Do’s & Don’ts of Cash Flow/Balance Sheet Forecasting

ASA’s 23rd Advanced Business Valuation Conference

San Antonio, TX - October 7, 2004

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Agenda

- Overview of Discounted Cash Flow (DCF) Method and Forecasting
- What to Forecast?
- Individual Statements & Issues
- Terminal Value Issues
Overview – When to Use DCF?

- DCF Method Useful When:
  - Business in industry amenable to forecasting
    - Non-commodity
  - When future cash flows expected to be materially different than recent past
    - Otherwise redundant with capitalization method
  - When history difficult to determine or get
    - Divestiture of subsidiary
    - Turnaround situations
    - Transactions with changed assumptions
Overview - Key DCF “Components”

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**Projections**

- **Income Statement (Interest & Taxes)**
- **Cash Flow Items driven by Balance Sheet Changes**

**Terminal Value & Growth Rates**

<table>
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<th>Year</th>
<th>Projections</th>
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<tr>
<td>2009</td>
<td>421.4 [1]</td>
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<td></td>
<td>481.6</td>
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**Discount Rate**

- **Equity Rate**: 20% (Year end discounting)

**Value & Adjustments**

- **Net Present Value of Equity**: $325.1

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[1] Terminal Value Model: Gordon Growth Model: $CF \times (1 + g) / (ER - g)$
Overview – DCF Projections

- Current Appraisal Practice
  - Some use projected net income/NOPAT only
  - Many make only limited adjustments to NI based on estimates for certain items
  - Full projections used more often today
  - Probability weighted projections

- Sources of Projections
  - Management (at more sophisticated companies)
  - Valuation expert with management input
Overview – Why Full Projections?

- Cash Flows are Key Valuation Measure
  - Ibbotson return data relates to cash flows
  - Cleanest measure of economic income to investors
  - Most appraisers underestimate required investment in businesses over time, particularly in the “terminal value” calculations
  - Affords appraisers ability to explicitly examine assumptions and their impact on cash flow
Agenda

- Overview of Discounted Cash Flow (DCF) Method and Forecasting
- What to Forecast?
- Individual Statements & Issues
- Terminal Value Issues
What to Forecast?

- Type of Analysis Being Done
  - Level of value
  - Paths to value
    - Direct-to-equity
    - Total invested capital
Level of Value

- **Historical Income Statement Adjustments**
  - Minority interest level of value adjustments
    - Normalize for unusual historical items
    - Normalize for *owner-officer* compensation
      - Generates freely-tradable value assuming normal industry compensation
      - Compensation adjustments alone does NOT generate a control level of value
  - All of the above adjustments
  - Streamlining of operations (if appropriate)
  - Synergistic Adjustments (if appropriate)
    - Consolidation savings
    - Lower financing costs
    - Wider or deeper product sales channels, etc.
“Paths” to Value

- Path determines balance sheet items to be forecasted and cash flows to be used
  - Direct-to-Equity - using an equity discount rate and equity cash flows (net of all debt service)
  - Total Invested Capital (“TIC”) - using a “WACC” discount rate and debt-free cash flows (before debt service)
    - Provides enterprise or total invested capital values (debt+equity)
    - Subtract existing debt from TIC to derive equity value
Annual Cash Flows By “Path”

Value of Annual Operating Free Cash Flows

<table>
<thead>
<tr>
<th>TIC or “Enterprise Value”</th>
<th>Equity Value</th>
<th>Debt Value</th>
<th>Operating Free Cash Flows</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td>32</td>
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<td>40</td>
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<td></td>
<td></td>
<td></td>
<td>46</td>
</tr>
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</table>

Total Invested Capital Cash Flows

Cash Flows to Debt Holders (total debt service)

Direct to Equity Cash Flows

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Example: Net Cash Flow to Equity

- Traditionally:
  Net income (after interest exp. & taxes)
  - Plus: deprec., amort., & non-cash charges
  - Less: working capital changes +/-
  - Less: capital expenditures
  - Plus: new debt incurred
  - Less: principal repayments
Example: To Total Invested Capital - TIC

- Net Income
  - Plus: deprec., amort., & non-cash charges
  - Less: working capital changes +/-
  - Less: capital expenditures
  - Plus: interest expense (after tax cost)
  - Note: Can also tax effect EBIT to get “debt-free” NI

- Equals: cash flow to debt & equity holders (or operating cash flows)
Agenda

- Overview of Discounted Cash Flow (DCF) Method and Forecasting
- What to Forecast?
  - Individual Statements & Issues
- Terminal Value Issues
Statement Forecasts - General

