THE BENEFICIAL ROLE OF RANDOMNESS

Andrea Rapisarda, Alessio Emanuele Biondo and Alessandro Pluchino
University of Catania

in Management, Politics, Financial Markets and in Our Everyday Life

THE BENEFICIAL ROLE OF RANDOMNESS

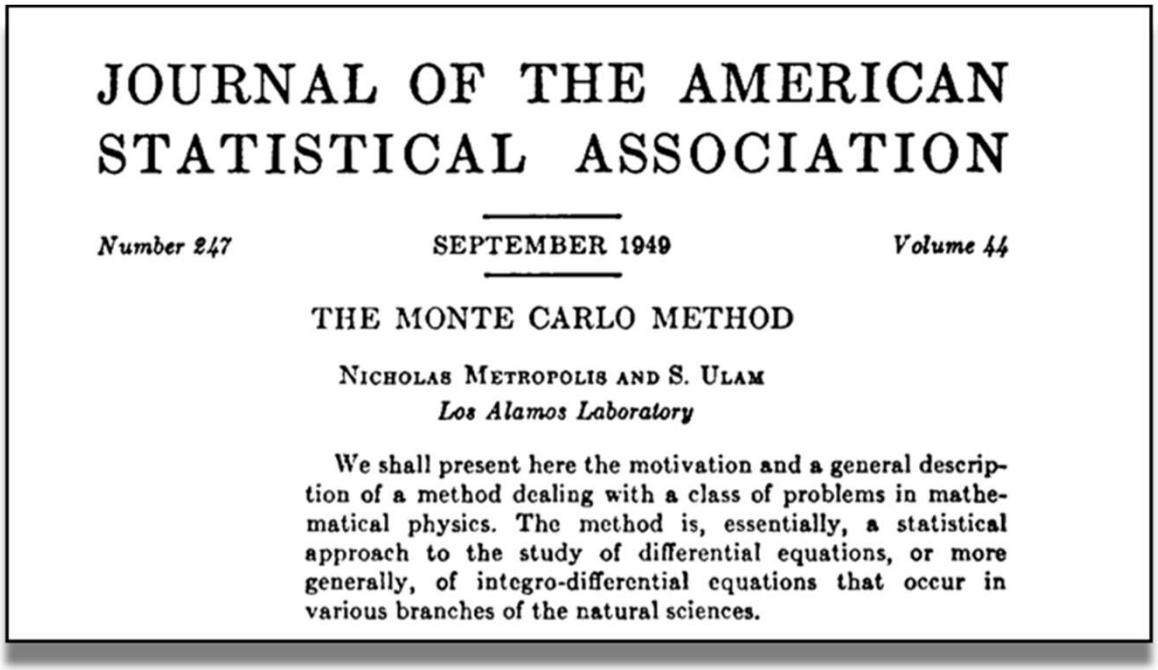
Andrea Rapisarda

in Management and Politics

UNIVERSITÀ degli STUDI di CATANIA

RANDOM NUMBERS IN PHYSICS AND MATH ARE COMMONLY USED WITH SUCCESS

THE EUROPEAN LOTTERIES



JOURNAL OF THE AMERICAN STATISTICAL ASSOCIATION

Number 247 SEPTEMBER 1949 *Volume 44*

THE MONTE CARLO METHOD

NICHOLAS METROPOLIS AND S. ULAM
Los Alamos Laboratory

We shall present here the motivation and a general description of a method dealing with a class of problems in mathematical physics. The method is, essentially, a statistical approach to the study of differential equations, or more generally, of integro-differential equations that occur in various branches of the natural sciences.

The so called *"Monte Carlo" method* was invented by Ulam and Metropolis to solve complicated integrals in Los Alamos during the II World War

But can we use it also outside Physics and Math?

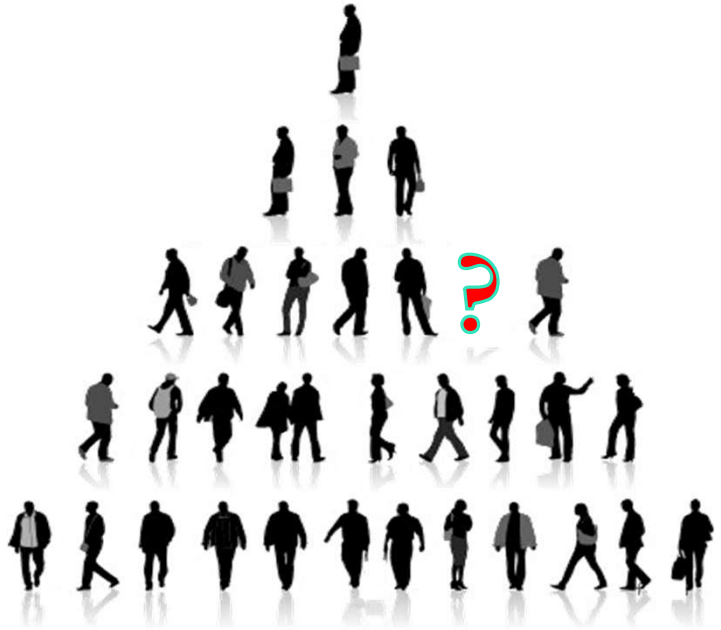
IN EVERYDAY LIFE…

We often use noise or randomness without realizing it… for example when a key is not properly working!

But there are other useful applications …

"WHO SHOULD YOU PROMOTE TO INCREASE THE EFFICIENCY OF YOUR ORGANIZATION?"

THE EUROPEAN LOTTERIES



Common sense answer: within the reasonable **assumption** that a member who is competent at a given level will be competent also at an higher level of the hierarchy, it seems a good deal to **promote the best member** from the lower level…

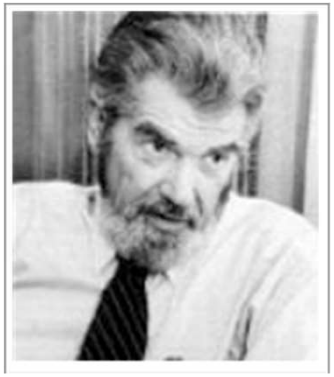
But is such an assumption always valid?

would you ever "promote" the **best goalkeeper** of your football team...

…to the vacant role of your missing **forward player**?

THE EUROPEAN LOTTERIES

THE PETER HYPOTHESIS



In the late sixties **Laurence J. Peter**, a Canadian psychologist, **put into question** the **meritocratic** common sense assumption by observing that **a new position in a given organization usually requires different work skills** for effectively performing the new task (often completely different from the previous one).

Therefore, the **Peter hypothesis** was that the competence of a promoted member at the new level could be **uncorrelated** to that at the previous one…

THE PETER PRINCIPLE

On the basis of his hypothesis Lawrence Peter advanced the following **apparently paradoxical principle**:

> **"Every new member in a hierarchical organization climbs the hierarchy until he reaches his *level of maximum incompetence*"**
>
> L. J. Peter and R. Hull, "**The Peter Principle: Why Things Always Go Wrong**", William Morrow and Company, New York (1969).

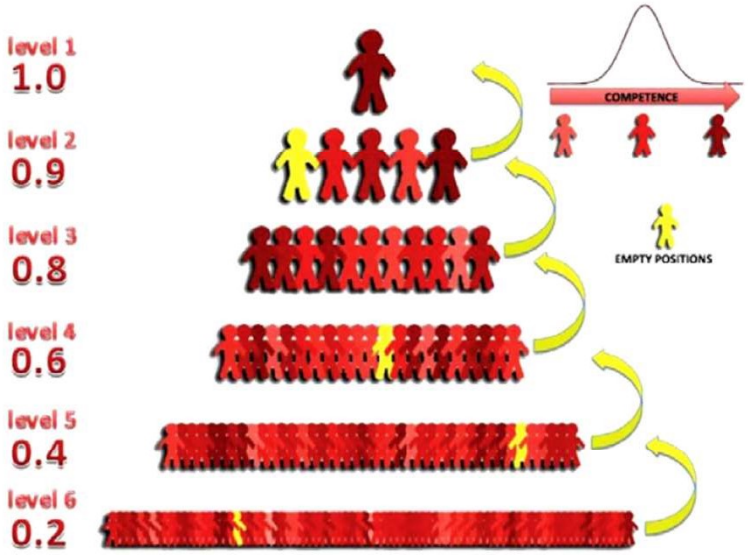
According to the **Peter hypothesis**, **each member of a hierarchy, sooner or later, will be promoted to a position at which he will be no longer competent** and there he will remain, being unable to be further promoted!

Peter's Corollary states that incompetence spreads over the organization since "***in time, every position tends to be occupied by an employee who is incompetent to carry out his duties***" and adds that "***work is accomplished by those employees who have not yet reached their level of incompetence…***"

OUR PROPOSAL: A MATHEMATICAL MODEL OF HIERARCHICAL ORGANIZATION

THE EUROPEAN LOTTERIES

In 2009, in order to verify the validity of the Peter Principle, we developed a **mathematical model of a prototypical hierarchical organization** and we evaluated its efficiency with the aid of agent-based computer simulations …

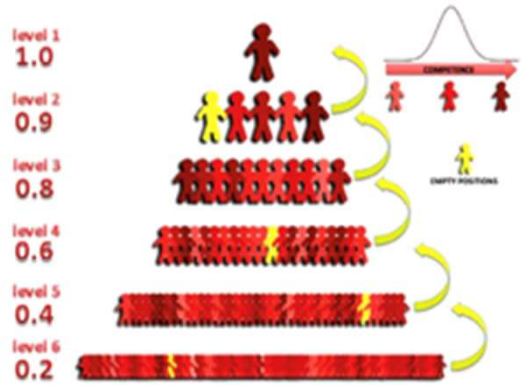


A.Pluchino, A.Rapisarda, C.Garofalo, "The Peter Principle Revisited: a Computational Study", Physica A 389 (2010) 467

GLOBAL EFFICIENCY

One can define the global efficiency of the system by adopting the following formula

$$E(\%) = \frac{\sum_{i=1}^{6} C_i r_i}{E_{max}} \cdot 100$$



with

$$r_i \text{ with } i = 1, 2, \ldots, 6$$

is the level dependent factor of responsibility

with

$$C_i \text{ with } i = 1, 2, \ldots, 6$$

total competence of the level i

$$E_{max}$$

maximal value of the efficiency obtained considering the maximal competence for all agents

