— T $2c < U(1) - V(1)$T V

x V— U

Vu T J J

J JV[a] — Vu

P VVu o QT T

J JV u T

k[b] q T

Vu T

Vu T U

T V–

P QT

V— T

r,

[a] s V

[b] _ u o g T

T V

$$W(r) = \frac{1}{1+r}U(r) + \frac{r}{1+r}V(r) - c\frac{1-r}{1+r}. \qquad \text{PbQ}$$

— $\frac{1}{1+r}$

T $U(r),$ $V(r).$ —

T

λ

V—

$c + \frac{c}{2} + \frac{c}{4} + ..,$ $2c.$ λ $\frac{1-r}{2(1+r)}$

$r.$

t $r?$ — V–

$r \leq 1$ λ T

T Vm

T P Q $u_B - u_G - 2c > 0$T

Vz T

V— 2λ

T VV

J J V —

$-(\rho_B + \rho_G),$ U

$u_B - u_G - 2c - \rho_B - \rho_G,$ $u_B - u_G - \rho_G < 0$ P

QV— T

Vy T

r $r < 1$

$$\left.\frac{\partial W}{\partial r}\right|_{r<1} = \frac{V(r) - U(r) + 2c + (1+r)[U'(r) + rV'(r)]}{(1+r)^2}. \qquad \text{PcQ}$$

– $V'(r) = 0$ $U'(r) = \rho$ $r < 1,$

$$\left.\frac{\partial W}{\partial r}\right|_{r<1} = \frac{u_G - u_B + \rho_B + \rho_G + 2c}{(1+r)^2} > 0. \qquad \text{PdQ}$$

– T $\left.\frac{\partial W}{\partial r}\right|_{r>1} < 0,$

r 1. u T T

Vt T

V— T

Vu T

T Y

T $\rho_B + \rho_G$

Vr T
q W m T
V— T
J J V– T
U T
Vfi
V
V

Proposition 1 $u_B - u_G > c$

c

– T
P o u Q V
t T T
Vm
T
V— T T
V

V

2.1 Heterogeneity

T
T V
Vm U

Vm T
T Vq U
T V

2.1.1 Ex post heterogeneity

– T
$\rho + \varepsilon$, ε

$F(.)$, $[0, e]$.

T V

P QT T

Vm i j,

i j. — T

Tn o PYeecQVm

Vy

Vu T

Vu $r \leq 1$T

T T

$$U(r) = u_B + r[\rho + \mathbf{E}(\varepsilon)]. \quad \text{PYZQ}$$

— T r T T

T

V– T

$$V(r) = u_G + \rho + \mathbf{E}(\varepsilon | \varepsilon \geq F^{-1}(1 - r)). \quad \text{PY[Q}$$

r T r

T ε ε

$F^{-1}(1 - r)$. — r T

T$V(r)$, V

z T V—

T

Vr T $u_B - u_G - 2c < 2\rho$,

r V fl Y

Vm V

2.1.2 Ex ante heterogeneity

U U

V x P QTH L,

μ Y . m

T Vx

ρ^i $i,$ $i \in \{L, H\}.$
m V
o V u
PVV $u_B + \rho^L < u_G + \rho^H),$
c T T$r_H^*,$

$$u_B + r_H^* \rho^H + (1 - r_H^*)\rho^L - 2c = u_G + \rho^H. \qquad \text{PY] Q}$$

— T
g
Vo T$r_H^* < 1$ $u_B - u_G > 2c.$
z Vm $\frac{1-r_H^*}{1+r_H^*}\mu$
T $r_L,$
$\frac{r_L}{1+r_L}.$ – $\frac{(1+r_L)(1-r_H^*)}{r_L(1+r_H^*)}\mu$
V — $\left[\frac{r_L}{1+r_L} - \frac{1-r_H^*}{1+r_H^*}\mu\right]$
$\frac{1}{1+r_L}$ Vo T
T
T V
—

$$U^L(r_L, r_H^*) = u_B + \min\left\{r_L - \frac{(1+r_L)(1-r_H^*)}{1+r_H^*}\mu, 1\right\}\rho^L. \qquad \text{PYaQ}$$

—

$$V^L(r_L, r_H^*) = u_G + \frac{(1+r_L)(1-r_H^*)}{r_L(1+r_H^*)}\mu\rho^H + \min\left\{\frac{1+r_H^*}{(1+r_H^*)\,r_L - (1+r_L)\,(1-r_H^*)\,\mu}, 1\right\}\rho^L. \qquad \text{PYbQ}$$

