

### Quiz 1/25/2012 (Annotated Key)



**Quiz:** Assume that you can buy or sell risk-free bonds that mature for any dollar amount either a year from today or two years today. All risk-free bonds pay an annual interest rate of 4%. Assume also that you can buy or sell the following securities at the market prices listed:

		Payoff one year from today if the economy is:		Payoff two years from now if the economy is:	
<u>Security</u>	<u>Market Price</u>	<u>Strong</u>	<u>Weak</u>	<u>Strong</u>	<u>Weak</u>
X	70	100	50	0	0
Z	160	0	0	200	150
ETF	445	150	100	400	300

- What portfolio of securities will generate cash flows identical to those generated by the ETF?
- What is the no-arbitrage price of the ETF?

Note: Feel free to answer parts “c” and “d” with a table:

- What set of transactions today will generate an arbitrage profit today?
- What cash flows (each trade and total) will your transactions produce today, a year from today, and two years from today?

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- Equivalent portfolio: 
    - Buy one share of X
    - Buy 2 shares of Z
    - Buy 1 risk-free bond that matures for \$50 in one year (PV = \$48.08)
  - $70 + 2(160) + 50 / (1.04) = \$438.08$  

		Cash flow one year from today:		Cash flow two years from today:	
<u>Transaction</u>	<u>Cash Flow Today</u>	<u>Strong</u>	<u>Weak</u>	<u>Strong</u>	<u>Weak</u>
Buy X	-\$70.00	+\$100	+\$50	\$0	\$0
Buy 2 Z	-\$320.00	\$0	\$0	+\$400	+\$300
Buy risk-free bond	-48.08	+\$50	+\$50	\$0	\$0
Short-sell ETF	+445.00	-\$150	-\$100	-\$400	-\$300
<b>Total</b>	<b>+\$6.92</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>