

UNBUNDLING AND MEASURING TUNNELING IN RUSSIAN OIL AND GAS COMPANIES

Vladimir Atanasov, College of William and Mary
Bernard Black, University of Texas at Austin
Conrad Ciccotello, Georgia State University
Matthew Sass, College of William and Mary

Tunneling

- Insiders extract value from firms (Johnson et al, 2000)
- The existing tunneling literature
 - PG: La Porta, et al, 1998 (mention shareholder expropriation)
 - PG-13: Johnson et al, 2000 (three case studies of tunneling)
 - NC-17: our paper (a graphic manual how to tunnel and how to detect various forms of tunneling)

THE BANK JOB

The Three Types of Tunneling

- Cash flow tunneling
 - Excessive salary
 - Perk consumption, a \$6,000 shower curtain
 - Transfer pricing
- Asset tunneling
 - Asset stripping: sell productive assets to related party
 - Buy overpriced assets from related party
- Equity tunneling
 - Dilution
 - Freezeout
 - Excessive equity compensation
 - Insider trading

The Three Types of Tunneling

- Imagine an apple-tree orchard, jointly owned by two investors C and M
- Cash flow tunneling
 - C steals some apples
- Asset Tunneling
 - C cuts some trees and uses them for building material
- Equity Tunneling
 - C gets M intoxicated and forces him to transfer his ownership to C at zero price



Simple Reduced-Form Model

- Assume zero-growth, no taxes, no debt,
- Discount rate K_0
 - independent of tunneling risk
- “Intrinsic” per-share value, no tunneling:

$$IV_{no-tun} = \frac{ROA_0 * A_0}{K_0}$$

Add Cash-flow Tunneling

- Controller diverts fraction d_{cf} of EBIT
- Share price drops by factor $(1 - d_{cf})$

$$MV_{0,CFtun} = \frac{(1 - d_{cf}) * ROA_0 * A_0}{K_0}$$

- **Transfer pricing:** depresses gross margin (sales-COGS)/sales **and** operating margin (EBIT/sales)
- **Excess executive comp:** depresses only operating margin
- **Both:** affect ROA (EBIT/assets), Tobin's q (MV/assets)
- **Neither:** affects P/E (similar effect on both P and E)

Modeling Asset and Equity Tunneling

- Take a similar approach to modeling default risk
 - Probability of asset/equity tunneling event – equivalent to probability of default
 - Magnitude of loss conditional on event – equivalent to loss given default
- Tunneling probabilities and magnitudes could change across time based on economy, industry, and firm factors

Asset Tunneling

- Expected **future** tunneling:
 - probability = p_a ; fraction of value = d_a
 - lower post-tunneling ROA = factor $(1-d_{syn})$
 - tunneling **out** (asset stripping): lost synergy
 - tunneling **in** (overpayment): higher D&A (→ lower return), inflated assets

$$MV_{0,assetun} = \frac{(1-p_a d_a) * (1-p_a d_{syn}) * ROA_0 * A_0}{K_0}$$

- **Affects:** metrics based on price (P/E, Tobin's q)
- **Doesn't affect:** financial statement metrics

Equity Tunneling

- Expected **future** equity tunneling:
 - probability = p_{eq} ; fraction of value = d_{eq}
 - equity dilution: assume for simplicity firm issues new shares to insiders for zero price

$$MV_{0,eq\ tun} = \frac{(1 - p_{eq} d_{eq}) * ROA_0 * A_0}{K_0}$$

- **Affects:** metrics based on price (P/E, Tobin's q)
- **Doesn't affect:** operating performance metrics

Tunneling and Metrics

	ROA	Margin	PS	PE	P/Book	EV/BOE
Asset Tunneling	No	No	Depends	Depends	Yes	Yes

Tunneling in the Oil and Gas Industry

- Russian oil and gas companies in 1995-2001
 - Anecdotal evidence that all three types of tunneling are going on
 - Equity tunneling – loans-for-shares, dilutive offerings, forced sales of equity blocks to oligarchs
 - Asset tunneling – sale of oil and gas fields to related parties for ridiculously low prices
 - Cash flow tunneling – setting intermediaries that buy oil and gas from producers at low prices and resale to final customers at market prices
 - Some estimate that more than half a trillion dollars were tunneled from Russian oil and gas companies

Tunneling and Financial Analysis

- The analysis of Gazprom by William Browder, Hermitage Capital (McMillan, 2002)
 - Trading as if 99% of assets are stolen
 - Hermitage publishes report arguing that only 10% of assets are stolen and that tunneling is likely to decrease
 - Built-in tunneling probabilities and magnitudes are too high – BUY opportunity
 - Hermitage Capital generated the best 5-year return than any long-only manager in the world in 2003 (Bloomberg)

Changing Environment in Russia Following 2001

- Series of changes in Corporate and Securities laws regulate dilutive offerings and freezeouts
 - Reduced probability and magnitude of equity tunneling
- Some oligarchs improve corporate governance reported performance to boost valuations
- Management of Gazprom cracks down on cash flow tunneling
- Asset tunneling still a significant risk mainly from the Putin government (Yukos)

Data

- Oil and Gas companies from Bloomberg (2000-2007)
 - Valuation and profitability metrics data
 - BOE reserves data
- Augment with Compustat Global
 - Adds a small number of observations (mainly Yukos)
- Final sample
 - 32 companies with >1 Billion BOE reserves
 - 7 Russian, 1 Hungarian and 1 Romanian firms

Measuring the Impact of Tunneling

- Compare the six profitability and valuation multiples of Russian oil companies and their peers
 - Similar results if we add the Hungarian and Romanian firm
- Two sets of peers
 - Anglo-Saxon companies (US, UK, Canada)
 - All non-Russian companies

