

Ameritrade – cost of capital



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Group Case 1: Ameritrade - Cost of Capital Executive Summary: As a deep-discount brokerage, Ameritrade planned to improve its competitive position by price cutting, technology enhancements, and increased advertising in mid-1997. Before initiating the plan, Ameritrade needed know whether the investment returned more than it cost. We were hired to estimate the cost of capital correctly. The key question is to find suitable comparable firms to estimate Ameritrade's asset beta, since it was a recently-listed firm. We thought discount brokerage companies were best due to same revenue resources.

Proper risk-free rate and market risk premium should also be chosen carefully, and we used 30-year bonds YTM and the annual return difference between large company stocks and long term bonds respectively. In the end, we came to the conclusion that Ameritrade's cost of capital is 20.81%, higher than pessimistic and lower than optimistic expected return. Body of the write-up: 1. Factors Ameritrade management should consider when evaluating the proposed advertising program and technology upgrades. The company needed to consider return and risk. That is whether the expected returns on investment were greater than the cost of capital.

If the return on investment is higher than the cost of capital, the advertising program and technology upgrade can bring profits for the company. The investment becomes worthy. Otherwise, the investment will definitely cause loss for the company. What's worse is that the investment can cause bankruptcy of the company. 2. Choose the best estimate of the risk-free rate in calculating the cost of capital. The risk-free rate should equal to long term treasury bond rate, which is the 30 year bonds rate 6.61% (Exhibit 3 Capital

Market Return Data). It is the minimum return an investor expects for any investment.

First, long-term bond experiences a long time. Due to inflation and uncertainty, the bond return should be the most suitable return compared to other debt's return. It also provides future prediction because it really will experience for a long time in the future, reflecting the future market situation. Moreover, Treasury bond can be more reliable and credible than other kinds of bonds. Thus, we use long term bond return to be our risk free rate. 3. Choose the best estimate of market premium in calculating the cost of capital. The market risk premium = expected return on the market - expected risk free rate, which is $12. \% - 5. 5\% = 7. 2\%$. This is very close to the experienced 7%. On the one hand, the longer the time period is, the more accurate market return is. So we use the 1929-1996 long-term bonds return as the expected risk-free. On the other hand, S&P can reflect the market return more comprehensively than the small company stock return. Then we choose it as the expected return on the market. 4. Choose the best comparable firms to determine the beta of Ameritrade's investments. At first we sort out four discount brokerage companies, Charles Schwab Corp(CSC), E*Trade, Quick & Reilly Group(QRG) and Waterhouse Investor Srvcs.

We believe companies with same revenue resources are more likely face the same risks and thus more comparable. However, E*Trade is also newly listed without enough stock price data. Waterhouse Investor Srvcs was acquired by Toronto-Dominion Bank in 1996, thus its current Debt/ Value is N/A. We desire for current data and rule it out. Finally, we choose CSC and QRG as the comparable firms to calculate the asset beta of Ameritrade. 5. Calculate

Ameritrade's cost of capital and asset betas for the comparable firms. (1)

Estimate equity betas of CSC and QRG.

Due to dividend and stock split, CSC and QRG's historical stock price data should be adjusted. We selected 1992 July to 1997 August stock price data of CSC and QRG. Then we use a VB program in Excel to get the adjusted month stock price for the nearest 5 years. After calculating the returns of these months, we perform a regression analysis between the two companies' returns and the market returns. Here we choose VW NYSE, AMEX, and NASDAQ data as market returns, because it's value weighted and more reliable. The results show CSC's equity beta = 2.27, QRG's equity beta = 1.79. (2) Estimate asset betas of CSC and QRG. The formula is: ?

$A = \frac{D}{D+E} \cdot \beta_D + \frac{E}{D+E} \cdot \beta_E$. From Exhibit 4, we find discount brokerage companies less relied on debt. Thus ? D's effect is small and we assume ? $D = 0$. Here we use the current Debt/Value, since market value is more accurate. For CSC: $\frac{D}{D+E} = 0.05$. ? $A = \frac{D}{D+E} \cdot \beta_D + \frac{E}{D+E} \cdot \beta_E = 0.05 \cdot 0 + 0.95 \cdot 2.27 = 2.16$ For QRG: $\frac{D}{D+E} = 0$. ? $A = \frac{D}{D+E} \cdot \beta_D + \frac{E}{D+E} \cdot \beta_E = 0 \cdot 0 + 1 \cdot 1.79 = 1.79$ (3) Estimate Ameritrade's WACC. The average asset beta of CSC and QRG = 1.972. $WACC = R_f + \text{avebetaassets} \cdot \text{market risk premium} = 6.61\% + 1.972 \cdot 7.2\% = 20.81\%$. 6. Conclusion: Our estimated cost of capital, 20.81%, is lower than Ricketts' expected return, 30%-50%, thus the investment is worthy.