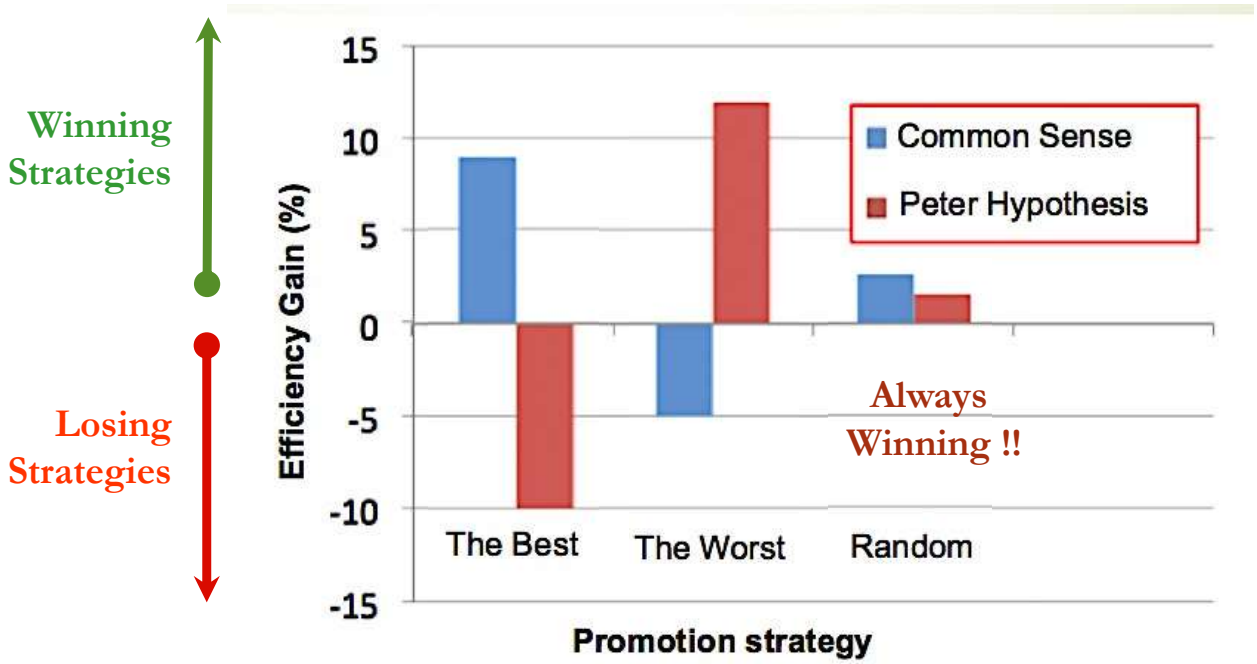
A.Pluchino, A.Rapisarda, C.Garofalo, "The Peter Principle Revisited: a Computational Study", Physica A 389 (2010) 467

NUMERICAL RESULTS

First we demonstrated that, in terms of efficiency gain, **promoting the best** workers under the Peter Hypothesis is a losing strategy…

…while **promoting the worst** could be better…

But we also demonstrated that, when you don't know if the Peter Hypothesis applies, the more convenient strategy is that of **promoting people… at random!**



THE EUROPEAN LOTTERIES

Quoted by many blogs and newspapers and in particular by NYT among the most interesting ideas of 2009

The New York Times

December 2009

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The New York Times — Saturday, February 13, 2010 — Magazine — Search All NYTimes.com

THE 9TH ANNUAL YEAR IN IDEAS

A B C D E F G H I K L M O P R S T U W Z

Random Promotions

In 1969, the Canadian psychologist Laurence J. Peter posited the "Peter Principle": people in a workplace are promoted until they reach their "level of incompetence." This happens, Peter argued, because we wrongly assume that people who are good at their jobs will also be good at jobs that are one rung up on the corporate ladder — so we promote them. But often the new job is so different from the previous job that the employee can't handle it. Now performing incompetently, the employee stays in place, dragging the efficiency of the firm downward. Eventually the entire economy becomes like the paper company Dunder Mifflin in "The Office" — clogged with incompetence.

Is there any way to avoid this trap? Yes, by promoting people at random. That's what a trio of Italian scientists discovered this year. They created a computer model of a 160-person corporation and programmed it with Peter Principle-like logic: the best performers were promoted, but they had only a random likelihood of being good at their new jobs. Sure enough, the firm was soon cluttered with incompetents, and its efficiency plunged. But then the researchers tried something different: they reprogrammed the firm so that it promoted people entirely randomly, and the overall efficiency of the firm improved.

They also tried alternately promoting the absolute best and absolute worst performers. That, too, worked out better than promoting on merit. The scientists say these strategies work because they harness "Parrondo's Paradox," a piece of game theory in which you win by alternating between two losing strategies. "In physics or game theory, this isn't new," says Andrea Rapisarda, a physicist at the University of Catania in Italy and a co-author of the study, which was recently published in the journal Physica A.

As Rapisarda points out, if you could know for sure that the people being promoted would excel in their new jobs, that would be the best strategy of all. But if you aren't sure — and in the real world, we rarely are — then random works better. CLIVE THOMPSON

attitude
+ dedication
+ results
– attitude
– dedication
– results
promotion

ILLUSTRATION BY OPEN

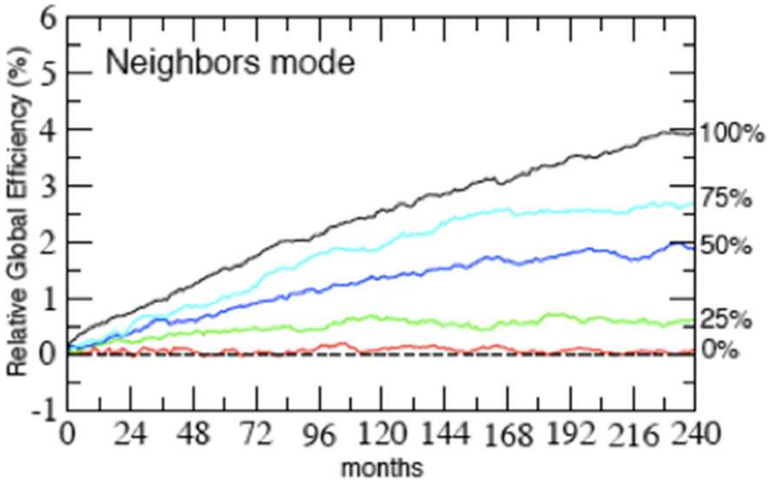
IG NOBEL PRIZE 2010 AT HARVARD FOR MANAGEMENT

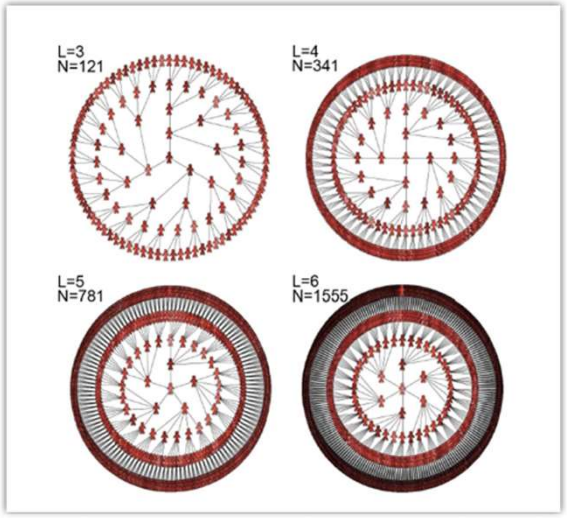
THE EUROPEAN LOTTERIES

"Organizations would become more efficient if they promoted people… at random!"

…and then our results became really popular !

GENERALIZED MODEL



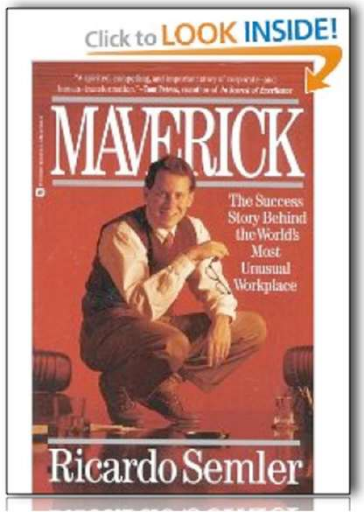


Results are very robust and are confirmed by more realistic models !

The increase in efficiency is immediate and persistent, even considering only a percentage of random promotions, reaching after only 20 years almost 80% of the asymptotic total gain

See: Pluchino, Rapisarda, Garofalo, Physica A 390 (2011) 3496

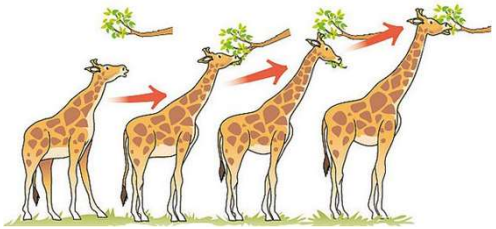
SUCCESSFUL REAL EXAMPLES



In Brazil Ricardo Semler transformed his family company into a world leader company by applying his innovative management strategy based on democratic participation and job rotations (very similar to our random promotion strategy) going even beyond the results we have found.

Google™

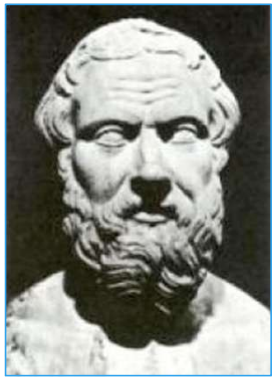
At Google, employees can spend 20% of their working time to develop personal projects that then can be proposed to the company!!



Bottom-up strategy works ! This is also true for fundamental research and natural selection !

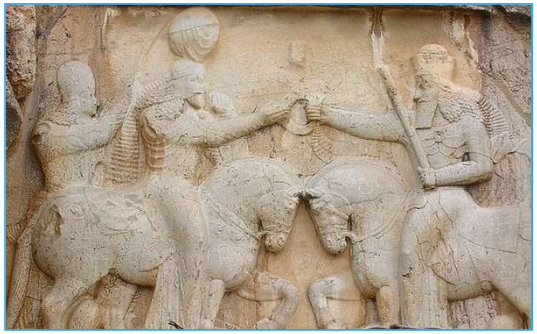
ARE RANDOM STRATEGIES ALSO EFFECTIVE IN POLITICS?

The ancient Persians already believed in it !!!



"The Persians are used to ***discuss their most important matters when they are drunk****. Any decision taken is proposed again the next day, when they are sober: whether they approve even sober, they confirm, otherwise they drop…"*

Herodotus (484-425 BC)



A few glasses of wine can be very helpful!

HISTORICAL BACKGROUND: RANDOM SELECTION OF GOVERNING BODIES

THE EUROPEAN LOTTERIES

Today, most people think that democracy means elections of candidates indicated by political parties.

But in the first significant democratic experience, the Athenian democracy, parties did not exist at all and random selection (**Sortition**) was the basic criterion to select legislators!

Many other cities used some kind of Sortition as rule for the same purpose, such as Bologna, Parma, Vicenza, San Marino, Barcelona and some parts of Switzerland (1640-1837).

Lot was also used in Florence (13th and 14th century) and in Venice (from 1268 until 1797).

MORE RECENT EXAMPLES OF PROPOSALS BASED ON COMMON SENSE

Modern juries **randomly select** people in common law adversarial-system jurisdictions

Segoléne Royal proposed to **randomly select** popular juries for controlling the work of politicians

Barnett and Carty proposed a radical reform of the House of Lords by a **random elections**

Very recently, Iceland performed a unique experiment of direct democracy where 1,000 **randomly chosen** Icelanders – aged 18-89 – rewrited the Constitution

In Ontario (Canada) an Assembly of random citizens proposed a new Electoral Law in 2007

OUR PROPOSAL:
A MATHEMATICAL MODEL OF PARLIAMENT

In 2011, through a mathematical model, we studied how the efficiency of a modern Parliament, may be affected by the introduction of a given number of **independent members**,

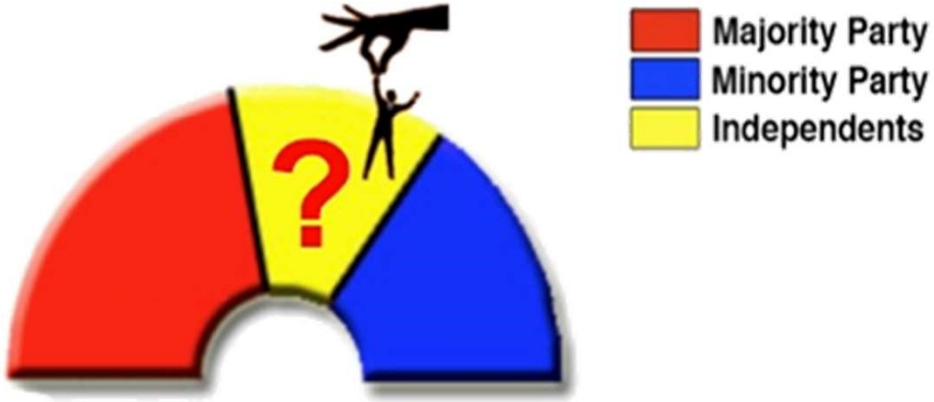
i.e. a given percentage of legislators who are not elected but randomly selected among common citizens and for this reason free from the influence of the parties.

