

SFB 649 Project Proposal

Corporate Speculation with  
Derivatives

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# Why Firms Should Use Derivatives

Reducing risk exposures (hedging) increases shareholder value.

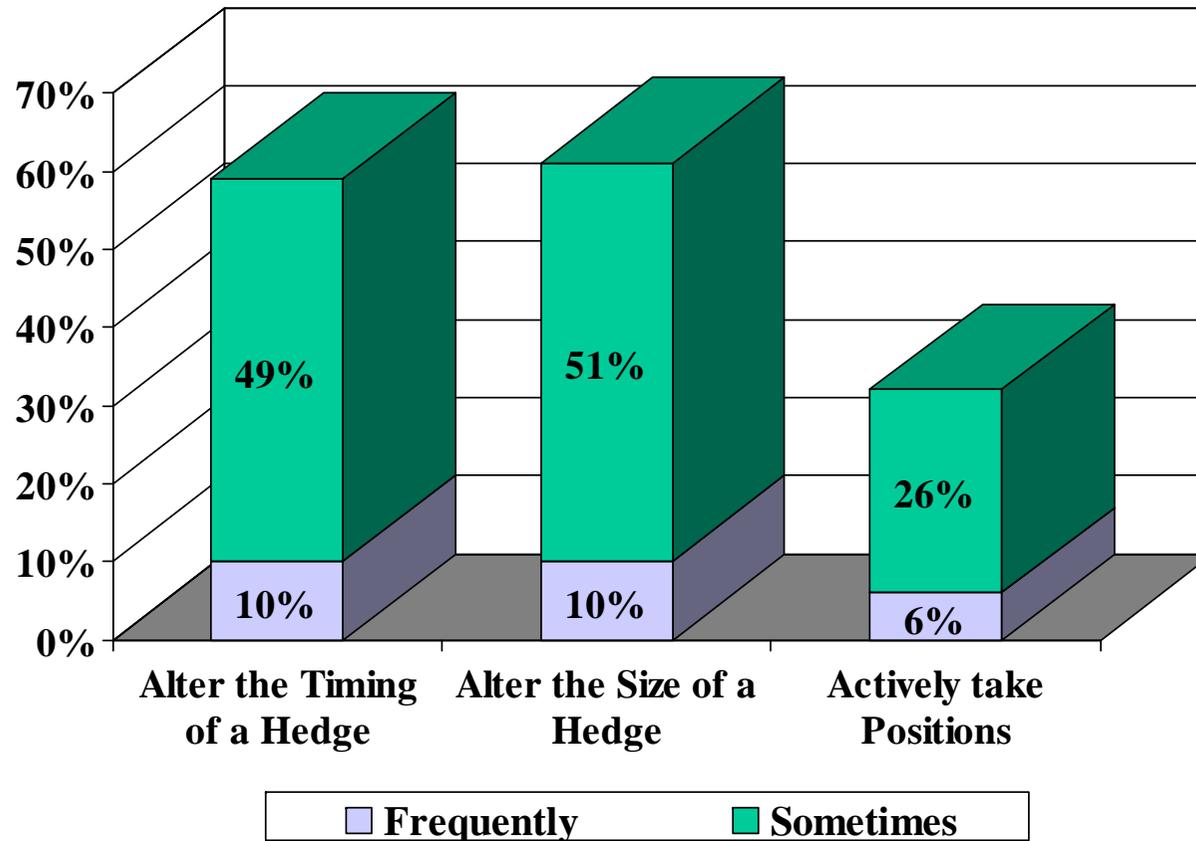
- Taxes
  - Smith and Stulz (1985)
- Financial distress costs
  - Smith and Stulz (1985), Shapiro and Titman (1986)
- Information asymmetries & agency costs
  - Froot, Scharfstein and Stein (1993), DeMarzo and Duffie (1991) ...
- Risk-aversion of stakeholders
  - Stulz (1984), Smith and Stulz (1985)

All theories assume that rational managers act in a rational world.

# Empirical Evidence

- Nance, Smith and Smithson (1993), Mian (1996), Dolde (1993) Geczy, Minton and Schrand (1997), Tufano (1996), Haushalter (2000), Allayannis and Ofek (2001), Brown (2001), Graham and Rogers (2002), Adam and Fernando (2006), Lel (2006), ...
- Most variation in derivatives strategies cannot be explained by the traditional models of hedging.
  - Firm size, size of exposure
  - Working (1962): The traditional risk avoidance notion of hedging is seriously deficient when it comes to explaining hedging behavior in practice
- There is significant anecdotal and survey evidence that firms speculate with derivatives.

## Do firms speculate with derivatives?



Source: 1998 Wharton Survey of Derivatives Usage by U.S. Non-Financial Firms

# Empirical Evidence on Corporate Speculation

- **Dolde (1993):** Over 90% of firms surveyed adjust their hedges according to managers' market views. Glaum (2002) finds similar survey results for German companies.
- **Faulkender (2005):** Issuance of fixed/floating rate debt is correlated with the term structure of interest rates.
- **Geczy, Minton and Schrand (2006):** Probability of actively taking positions is positively correlated with CFO delta and negatively correlated with CEO delta.
- **Beber and Fabbri (2006):** Speculative behavior is correlated with CEO gender, age, tenure, and MBA degree, but not with delta.
- **Adam and Fernando (2006):** Corporate speculation does not yield profits on average.