However, it's higher than other pessimistic members' expected return, 10%-15%, making the decision more complex and requiring further valuation?

Appendix: Charles Schwab's adjusted stock price and returns| Date| Adjusted

Stock Price| Stock Price| Dividend| Split| Adjusted returns| Rm| 31-Jul-92| 5.
257| 20. 125| -| | | 31-Aug-92| 4. 804| 19. 625| 0. 080| | -0. 086294416| -0.
02076| 30-Sep-92| 3. 843| 20. 125| -| | -0. 2| 0. 01242| 30-Oct-92| 4. 338| 21.
000| -| | 0. 128762542| 0. 0109| 30-Nov-92| 5. 329| 25. 375| 0. 080| | 0.
228395062| 0. 04019| 31-Dec-92| 5. 596| 24. 750| -| | 0. 050251256| 0.
01754| 29-Jan-93| 6. 95| 27. 000| -| | 0. 160560138| 0. 01233| 26-Feb-93| 6.
951| 26. 000| 0. 220| | 0. 070247934| 0. 00545| 31-Mar-93| 7. 837| 27. 125|
-| | 0. 127413127| 0. 02501| 30-Apr-93| 7. 046| 25. 125| -| | -0. 100892244| -
0. 02551| 28-May-93| 7. 584| 26. 125| 0. 100| | 0. 076335878| 0. 02942| 30-
Jun-93| 9. 198| 28. 875| 1. 443| | 0. 212765957| 0. 00513| 30-Jul-93| 9. 375|
30. 750| -| | 0. 019332162| -0. 00076| 31-Aug-93| 10. 628| 35. 000| 0. 100| |
0. 13362069| 0. 03934| 30-Sep-93| 11. 154| 36. 250| -| | 0. 049429658| 0.
00061| 29-Oct-93| 11. 210| 35. 875| -| | 0. 005079826| 0. 01804| 30-Nov-93|
10. 320| 34. 250| 0. 00| | -0. 079422383| -0. 01735| 31-Dec-93| 10. 482| 35.
750| 1. 788| | 0. 015686275| 0. 01945| 31-Jan-94| 9. 572| 35. 375| -| | -0.
086828664| 0. 03133| 28-Feb-94| 8. 923| 28. 375| 0. 270| | -0. 06779661| -0.
02409| 31-Mar-94| 8. 720| 25. 625| -| | -0. 022727273| -0. 04574| 29-Apr-94|
9. 231| 26. 375| -| | 0. 058571162| 0. 00983| 31-May-94| 9. 841| 26. 875| 0.
120| | 0. 066079295| 0. 0095| 30-Jun-94| 8. 051| 25. 375| -| | -0. 181818182|
-0. 02738| 29-Jul-94| 8. 727| 24. 750| -| | 0. 083873582| 0. 03041| 31-Aug-94|
10. 032| 29. 250| 0. 120| | 0. 14953271| 0. 04283| 30-Sep-94| 9. 665| 25.
875| -| | -0. 36585366| -0. 01865| 31-Oct-94| 11. 568| 25. 750| -| | 0.
196920995| 0. 01487| 30-Nov-94| 10. 423| 24. 750| 0. 120| | -0. 098939929|
-0. 03707| 30-Dec-94| 11. 404| 28. 375| -| | 0. 094117647| 0. 01275| 31-Jan-
95| 13. 114| 30. 875| -| | 0. 149920943| 0. 02055| 28-Feb-95| 14. 548| 35.
000| 0. 290| | 0. 109375| 0. 03962| 31-Mar-95| 15. 860| 35. 500| -| | 0.

