IT'S PITCH BLACK HERE: MY VALE EXPERIMENT'S NOT-SO-HAPPY ENDING!

It is darkest before the sun burns out..

An excursion on the dark side

- In my first post on Vale, in November 2014, I argued that your opportunities to find mispricing are greatest, where it is darkest, i.e., where uncertainty abounds.
- Using that logic, I looked at Vale and Lukoil as companies that were in the midst of a trifecta of uncertainty, with country risk, currency risk and commodity risk all conspiring to drive investors away.
- In my valuation of Vale, I assume that the operating income in the last twelve months (down about 50% from 2013 levels) reflected lower iron ore prices, that the company would settle into a steady state where its earnings would grow with iron ore prices (2% a year) and the company will earn no excess returns.

Valuing Vale in November 2014 (in US dollars)

Let's start with some history & estimate what a normalized year will look like

Commodity risk shows up in ups & downs of operating income. **Currency risk** affects earnings in US $ terms.

Year	Operating Income ($)	Effective tax rate	BV of Debt	BV of Equity	Cash	Invested capital	ROIC
2010	$23,033	18.67%	$23,613	$59,766	$11,040	$72,339	25.90%
2011	$30,206	18.54%	$27,668	$70,076	$9,913	$87,831	28.01%
2012	$13,346	18.96%	$23,116	$78,721	$3,538	$98,299	11.00%
2013	$17,596	15.00%	$30,196	$75,974	$5,818	$100,352	14.90%
2014 (LTM)	$12,475	20.00%	$29,198	$64,393	$5,277	$88,314	11.30%
Average	**$19,331**	**18.23%**					**18.22%**

Corporate governance risk shows up in investment policy (reinvestment & ROC) & financing policy.

Estimate the costs of equity & capital for Vale

Business	Unlevered beta	Proportion of value	D/E ratio	Levered beta
Metals & Mining	0.86	16.65%	66.59%	1.2380
Iron Ore	0.83	76.20%	66.59%	1.1948
Fertilizers	0.99	5.39%	66.59%	1.4251
Logistics	0.75	1.76%	66.59%	1.0796
Vale Operations	**0.84**	**100%**	66.59%	**1.2092**

Reserves in	% of total	ERP
Brazil	68%	8.50%
Rest of the world	32%	6.45%
Vale		7.84%

Riskfree Rate	2.50%
Default Spread for Brazil	2.50%
Default spread for Vale	1.50%
Cost of debt for Vale (pre-tax)	**6.50%**

Country risk shows up in the ERP and the cost of debt

Cost of equity = 2.50% + 1.2092 (7.84%) = 11.98%

Cost of capital = 11.98% (.6003) + 6.50% (1-.34) (.3997) = 8.91%

Assume that the company is in stable growth, growing 2% a year in perpetuity, with the last 12 months as the base year (for both operating income and return on capital)

$$Reinvestment\ Rate = \frac{Expected\ growth\ rate}{Return\ on\ Capital} = \frac{.02}{.1130} = .1770\ or\ 17.70\%$$

$$Value\ of\ Operating\ Assets = \frac{\$12{,}475\ (1-.20)(1-.177)}{(.0891-.02)} = \$121{,}313$$

Value of operating assets	= $121,313
+ Cash & Marketable Securities	= $ 7,873
- Debt	= $ 29,253
Value of equity	= $ 99,933
Value per share	=$ **19.40**
Stock price (11/18/14)	= $ 8.53

The search for investment serenity

- As Vale's stock price continued to drop, and all of the risks that were affecting the company in November 2014 continued to rise, I revisited my valuation of Vale, in a (desperate) search for comfort and serenity.
- That serenity was threatened by the implosion at Petrobras, a company with more resemblance to Vale than I liked, where government intrusion had pushed to the company to the edge of disaster.
- Using the updated earnings for the last twelve months, a drop of another 50% from the November 2014 level, as the base year earnings and keeping the rest of the narrative fixed, the value per share that I obtained was much lower than in November 2014 but still higher than the stock price.

Valuing Vale in April 2015 (in US dollars)

Let's start with some history & estimate what a normalized year will look like

Earning Surprise
Vale's last quarter earnings report came in well below expectations.

Year	*Operating Income ($)*	*Effective tax rate*	*BV of Debt*	*BV of Equity*	*Cash*	*Invested capital*	*ROIC*
2010	$23,033	18.67%	$23,613	$59,766	$11,040	$72,339	25.90%
2011	$30,206	18.54%	$27,668	$70,076	$9,913	$87,831	28.01%
2012	$13,434	18.96%	$23,116	$78,721	$3,538	$98,299	11.08%
2013	$17,596	15.00%	$30,196	$75,974	$5,818	$100,352	14.90%
2014	$8,497	20.00%	$29,198	$64,393	$5,277	$88,314	7.70%
Average	**$18,553**	**18.23%**					**17.52%**

Petrobrased?
Vale could become the government's new focus, now that Petrobras is beyond repair.

Estimate the costs of equity & capital for Vale

Business	*Unlevered beta*	*Proportion of value*	*D/E ratio*	*Levered beta*
Metals & Mining	0.86	16.65%	90.63%	1.3744
Iron Ore	0.83	76.20%	90.63%	1.3264
Fertilizers	0.99	5.39%	90.63%	1.5821
Logistics	0.75	1.76%	90.63%	1.1986
Vale Operations	**0.84**	**100%**	**90.63%**	**1.3424**

Region	*% of total*	*ERP*
Brazil	68%	8.60%
Rest of the world	32%	7.18%
Vale		8.15%

Riskfree Rate	2.00%
Default Spread for Brazil	3.00%
Default spread for Vale	2.00%
Cost of debt for Vale (pre-tax)	7.00%

Brazil's rating & equity markets have held up, but its reputation and currency have suffered. ERP & Default Spreads (country & Vale) have widened.