— T$r_L^*,$ V
u $\left|U^L(1, r_H^*) - V^L(1, r_H^*)\right| < 2c,$ $r_L^* = 1.$ fi T r_L^*
$\left|U^L(1, r_H^*) - V^L(1, r_H^*)\right| = 2c.$ —
V$r_L^* > r_H^*,$

---

c $(u_B, u_G$ $c)$
V t T
V

V—

P

QT P

r_L, r_H^*QY

u T

T V —

T

T

V

— T

V— u

P Q

V— Ye[Y

u T

V

r T

T

PVV $u_G - u_B + 2c + 2(\rho^H - \rho^L) > 0$QY y

T

T Vm $r_L^* = 1$,

V z $\rho^H < 2\rho^L$,

V–

V– $r_L^* < 1$. u T

T T

V T

V[d]

— — U

PYecYQ V— U

U T T

V— T

---

d u T

V

T Vfi
T Vz
T
T Vu q
PYeeeQT
T V–
T T
Vu
T P Q
$p \in (0.5, 1)$, .
u T
P$c = 0$),
V[e]
T V

2.2 Hepatitis B and the sex ratio

m fi PZXXaQ
nT
Vt n
ZXM o T aM
u Vt T
P fi QY
T n T
Vx
p^u T
$p^h > p^u$. $p^u = 0.5$,
Vx λ V
o
V— T $u_B \simeq u_G$T
c $|u_B - u_G|$T
V x n
Tλ, Vu T

---

e
T
V

n PλQT

λf

$$p(\lambda) = p^u + \lambda(p^h - p^u). \qquad \text{PYcQ}$$

— n

$p^h - p^u$. — T$r(\lambda) = (1 - p(\lambda))/p(\lambda)$.

z

V u T

n Vfi

n V–

n T

T

XVaT n V—

T

T VV$U(r^*) - V(r^*) = 2c$. —

λ,

n V

— T

n V—

n Vx

V m r,

T

V —

T V

o T T

V —

$p^h - p^u$.[YX] —

T

PVV

QV

YX__

V

λ,

$$p^j U(r^*) + (1 - p^j)V(r^*) - 2c = V(r^*), \quad \text{PYdQ}$$

$$p^j = \begin{cases} p^h & \lambda + (1-\lambda)p^u \geq 1/(1+r^*) \\ p^u & \lambda + (1-\lambda)p^u < 1/(1+r^*). \end{cases} \quad \text{PYeQ}$$

z PYdQ λ

$\lambda + (1-\lambda)p^u - 1/(1+r^*)$ V— λ

r^*

3 Bride Prices

T T' PYee[QY[11] —

Vr T U Ph

– TZXX[g o TYeeeQ

V – T

T U

J J VV n t PYeeeQV[12] —

T

ZM T U T

YXM V u

T u

U g T

V

T u T

V—

V

3.1 Walrasian Markets

m U Vfi U

T P

Q T V

x t T VV . u

T

V – $t = \rho_B$ $r < 1$ $t = -\rho_G$ $r > 1$.u

$r = 1$, $t \in [-\rho_G, \rho_B]$ V x

T 1 P

Q t^*,

r^* t^* r^*.

V–

$r^* < 1$, $t^* = \rho_B$. u T

T $u_B - u_G < \rho_B$. – r^*

V– T $r^* > 1$.

---

[11] m ' T U
u Vt T
V

[12] _ m PZXX[Q
V

T T

t^*

$$\frac{(u_B - u_G) - 2c}{2} \leq t^* \leq \frac{(u_B - u_G) + 2c}{2}. \quad \text{PZXQ}$$

— T

$[-\rho_G, \rho_B]$, Vr T

T

T Vz

t^*

T T $c > 0$.

fi T $(\rho_G$

ρ_B Q

Vt T

T ρ_G ρ_B

Vz T

$\bar{t}$ $|t| \leq \bar{t}$. — T P Q

$\bar{t}$ T

2

3.2 Frictional Matching

—

. y

T V

T U

V x T

, PYedaQ y fl PYee] QV—

T T

iVm T T

μ, $x\mu$, x

Vy fl T U

$m(x\mu, \mu)$. — $m(.)$ T

T PVV$m(y, z) = m(z, y)$)

V—

x, T μ. m U

T $\alpha(x) = m(x, 1)$ T

$x\alpha$. u $\alpha(x)$

x, $x\alpha(x)$ x, VV

V r T

V

y T T$s(x) = \alpha(x) + x\alpha(x)$,

T VV$s(x)$

P V Q x $x < 1$ P V$x > 1$).

