



SUPPLY CHAIN COMPLEXITY

Free Options & Hidden Concavity
in Project Engagement

AEC Business Fragility Risk Transfer

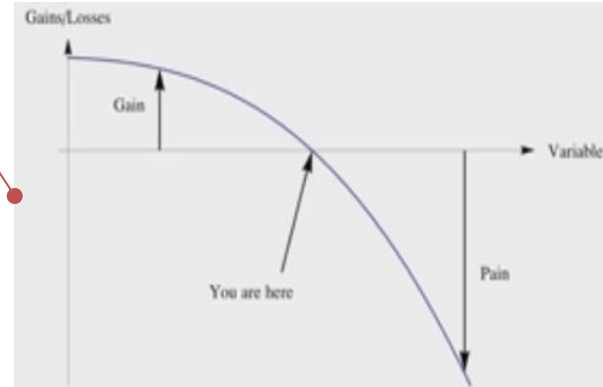
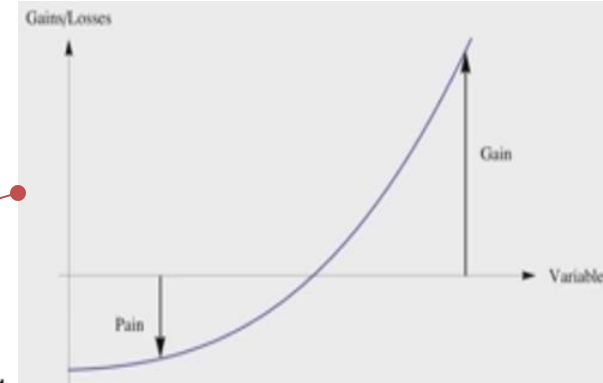
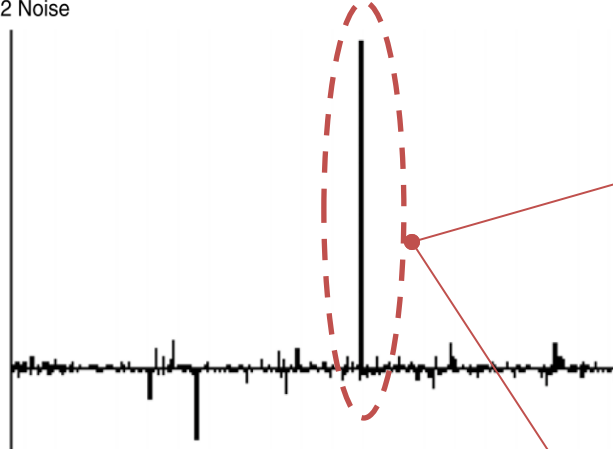
Type-1 (White) Noise in Prediction Markets

random interference in the line : *what Construction Forecasting & Project Financial Risk metrics are based on*

Type-1 Noise



Type-2 Noise



Type-2 Noise in Complex Markets

extreme spikes necessitate more redundancy (for insurance)

dilemma of bundling construction services

transfer of Fragility is a *two-way streak*,

and particularly acute in building bridges, dams, or **tall buildings**

contractual service bundling with fabrication may lead to both Savings and bigger Payoffs for the builder and designer, it will also burden the fabricator with *compounding* hidden risks

fragility and inconsistencies in either partner capability or practice culture directly transfers onto the fabricator, both in production and litigation

engagement payoff with sub-par contractors who offer only short-options compromises the lifetime value of the building

Positioning for Convexity

Investment professionals know the **value of a convex bond** - *why it's good to be convex ?*