# Theories of (Rational) Speculation

- Jensen and Meckling (1976): Agency costs of debt – asset substitution
- Stulz (1996): Some firms may acquire private information about the markets they transact in, but only financially strong firms can trade on this information without jeopardizing their core business.
- Executive compensation contracts may reward speculation.
  - Stock options
  - Teilprojekt A6 (Kübler): “Strategisches Risiko in Experimentellen Spielen”

# Behavioral Theories

- Managerial biases: Limited rational managers act in a rational world.
  - *Mental accounting*: Derivatives losses and the opportunity costs of not hedging are often treated differently, which can cause loss aversion. Thaler (1980)
  - *Managerial overconfidence*: Managers may be overconfident in their ability to beat the market, resulting in excessive risk taking. Daniel, Hirshleifer and Subrahmanyam (1998)
- Market imperfections: Fully rational managers act in a partially irrational world.
  - Managers take advantage of (perceived) mispricings.
  - Adam and Fernando (2006) document a risk/forward premium in the gold market.

# Objectives of Research Proposal

- Document the extent of corporate speculation with derivatives.
- Examine what motivates firms to speculate with derivatives.
  - Rational theories of speculation
  - Behavioral theories
- Examine how managers' incentives to speculate could be reduced?
  - Teilprojekt A7 (Gassen): “Accounting Standards and the Cost of Capital”
- Sample: The gold mining industry
  - Similar exposures
  - Gold producers are price takers
  - Liquid market for gold derivatives
  - High quality data

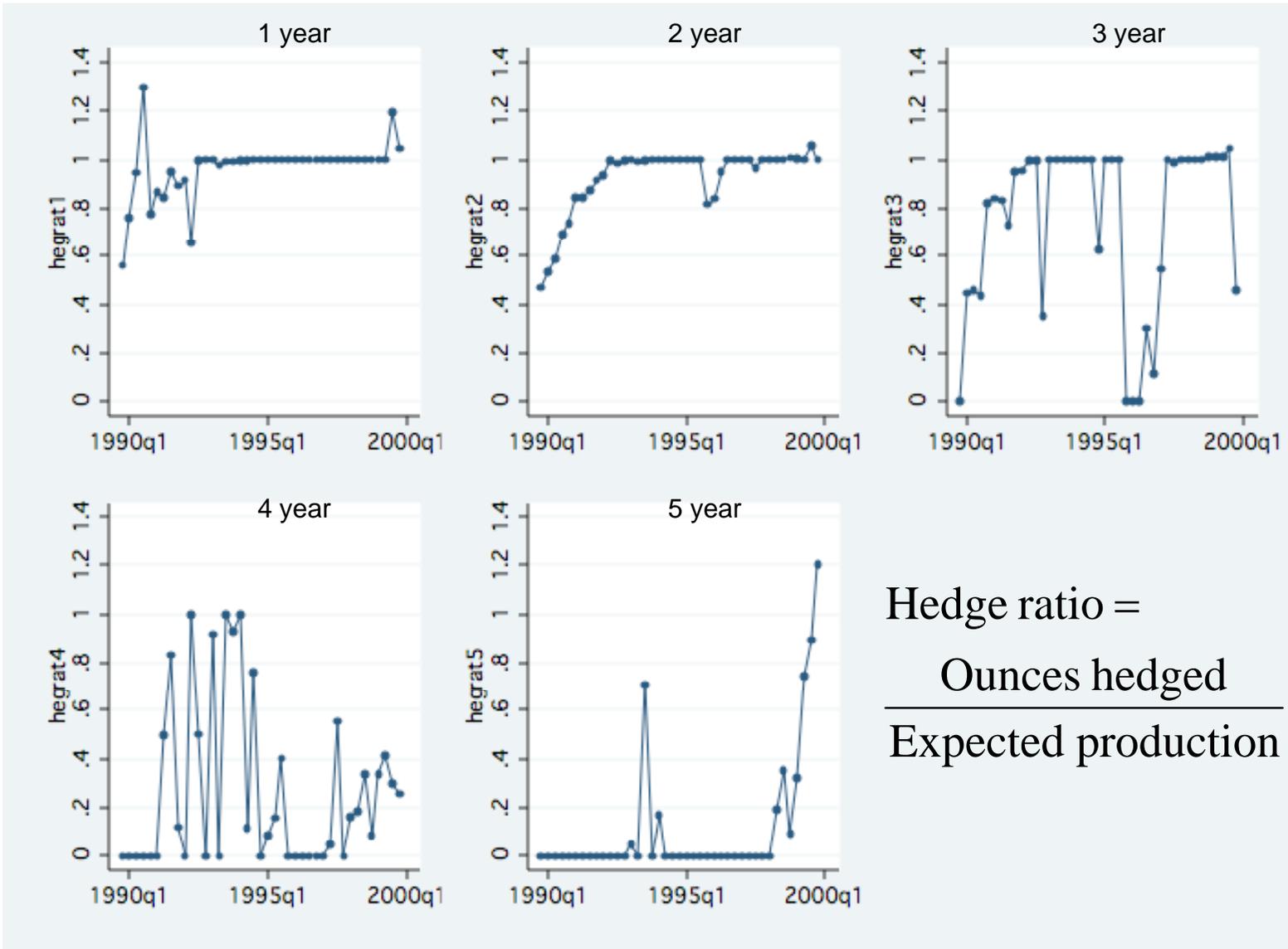
## Derivatives Positions of Placer Dome December 31, 1998