A.Pluchino, C.Garofalo, A.Rapisarda, S. Spagano, M. Caserta,
"Accidental politicians: How Randomly Selected Legislators can Improve Parliament Efficiency", Physica A 390 (2011) 3944

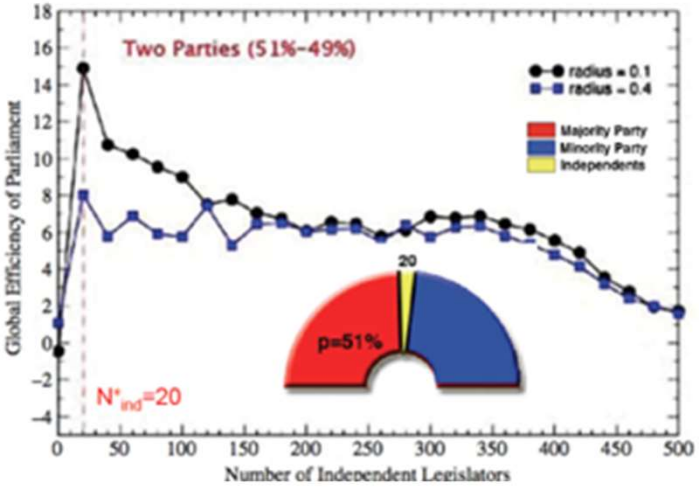
SO THE QUESTION IS:

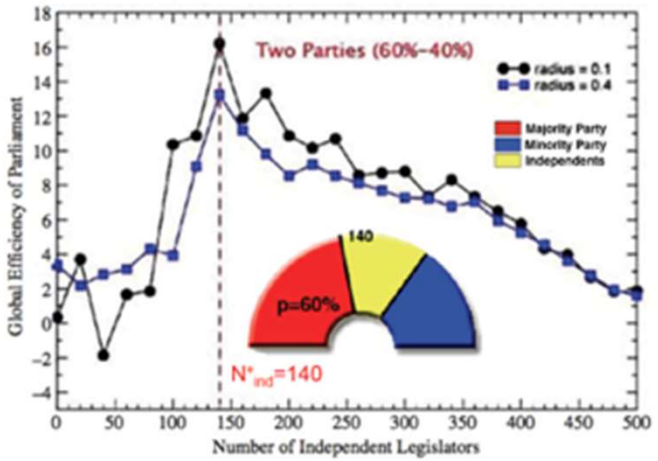
THE EUROPEAN LOTTERIES

Does it exist an optimal number N^*_{ind} of randomly selected independent legislators which maximize the Parliament efficiency?



RESULTS

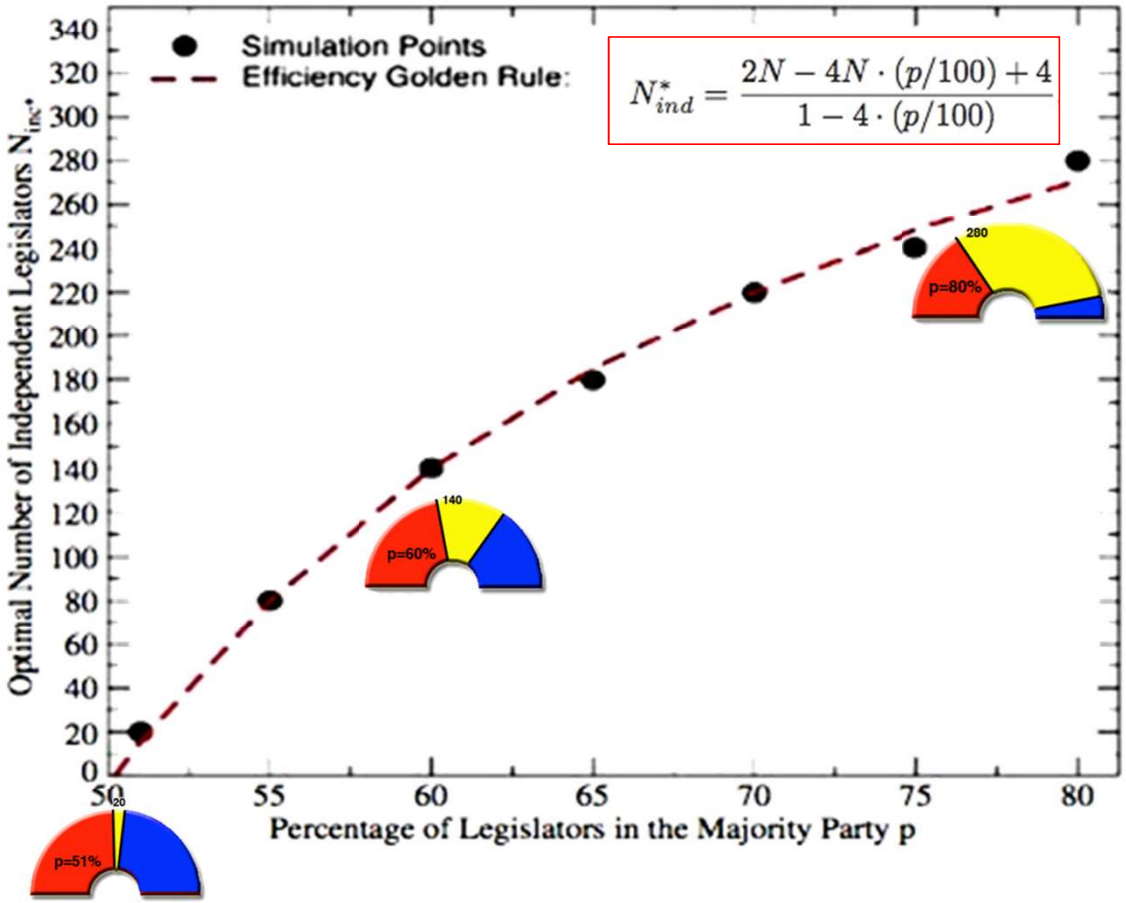




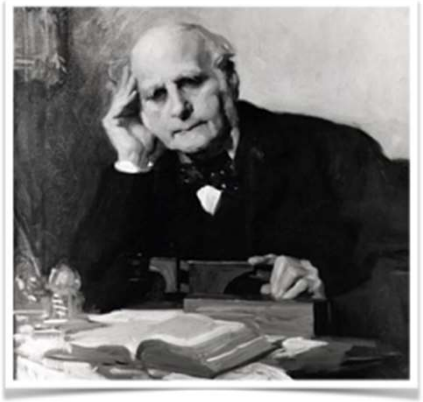
Considering the **Global efficiency of the Parliament**, defined as the product of the percentage of accepted proposals times the average social welfare ensured, as function of the number of independent legislators N_{ind}, one gets a well pronounced peak in correspondence of a well defined value N^*_{ind} of independent legislators

This optimal value increases with the percentage of the majority party

THE EFFICIENCY GOLDEN RULE



WISDOM OF THE CROWD



Francis Galton

Vox Populi

Nature 75, 450 (1907)

"In these democratic days, any investigation into the trustworthiness And peculiarities of popular judgements is of interest. The material about to be discussed refers to a small matter, but is much to the point.
A weight-judging competition was carried on at the annual show of the West of England Fat Stock and Poultry Exhibition recently held in Plymouth. A fat ox having been selected, competitors bought stamped and numbered cards, for 6d. each, on which inscribe their respective names, addresses, and estimates of what the ox would weigh after it had been slaughtered and dressed. Those who guessed most successfully received prizes. About **800 tickets** were issued"

The middlemost estimate was 1207 lb. and the weight of the dressed ox proved to be 1198 lb.

Galton concluded "It appears that Vox Populi is correct to within 1% of the real value"

AND NOW LET'S TRY A SMALL EXPERIMENT

How many beans are inside the jar?

ODERAL

Organizzazione per la Democrazia Rappresentativa Aleatoria

THE EUROPEAN LOTTERIES

www.oderal.org

You will find many real experiments on popular juries and delinerative assemblies of common citizens sorted by lot all around the world today !

SO... GET READY, YOUR TURN MAY COME SOON!

THE BENEFICIAL ROLE OF RANDOMNESS

THE EUROPEAN LOTTERIES

Alessio Emanuele Biondo

in Financial Markets

SICILIAE STVDIVM GENERALE · A · 1434

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RANDOMNESS IN ECONOMIC SYSTEMS

THE EUROPEAN LOTTERIES

How can we really think that randomness matters in economic systems?

RANDOMNESS IN ECONOMIC SYSTEMS

THE EUROPEAN LOTTERIES

Let us play the game of Analysts!

Which is the correct real-GDP growth forecast for the EU?

A. 1,2

B. 1,6

C. 1,7

D. 1,5

E. none of the above

RANDOMNESS IN ECONOMIC SYSTEMS

THE EUROPEAN LOTTERIES

Let us play the game of Analysts!

The reply is "none of the above". Why?

A. all analysts have their own interests and say whatever they like

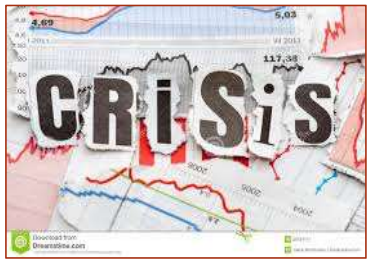
B. analysts are not that good and make systematically mistakes

C. forecasts on macroeconomic variables should be coordinated

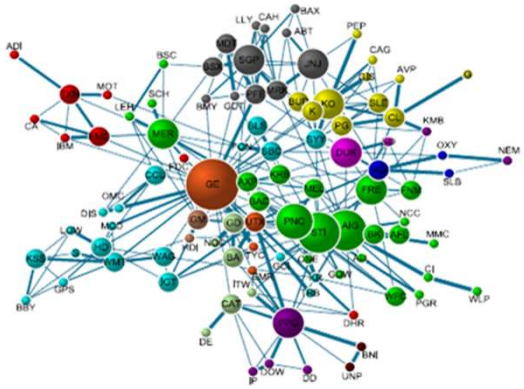
D. forecasts on macroeconomic variables are impossible

MACROECONOMICS AND COMPLEXITY

Economic systems exhibit fluctuating dynamics: expansions/contractions, boom, crises, affect wealth of people and their disposable income.
Why aren't we able to predict such oscillations in advance, so that such a variability can be managed by sound economic policies?



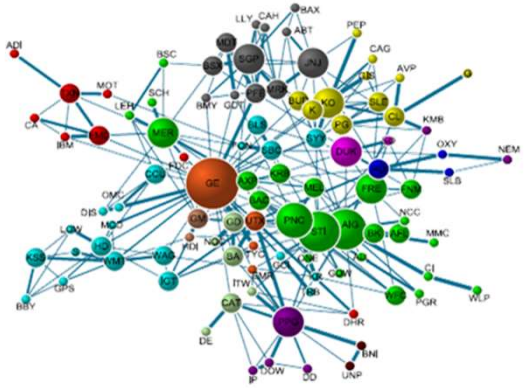
MACROECONOMICS AND COMPLEXITY



Economic systems are examples of contexts in which individual elements interact with each other and such an interaction generates *emergent* aggregate outcomes, *which qualitatively differ from the features of their constituents, as spontaneous self-organized structures, at different layers of a hierarchical configuration* (Gallegati and Richiardi 2009)

The aggregate behavior of the system is more dependent on the role played by the interaction among its components than on their individual characteristics. Therefore, all predictions about magnitude and timing of emergent properties in complex contexts are useless (Prigogine 1997).