Profitability Measures

Year	Operating Margin			Return on Capital		
	Russian	Anglo-Saxon	Other	Russian	Anglo-Saxon	Other
2000	35.250 (31.027)	14.812 (13.562)	19.250 (19.276)	26.932 (32.447)	17.543 (18.239)	14.536 (13.150)
2001	25.433 (27.648)	13.345 (11.514)	15.637 (14.785)	15.580 (15.817)	13.407 (12.570)	13.686 (13.622)
2002	19.341 (21.335)	11.972 (8.726)	15.199 (11.364)	9.626 (10.467)	10.224 (11.194)	12.342 (12.514)
2003	22.228 (23.673)	13.416 (10.249)	17.265 (15.360)	15.162 (8.252)	15.915 (15.590)	14.983 (15.584)
2004	25.618 (25.465)	14.166 (11.622)	19.647 (17.556)	14.653 (12.148)	18.750 (17.757)	18.368 (20.184)
2005	24.010 (21.960)	15.731 (11.971)	21.797 (21.084)	20.297 (20.124)	22.506 (22.823)	19.207 (19.340)
2006	22.213 (20.246)	17.867 (15.083)	19.173 (18.246)	18.782 (15.667)	23.992 (22.721)	18.516 (18.677)
2007	21.578 (21.784)	16.420 (13.051)	16.572 (15.606)	28.450 (29.450)	21.693 (21.172)	15.735 (16.100)
Total	24.410*** (23.363)***	14.716 (12.194)	18.055 (17.833)	17.758 (15.989)	18.084 (17.761)	15.995 (16.197)

Price/Flow Measures

Year	Price to Earnings			Price to Sales		
	Russian	Anglo-Saxon	Other	Russian	Anglo-Saxon	Other
2000	2.175 (1.495)	12.100 (11.261)	9.479 (8.416)	0.773 (0.430)	1.264 (0.965)	0.858 (0.967)
2001	7.623 (4.274)	15.518 (14.090)	44.438 (9.212)	1.003 (0.800)	1.334 (1.025)	0.787 (0.745)
2002	12.860 (8.091)	18.468 (16.074)	8.313 (7.498)	1.361 (1.379)	1.188 (0.997)	0.716 (0.671)
2003	10.557 (5.935)	13.498 (12.414)	10.262 (9.341)	1.397 (0.995)	1.159 (1.149)	1.021 (0.809)
2004	6.848 (6.953)	12.287 (12.736)	8.349 (8.268)	1.369 (1.580)	1.203 (1.104)	1.071 (0.806)
2005	8.120 (7.508)	13.047 (10.799)	9.769 (9.488)	1.703 (1.235)	1.347 (0.912)	1.261 (0.999)
2006	12.983 (10.481)	11.648 (11.699)	10.407 (10.231)	1.961 (1.988)	1.370 (0.848)	1.243 (0.960)
2007	12.149 (10.193)	14.320 (12.870)	12.551 (11.235)	2.027 (1.923)	1.579 (0.997)	1.285 (0.975)
Total	9.208* (7.200)***	13.835 (12.593)	14.540 (9.331)	1.433** (1.138)**	1.309 (1.006)	1.034 (0.875)

Price/Stock Measures

Year	Price to Book			EV/BOE Reserves		
	Russian	Anglo-Saxon	Other	Russian	Anglo-Saxon	Other
2000	0.458 (0.417)	2.635 (2.430)	1.526 (1.242)	0.886 (0.658)	9.932 (9.991)	7.027 (7.984)
2001	0.640 (0.795)	2.643 (2.609)	1.419 (1.209)	0.834 (0.831)	11.161 (10.391)	6.838 (7.097)
2002	0.941 (0.734)	2.258 (2.240)	1.315 (1.096)	1.853 (0.965)	9.993 (9.814)	5.616 (4.803)
2003	1.156 (1.091)	2.406 (2.449)	1.712 (1.785)	2.063 (0.859)	12.418 (11.359)	8.277 (6.873)
2004	1.107 (1.167)	2.534 (2.683)	1.917 (1.821)	2.096 (1.056)	17.657 (14.932)	10.86 (11.221)
2005	1.559 (1.422)	2.99 (2.749)	2.216 (2.184)	2.466 (1.914)	20.761 (16.147)	16.383 (16.112)
2006	2.307 (2.192)	2.986 (2.314)	2.306 (2.291)	4.541 (4.898)	22.19 (20.454)	19.715 (19.590)
2007	2.343 (2.561)	3.343 (3.177)	2.457 (2.554)	5.668 (6.172)	31.65 (26.205)	30.993 (26.255)
Total	1.338*** (1.091)***	2.736 (2.543)	1.866 (1.888)	2.491*** (1.305)***	17.271 (14.085)	12.069 (9.844)

Russian Companies vs. Peers

- Better margins
 - Cash flow tunneling is not an issue
- Extremely low PE ratios in early years, now in line with peers
 - Equity tunneling risk has decreased significantly
- Significantly lower EV/BOE ratio
 - Built in risk of asset tunneling
 - Probabilities and magnitudes are large
- The results from the univariate comparisons remain in regressions with year and industry dummies

Conclusion

- Develop a framework to analyze the three types of tunneling risk and their impact on financial metrics
- Use the framework to determine what tunneling risks are priced by investors in Russian oil and gas companies
- Important addition to equity analysis
 - Analyzing industry and company operating performance is not enough, need to evaluate tunneling risk as well
 - Then, can compare independent estimates of tunneling risk to values built in market prices to determine buy/sell recommendations