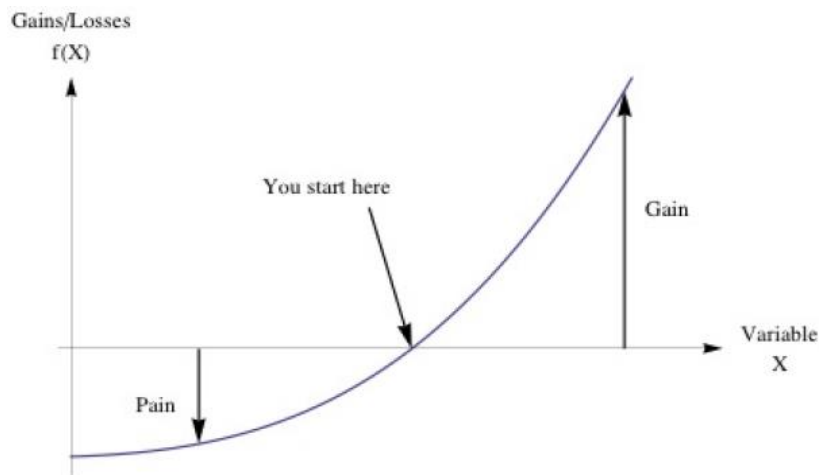
— **it gains more from falling rates than it loses from rising ones.**

that is **antifragile** — **ready to gain from disorder or uncertainty**

since the antifragile activity provides a lifetime of paychecks (even to those who are average)

and the fragile one conveys the opportunity to really excel,

things that are convex benefit from uncertainty, while things that are concave are hurt by it



suppose an environmental shock causes us to have an equal probability of moving left or right along the x-axis if we stand to gain more from a move to the right than we stand to lose from an equal move to the left, we're better off with the shock than without it.

We're Convex.

Positioning business engagement for Convexity : Upside over Downside

if you have more gain,

if the market goes up 10%, and you make **more** money than had the market went down 10%
you are convex & anti-fragile to business volatility
and you have more to gain from market volatility

if the market goes up 10%, and you make **less** money than had the market went down 10%
you are concave & fragile to business cycle shifts with variable volatility
and problems will compound downward in a death spiral

Embedded – Optionality, but *only* for the antifragile

an **Option**

is the weapon of antifragility

is what allows us to exercise rationality *before participating*

Optionality

is the ability to switch modes,

typically **hides inside path dependencies**, where we don't want to find them

exploitation of

Optionality

is making mistakes to identify the asymmetry (option)

and taking the best path in choosing the upper bound

by applying

wisdom (heuristics, or rules of the ancients) over intelligence (data),

where

the path dependency escalates processes naturally

and business systems get locked into a state better than the previous one

thereby enabling

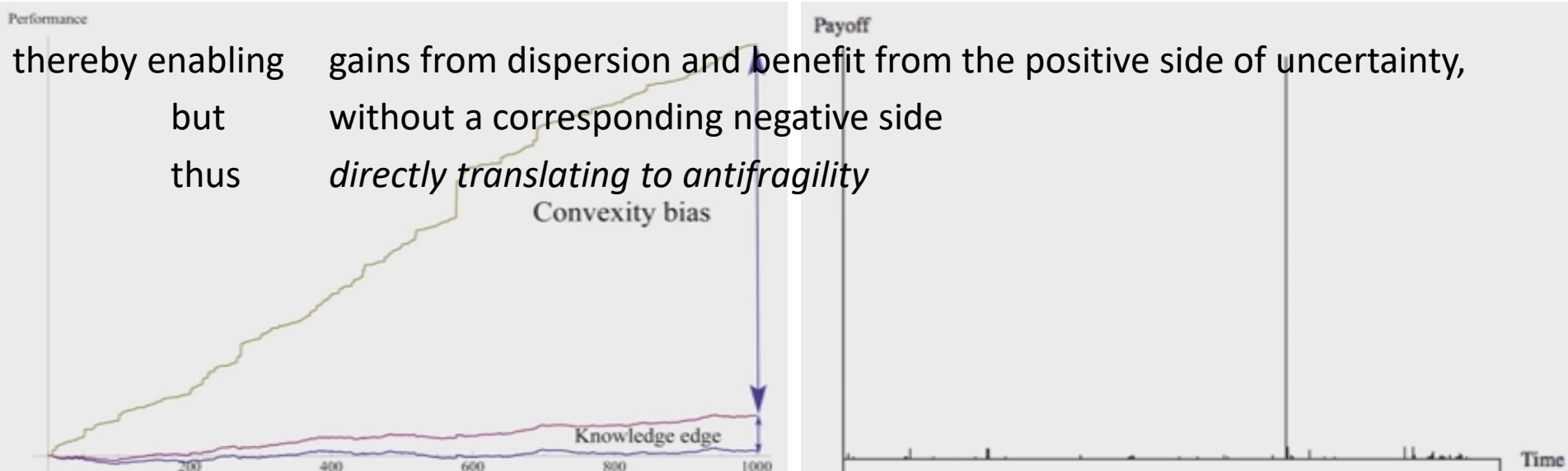
but

thus

gains from dispersion and benefit from the positive side of uncertainty,

without a corresponding negative side

directly translating to antifragility



domesticating Uncertainty

theory is the child of the cure, not the other way around

It is crucial that

all construction options are considered on a **level playing field**
to ensure **assets** are built in the most efficient way.

