

LEE KUAN YEW

*Distinguished  
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PROGRAMME

PUBLIC LECTURE SERIES

# Prof Richard Zeckhauser

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Kennedy School of Government, Harvard University

## INVESTING IN THE UNKNOWN AND THE UNKNOWABLE



# Investing in The Unknown and the Unknowable

Public Lecture

**Nanyang Technological University**

March 24, 2008

Oriented primarily toward personal as well as corporate investment decisions

- ◆ Know thyself.
- ◆ Infer the knowledge of others.
- ◆ Stay away from investments where others may have superior information.
- ◆ Steer toward investments where there is limited competition.
- ◆ Accept ambiguity where other side is unlikely to be better informed.

# David Ricardo

## Battle of Waterloo

Four days before the battle. He understood “dismal forebodings.”

- Not a military analyst BAD
- No basis to compute the odds BAD



## BUT

- Knew that the competition was thin. GOOD
- The seller was eager. GOOD
- The pounds if he won would be worth much more than the pounds if he lost. VERY GOOD

The financing was 36 million pounds. Ricardo took a substantial share. Malthus bailed out on 5,000 pounds. Ricardo made more than \$50 million by today's standards, and that does not allow for the increased value of the pound.

# Good Investments When Uncertainty Well Beyond That in Traditional Models

- ◆ Global warming, terrorism, pandemic flu
- ◆ Strategies of Vladimir Putin
- ◆ Drawing inferences from behavior when Davis Oil “sort of” asks you into deal.
- ◆ Economics terminology – Prior distributions are diffuse

# Risk, Uncertainty and Ignorance

## Escalating Challenges to Effective Investing

- ◆ Overall goal: Select assets that will do well when future states of the world become known.
- ◆ Probabilities known: RISK. Merely an portfolio optimization problem. CAPM
- ◆ Probabilities unknown: UNCERTAINTY. Big payoff to person who estimates probabilities the best. Warren Buffett's approach.
- ◆ Real world of investing ratchets the level of non-knowledge into still another dimension. Even the IDENTITY and NATURE of POSSIBLE FUTURE STATES are UNKNOWN.
- ◆ The WORLD OF IGNORANCE. One can't sensibly assign probabilities to the unknown states of the world.
- ◆ Risk – Modern finance theory triumphs.
- ◆ Uncertainty – Modern finance theory hits the wall.
- ◆ Ignorance – Unknown and unknowable (UU) – Need new skills. Standard investors steer clear. Greatest profits available.

## Table 1. Escalating Challenges to Effective Investing

	<b>Knowledge of States of the World</b>	<b>Investment Environment</b>	<b>Skills Needed</b>
<b>Risk</b>	Probabilities known	Distributions of returns known	Portfolio optimization.
<b>Uncertainty U</b>	Probabilities unknown	Distributions of returns conjectured	Portfolio optimization. Decision theory.
<b>Ignorance UU</b>	States of the world unknown	Distributions of returns conjectured, often from deductions about other's behavior.  Complementary skills often rewarded along side investment.	Portfolio optimization. Decision theory. Complementary skills (ideal). Strategic inference.



# Dreary and Positive Conclusions

- ◆ **Dreary 1.** Unknown and unknowable situations are widespread. (As unknowable today as 1997 Asian meltdown, 9/11 attacks, NASDAQ soar and swoon at turn of century, subprime crisis?)

Aggregate versus idiosyncratic unknowables. Idiosyncratic: Will Vietnam let me sell my insurance product on a widespread basis? Will my friends' new software product capture significant market share? LAND OF BIG PAYOFF.

- ◆ **Dreary 2.** Most investors, even professionals, trained to deal with world where states and probabilities are known, have little idea of how to deal with the unknowable.

They recognize its presence, but they simply steer clear. (Buffett)

- ◆ **Positive 1.** Unknowable situations have been and will be associated with remarkably powerful investment returns.

Will have losses, and will be blameworthy after the fact. But the net results will be strongly positive.

LEAVE THIS LECTURE IF BLAME AVERSION IS A PRIME CONCERN.



# The Nature of Unknowable Events

Sky Masterson from Guys and Dolls, classic American musical comedy.