MACROECONOMICS AND COMPLEXITY



Two consequences:
1) predictions are impossible: no direct causation among events;
2) individuals cannot explain what happens around themselves.

Such *a perception of randomness* must be taken in consideration both when considering targets and instruments of economic policy and when assessing its efficacy: when dealing with aggregate economic systems, there is not the possibility to "determine" the dynamics. Policy-makers can just set a direction, by means of a reasonable action of incentives-building.

Example topics?
GDP, inflation, expectations, unemployment, financial markets dynamics, electoral regimes, consumption activities,….

MACROECONOMICS AND COMPLEXITY

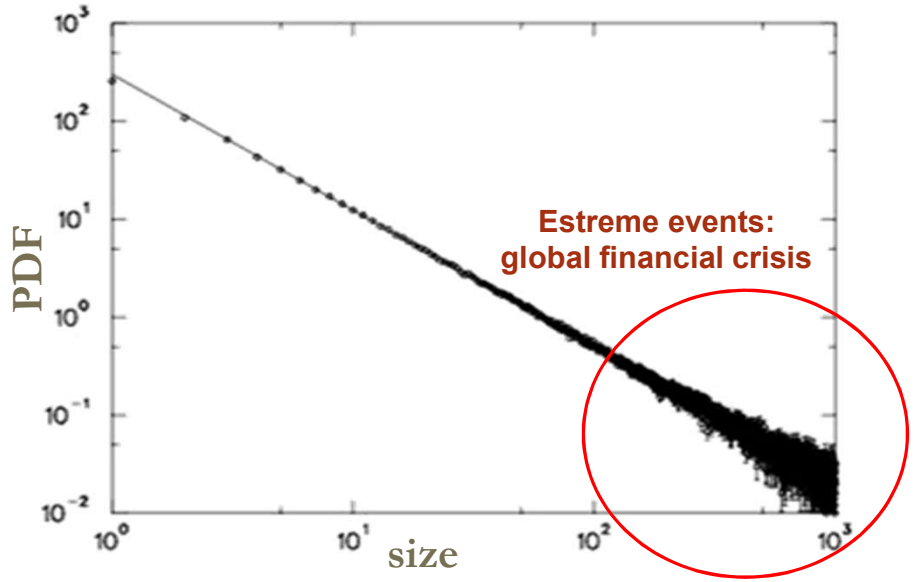
Such a consciousness should destabilyze your self-confidence…

New tools are coming and, with time, we will learn how to manage such a challenging truth: but the myth of ”perfect measurability and determinism” in macroeconomics is a dead end…

POWER LAWS AND FINANCIAL MARKETS

Financial markets often experience extreme events, i.e. "bubbles" or "crashes". The underlying dynamics is related to avalanches, whose size is distributed according to power laws.

Power Law Distribution



High probability of small events,
Low probability of catastrophic events

N.N.Taleb

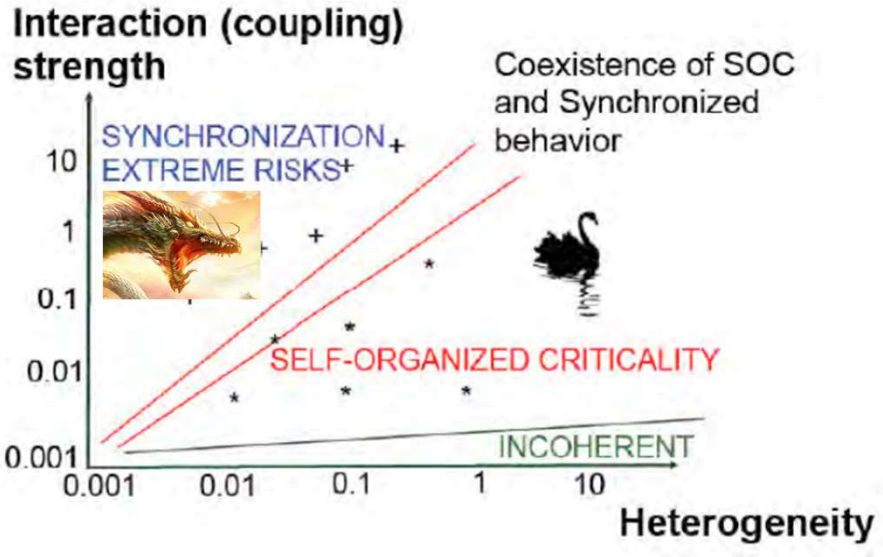
Black Swans

POWER LAWS AND FINANCIAL MARKETS

Some scientist is advancing the idea that it is possible to study complex power-law distributed phenomena, by focusing on events that coexist with power-laws in the distribution of event sizes but that are outliers: when synchronization amplifies criticality, the Dragon King comes out!

D. Sornette

Heterogeneity and Interaction



ARE RANDOM STRATEGIES EFFECTIVE IN FINANCIAL MARKETS?

THE EUROPEAN LOTTERIES

Financial markets are an extraordinarily simple example of complexity in action: many people see herding behavior at the origin of the insane fluctuation typically present negotiating stocks.

How can we separate (if possible at all) *true* and significant economic rationale of transactions and speculation?

IS IT A MATTER OF COMPETENCE?

The Richard Wiseman Experiment (2001)

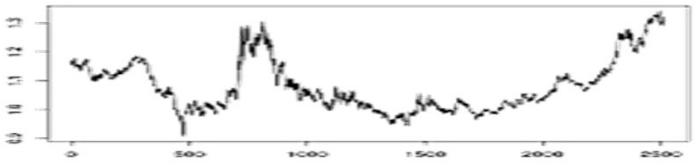
The same amount of money (GBP. 5000) was given to:
a five years old baby-girl (random strategy), the sweet Tia,
a Financial Analyst (technical trading), not that sweet,
an Astrologer (stars and planets), sincerely ugly
to invest them in the **LSE** for a given time…

Results 1-week later:

Baby-girl: - 4,6%

Financial analyst: - 7,1%

Astrologer: - 10,1 %



Results 1-year later:

Baby-girl: + 5,8%

Astrologer: - 6,2%

Financial analyst: - 46,2%

London Stock Exchange

OUR PROPOSAL:
A SIMULATIVE MODEL OF FINANCIAL MARKET

THE EUROPEAN LOTTERIES

In 2013, stimulated by the Wiseman experiment and by similarities between earthquakes and financial extreme events, we developed an agent-based model that depicts a community of interacting traders. The model proposes a sort of backtesting on empirical data from a real external financial market (S&P 500). Agents have to invest a given amount of money, by following both technical and random strategies.

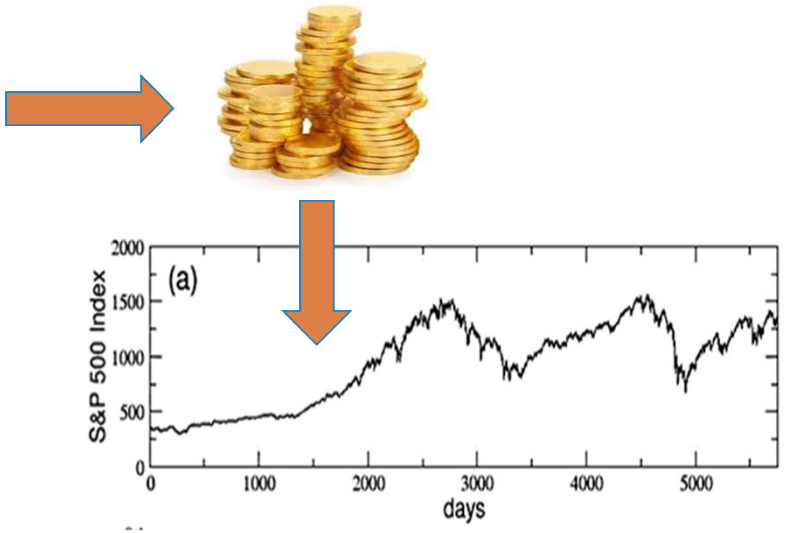
A.E.Biondo, A.Pluchino, A.Rapisarda, D. Helbing,
"Reducing financial avalanches by random investments",
Phys. Rev. E 88 (2013) 062814

Dirk Helbing

OUR PROPOSAL:
A SIMULATIVE MODEL OF FINANCIAL MARKET

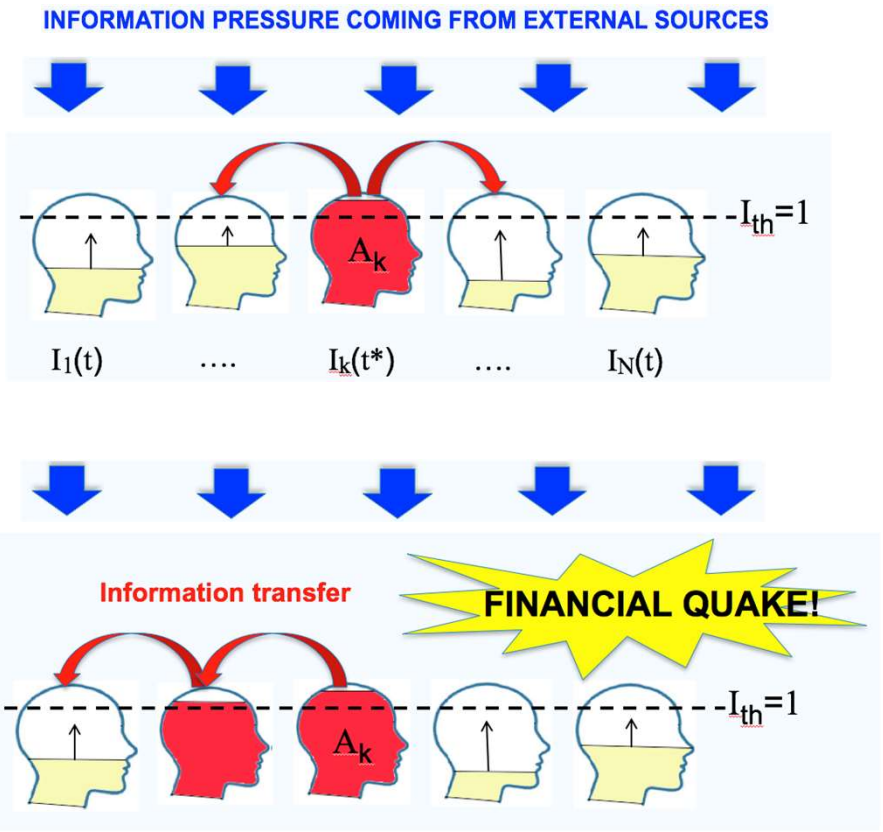
THE EUROPEAN LOTTERIES

Heterogeneous traders (fundamentalists and chartists) in a small-world community bet every day on the next day prediction of the market behavior, on the basis of their personal expectations. The timing of their forecasts depends on the network topology (which replicates the OFC model of earthquakes) for all traders but for those playing at random.