in a **socio-economically least developing economy**,

it's more important to be in *IN* something, than to miss it

the **payoff is so large** that we can't afford **not to be in EVERYTHING**

only way to **domesticate uncertainty** without knowing the future
is by **growing adept at managing Optionality**

in a **hierarchical** , **human-managed volatile business environment**,

Options follow a power-like statistical distribution

with big **near unlimited upside**

and **limited downside** because of the **abundance of liquidity** (optionality)

in a **centralized operating model with a poor-track record**,

embedding Optionality as our practice's **instrumental mechanism**

looks at the future without any meaningful dependence on a story

requires little understanding, just **broad rationality**

in considering the two outcomes and exercising the better option

antifragile by principle

to manage business fragility

as a technologist, I seek to **build reliable systems from unreliable components**

as a team of engineers, we
should do our best
to address
and do our best
to prevent errors

desire predictability in our business systems,
to prevent, detect and fix errors to combat existing fragility
fault prevention, fault tolerance, fault removal, fault forecasting
to create dependable, fault-tolerant systems
by following **educated practices**

detect fabrication tolerances by extensively testing them and comparing the final cut against the design specs
customize and place markings only after our pre-assembly fit-check
fix defects reported by Erection-QA inspection and ship the fixes over the next scheduled shipment

an **antifragile framework** that continuously improves when exposed to faults exercises
fault self-injection in production
embedded **adaptive fault tolerance**
dependable runtime bug-fixing capabilities

there is probably a **mirror trade-off between**
the **short term business losses** due to **injected faults**
and the **long term business gains** resulting from having **more dependable systems**
beyond the vision, in reality, there is probably

thus a **dependability balance** (between) results from using **fault injection**
dependability losses (due to **injected system failures**)
dependability gains (due to **process improvements**)

embedding antifragility by Target Value Engineering

robust and resilient is neither harmed or helped by volatility and disorder
and limit the risk maxima of fragile subsystems to 30-bases points,
however, in the event of a volatility shift sensitive to **errors** that inherently contain some intrinsic value
you are disproportionately affected if you are fragile

so a system is **antifragile** if it thrives and improves when facing errors.

the immune system, is antifragile as it requires constant pressure from microbes to stay reactive

from a Construction Project management perspective,

these are lumps of concentrated randomness and (hidden) errors that aggregate unnoticed

and result in un-predictable and undetectable Fat Tails or remote events with devastating impact

from a **Value engineering** perspective,

if one can do better than just resisting to errors with robust business relationships

one could extract the latent value of communication errors

turning the *fragile* which has no options

to the *antifragile* which has the options to pick the best for itself by exercising rationality

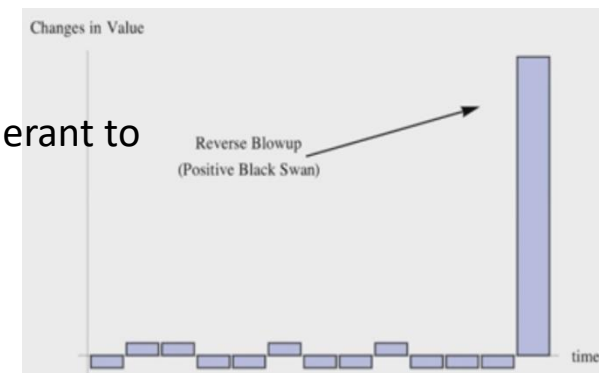
This is the goal of **embedding anti-fragility in business processes**

to implement a wide acceptance of **error** in our processes that are tolerant to

volatility for financial systems

attacks and shocks for immune systems

death and dishonesty for human systems



antifragile by engagement design

a business conduct perspective

Project Lifecycle Management

need **appropriate Project Lifecycle Management (PLM) framework** (for **leveraging complementarity**):

a **leadership based structure** which

minimizes the need for technical expertise and experience,

but **uses logic and minimized decision making**

aligns the transfer of risk, efficiency, measurement, delegation, outsourcing,
supply chain thinking, accountability, and risk minimization

motivates a trained workforce who participates in **continuous improvement**

Off-site Modular Construction Optionality

availability of digital information will also enable more effective design for manufacture and assembly.