– V

T U $\frac{t}{i}$

Vs T

$$U^m = \frac{u_B + \rho - t}{i}, \qquad \text{PZZQ}$$

u_B ρ V $\rho_G = \rho_B = \rho$ .Y]

– T

Y] u ρ_B ρ_G, $\rho = (\rho_B + \rho_G)/2$, $\hat{t} = t + \rho - \rho_G$.
— V

$$V^m = \frac{u_G + \rho + t}{i}. \quad \text{PZ[Q}$$

— T x J J t

$$iU(x,t) = u_B + x\alpha(x)(U^m - U). \quad \text{PZ]Q}$$

—

$$U(x,t) = \frac{u_B}{i} + \frac{x\alpha}{i(x\alpha + i)}(\rho - t). \quad \text{PZaQ}$$

– T

$$V(x,t) = \frac{u_G}{i} + \frac{\alpha}{i(\alpha + i)}(\rho + t). \quad \text{PZbQ}$$

z

V — t^* z

$U(x,t)$ $U(x,t)$.[Ya]

z T T

Tt^*, t. —

f

$$U^m(t^*) - U(x,t^*) = V^m(t^*) - V(x,t^*). \quad \text{PZcQ}$$

— x :

$$t^*(x) = \frac{\rho(1-x)\alpha(x)}{\alpha(x)(1+x) + 2i}. \quad \text{PZdQ}$$

x V— $\tilde{U}(x) = U(x, t^*(x))$

$$\tilde{U}(x) = \frac{u_B}{i} + \frac{2\rho x\alpha(x)}{[\alpha(x)(1+x) + 2i]i}. \quad \text{PZeQ}$$

$$\tilde{V}(x) = \frac{u_G}{i} + \frac{2\rho\alpha(x)}{[\alpha(x)(1+x) + 2i]i}. \quad \text{P[XQ}$$

[Ya] m T T

V—

Vm

V

T P Qx^*

Tcf

$$\tilde{U}(x^*) - \tilde{V}(x^*) = 2c. \qquad \text{P[YQ}$$

x^* 1 $u_B -$

$u_G > 2ci$. r T $x = 1$, $\tilde{U}(1) - \tilde{V}(1) = \frac{u_B - u_G}{i}$ P

T$\alpha(x) = x\alpha(x)$ $x = 1$)

V

Vx

g,[Yb] θ

V x μ T

δ. —

$$\alpha x\mu + \delta\mu = (1-\theta)g. \qquad \text{P[ZQ}$$

$$\alpha x\mu + \delta x\mu = \theta g. \qquad \text{P[[Q}$$

– T θ

$$\theta(x) = \frac{g + \delta\alpha(x-1)}{2g}. \qquad \text{P[ ] Q}$$

— T x^* T

$\theta(x^*)$.

— T

$x, W(x)$. —

$$W(x) = (1-\theta(x))\tilde{U}(x) + \theta(x)\tilde{V}(x) - (1-2\theta)c. \qquad \text{P[aQ}$$

$$W'(x) = \left\{(1-\theta)\tilde{U}'(x) + \theta\tilde{V}'(x)\right\} + \left\{\theta'(x)[\tilde{V(x)} + 2c - \tilde{U}(x)]\right\}. \qquad \text{P[bQ}$$

x J J

P Q

x. —

Yb— T

T V

$\theta(x)\alpha'(x) + (1-\theta(x))\{x\alpha'(x) + \alpha(x)\}.$ P[cQ

z $s'(x) = \alpha'(x) + \{x\alpha'(x) + \alpha(x)\} \geqslant 0$ $x \leqslant 1,$ $\theta(x)$

x U $x = 1,$

P[cQ T VV $x = 1,$

$x < 1,$ $x > 1$Vu T

T

V

— T U

V

— $x > x^*$

V

— P[bQ Vr T

T x^*

T $x^*,$ T $W'(x)_{|x=x^*} > 0.$ – T

x^{**} x^* 1, 1

$W'(x)_{|x=1} < 0.$

x $x^*,$ VV

V fl

T T

V—

V

$x = 1$ V

r P[bQT $x = 1$

x $x = 1.$ —

x x^* YV —

P ZQ

V T

U T$r,$

$\frac{r}{1+r}$ $r < 1$ 1

y fl PYee] QV —
T
V — T
T
V— T
T T
Vu T

Pt TYeeXQV u
T
V— T
Vu
u Tn ' PZXXZQ
U V
— T
T
V–
T T VV x.
Vr U
P[YQT c

$$\frac{dx^*}{dc} = \frac{2}{\tilde{U}'(x)\,|_{x=x^*} - \tilde{V}'(x)\,|_{x=x^*}}, \qquad \text{P[dQ}$$