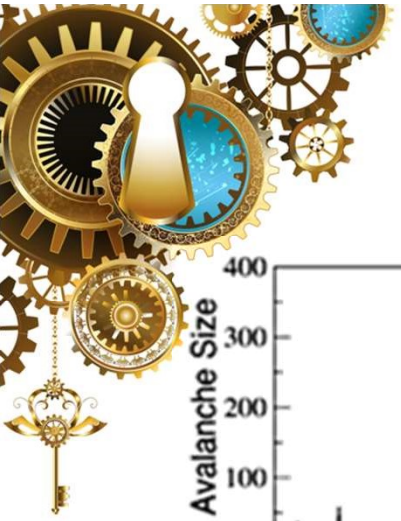
Standard & Poor's 500

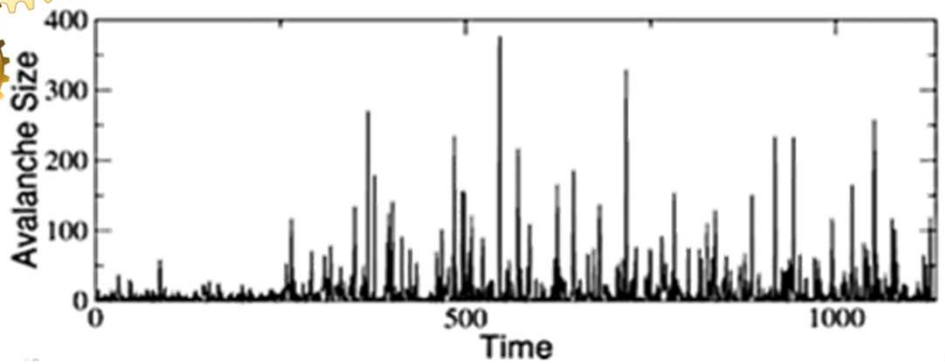
OUR PROPOSAL:
A SIMULATIVE MODEL OF FINANCIAL MARKET

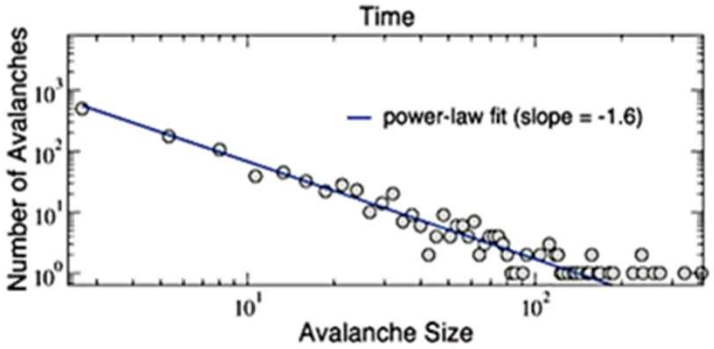


Information pressure received from the global environment is accumulated by traders. Each of them has an activation threshold. When a trader accumulates sufficient information to surpass her threshold, she becomes active and transmits information about his status (asker/bidder) and his order (ask/bid-price) to her neighbours (who, possibly, become active, by assuming same status and order).

SIMULATION OF CONTAGION:
AVALANCHES!

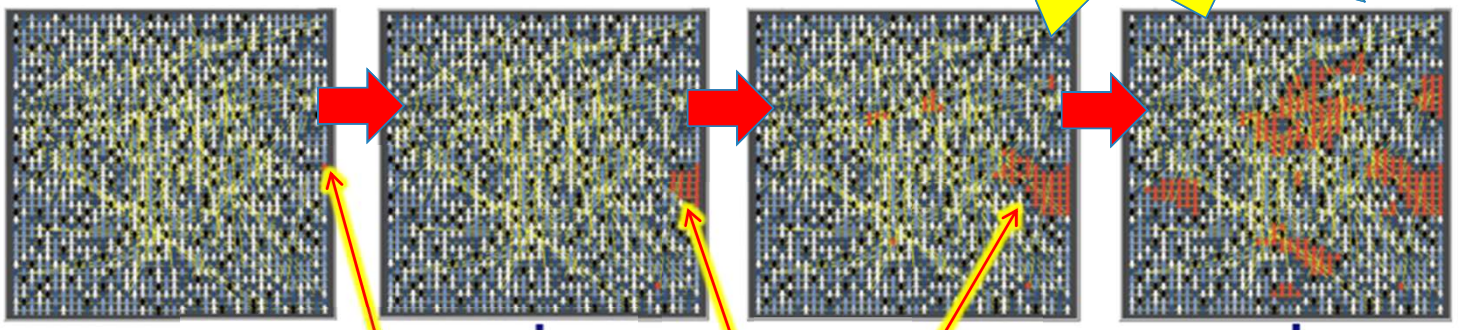






FINANCIAL QUAKE!

$t = t^*$ $t > t^*$



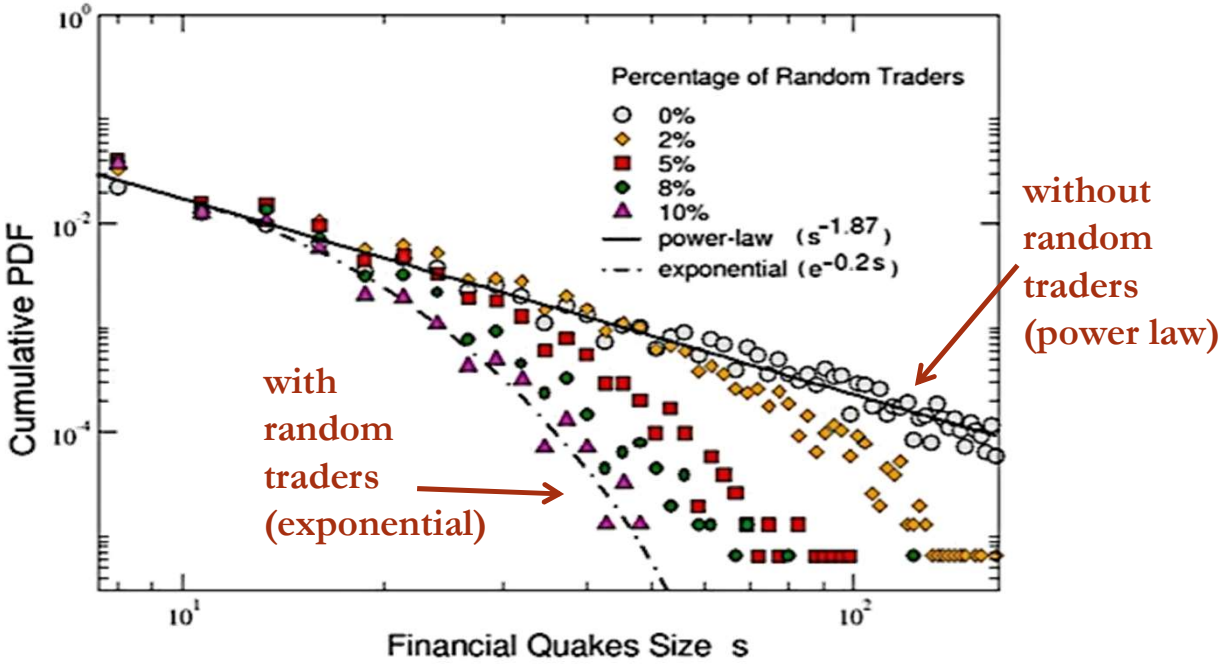
first active agent A_k

active agents

LIMITING THE SIZE OF FINANCIAL CRASHES

THE EUROPEAN LOTTERIES

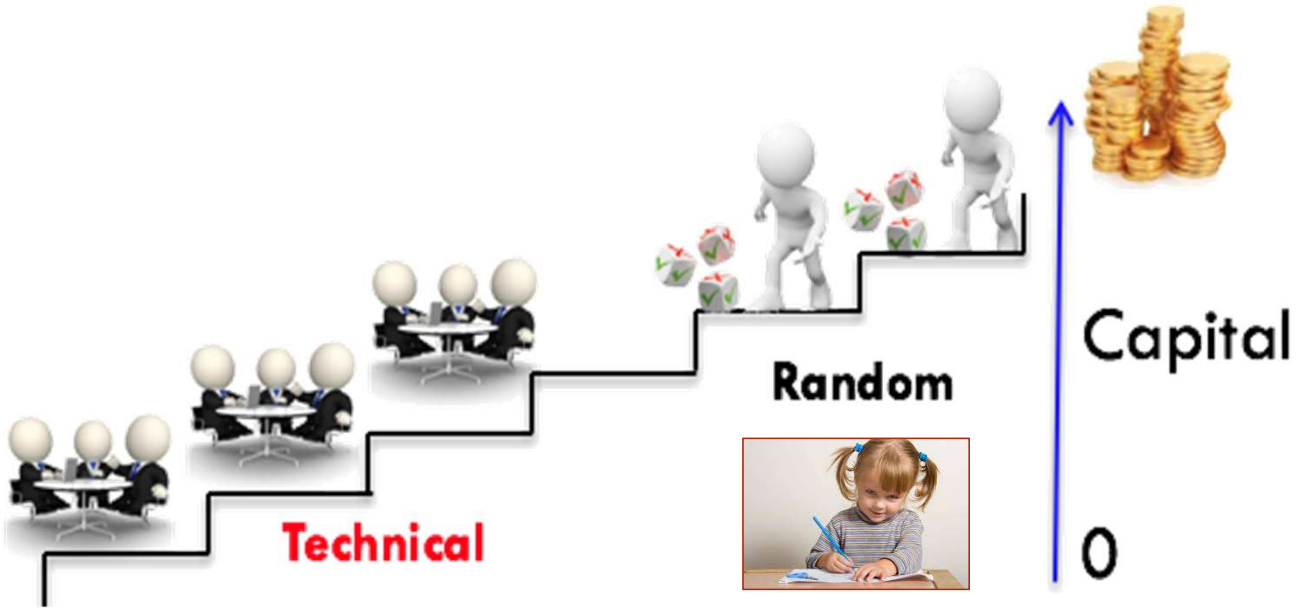
We found that the size of the dangerous herding-related avalanches in the community could be strongly reduced by the presence of a relatively small percentage of random traders. These results suggest a promising strategy to limit the size of financial bubbles and crashes.



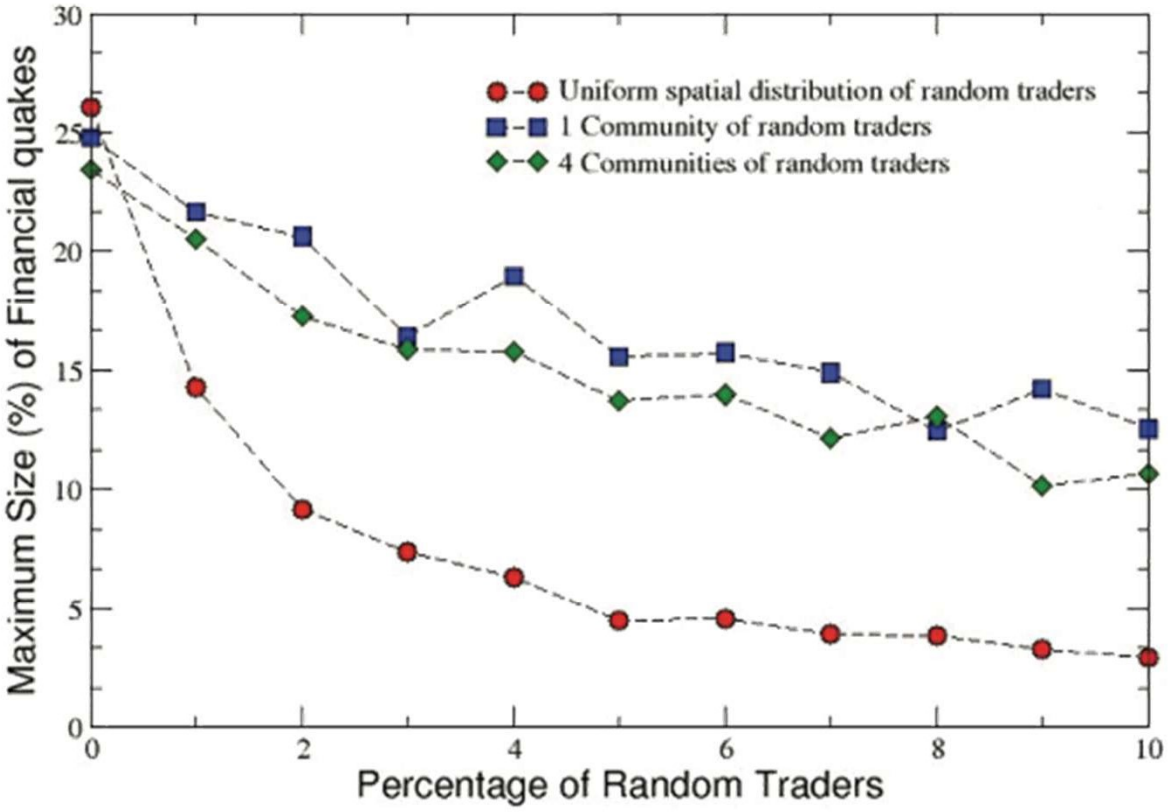
TO INVEST AT RANDOM IS CONVENIENT!