- Spread and analyze full historical financials
  - Much better insight into history
  - “Normalize” to establish base for projections

- Do ratio analysis on historical and projected financials
  - Ratios should be consistent or explained if different

- Number of years - Until growth and cash flows normalize
  - Five years typical
  - 10 + years for large projects/utility/telecom type companies
Look to Each Type of Statement

- Projected Income Statements
- Projected Balance Sheets
- Projected Cash Flow Statements
Income Statements – Historical Perspective

- Minority interest level value adjustments
  - Normalize for unusual historical items
  - Normalize for owner-officer compensation

- Controlling interest level adjustments
  - All of the above adjustments
  - Streamlining of operations (if appropriate)
  - Synergistic Adjustments (if appropriate)
    - Consolidation savings
    - Lower financing costs
    - Wider or deeper product sales channels, etc.
Income Statements - Projections

- Revenues to operating income levels
- Interest expense
- Taxes
Beware of the “Hockey Stick” Forecast

Graph showing trends in Sales, Income, and Cash Flow over time.
Projected Operating Income

- Need solid reasons for rapid changes in revenues and operating income

- Reasonableness Check: Consistent with public company levels or own restated history (particularly if start-up situation with high op. inc. projected later...high tech cos.)

- Calculate/check depreciation & amortization separately
  - May have to revise as analysis proceeds

- Know what went into the projections
  - Client projections may intermix key expenses (e.g., int. exp., deprec., owner perks) without breakouts
Sources for Insights into Projections

- Management estimates
- Historical performance of subject company
- Historical performance of public, guideline companies
- 10-K discussions on industry trends from guideline companies
- Analyst (e.g., I/B/E/S) estimates for guideline companies or industry
- Government - industry growth estimates
- Internally generated growth – self funding ability
Income Statements – Interest Expense

- Direct to Equity Path - Interest expense left in as expense
- Total Invested Capital Path
  - Intra year, short term working capital debt (interest related to spikes in borrowings) costs may be left in and viewed as almost an operating expense
  - Interest on permanent short term debt can/should be added back – but the market value of debt should also be subtracted at the end (if an equity value is to be determined)
  - Interest on long-term debt usually added back, and its market value subtracted at the end (again, to determine equity)
- Key is to be consistent to the “Path” selected
Income Statements – Taxes

- Adjust Subchapter-S taxes as appropriate
- Determine tax rate to use
  - Potential hypothetical willing buyer
  - Tax levels for standalone business
- Use marginal tax rate (w/depreciation on tax basis)
- Incorporate existing Net Operating Loss Carryforwards, where appropriate (non-change in control situations)
Income Statements – Common Errors

- “Hockey Stick” projections w/out consideration to history, capital requirements and market realities
  - Revenue Rocket
  - Margin Creep
  - Off the Books Revenue/Income

- Improper add backs for level of value being considered

- Non-operating asset/liability impacts on earnings not eliminated from income or expenses
Look to Each Type of Statement

- Projected Income Statements
- Projected Balance Sheets
- Projected Cash Flow Statements
Balance Sheets – Function in Valuation

- Allows for analyzing and tracking all working capital accounts (including cash)
  - Historically
  - Projected basis
- Validates capital exp. and depreciation ratios going forward
  - Explicit forecast of PP&E
- Tracks other non-current assets/liabilities levels that the company needs to operate
- Tracks debt assumptions if appropriate
Balance Sheets – Forecasting

- Review History
- Establish Assumptions and Ratios
  - Ratios can be used to drive projections
- Focus on:
  - Net Property/Plant/Equip (PPE)/Net Sales
  - Days or turns for major working capital categories
  - Debt and equity financings that may be imbedded in projections (need to account for properly or remove)
  - Intangible Asset Treatment
  - Other ratios as appropriate
Balance Sheets – Forecasting

- Minor misalignments in depreciation and capital expenditures potentially cause major issues
- Issue occurs with most projections

<table>
<thead>
<tr>
<th>SAMPLE COMPANY</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Terminal</th>
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<td>1,440</td>
<td>1,699</td>
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<td>20%</td>
<td>18%</td>
<td>15%</td>
<td>10%</td>
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<tr>
<td>PP&amp;E</td>
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<td>178</td>
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<td>72</td>
<td>86</td>
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Balance Sheets – Forecasting

- Consider building own capital expenditure tax based depreciation “water fall” to test or as part of own projections

Five Year Asset Depreciation Schedule - MACRS 200% DDB

3% Projected Growth in Capex per Year

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<th>NEW CAPEX</th>
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<td>6</td>
<td>1,159</td>
<td>232</td>
<td>371</td>
<td>220</td>
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New Tax Depreciation