	<u>Contracts Maturing in 1999</u>			<u>Contracts Maturing in 2000</u>		
	Ounces	Price (\$/oz)	Percent of Prod.	Ounces	Price (\$/oz)	Percent of Prod.
Forwards	649,000	503		213,000	504	
SDC	390,000	397		737,000	440	
Puts	298,000	298		127,000	303	
<b>Total</b>	<b>1,337,000</b>		<b>44.0%</b>	<b>1,077,000</b>		<b>37.0%</b>
Calls	521,000	310		115,000	371	

Maturities of derivative contracts: 1 – 5 years

Data frequency: Quarterly, 1989 – 1999 & 2002 – 2007

# Barrick Gold



# Measures of Speculation

- A firm's hedge ratio  $h_i$  at time  $t$  is defined as follows.

$$h_{i,t} = \frac{\text{delta of derivatives portfolio}_{i,t}}{\text{expected gold production}_{i,t}}$$

- Measures of speculation
  - Absolute quarterly change in a firm's hedge ratio

$$spec1_{i,t} = |h_{i,t} - h_{i,t-1}|$$

- Absolute residual of a standard hedge ratio regression

$$spec2_{i,t} = |h_{i,t} - \hat{h}_{i,t}|$$

# Empirical Hypotheses

- Rational theories of speculation
  - Leverage and the probability of financial distress is positively correlated with speculation (asset substitution).
  - Large and financially stable firms speculate more than small and financially unstable firms (Stulz, 1996).
  - Managers who hold more stock options speculate more.
- Managerial biases
  - Managers reduce their hedge positions when the market moves against them (mental accounting).
  - Past derivatives gains are positively correlated with speculation, while past derivatives losses are less or uncorrelated with speculation (managerial overconfidence).
- Market imperfections
  - Hedge positions are positively correlated with managers' perceptions of the risk/forward premium.

# Estimation Difficulties

- Some of the factors that affect corporate derivatives strategies are difficult to measure.
  - Probability of financial distress – financial stability
    - Altman's Z-score
    - Teilprojekt A10 (Schäfer): “Nonparametric Modelling of Bankruptcy Risk at Financial and Non-Financial Corporations”
  - The expected risk/forward premium in the gold market.
    - Rational expectations: future realized forward premium
    - Teilprojekt B1 (Härdle): “Dynamische semiparametrische Modellierung”
  - Stock return volatility (stock option vega)
    - Teilprojekt B1 (Härdle) and Teilprojekt B5 (Spokoiny)
  - Information advantage
    - Proxy variables: Firm size, global player

# Estimation Difficulties

- Causality
  - Managerial compensation versus speculation
  - Financial condition versus speculation
- Potential solutions
  - Find instrumental variables for managerial compensation and a firm's financial condition
  - Event study: Exogenous changes in firms' financial conditions

# Multivariate Analysis

- Regression specification (rational theories)

$$\begin{aligned} spec_{it} = & a_i + b_1 size_{it} + b_2 leverage_{it} + b_3 zscore_{it} + b_4 zscore_{it}^2 \\ & + c_1 CEOdelta_{it} + c_2 CEOvega_{it} + e_{it} \end{aligned}$$

- Regression specification (behavioral theories)

$$spec_{it} = a_i + b_1 cashflow_{it-1} + b_2 cashflow_{it-1} \times posCFdum_{it-1} + e_{it}$$

$$h_{it} = a_i + b_1 gold_{it-1} + b_2 gold_{it-1} \times negdum_{it-1} + e_{it}$$

## Collaboration within the Research Centre

- Teilprojekt A10 (Schäfer): “Nonparametric Modelling of Bankruptcy Risk at Financial and Non-Financial Corporations”
  - Estimation of bankruptcy probabilities
- Teilprojekt B1 (Härdle): “Dynamische semiparametrische Modellierung” and Teilprojekt B5 (Spokoiny): “Strukturadaptive Datenanalyse”
  - Estimation of stock return volatilities &
- Teilprojekt A7 (Gassen): “Accounting Standards and the Cost of Capital”
  - Improving corporate governance
- Teilprojekt A6 (Kübler): “Strategisches Risiko in Experimentellen Spielen”
  - The impact of convexity in managerial compensation