THE EUROPEAN LOTTERIES

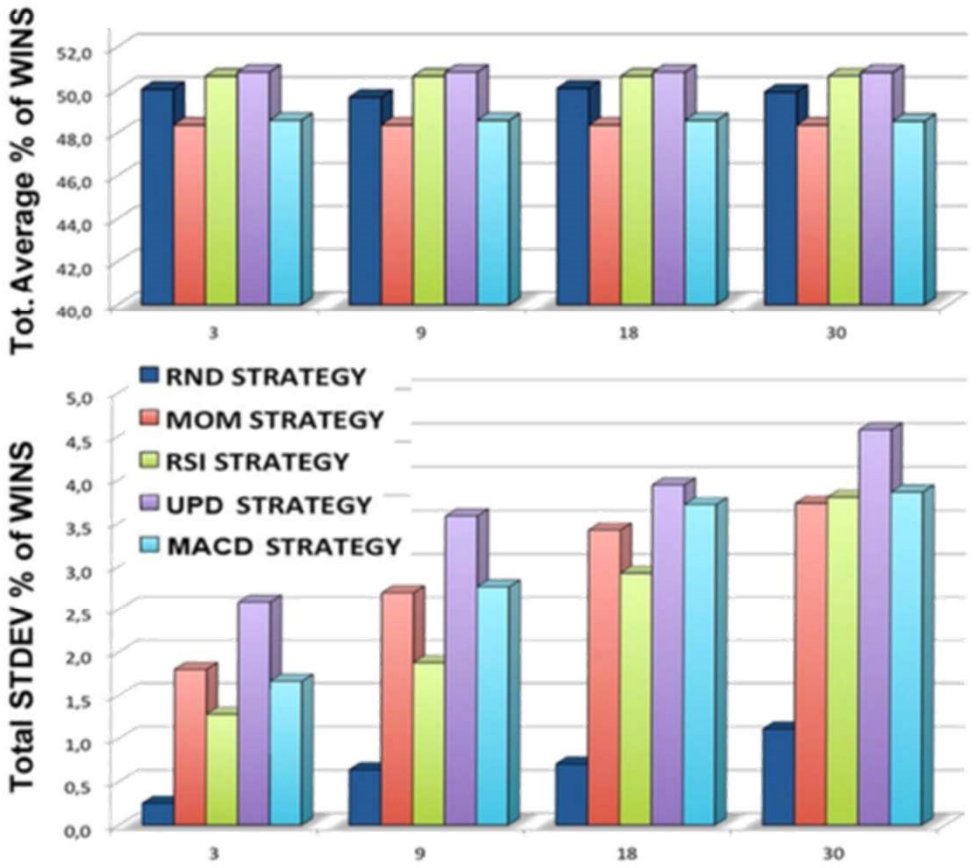
We further show that in our simulations random traders gain, on average, more than technical analysts, thus replicating the good fate of sweet Tia, in the Wiseman experiment!



RESULTS


Uniform spatial distribution of random traders
1 Community of random traders
4 Communities of random traders
Maximum Size (%) of Financial quakes
Percentage of Random Traders
0
5
10
15
20
25
30
0
2
4
6
8
10

RESULTS


Tot. Average % of WINS
52,0
50,0
48,0
46,0
44,0
42,0
40,0
3
9
18
30
RND STRATEGY
MOM STRATEGY
RSI STRATEGY
UPD STRATEGY
MACD STRATEGY
Total STDEV % of WINS
5,0
4,5
4,0
3,5
3,0
2,5
2,0
1,5
1,0
0,5
0,0
3
9
18
30

CONCLUSIONS

Several aspects of financial dynamics suggest that individual decisions are not entirely responsible for the results that an investment can yield. On the contrary, the weight of apparently robust theories of financial investments, mathematical models used by traders and technical analysis is negligible: that much that random investments can perform almost identically! And the difference is not worth the risk differential!

The most motivated decision can be completely subverted because of the context in which it has been taken.

But such a rationale is not an exclusive property of financial markets or, more broadly, of macroeconomic issues: indeed, it counts much more than one can expect at first sight...

THE BENEFICIAL ROLE OF RANDOMNESS

Alessandro Pluchino

in Our Everyday Life

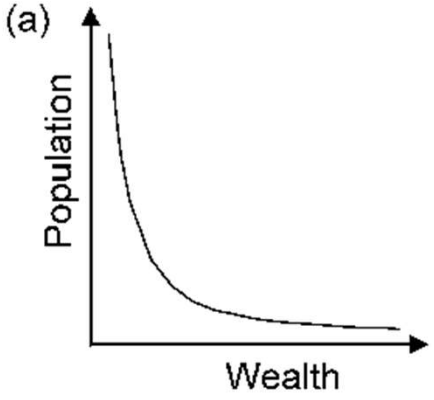
UNIVERSITÀ degli STUDI di CATANIA

THE PARETO LAW AND THE ASYMMETRIC DISTRIBUTION OF WEALTH

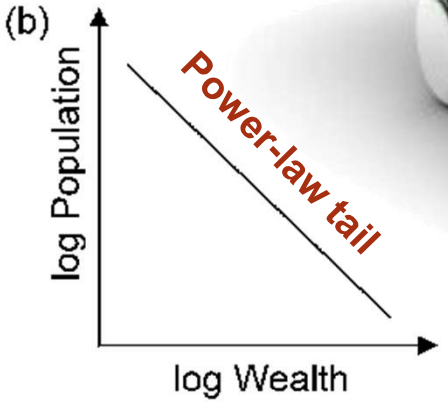
D.Hardoon."An economy for the 99%". Oxfam GB, Oxford UK (January 2017)

THE PARETO LAW AND THE ASYMMETRIC DISTRIBUTION OF WEALTH

Vilfredo Pareto (1897)



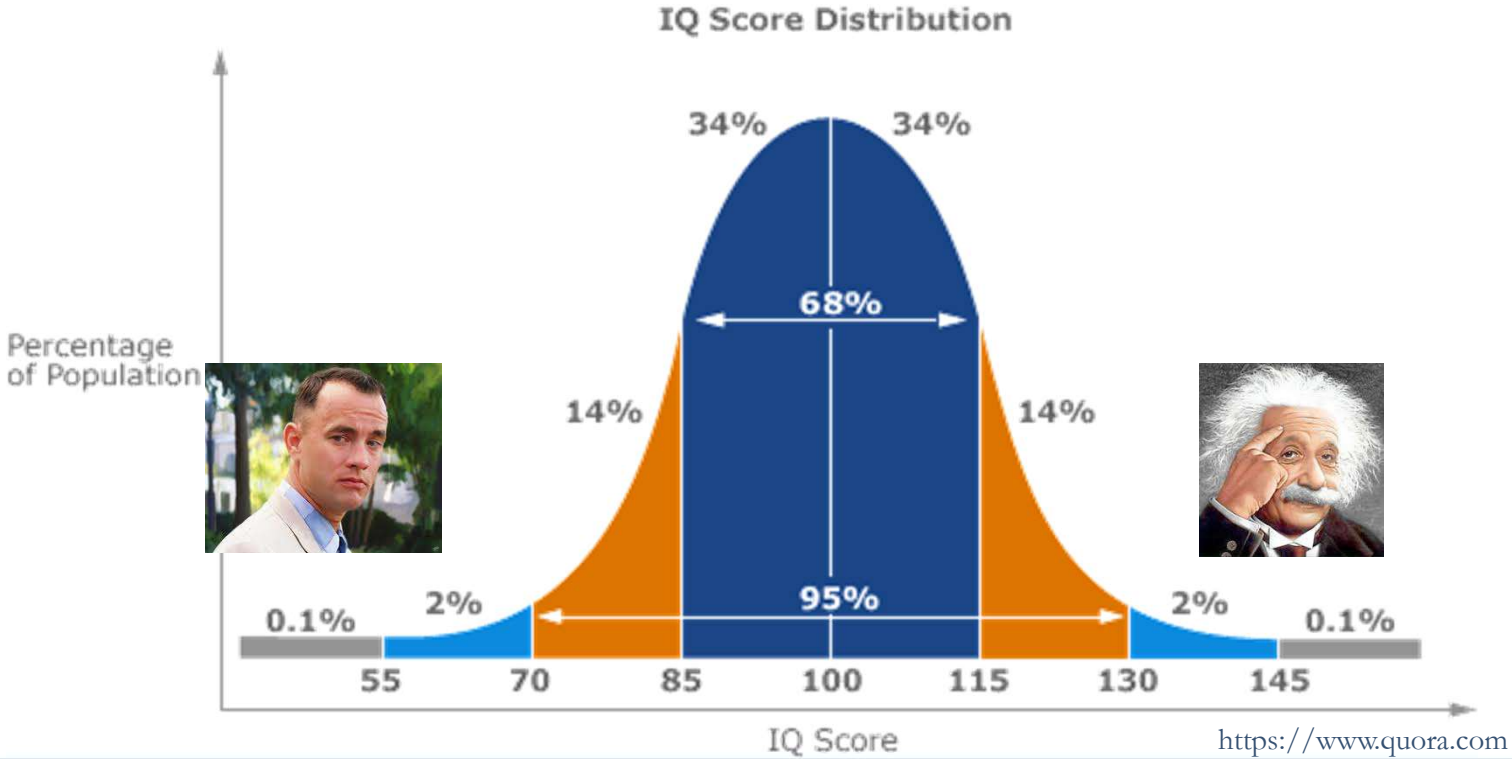
Power-Law Distribution of Wealth across a Population



Power-Law Distribution of Wealth across a Population on a log-log Plot

THE NORMAL DISTRIBUTIONS OF IQ AND WORK HOURS

If one considers the individual wealth as a proxy of social success, one could argue that its deeply asymmetric and unequal distribution among people is either a consequence of their natural differences in talent, skill, competence, intelligence, ability or a measure of their willfulness, hard work or determination.



https://www.quora.com

THE NORMAL DISTRIBUTIONS OF IQ AND WORK HOURS

If one considers the individual wealth as a proxy of social success, one could argue that its deeply asymmetric and unequal distribution among people is either a consequence of their natural differences in talent, skill, competence, intelligence, ability or a measure of their willfulness, hard work or determination.