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<th>732</th>
<th>869</th>
<th>1,010</th>
<th>1,101</th>
<th>895</th>
<th>539</th>
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Existing Tax Depreciation

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<th>800</th>
<th>600</th>
<th>400</th>
<th>200</th>
<th>100</th>
<th>100</th>
<th>100</th>
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</table>

Total Tax Depreciation

|          | 1,200 | 1,326 | 1,332 | 1,269 | 1,210 | 1,201 | 995   | 639   |
Balance Sheets – Forecasting Issues

Tricky Areas:

- Debt and working capital
  - Short and long-term debt forecasting
  - “Path to value” determines treatment
- Capitalized leases vs operating leases
- Depreciation/Amortization
- Excess Assets/Liabilities
- Cash balances
  - Requirements of business – rest “distributed” for value
- Terminal (or normalized) year cash flows in high growth to lower growth situations
Balance Sheets – Common Errors

- Depreciate PP&E to negative or insupportably low numbers given growth in revenues over projection period
  - Look at **NET PP&E to sales ratio** over time to check
  - Capital expenditures usually understated for depreciation taken

- Ignore smaller but important working capital accounts (both asset and liabilities)

- Overly aggressive changes in required current assets or liabilities
  - Reductions in Accts. Rec. from 60+ days to 30 days or vice versa for Accts. Pay, without adequate reasoning
  - Inventory turns adjusted without consideration to margin impacts

- Ignore long-term net asset investments required

- Ignore deferred taxes if income statements not on tax basis
Look to Each Type of Statement

- Projected Income Statement Topics
- Projected Balance Sheets
- Projected Cash Flow Statements
Cash Flow Statements

- Ties projections together so all are functioning properly

- Easy place to spot anomalies in cash flows and trouble shoot unbalanced balance sheet forecasts/histories
Agenda

- Overview of Discounted Cash Flow (DCF) Method and Forecasting
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- Terminal Value Issues
Terminal Value is Very Important

- 50% to 80% of value typically captured in Terminal Value

- Terminal year projections and adjustments have major impacts on values

- Many appraisers project a “normalized” terminal year (different from the last projection year) to ensure proper cash flow levels
Terminal Value Cash Flows

- Adjustments needed if long-term growth expected to be lower than last year of projections
  - Explicitly project extra year at normalized growth rate
  - Confirm correct relationship between capital expenditures and depreciation
  - Confirm proper treatment of tax amortization benefit or other cash flow benefits that may not be in perpetuity

- Confirm your discount/WACC rate agrees with the cash flows you are forecasting for valuation purposes (consistent “path to value”)
Many use short cut with only NI, Depreciation, Capex, and Working Capital needs in calculation (vs full balance sheet forecast). Consider:

- **Depreciation to capital expenditure ratio**
  - Consistent with long-term growth assumption
    - 3% vs 6% growth rates = very diff. net levels
  - Depreciation – capital exp. ratio calculator

- **Working capital assumptions**
  - Consistent with long-term growth assumption
    - 3% vs 6% growth rates = very diff. net levels
  - Working capital ratio calculator
## Cap. Exp. vs Depreciation vs Growth

- **Capital Exp. vs Depreciation Calculator**
- Based on MACRS depreciation schedule

### Ratio of Capital Expenditures to Depreciation at Equilibrium

<table>
<thead>
<tr>
<th>Five year Assets</th>
<th>Seven year Assets</th>
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<td><strong>Assumed</strong></td>
<td><strong>Assumed</strong></td>
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<tr>
<td>LT Growth</td>
<td>Ratio</td>
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<tr>
<td>3.0%</td>
<td>105%</td>
</tr>
<tr>
<td>4.0%</td>
<td>107%</td>
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<tr>
<td>5.0%</td>
<td>109%</td>
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<tr>
<td>6.0%</td>
<td>111%</td>
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<tr>
<td>7.0%</td>
<td>112%</td>
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<tr>
<td>8.0%</td>
<td>114%</td>
</tr>
<tr>
<td>9.0%</td>
<td>116%</td>
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* Reciprocal = Depreciation as % of Capex

Example: If Depreciation = $100 in terminal year then Capex should = $107, if mostly 5-year assets with 4% growth assumed.
## TERMINAL YEAR WORKING CAPITAL CALCULATOR

