Figure 34.6: Stock Index Futures: Pricing and Arbitrage

$F^* = S\,(1+r-y)^t$

If $F > F^*$		If $F < F^*$	
Action	**Cashflows**	**Action**	**Cashflows**
1. Sell futures contract	0	1. Buy futures contract	0
2. Borrow spot price of index at riskfree r	S	2. Sell short stocks in the index	S
3. Buy stocks in index	-S	3. Lend money at riskfree rate	-S
1. Collect dividends on stocks	$S((1+y)^t-1)$	1. Collect on loan	$S(1+r)^t$
2. Delivery on futures contract	F	2. Take delivery of futures contract	-F
3. Pay back loan	$-S(1+r)^t$	3. Return borrowed stocks; Pay foregone dividends	$-S((1+y)^t-1)$
	$F-S(1+r-y)^t > 0$		**$S\,(1+r-y)^t - F > 0$**

uts:

eoretical futures price — r= Riskless rate of interest (annualized)

ual futures price — t = Time to expiration on the futures contract

level of index — y = Dividend yield over lifetime of futures contract as % of current index level

umptions

nvestor can lend and borrow at the riskless rate.

are no transactions costs associated with buying or selling short stocks.

ends are known with certainty.

Figure 34.7: Stock Index Futures: Pricing and Arbitrage with modified assumptions

d Assumptions

tor can borrow at r_b ($r_b > r$) and lend at r_a ($r_a < r$).

ansactions cost associated with selling short is t_s (where t_s is the dollar transactions cost) and the transactions cost associated with buying the stoc t_c.

$$F_h^* = (S+t_c)(1+r_b-y)^t$$
$$F_l^* = (S-t_s)(1+r_a-y)^t$$

If $F > F_h^*$ | If $F < F_l^*$

Action	Cashflows	Action	Cashflows
1. Sell futures contract	0	1. Buy futures contract	0
2. Borrow spot price at r_b	$S+t_c$	2. Sell short stocks in the index	$S - t_s$
3. Buy stocks in the index	$-S-t_c$	3. Lend money at r_a	$-(S - t_s)$
1. Collect dividends on stocks	$S((1+y)^t-1)$	1. Collect on loan	$(S-t_s)(1+r_a)^t$
2. Delivery on futures contract	F	2. Take delivery of futures contract	-F
3. Pay back loan	$-(S+t_c)(1+r_b)^t$	3. Return borrowed stocks;	
		Pay foregone dividends	$-S((1+y)^t-1)$
	$F-(S+t_c)(1+r_b-y)^t > 0$		**$(S-t_s)(1+r_a-y)^t - F > 0$**

per limit for arbitrage bound on futures prices F_l = Lower limit for arbitrage bound on futures prices