this will make **offsite construction solutions**,

which are often **precluded by current procurement practices**, more readily applicable in the future.

as **demand** for low carbon and **sustainable construction** continues to increase,

the potential of **offsite construction to deliver assets with half the waste** and 25% less energy in use
will make it an ever more attractive **option**.

other **benefits of offsite construction** can include

greater precision and quality,

reduced overall manufacture/assembly time,

and **safer and cleaner working conditions**.

Curbing Fragility in path-dependence Strategies

a Bottom-up Approach

5-year Scenario analysis (+ *planned resources* mapping)

Construct multiple scenarios for market movements and defaults

rank using **wisdom criteria** (*likelihood, l.o.e., preferences, etc*)

identify **path dependencies** and required additional resources

measure comparative fragility and identify Options

navigate the Triad to map Exposers

look for Optionality, but disregard those with limited payoffs

rank things according to **Optionality with open-ended payoffs**

make sure we are Bar-Belled

request quotations for **top two preferred scenarios**

review **cost-benefit analysis** for

averting path dependencies and **investing in overall antifragility**

investing in **optionality**

Exercising convex functions of randomness

Economic theory of **ADDITIONALITY**

is the idea of doing more than designing something with a new purpose, but also nurturing the idea until it is commercially viable

In business relations, this is interpreted as **Complementarity**
which has a super-additive function with explosive benefits

that $1+1 > 2$

$1+1+1 \gg 3$

by practicing trial with small errors in collaboration

letting ideas copulate with pure non linearity

spreading attempts in as large amounts of trials as possible

Hence if we can **identify our desirable options**,

we can invest our commitment in all of them in *equal* amounts
small amounts per trial, lots of trials, broader than we want

Should produce options that behave extremely well under volatility
and offer huge Payoffs in times we will need it the most

funding construction Risk-Optioneering

the 1-over-n style & B + C

Working Form of Spending

Spending should be given to people, not project,

and spread in small amounts across many research areas by investing in people, not the ideas

aggressive tinkerers who you trust will milk the option

Bet on the jockey, not the horse

because innovation drifts and one needs *phleneur-like* abilities to catch the opportunities that arrive

Blind funding

the business plans should act as a back-up, of a confirmatory nature

spreading attempts in as large amounts of trials as possible

if you have n options, invest in all in equal but small amounts per trial, lots of trials, broader than you want

where Payoffs will be linear to the number of trials since the winner will have an explosive payoff uncapped

Bricolage

convex functions of randomness practicing trial with small error

simpler is better & **negative rules are subtraction measures by omission**

produces options that behave extremely well under volatility

Collaboration

letting ideas copulate with pure non linearity has a super-additive function with explosive benefits

that $1+1 > 2$

$1+1+1 >>> 3$

AEC Alliance Strategy

M1 Investing in a prerequisite core capa
M2; M3

as the decision makers,
we desire the upsides with zero downsides to ourselves
we want to focus on the payoffs and consequences of the actions
need to Push Priority level to reap maximum Benefits

aspect	Builder	Designer	Fabricator	comments
vision	<i>*b</i>	<i>*d</i>	<i>*f</i>	
top Strategy	B1	D1	<i>Let's Make Lemonade</i>	Convertible Long Option
broad mission	B2	M2 <i>aligned</i>	<i>Prospects</i>	Transfer of Fragility inevitable
Partnership objective	M1 <i>aligned</i>	<i>Complementary coefficient</i>	<i>Funding</i>	Risk of Liquidity Trap
options	HIDDEN	NONE	CONCAVITY	Doomed to fail

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