**FOR NORMALIZING WORKING CAPITAL TO LONG-TERM GROWTH ASSUMPTIONS**

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<th>($000)</th>
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<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
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<td>$65.0</td>
<td>$70.0</td>
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<td>$7.0</td>
<td>$7.0</td>
<td>$8.0</td>
<td>$9.0</td>
</tr>
<tr>
<td><strong>INVENTORY:</strong></td>
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<td>$11.0</td>
<td>$13.0</td>
<td>$13.5</td>
<td>$15.0</td>
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<tr>
<td><strong>PAYABLES:</strong></td>
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<td>$5.0</td>
<td>$5.0</td>
<td>$6.0</td>
<td>$6.0</td>
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<tr>
<td><strong>OTHER CURRENT A.:</strong></td>
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<td>$0.6</td>
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<td>$4.0</td>
<td>$4.0</td>
<td>$5.0</td>
</tr>
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### DAYS IN SALES OF EACH ITEM

<table>
<thead>
<tr>
<th>Item</th>
<th>Period</th>
<th>Average Days</th>
<th>Analyst's Normalized Values</th>
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<tr>
<td>DAYS REC</td>
<td>(43.8)</td>
<td>(46.5)</td>
<td>(42.6)</td>
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<tr>
<td>DAYS INVENTORY</td>
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<td>(73.0)</td>
<td>(79.1)</td>
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<td>DAYS PAYABLE to SLS</td>
<td>29.2</td>
<td>33.2</td>
<td>30.4</td>
</tr>
<tr>
<td>DAYS OTHER A. to SLS</td>
<td>(0.7)</td>
<td>(1.3)</td>
<td>(2.3)</td>
</tr>
<tr>
<td>DAYS OTHER L. to SLS</td>
<td>21.9</td>
<td>19.9</td>
<td>24.3</td>
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<tr>
<td>WORKING CAP LINE</td>
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### TERMINAL VALUE WKG CAPITAL INV CALCULATIONS

- **TERMINAL VALUE GROWTH ASSUMPTION:** 4.00%
- **NORMALIZED OR BASE YEAR'S SALES VOLUM:** $70.00
- **NEXT YEAR'S SALES VOLUME:** $72.80 [BASE YEAR'S SALES + GROWTH]
- **RESTATED PRIOR YEAR'S SALES BASED ON TERMINAL GROWTH ASSUMPTION:** $70.00
- **NORMALIZED TOTAL WKG CAP INV FOR:**
  - **NEXT YEAR'S SALES:** ($13.26) [FUNCTION OF DAYS OF SALES]
  - **LESS: PRIOR YEAR:** ($12.75)
- **CHANGE IN WKG CAP AT L-T. GROWTH RATE:** ($0.510)
Appendix
Balance Sheets – Forecasting Ratios

- Liquidity Ratios
  - Current Ratio
    - Current Assets/Current Liabilities
  - Quick Ratio
    - Cash & Equivalents + Invests + Accts. Receivables
      - Current Liabilities
Balance Sheets – Forecasting Ratios

- **Activity Ratios**
  - **Days Payables (Payment Policy Measure)**
    - \( \frac{365}{\text{Cost of Goods Sold/Average Accts. Payables}} \)
  - **Days Receivables (Collection Measure)**
    - \( \frac{365}{\text{Sales/Average Accts. Receivables}} \)
  - **Days Inventory (Inventory Age/Costs)**
    - \( \frac{365}{\text{Cost of Goods Sold/Average Inventory}} \)
  - **Working Capital to Sales**
    - \( \frac{(\text{Current Assets-Current Liabilities})}{\text{Sales}} \)
  - **Sales to Net PP&E (PP&E Utilization & Adequacy)**
    - Average Net PP&E/Sales or reciprocal
Balance Sheets – Forecasting Ratios

- **Profitability & Return Ratios**
  - EBITDA to Sales
    - EBITDA = Earnings before Interest, Taxes, Depreciation, & Amortization
  - Operating Profit to Sales
  - Net Income to Sales
  - Return on Equity
    - Net Income/Average Stockholder’s Equity
  - Return on Total Assets
    - EBIT/Average Total Assets
    - EBIT = Earnings before Interest & Taxes
Balance Sheets – Forecasting Ratios

**Leverage Ratios – Direct-to-Equity Path Model**

- Total Interest Bearing Debt to Total Assets
- Equity to Total Book Capital
  - Total Equity/(Long Term Debt + Book Equity)
- Times Interest Earned
  - EBIT/Interest Expense
- Fixed Charges Coverage
  - EBIT + Lease Pmts. /(Interest + Current Debt Due + Lease Pmts. Due)
Do’s & Don’ts of Cash Flow/Balance Sheet Forecasting

23rd Advanced Business Valuation Conference
American Society of Appraisers
San Antonio, TX - October 7, 2004

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