https://greatnotbig.com/2016/05/sustainable-pace/

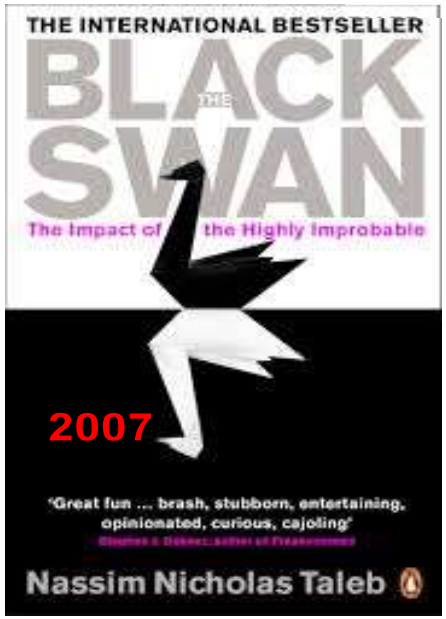
IT IS STRONG THE SUSPECT THAT SOME HIDDEN FACTOR COULD PLAY A ROLE IN OUR EVERYDAY LIFE IN ORDER TO AMPLIFY TALENT AND TO TRANSFORM IT, SOMETIMES, IN SUCCESS…

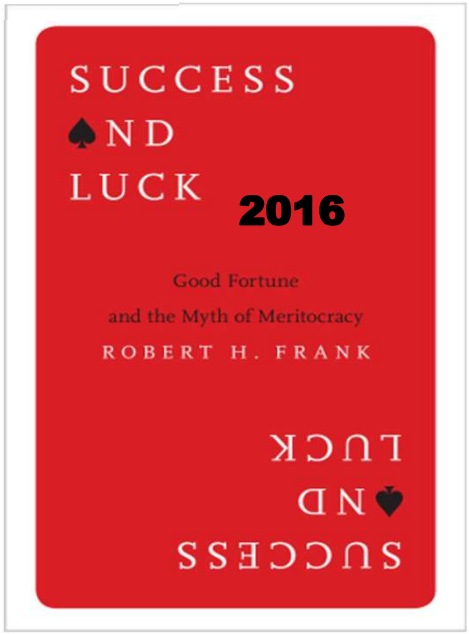
THE EUROPEAN LOTTERIES

Which could be such a factor?

SEVERAL AUTHORS SUGGEST THAT IT COULD BE JUST… LUCK!

Nassim N. Taleb





Robert H. Frank

MANY EMPIRICAL EVIDENCES SEEM TO CONFIRM THIS SUSPECT…

THE EUROPEAN LOTTERIES

Individuals with easy-to-pronounce names are judged more positively than those with difficult-to-pronounce names…

Laham, S. M., Koval, P. and Alter, A. L., J. Exp. Soc. Psychol. 48 (2012) 752–756.

MANY EMPIRICAL EVIDENCES SEEM TO CONFIRM THIS SUSPECT…

THE EUROPEAN LOTTERIES

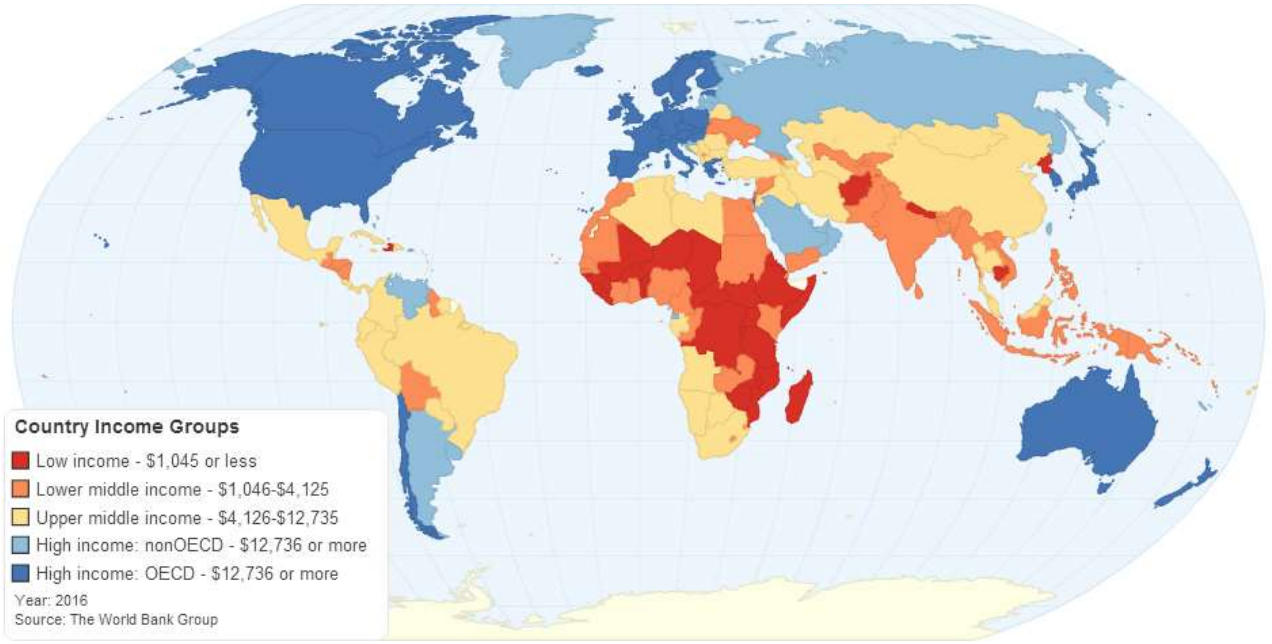
Females with masculine monikers are more successful in legal careers…

Coffey, B. and McLaughlin, P., SSRN Electron. J. (2009) doi:10.2139/ssrn.1348280,

MANY EMPIRICAL EVIDENCES SEEM TO CONFIRM THIS SUSPECT…

THE EUROPEAN LOTTERIES

Roughly half of the variance in incomes across persons worldwide is explained only by their country of residence and by the income distribution within that country…

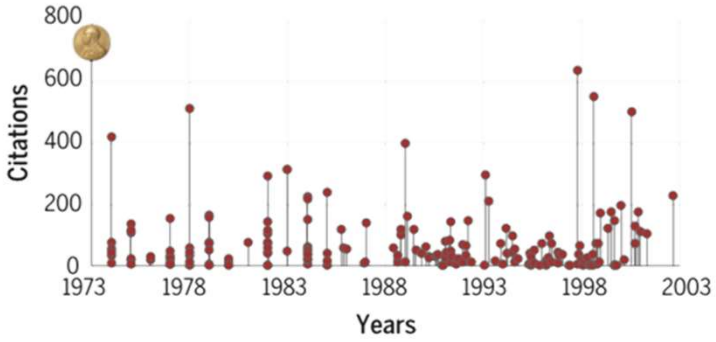


Milanovic, B., Rev. Econ. Stat. 97(2) (2015) 452–460.

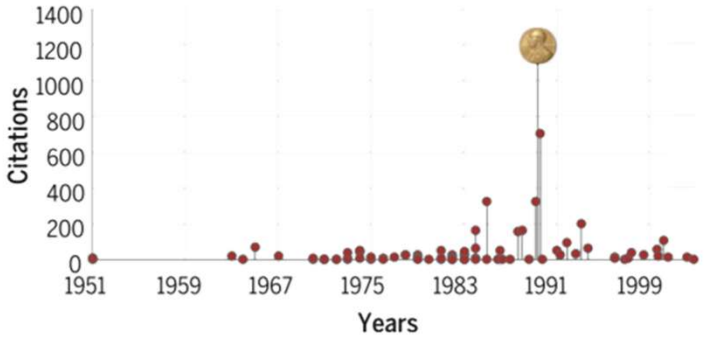
MANY EMPIRICAL EVIDENCES SEEM TO CONFIRM THIS SUSPECT…

THE EUROPEAN LOTTERIES

Scientists have the same chance of publishing their biggest hit at any moment along their career…



Frank A. Wilczek
Physics Nobel,
2004



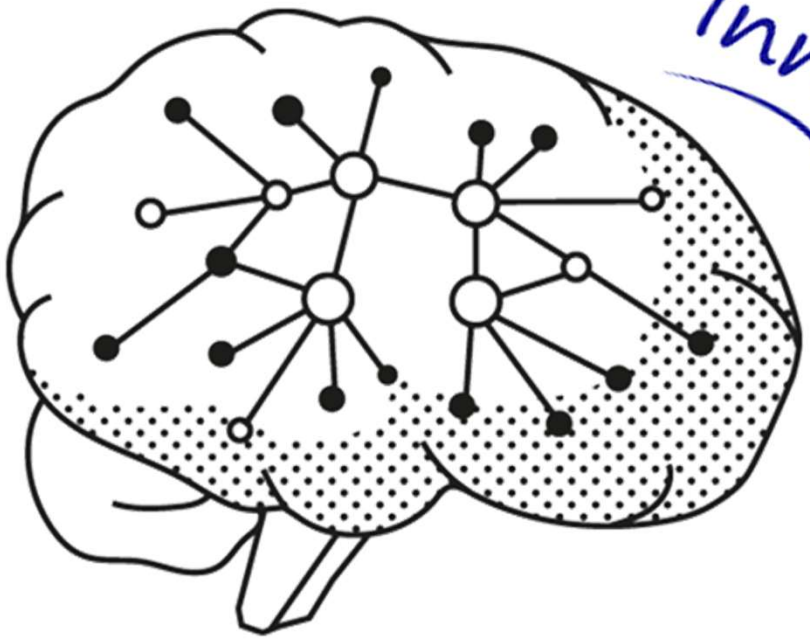
John B. Fenn
Chemistry Nobel,
2002

Sinatra, R., Wang, D., Deville, P., Song, C. and Barabasi, A.-L., Science 354 (2016) 6312.

MANY EMPIRICAL EVIDENCES SEEM TO CONFIRM THIS SUSPECT…

THE EUROPEAN LOTTERIES

The innovative ideas are the results of a random walk in our brain network…



Iacopini, I., Milojevic, S. and Latora, V., Phys. Rev. Lett. 120 (2018) 048301

MANY EMPIRICAL EVIDENCES SEEM TO CONFIRM THIS SUSPECT…

66% of probability of developing a cancer, maybe cutting a brilliant career, is due to simple bad luck...

Tomasetti, C., Li, L. and Vogelstein, B., Science 355 (2017) 1330–1334.