090140845| 0. 02697| 28-Apr-95| 16. 875| 40. 625| -| | 0. 06399503| 0.
 02488| 31-May-95| 17. 244| 47. 000| -| | 0. 02189781| 0. 03416| 30-Jun-95|
 21. 617| 36. 625| 0. 150| 1. 5| 0. 253571429| 0. 03084| 31-Jul-95| 22. 767|
 38. 500| -| | 0. 05320242| 0. 4067| 31-Aug-95| 23. 014| 37. 375| 0. 100| | 0.
 010840108| 0. 00934| 29-Sep-95| 28. 628| 45. 875| -| | 0. 243967828| 0.
 03639| 31-Oct-95| 22. 613| 23. 750| -| 1. 5| -0. 210117403| -0. 01115| 30-
 Nov-95| 23. 972| 25. 375| 0. 070| | 0. 06010929| 0. 04297| 29-Dec-95| 19.
 894| 20. 500| -| | -0. 170103093| 0. 0154| 31-Jan-96| 24. 887| 23. 250| -| | 0.
 250933532| 0. 02809| 29-Feb-96| 25. 258| 26. 250| 0. 080| | 0. 014925373|
 0. 01605| 29-Mar-96| 25. 630| 29. 500| -| | 0. 014705882| 0. 0112| 30-Apr-
 96| 24. 305| 30. 500| -| | -0. 051674086| 0. 02513| 31-May-96| 24. 057| 33.
 875| 0. 070| | -0. 010204082| 0. 2672| 28-Jun-96| 24. 305| 32. 500| -| | 0.
 010309278| -0. 00766| 31-Jul-96| 23. 982| 28. 375| -| | -0. 013292434| -0.
 05339| 30-Aug-96| 24. 852| 29. 250| 0. 080| | 0. 03626943| 0. 03222| 30-
 Sep-96| 22. 864| 26. 500| -| | -0. 08| 0. 05299| 31-Oct-96| 24. 906| 26. 250| -|
 | 0. 089324619| 0. 01394| 29-Nov-96| 30. 136| 28. 375| 0. 080| | 0. 21| 0.
 06573| 31-Dec-96| 31. 880| 29. 875| -| | 0. 05785124| -0. 01135| 31-Jan-97|
 37. 359| 36. 625| -| | 0. 171875| 0. 05304| 28-Feb-97| 37. 409| 35. 000| 0.
 190| | 0. 001335113| -0. 00088| 31-Mar-97| 31. 922| 20. 875| -| 1. 5| -0.
 146666667| -0. 04439| 30-Apr-97| 36. 36| 22. 125| -| | 0. 14453125| 0.
 04246| 30-May-97| 40. 582| 23. 000| 0. 060| | 0. 110731374| 0. 07125| 30-
 Jun-97| 40. 457| 23. 250| -| | -0. 003076923| 0. 0442| 31-Jul-97| 46. 950| 26.
 250| -| | 0. 160493827| 0. 07631| 29-Aug-97| 42. 750| 34. 250| 0. 060| | -0.
 089456869| -0. 03645| | | | | | Quick & Reilly's adjusted stock price and
 returns| Date| Adjusted Price| Stock Price| Dividend| Split| Adjusted returns|
 Rm| 31-Jul-92| 4. 891| 20. 125| -| | | 31-Aug-92| 4. 788| 19. 625| 0. 080| | -0.

02095| -0. 02076| 30-Sep-92| 4. 910| 20. 125| -| | 0. 025478| 0. 01242| 30-
Oct-92| 5. 124| 21. 00| -| | 0. 043478| 0. 0109| 30-Nov-92| 6. 215| 25. 375| 0.
080| | 0. 212954| 0. 04019| 31-Dec-92| 6. 062| 24. 750| -| | -0. 02463| 0.
01754| 29-Jan-93| 6. 613| 27. 000| -| | 0. 090909| 0. 01233| 26-Feb-93| 6.
420| 26. 000| 0. 220| | -0. 02913| 0. 00545| 31-Mar-93| 6. 698| 27. 125| -| | 0.
043269| 0. 02501| 30-Apr-93| 6. 204| 25. 125| -| | -0. 07373| -0. 02551| 28-
May-93| 6. 477| 26. 125| 0. 100| | 0. 043956| 0. 02942| 30-Jun-93| 7. 577| 28.
875| 1. 443| | 0. 169881| 0. 00513| 30-Jul-93| 8. 069| 30. 750| -| | 0. 064935|
-0. 00076| 31-Aug-93| 9. 215| 35. 000| 0. 100| | 0. 141925| 0. 03934| 30-Sep-
93| 9. 44| 36. 250| -| | 0. 035714| 0. 00061| 29-Oct-93| 9. 445| 35. 875| -| | -
0. 01034| 0. 01804| 30-Nov-93| 9. 042| 34. 250| 0. 100| | -0. 04263| -0.
01735| 31-Dec-93| 9. 958| 35. 750| 1. 788| | 0. 101288| 0. 01945| 31-Jan-94|
9. 854| 35. 375| -| | -0. 01049| 0. 03133| 28-Feb-94| 7. 965| 28. 375| 0. 270| |
-0. 19171| -0. 02409| 31-Mar-94| 7. 193| 25. 625| -| | -0. 09692| -0. 04574|
29-Apr-94| 7. 403| 26. 375| -| | 0. 029268| 0. 00983| 31-May-94| 7. 578| 26.
875| 0. 120| | 0. 023615| 0. 0095| 30-Jun-94| 7. 155| 25. 375| -| | -0. 05581| -
0. 02738| 29-Jul-94| 6. 979| 24. 750| -| | -0. 02463| 0. 03041| 31-Aug-94| 8.
88| 29. 250| 0. 120| | 0. 187576| 0. 04283| 30-Sep-94| 7. 332| 25. 875| -| | -0.
11538| -0. 01865| 31-Oct-94| 7. 296| 25. 750| -| | -0. 00483| 0. 01487| 30-
Nov-94| 7. 046| 24. 750| 0. 120| | -0. 03433| -0. 03707| 30-Dec-94| 8. 078|
28. 375| -| | 0. 146465| 0. 01275| 31-Jan-95| 8. 789| 30. 875| -| | 0. 088106|
0. 02055| 28-Feb-95| 10. 058| 35. 000| 0. 290| | 0. 144352| 0. 03962| 31-
Mar-95| 10. 202| 35. 500| -| | 0. 014286| 0. 02697| 28-Apr-95| 11. 675| 40.
625| -| | 0. 144366| 0. 02488| 31-May-95| 13. 507| 47. 000| -| | 0. 156923| 0.
03416| 30-Jun-95| 15. 838| 36. 625| 0. 150| 1. 5| 0. 172625| 0. 3084| 31-Jul-
95| 16. 649| 38. 500| -| | 0. 051195| 0. 04067| 31-Aug-95| 16. 205| 37. 375|

