Risk Premia and Capital Market Integration (An Example):

2 Capital Markets: Boston = dominated by textile mills (raw cotton users)
Charleston = dominated by farmers and shippers (raw cotton suppliers)

Assume: A large negative shock to raw cotton supply from India.

$\therefore$ $\downarrow$ global supply raw cotton and $\uparrow$ international price of raw cotton.

$\Rightarrow$ negative shock to Boston K market and positive shock to Charleston K market

Note: This shock implies negative covariance between Charleston and Boston markets.

Assume: Probability of this shock = 25%

Assume: In Charleston Y_{shock} = \$100
$Y_{noshock}$ = \$16

In Boston Y_{shock} = \$4
$Y_{noshock}$ = \$48

$\therefore$ Charleston E(Y) = 0.25 x 100 + 0.75 x 16 = $37

Boston E(Y) = 0.25 x 4 + 0.75 x 48 = $37

Note: In Charleston Var(Y) = (100 – 16) / E(Y) = 2.27

In Boston Var(Y) = (48 – 4) / E(Y) = 1.19

Assume: Investor's U(Y) = $Y^{1/2}$

Note: In both Charleston and Boston $\Rightarrow$ U(E(Y)) = $37^{1/2}$ = 6.08

Assume: Charleston and Boston K markets are unintegrated.

$\therefore$ investor can invest in Charleston OR Boston, but not both (simultaneously).

Investing in Charleston: $E(u(Y)) = 0.25 \times 100^{1/2} + 0.75 \times 16^{1/2} = 5.50$

Risk Premium = $\gamma = E(Y) - X$

Where: $U(X) = E(u(Y))$

$X^{1/2} = 5.50$

$X = 30.25$

$\therefore \gamma = 37 - 30.25 = \$6.75$

Investing in Boston: $E(u(Y)) = 0.25 \times 4^{1/2} + 0.75 \times 48^{1/2} = 5.70$

Risk Premium = $\gamma = E(Y) - X$

Where: $U(X) = E(u(Y))$

$X^{1/2} = 5.70$

$X = 32.49$

$\therefore \gamma = 37 - 32.49 = \$4.51$

Note: We can confirm that investor is risk averse because $u(E(Y)) > E(u(Y))$ in both Boston and Charleston markets.

What have we learned so far?

⇒ Investment projects in Charleston that cost more than \$30.25 will not be funded.

⇒ Investment projects in Boston that cost more than \$32.49 will not be funded.

∴ projects that cost more than \$30.25, but less than \$32.49 will only be funded in Boston.

⇒ This implies more rapid K accumulation in Boston.

Note: Higher variance in outcomes in Charleston ⇒ higher risk premium in Charleston ⇒ fewer investment projects funded.

Assume: Charleston and Boston K markets are fully and costlessly integrated.

∴ investor can split investment between Charleston AND Boston.

Assume: Investors equally split investment between two markets (not efficient investment strategy).

Investing in Joint Market: $Y_{shock} = 0.5 \text{ x } 100 + 0.5 \text{ x } 4 = \$52$

$Y_{noshock} = 0.5 \text{ x } 16 + 0.5 \text{ x } 48 = \$32$

$E(Y) = 0.25 \text{ x } 52 + 0.75 \text{ x } 32 = \$37$

$Var(Y) = (52 - 32) / E(Y) = 0.54$

$E(u(Y)) = 0.25 \text{ x } 52^{1/2} + 0.75 \text{ x } 32^{1/2} = 6.04$ (still < u(E(Y)))

Risk Premium = $\gamma = E(Y) - X$

Where: $U(X) = E(u(Y))$

$X^{1/2} = 6.04$

$X = 36.48$

$\therefore \gamma = 37 - 30.25 = \$0.52$

Now, what have we learned?