ASIDE: Warren Buffett – “Playing bridge is the best training for business.”

- ◆ It requires assessing probabilities in at best marginally knowable situations.
- ◆ Hundreds of decisions in a single session.
- ◆ Continually balancing of gains and losses.
- ◆ Must make peace with own decisions and those of partner.

Many unknowable events arrive in a thunderclap. Once they arrive, do not seem so strange. Dangers of hindsight, and Monday-morning quarterbacking. 9/11

Some take place over time, but still remarkable. January 1996 – January 2001 NASDAQ rose five fold, then fell by two thirds in three years. Contrary to finance theory.

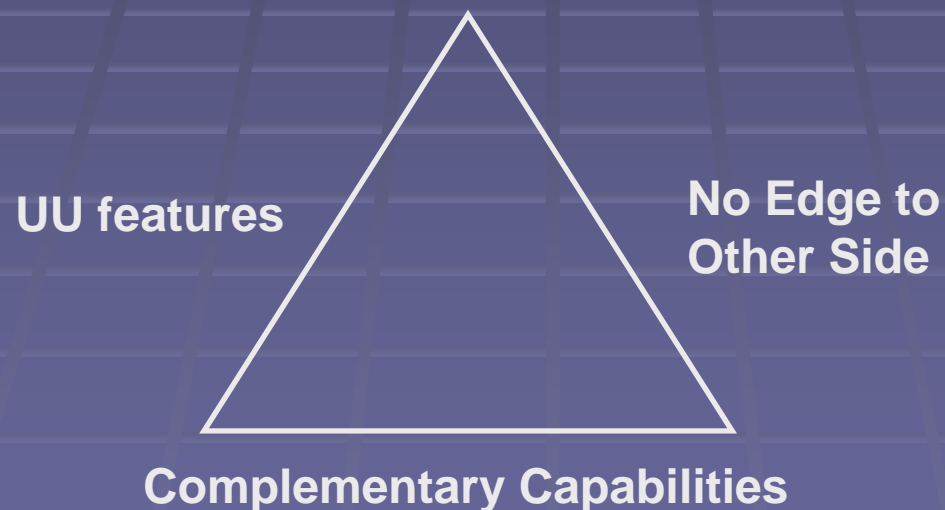
Warren Buffett: “Virtually all surprises are unpleasant.”

Disagree. As of 2004, there were 2.5 million millionaires apart from housing wealth. Most had positive UU events, investments that multiplied their money 10 fold or 100 fold.

Percentage symmetry in returns. As likely to multiply 10 fold as to fall to 1/10 of the value.

# Three-Prong Test for Big Positive Expected Value Bets

1. UU underlying features.
2. Complementary capabilities are required to undertake them. (Hence limited competition.)
3. Unlikely that party on the other side of the transaction is better informed.



Not common, but not rare. Will not scale up like NYSE stock.  
Top-flight investors are always on the lookout. Warren Buffett trolls for them.

# Uniqueness

- ◆ A third U.
- ◆ Thus, unknown, unknowable, and unique  
UUU.
- ◆ Standard players stay away.
- ◆ Drive off speculators. Like to have a history  
(as with corporate takeovers).
- ◆ Drive off people in organizations. Worried  
about blame.
- ◆ Fat tails. 1987 would never happen.  
(Taleb, Fooled by Randomness, The Black Swan)

# Complementary Skills

Few of us have capability to be:

- ◆ Real estate developer
- ◆ Venture capitalist
- ◆ High tech pioneer
- ◆ Direct investor in China

Unusual judgment

- ◆ Bill Miller in October 2004, GOOGLE AT \$140.
- ◆ Buffett – But also gets investments that you and I would not, savvy, reputation, discounted price
- ◆ Successful investors explain their success ... others can't follow. Seem like nice guys.

# Decision Problem

A good friend and former business partner asks you to join the Business Advisory Board of a company named Tengion. Tengion was founded in 2003 to develop and commercialize a medical breakthrough: “developing new human tissues and organs (neo-tissues and neo-organs) that are derived from a patient’s own cells...[this technology] harnesses the body’s ability to regenerate, and it has the potential to allow adults and children with organ failure to have functioning organs built from their own (autologous) tissues.”  
<http://www.tengion.com/>

This is assuredly a UU situation, doubly so for you, since until now you had never heard the term neo-organ. A principal advantage of joining is that you would be able to invest a reasonable sum on the same basis as the firm’s insiders and venture capitalists.