$x^* < 1$
$U'(.) > V'(.)$. — T
T V—
T $W^*(c) = W\left(x^*(c)\right)$. u T
Vffi T
$2c$,

$$W^*(c) = \tilde{V}(x^*(c)) + c. \qquad \text{P[eQ}$$

$$
\begin{aligned}
\frac{dW^*}{dc} &= \left.\frac{\partial \tilde{V}}{\partial x}\right|_{x=x^*} \frac{dx^*}{dc} + 1. \qquad \text{P] XQ} \\
&= \frac{2\tilde{V}'(x)_{|x=x^*}}{}
\end{aligned}
$$

4 Family Balancing Considerations

V— Z
T
T Vt T
T
T V u
T
V
r T V x
f
T Vm
Vx u_{GG}, u_{BG}, u_{BB}

$u_{GB} = u_{BG}$.— T $\rho_1 > 0$
T $\rho_2 > \rho_1$
. u $\rho_2 < 2\rho_1$,
V
fi V r T
P
– q m Q V —
V u
o U V – T

T ffiw ffi–T
u

T P

Q $u_{BB} - u_{BG} < u_{BG} - u_{GG}$,

Vx $r \le 1$,

V—

$$V_{GG}(r) = u_{GG} + \rho_2.$$ P] ZQ

r. — f

$$V_{BG}(r) = u_{BG} + r\rho_2 + (1-r)\rho_1.$$ P] [Q

– c $u_{GG} - u_{BG} - 2c > 0$. x r_G

V—

$$r_G = 1 - \frac{u_{BG} - u_{GG} - 2c}{\rho_2 - \rho_1}.$$ P]] Q

— $r > r_G$T

V

o V u

T V_{BG}T P] [QV u

T

V—

$$V_{BB}(r) = u_{BB} + r^2\rho_2 + 2r(1-r)\rho_1.$$ P] aQ

— r_B

T $r \in (0,1)$

$$u_{BB} - u_{BG} - 2c - r(1-r)(\rho_2 - \rho_1) - (1-r)^2\rho_1 = 0.$$ P] bQ

ﬃ P$\rho_2 < 2\rho_1$

$(u_{BB} - u_{BG} < u_{BG} - u_{GG}QTr_G < r_B$.

r T$V_{BB}(r_G) - V_{BG}(r_G) < 2c$ r_G,
V

V
u r_G
T
r_G. — T $r_G \geq 3/5$, r_G.
t T $r_G < 3/5$, r_B.

fi
V—
P Q
P Q V—
U u YeedT
v VPZXXbQV— YWY
T
V
fi U
o V u U
o T Tt VPZXXbQ[Yd] —

V — YecdT
V t T
V – T
T U T
T V t T
T V
r T T

T ZWYZ V
u T V

Yd — T
V r Tq n z n o
z Ph TZXX] Q f — U T o
U YedXT s n T o
T J T T J
V

$$r^* = 1 - \frac{u_B - u_G - 2c}{\rho_1}.$$

$r_G,$

$\rho_2 - \rho_1 < \rho_1$

$u_{BG} - u_{GG} > u_B - u_G,$

$r_G < r^*,$

4.2 Societies without generalized gender bias

bM
V
T
V —
m q
PYUZMQ
V[ZX] p y PZXXcQ
ﬃ–T T V[ZY]

— Yﬁ ﬂ V [

Y	YedX	YeeX
s n	XY[cZ	XY]]
n n s s	XY[Z	XY XcF
p	XWbX	XWb[
s s	XY] Y	XY YZ
n n	XYZ[	XY XY
p	XWXYd	XWXYY

– f ﬃ– Tm q PYeedQV

V —

T $u_{GB} > u_{BB}$ $u_{GB} > u_{GG}$.
$u_{BB} > u_{GG}$,
T VV P
T T T
$u_{BB} < u_{GG}$). x $u_{GB} - u_{GG} > 2c$,
T
T Vz
V –
T
Vﬁ