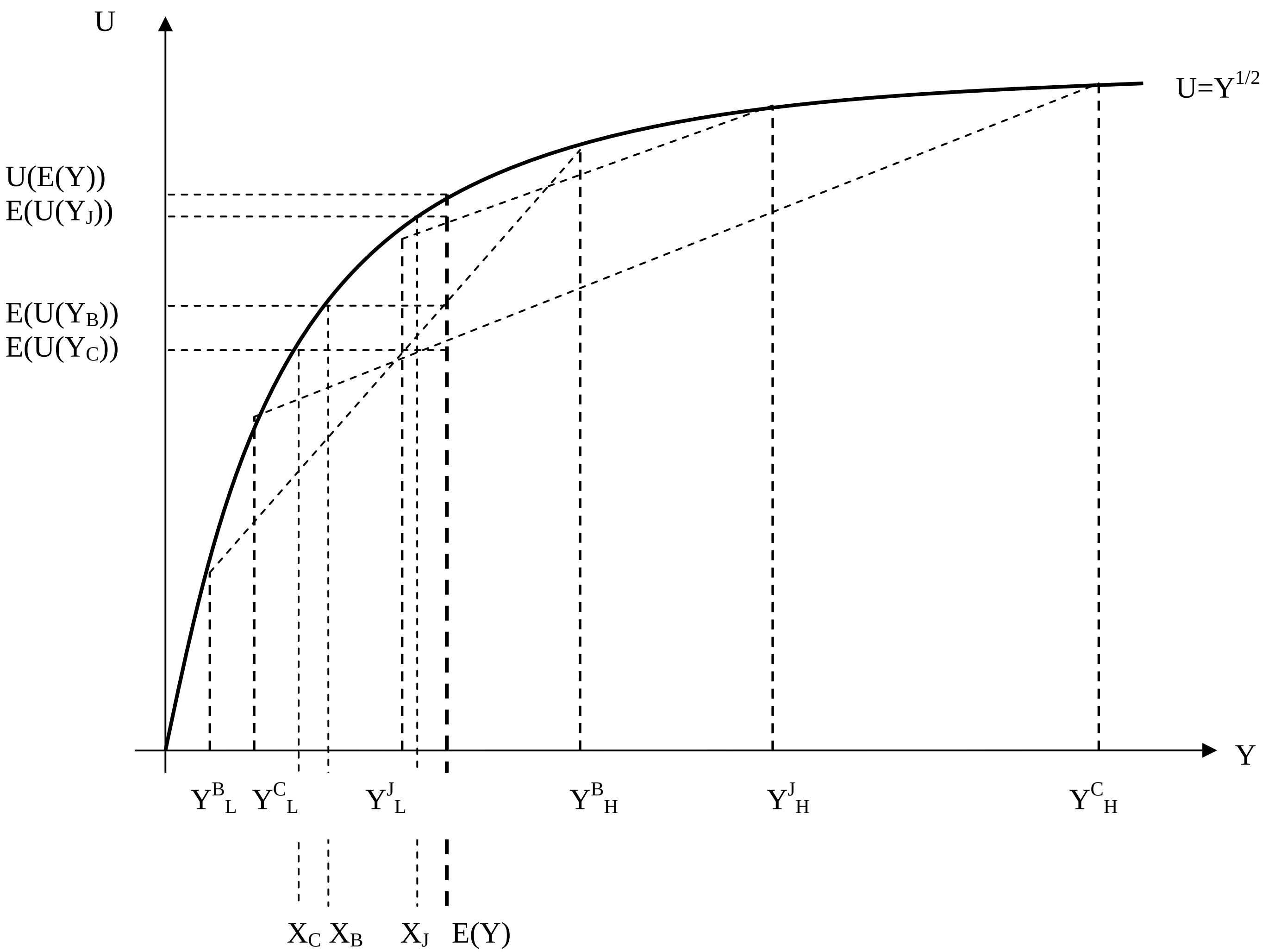
$\Rightarrow$ In an integrated Charleston-Boston market only projects costing more than \$36.48 will not be funded.

$\Rightarrow$ This implies additional projects being funded and more rapid K accumulation in the integrated market.

$\Rightarrow$ If the marginal investment project in each market makes investors just indifferent to investing or not, then we can calculate the maximum costs of integration (ie. moving funds between markets) that will be willingly paid by investors in an integrated market.

Max integration cost = 36.48 – (0.5 x 32.49 + 0.5 x 30.25) = \$5.11

$\therefore$ K market integration $\Rightarrow$ $\downarrow$ variance in outcomes (if markets have negative covariance)
$\downarrow$ risk premia
$\uparrow$ number of investment projects funded
$\uparrow$ K accumulation


U
U=Y^1/2
U(E(Y))
E(U(Y_J))
E(U(Y_B))
E(U(Y_C))
Y
Y^B_L Y^C_L Y^J_L Y^B_H Y^J_H Y^C_H
X_C X_B X_J E(Y)