Would you **join and invest**?

September 19, 2005

WORKING INTEREST OWNER: Richard Zeckhauser

Re: Well Proposal  
Davis Petroleum Corp.  
Devlin #1-12  
Section 12-T8N-R19W  
Washita County, Oklahoma

Gentlemen:

Davis Petroleum Corp. ("Davis") proposes the drilling of a 17,000' Sub-Thrusted Springer test at a surface location of 660' FNL and 1980' FWL and a bottom hole location of 1,650' FNL and 990' FWL of Section 12-T8N-R19W, Washita County, Oklahoma. Enclosed for your review is our AFE reflecting estimated dry hole costs of \$6,869,100.00 and estimated completion costs of \$2,745,400.00. As a working interest owner within the referenced unit and per the terms and conditions of that certain Order 450325, Cause CD 200100725-T, dated March 29, 2001, Davis respectfully requests that you elect one of the afforded options as follows:

1. Participate in the drilling and completing of said well by paying your proportionate share of well costs as stipulated by Order 450325;
2. Elect not to participate in the proposed test well, electing to farmout your unit interest delivering to Davis your interest at a proportionate 75% net revenue interest.

Per the terms of Order 450325 you have 15 days upon receipt of this proposal to make your election as outlined above. Failure to respond within the 15 day period will evidence your election not to participate thus relinquishing your interest under paragraph 2. above.

Please indicate the option of your choice by signing below and returning one copy of this letter to my attention. This proposal may be terminated without further notice. Should you have any questions, please contact me at (713) 439-6750 or Bill Jaqua at (405) 329-0779.

Sincerely,  
Davis Petroleum Corp.

Alan Martinkewiz  
Landman

**THE UNDERSIGNED HEREBY ACCEPTS OPTION NO. \_\_\_\_\_, THIS \_\_\_\_\_ DAY OF**  
\_\_\_\_\_, 2005

By: \_\_\_\_\_

Title: \_\_\_\_\_

Company: \_\_\_\_\_

# Sidecar Investments

- Pulled along by a powerful motorcycle  
Confidence in driver's integrity and motorcycle capabilities

- Price lower due to limited competition

- Premier sidecar investment Berkshire Hathaway

Buffett paid \$100,000/year with no options



**Maxim A:** Individuals with complementary skills enjoy great positive excess returns from UU investments. Make a sidecar investment alongside them when given the opportunity.

## Gazprom investment, January 2006

Do you have the courage to apply this maxim? It is January 2006 and you, a Western investor, are deciding whether to invest in Gazprom, the predominantly government-owned Russian natural gas giant in January 2006. Russia is attempting to attract institutional investment from the West; the stock is sold as an ADR, and is soon to be listed on the OTC exchange; the company is fiercely profitable, and it is selling gas at a small fraction of the world price. On the upside, it is generally known that large numbers of the Russian elite are investors, and here and there it is raising its price dramatically. On the downside, Gazprom is being employed as an instrument of Russian government policy, e.g., gas is sold at a highly subsidized price to Belarus, because of its sympathetic government, yet the Ukraine is being threatened with more than a four-fold increase in price, in part because its government is hostile to Moscow. And the company is bloated and terribly managed. Finally, experiences, such as those with Yukos Oil, make it clear that the government is powerful, erratic, and ruthless.

### Summary:

- Fiercely profitable, selling below world price, instrument of government policy, bloated and terribly managed, Russian elite investing

# Behavioral Decision Traps

- Overconfidence – % surprised in Singapore class ???
- The overconfident are the green plants in the elaborate ecosystem of finance, particularly in the UU world.
- Recollection bias –
  - Would I have sold out of NASDAQ stocks in January 2001?
  - Was I scared of terrorism on September 1 of that year?
- Thus subject to recollection bias will be poor UU investors.