Cost of equity = 2.00% + 1.3424 (8.15%) = 12.93%
Cost of capital = 12.93% (.5246) + 7.00% (1-.34) (.4754) = 8.98%

Assume that the company is in stable growth, growing 2% a year in perpetuity, with the last 12 months as the base year for operating income and assuming return on capital = cost of capital in perpetuity.

$$\text{Reinvestment Rate} = \frac{\text{Expected growth rate}}{\text{Return on Capital}} = \frac{2\%}{8.98\%} = 22.27\%$$

$$\text{Value of Operating Assets} = \frac{\$8{,}497\ (1.02)\ (1\text{-}.1823)(1\text{-}.2227)}{(.0898 - .02)} = \$77{,}195$$

Value of operating assets	= $ 77,195
+ Cash & Equity in Affliates	= $ 8,121
- Debt & Minority Interests	= $ 30,108
Value of equity	= $ 55,208
Value per share	**=$ 10.71**
Stock price (4/15/15)	= $ 6.19

Reality Checks

- It looks like the dark places that I entered in November 2014 are almost pitch black, as country risk in particular continued to rise unchecked, with the Brazilian Reai hitting lows and the sovereign CDS spread hitting highs.
- China, Vale's biggest market, has gone from being a strength for the company to a potential vulnerability.
- Vale continue to test the bottom for its earnings by reporting trailing 12-month earnings that were about one quarter of the earnings reported in April 2015. While some of the drop can be attributed to delayed reactions to earlier iron ore price drops, the adjusted earnings that I used (60% below the five-year average) is a late acceptance that iron ore prices are not going back to pre-2012 levels. With the rest of the story holding, the value per share is now down to $4.28, now lower than the stock price of $5.05.

Valuing Vale in September 2015 (in US dollars)

Let's start with some history & estimate what a normalized year will look like

Earning Down
Vale's earnings for the last 12 months have collapsed, with revenues & margins down.

Year	*Operating Income ($)*	*Effective tax rate*	*BV of Debt*	*BV of Equity*	*Cash*	*Invested capital*	*ROIC*
2010	$24,531	18.70%	$27,694	$70,773	$9,942	$88,525	22.53%
2011	$29,109	18.90%	$25,151	$78,320	$3,960	$99,511	23.72%
2012	$14,036	18.96%	$32,978	$75,130	$6,330	$101,778	11.18%
2013	$16,185	15.00%	$32,509	$64,682	$5,472	$91,719	15.00%
2014	$6,538	20.00%	$32,469	$56,526	$4,264	$84,731	6.17%
Last 12 months	$2,927	20.00%	$32,884	$49,754	$3,426	$79,211	2.96%
Average	**$15,554**	**18.59%**					**15.72%**

The China Card
The market collapse in China and the slowing economy put at risk Vale's biggest market

Estimate the costs of equity & capital for Vale

Business	*Unlevered beta*	*Proportion of value*	*D/E ratio*	*Levered beta*
Metals & Mining	0.86	16.65%	126.36%	1.5772
Iron Ore	0.83	76.20%	126.36%	1.5222
Fertilizers	0.99	5.39%	126.36%	1.8156
Logistics	0.75	1.76%	126.36%	1.3755
Vale Operations	**0.84**	**100%**	**126.36%**	**1.5405**

Region	*% of total*	*ERP*
Brazil	68%	13.00%
Rest of the world	32%	7.69%
Vale	*100%*	*11.30%*

Riskfree Rate	2.13%
Default Spread for Brazil	4.50%
Default spread for Vale	3.00%
Cost of debt for Vale (pre-tax)	9.63%

Brazil has seen its rating downgraded and the sovereign CDS spread has almost doubled over the last year.

Cost of equity = 2.13% + 1.5405 (11.30%) = 19.54%
Cost of capital = 19.54% (.5582) + 9.63% (1-.34) (.4418) = 12.18%

Assume that the company is in stable growth, growing 2% a year in perpetuity, with the last 12 months as the base year for operating income and assuming return on capital = cost of capital in perpetuity.

$$\text{Reinvestment Rate} = \frac{\text{Expected Growth Rate}}{\text{Return on Capital}} = \frac{2\%}{12.18\%} = 16.42\%$$

$$\text{Value of Operating Assets} = \frac{7{,}232\ (1.02)(1\text{-}.20)(1\text{-}.1642)}{(.1642\text{-}.02)} = \$48{,}451$$

Value of operating assets	= $ 48,451
+ Cash & Equity in Affliates	= $ 7,626
- Debt & Minority Interests	= $ 33,952
Value of equity	= $ 22,125
Value per share	**=$ 4.28**
Stock price (4/15/15)	= $ 5.05

Specific Lessons Learned

1. Normalization is dangerous: While I did not use normalized earnings in any of my valuations, the use of trailing 12-month numbers represented implicit views on the future of iron ore prices that turned out to be incorrect.
2. Political risk is sticky and persistent: Political risks tend to be long-standing and persistent, since the rational solutions to them almost always are not politically acceptable or expedient.
3. Doubling down effect of debt: Debt is a steroid, when companies are growing, but it becomes a sword hanging over the company, when risk kicks in.

Thoughts on losing

- If I had known then (in November 2014) what I know now, I would not have bought Vale, but that is both obvious and completely useless.
- I have no regrets, since I made my best estimates in my earlier valuations. I was wrong, but then again, this is neither the first time nor the last time that I will be wrong.
- I am glad that I followed my own precepts of spreading my bets and not investing money in “dark place” assets that I cannot afford to lose. My portfolio weathered the Vale loss and my family’s life style has not been impacted. More importantly, I have passed the sleep test with Vale.