V

ZX g T n P QV

ZY T T V u T U T V— T V

— U
(14) (15)] WV – $u_{GB} - u_{BB} > 2c$Vu
T

V—

T T V
u T $r < 1$ T
V
– $u_{GB} - u_{BB} < 2c$. u T U
T T
Vz
V–

$$u_{GB} - u_{GG} - (1 - r)[\rho_2 - \rho_1] = 2c. \quad (14)$$

$$u_{GB} - u_{BB} + r(1 - r)[\rho_2 - \rho_1] + (1 - r)^2\rho_1 = 2c. \quad (15)$$

q (14)
T VV $V_{BG} - V_{GG} = 2c$g r^*_G
r V q (15)
T$V_{BG} - V_{BB} = 2c$; r^*_B
r V
$\max\{r^*_G, r^*_B\} \geq 3/5$ (3/5
T Q[22] —
$\max\{r^*_G, r^*_B\}$V — T $r^*_G > r^*_B$,
r^*_G,
T V
fi T $r^*_G < r^*_B$T r^*_B. u T
T
V
fi
V u r^*_G,
V n T
T

22_ T
Vr T
$\max\{r^*_G, r^*_B\} < 3/5$, 3/5.

T V– T r_B^*,
V
u T T V— T

V
V x
$[u_{BG} - u_{GG} - 2c] - 2[\rho_2 - \rho_1] < 0.$ —

T
Vu T T

P Q̧V u T
V—
T $(u_{BB} - u_{BG} - 2c) + (u_{GG} - u_{BG} - 2c) > 0$
T
T V
m T T
V T
V

Proposition 3 $u_{GB} - u_{BB} < 2c < u_{GB} - u_{GG}$
$\max\{r_G^*, r_B^*\} < 1,$

$[u_{BG} - u_{GG} - 2c] - 2[\rho_2 - \rho_1] < 0.$ $(u_{BB} - u_{BG} - 2c) + (u_{GG} - u_{BG} - 2c) > 0,$

5 Conclusions

—
Vu T
T T
V m T

[Y

V V
—
T VV nV—

V— U
o T U T
o V

T V
u P Q
T
V—
V
fi Vfi

V— U
T
Vu U
To u T
V

6 Appendix

Y
TVV $r = 1$. r
$r \leq 1$,

$$W(r) = \frac{1}{1+r}\left[u_B + r(\rho + \mathbf{E}(\varepsilon))\right](r) + \frac{r}{1+r}\left[u_G + \rho + \mathbf{E}(\varepsilon|\varepsilon \geq F^{-1}(1-r))\right] - c\frac{1-r}{1+r}.$$

PaXQ

$r = 1$, T

$$W(1) - W(r) = \frac{1-r}{2(1+r)}\left\{u_G + 2c - u_B + 2\rho + 2\mathbf{E}(\varepsilon) - 2r\mathbf{E}(\varepsilon|\varepsilon \geq F^{-1}(1-r))\right\}.$$

PaYQ

–

$$\mathbf{E}(\varepsilon) - r\mathbf{E}(\varepsilon|\varepsilon \geq F^{-1}(1-r)) = \int_{0}^{e} \varepsilon dF - \int_{F^{-1}(1-r)}^{e} \varepsilon dF \geq 0, \qquad \text{PaZQ}$$

$W(1) - W(r) > 0$ $u_G + 2c - u_B + 2\rho > 0$ $r < 1.$ – T

$W(1) - W(r) > 0$ $r > 1.$

Proof of Proposition [f

u $r_G^* > r_B^*,$ r_G^*

T

T

V– T $r_G^* < r_B^*,$ r_B^* T

V

x T V U

U T V x λ_i

$i, , i \in \{G, B\}.$ x

$\lambda = \lambda_G - \lambda_B$ T λ

r $r = \frac{4-\lambda}{4+\lambda}.$ —

$$W(\lambda, \lambda_B) = \frac{1-\lambda-\lambda_B}{4} V_{GG} + \frac{1-\lambda_B}{4} V_{BB}(r(\lambda)) + \frac{2+\lambda+2\lambda(B)}{4} V_{BG}(r(\lambda)) - \frac{2\lambda(B)+\lambda}{2} c. \qquad \text{Pa[Q}$$

λ

V

$$\frac{\partial W}{\partial \lambda} = \frac{1}{4}[V_{BG} - V_{GG} - 2c] + \frac{1-\lambda_B}{4}\frac{\partial V_{BB}}{\partial \lambda} + \frac{2+\lambda+2\lambda_B}{4}\frac{\partial V_{BG}}{\partial \lambda}. \qquad \text{Pa] Q}$$