0.100 | -0.02669 | 0.00934 | 29-Sep-95 | 19.890 | 45.875 | - | | 0.227425 | 0.03639 | 31-Oct-95 | 15.446 | 23.750 | - | 1.5 | -0.22343 | -0.01115 | 30-Nov-95 | 16.551 | 25.375 | 0.070 | | 0.071579 | 0.04297 | 29-Dec-95 | 13.372 | 20.500 | - | | -0.19212 | 0.0154 | 31-Jan-96 | 15.165 | 23.250 | - | | 0.134146 | 0.02809 | 29-Feb-96 | 17.181 | 26.250 | 0.080 | | 0.132931 | 0.01605 | 29-Mar-96 | 19.309 | 29.500 | - | | 0.12381 | 0.0112 | 30-Apr-96 | 19.963 | 30.500 | - | | 0.033898 | 0.02513 | 31-May-96 | 22.223 | 33.875 | 0.070 | | 0.13211 | 0.02672 | 28-Jun-96 | 21.321 | 32.500 | - | | -0.04059 | -0.00766 | 31-Jul-96 | 18.615 | 28.375 | - | | -0.12692 | -0.05339 | 30-Aug-96 | 19.243 | 29.250 | 0.080 | | 0.033752 | 0.03222 | 30-Sep-96 | 17.434 | 26.500 | - | | -0.09402 | 0.05299 | 31-Oct-96 | 17.270 | 26.250 | - | | -0.00943 | 0.01394 | 29-Nov-96 | 18.725 | 28.375 | 0.080 | | 0.084257 | 0.06573 | 31-Dec-96 | 19.714 | 29.875 | - | | 0.052863 | -0.01135 | 31-Jan-97 | 24.169 | 36.625 | - | | 0.225941 | 0.05304 | 28-Feb-97 | 23.217 | 35.000 | 0.190 | | -0.03939 | -0.00088 | 31-Mar-97 | 20.771 | 20.875 | - | 1.5 | -0.10536 | -0.04439 | 30-Apr-97 | 22.015 | 22.25 | - | | 0.05988 | 0.04246 | 30-May-97 | 22.947 | 23.000 | 0.060 | | 0.042375 | 0.07125 | 30-Jun-97 | 23.197 | 23.250 | - | | 0.01087 | 0.0442 | 31-Jul-97 | 26.190 | 26.250 | - | | 0.129032 | 0.07631 | 29-Aug-97 | 34.250 | 34.250 | 0.060 | | 0.307751 | -0.03645 | Charles Schwab and Quick & Reilly's β | | Charles Schwab | Quick & Reilly | $D/D+E$ | 0.05 | 0 | β | d | 0 | 0 | $E/D+E$ | 0.95 | 1 | β | e | 2.272 | 1.786 | β | a (β | $a = D/(D+E) * \beta$ | $d + E/(D+E) * \beta$ | e) | 2.158 | 1.786 | Average β | 1.972 | Ameritrade's WACC | R_f | 6.61% | β | 1.972 | $E(R_m)$ | 5.50% | $E(R_f)$ | 12.70% | $E(R_m - R_f)$ | 7.20% | WACC ($R_a = R_f + \beta * E(R_m - R_f)$) | 20.81% |