# Lottery Choices

## Lottery Choice: Payoffs Versus Probabilities

	Payoff	Probability
A	\$2000	0.01
B	\$1000	0.025

Asteroid chances are calibrated to be 0.03 by median person.

## Lottery Choice: Payoffs Versus Probability or UU Event

	Payoff	Required contingency
C	\$2000	Draw a 17 from an urn with balls numbered 1 to 100
D	\$1000	10,000-ton asteroid passed within 40,000 miles of Earth

# Investing With Someone on the Other Side

- Drawing inferences from the actions of others.
- **Maxim C:** When information asymmetries may lead your counterpart to be concerned about trading with you, identify for her important areas where you have an absolute advantage from trading. You can also identify her absolute advantages, but she is more likely to know those already.

# Competitive Knowledge, Uncertainty and Ignorance

<b>Investing with Uncertainty and Potential Asymmetric Information</b>		
	<b>Easy for Others to Estimate</b>	<b>Hard for Others to Estimate</b>
<b>Easy for You to Estimate</b>	A. Tough markets	B. They're the Sucker
<b>Hard for You to Estimate</b>	C. Sky Masterson's Dad, You're the Sucker	D. Buffett's Reinsurance Sale Calif. Earthquake Auth.

**Maxim D:** In a situation where probabilities may be hard for either side to assess, it may be sufficient to assess your knowledge relative to the party on the other side (perhaps the market).

<b>Investing with Ignorance and Potential Asymmetric Information</b>		
	<b>Known to Others</b>	<b>Unknown to Others</b>
<b>Unknown to You</b>	E. Dangerous Waters Monday Morning Quarterback Risk	F. Low Competition Monday Morning Quarterback Risk

# Auctions as UU Events

- No one knows the rules
- Sale of Recovery Engineering, maker of PUR water purifiers.
- Monday
  - Gillette bid \$27
  - Procter and Gamble bid \$22
- Friday
  - The tale unfolds
- Citigroup purchases 85% of Guangdong Development Bank
  - “won the right to negotiate with the bank to buy the stake”

# A Buffett Tale

- 1996 and California Earthquake Authority. \$1 billion after \$5 billion in losses.
- “...we wrote a policy for the California Earthquake Authority that goes into effect on April 1, 1997, and that exposes us to a loss more than twice that possible under the Florida contract. Again we retained all the risk for our own account. Large as these coverages are, Berkshire's after-tax "worst-case" loss from a true mega-catastrophe is probably no more than \$600 million, which is less than 3% of our book value and 1.5% of our market value. To gain some perspective on this exposure, look at the table on page 2 and note the much greater volatility that security markets have delivered us.”  
[Chairman's letter to the Shareholders of Berkshire Hathaway, 1996, <http://www.ifa.com/Library/Buffer.html>]
- Too Low Deductibles in Insurance



# Singapore Entrepreneurship

- In recent years, Singapore has been making a major push to bolster entrepreneurial activity. Entrepreneurship in the 21st century often demands ventures into the unknown and the unknowable, with regard to both technologies and business relationships. Investors in entrepreneurial ventures take on an additional unknowable, namely the skill and reliability of the entrepreneur.
- Mama's Bank Account, beloved American story of immigrants in early 20<sup>th</sup> century.

# Two Closing Maxims

“Buffett’s prices are as much as 20 times higher than the rates prevalent a year ago, said Kevin Madden, an insurance broker at Aon Corp. in New York. On some policies, premiums equal half of its maximum potential payout, he said. [In a May 7, 2006, interview Buffett said:] ‘We will do more than anybody else if the price is right... We are certainly willing to lose \$6 billion on a single event. I hope we don’t.’ ”  
<http://seekingalpha.com/article/11697>

The **frequency** and **magnitude** of UU events is far greater than our news accounts would suggest.

Learning to invest more wisely in a UU world may be the most promising way to significantly bolster your prosperity.

- **Maxim G:** Discounting for ambiguity is a natural tendency that should be overcome, just as should be overeating.
- **Maxim H:** Do not engage in the heuristic reasoning that just because you do not know the risk, others do. Think carefully, and assess whether they are likely to know more than you. When the odds are extremely favorable, sometimes it pays to gamble on the unknown, even though there is some chance that people on the other side may know more than you.

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