– $r_G^*.$ u T

T U

V– V_{BB} V_{BG}

λ $\rho_1 > 0$ $\rho_2 - \rho_1 > 0,$

W λ V

— $r_B^*,$ U

λ $\lambda_G, \hat{W}(\lambda, \lambda_G).$ —

λ

$$\frac{\partial \hat{W}}{\partial \lambda} = \frac{1}{4}[V_{BG} - V_{GG} - 2c] + \frac{1 - \lambda_G + \lambda}{4}\frac{\partial V_{BB}}{\partial \lambda} + \frac{2 - \lambda + 2\lambda_G}{4}\frac{\partial V_{BG}}{\partial \lambda}. \quad \text{PaaQ}$$

t T f $V_{BG} - V_{GG} - 2c = 0$ r_B^*, λ. V $\lambda = 0$ PVV Q Vu $\lambda > 0$, V n T $[u_{BG} - u_{GG} - 2c]$. u T T $2[\rho_2 - \rho_1]$. – P$[u_{BG} - u_{GG} - 2c] - 2[\rho_2 - \rho_1] < 0)$, $\lambda = 0$. Z[

s $\lambda = 0$ T$\lambda_G = \lambda_B$. u $(u_{BB} - u_{BG} - 2c) + (u_{GG} - u_{BG} - 2c) > 0$, T V

References

Y m T–VTZXX[T p fl y q ' u T YYYTZbeU[YXV

Z m TvVT n Vq TYeedTo fl x – f q q ff r – T ddT] aXUcV

[m Tr VT–Vw —VwV' TZXXZT– – m u T ZdTcaeUcdaV

] n Tq VTZXX] To s x y s Tz n o z T fVVV V V V W Weaa[aXdV

Z[m T P T Q V m $\lambda > 0$, $2[\rho_2 - \rho_1]$, T ρ_2, $2[\rho_2 - \rho_1]$. t T $\lambda \to 0$, λ^2, V

a n T ﬂ VT Yec] T ﬁ x p u T
eTYZe[Y[X] V

b n Ts VTYedYT o f t ﬃ
ﬂ V

c n Tﬀ VT n Vs TZXXcTu y s f n To
q p T Z[TZZYU
Z[dV

d n ﬂ Vy VT –Vt T YeeeT p n p f
o o u y – T
a[TYZeUY] dV

e n Tr VT ﬀ V’ TZXXZT— n u f m o
– p ﬀ ’ u T eZT
YXZeUYX] [V

YX n Tq VTYecXT Tq T
x P YedeQV

YY n Ty VT mV– TZXX[T p kT
e[TY[daUY[edV

YZ n Tw VT y Vo TYeecTy o T
YYZTY] YUYbdV

Y[o TmVTYeddTp – ’ n f m ’
’ x T [aTZY] U[aV

Y] p Ts VT q Vy TZXXcT— p – T
V

Ya p Ty VTYedcT– p r o
’ ﬂ T Y[TccUYXXV

Yb q TxVTYeeeT– ﬂ T– ’ y ﬂ T
YXcTYZcaUY[X] V

Yc r T ’ VmVT Ye[XT
ﬁ :ﬁ ﬃ ﬂ V

Yd t T—VTx Vx V TZXXaTo fi o fl Za
T [a[TYYc YUYYcbV

Ye t TmVT YeeXT fi q y ’ y
– T acPZQTZceUZedV

ZX v TflT’ Vw TflVff Tz Vp Tp V— ’ Vy U
TZXXbTx y r – ’ o n u f z U
– YW T [bcTZYYUZYdV

ZY w Tp VT Yed[Ty ffi z T
v YaTbYUb] V

ZZ fi Tq VTZXXaTt n o y T
YY[TYYb[UZYbV

Z[‘ Tz VTZXXdTy fl — o f — q
– U– q – u T T
YZ[V

Z] y Tp VT o Vfl TYee] Tv o v p
— ffi T bYT[ecUJ YaV

Za – TmVTYeeZTy T [X] TadcUaddV

Zb — T’ VT p V TYec[Tz – fl m
ff – ’ fi T YceTeXUeYV

Zc ’ Tff VTYee[T— ’ fl t f m t m p
u ’ u T YXYTbbbUecV

Zd ’ TmVT mV TYedaTq y – U
n T a[TYY[[UYYaXV

Ze TvVT Vo TYeeeTp f m —
q m T YXcTcdbUdXdV