MANY EMPIRICAL EVIDENCES SEEM TO CONFIRM THIS SUSPECT…

THE EUROPEAN LOTTERIES

References:

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- Newgreen, D. F. et al., *Differential Clonal Expansion in an Invading Cell Population: Clonal Advantage or Dumb Luck?*, *Cells Tissues Organs* 203:105–113 (2017).
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- Snyder, R. E. and Ellner, S. P., *Pluck or Luck: Does Trait Variation or Chance Drive Variation in Lifetime Reproductive Success?*, *The American Naturalist* 191, no. 4 (2018): E90–E107.
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BUT A RIGOROUS PROOF OF THIS HYPOTHESIS WAS MISSING… AT LEAST SO FAR…

Advances in Complex Systems | Vol. 21, No. 03n04, 1850014 (2018)

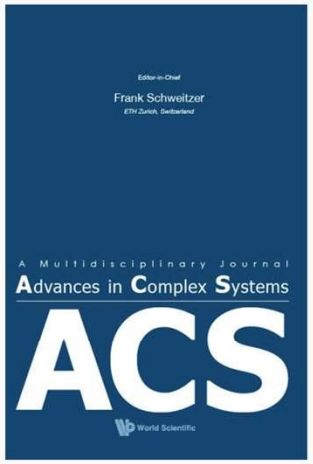
TALENT VERSUS LUCK: THE ROLE OF RANDOMNESS IN SUCCESS AND FAILURE

ALESSANDRO PLUCHINO, ALESSIO EMANUELE BIONDO and ANDREA RAPISARDA

https://doi.org/10.1142/S0219525918500145 | **Cited by:** 0

Abstract

The largely dominant meritocratic paradigm of highly competitive Western cultures is rooted on the belief that success is mainly due, if not exclusively, to personal qualities such as talent, intelligence, skills, smartness, efforts, willfulness, hard work



Vol. 21, No. 03n04

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TALENT VERSUS LUCK: THE ROLE OF RANDOMNESS IN SUCCESS AND FAILURE

Overview of attention for article published in Advances in Complex Systems, May 2018

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true economics

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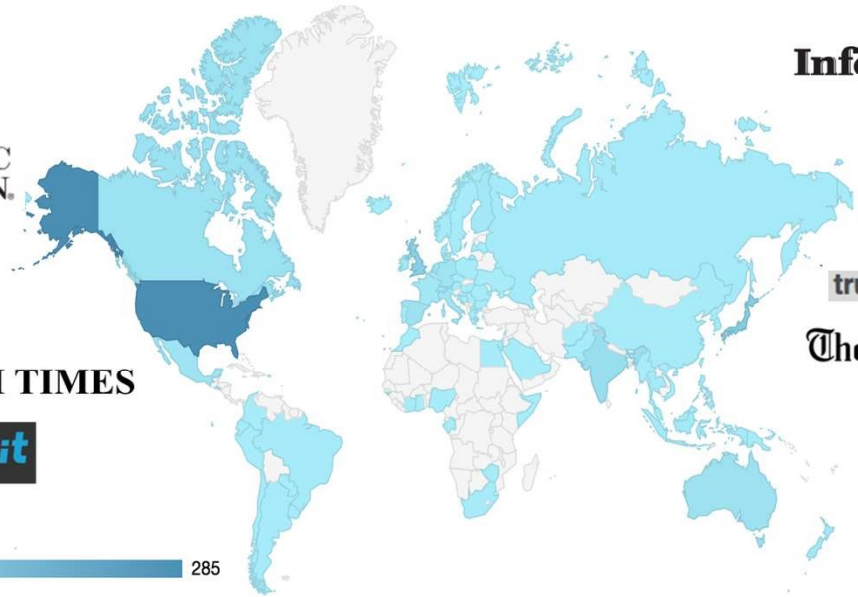


1 — 285

Geographical breakdown

Country	Count	As %
United States	285	18%
Japan	100	6%
United Kingdom	85	5%
India	42	3%
Canada	34	2%
Australia	33	2%
Spain	30	2%
Germany	26	2%
Mexico	24	2%
Other	281	18%
Unknown	654	41%

Demographic breakdown

Type	Count	As %
Members of the public	1283	80%
Scientists	259	16%
Science communicators (journalists, bloggers, editors)	31	2%
Practitioners (doctors, other healthcare professionals)	20	1%
Unknown	1	<1%

NEW!

A.PLUCHINO, A.E.BIONDO, A.RAPISARDA
University of Catania

Talent vs Luck:
The Role of Randomness in Success and Failure

Advances in Complex Systems - Vol. 21, No. 03n04, 1850014 (2018)

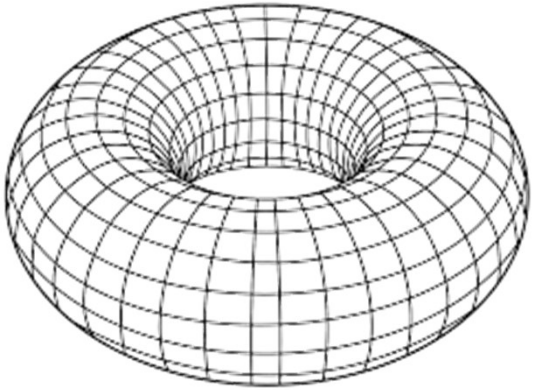
PREPRINT VERSION

http://www.pluchino.it/talent-vs-luck.html

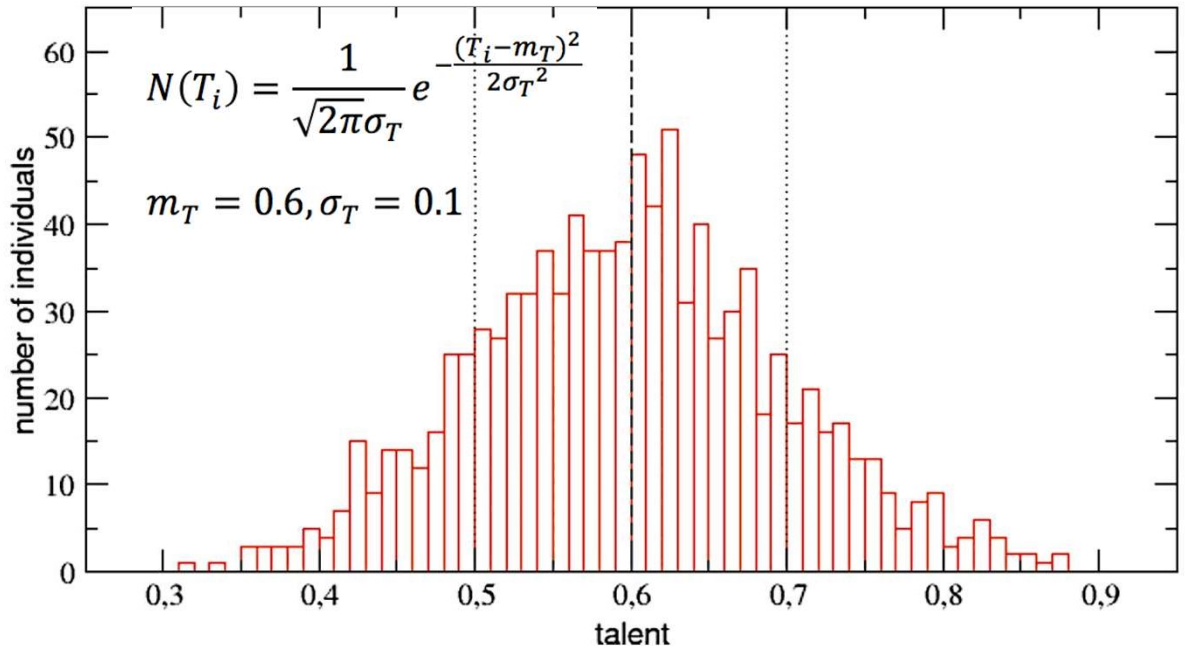
THE "TALENT VERSUS LUCK" (TVL) MODEL

NetLogo World: 201x201 patches with periodic boundary conditions

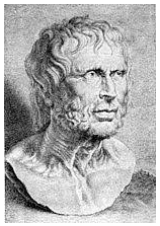
- N=1000 agents
- 250 lucky events
- 250 unlucky events



NORMAL DISTRIBUTION OF TALENT IN [0,1]



Talent T_i = probability of exploiting an opportunity



"Luck is what happens when talent meets opportunity"

L. A. Seneca, Roman Philosopher (4 BC, AD 65)

VERY SIMPLE DYNAMICAL RULES

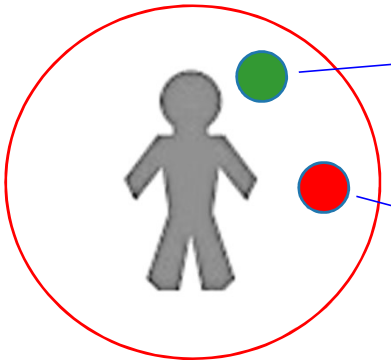
THE EUROPEAN LOTTERIES

Single Run SIM time interval: 40 years of working life

Check for events: every 6 months

Initial Capital (Success): $C_i(0) = 10\ units \quad i = 1, \dots, N$

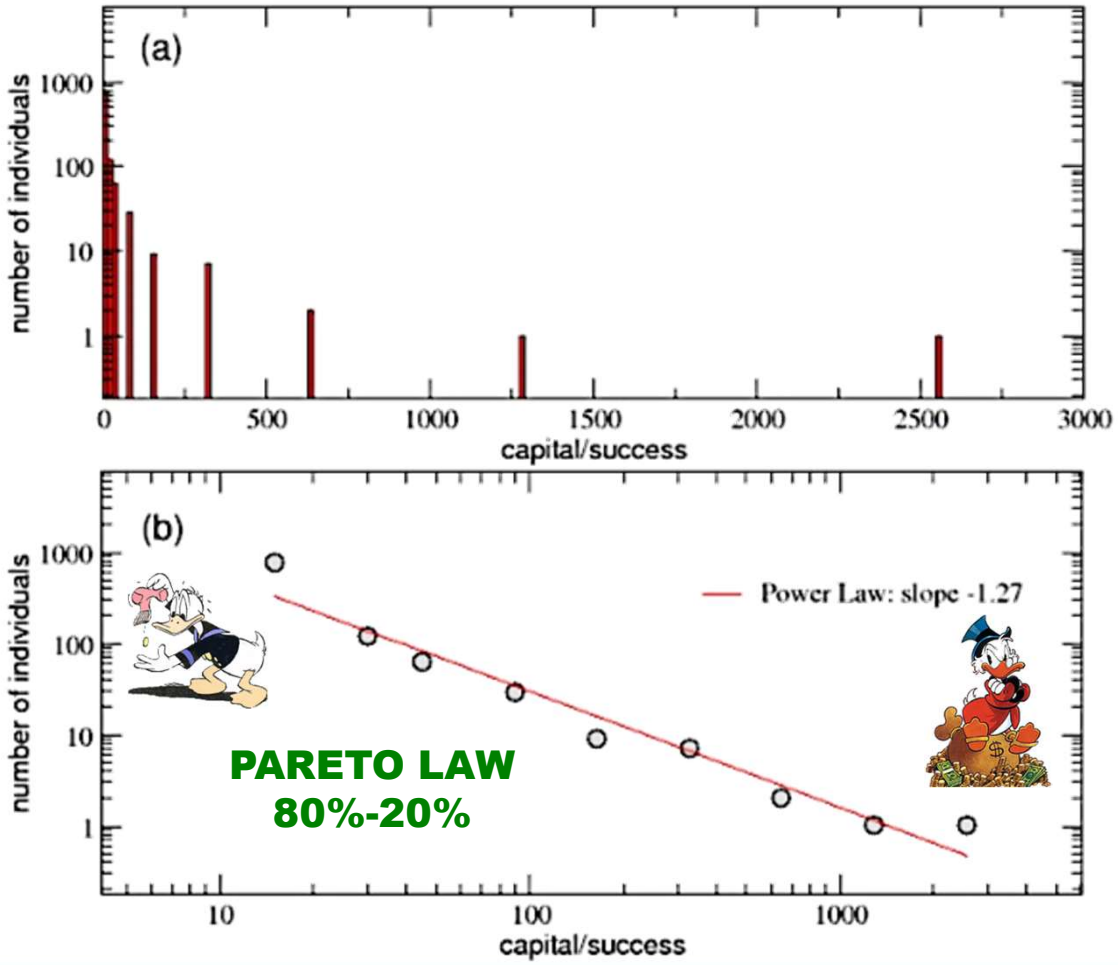
Matthew Effect: the rich get richer!



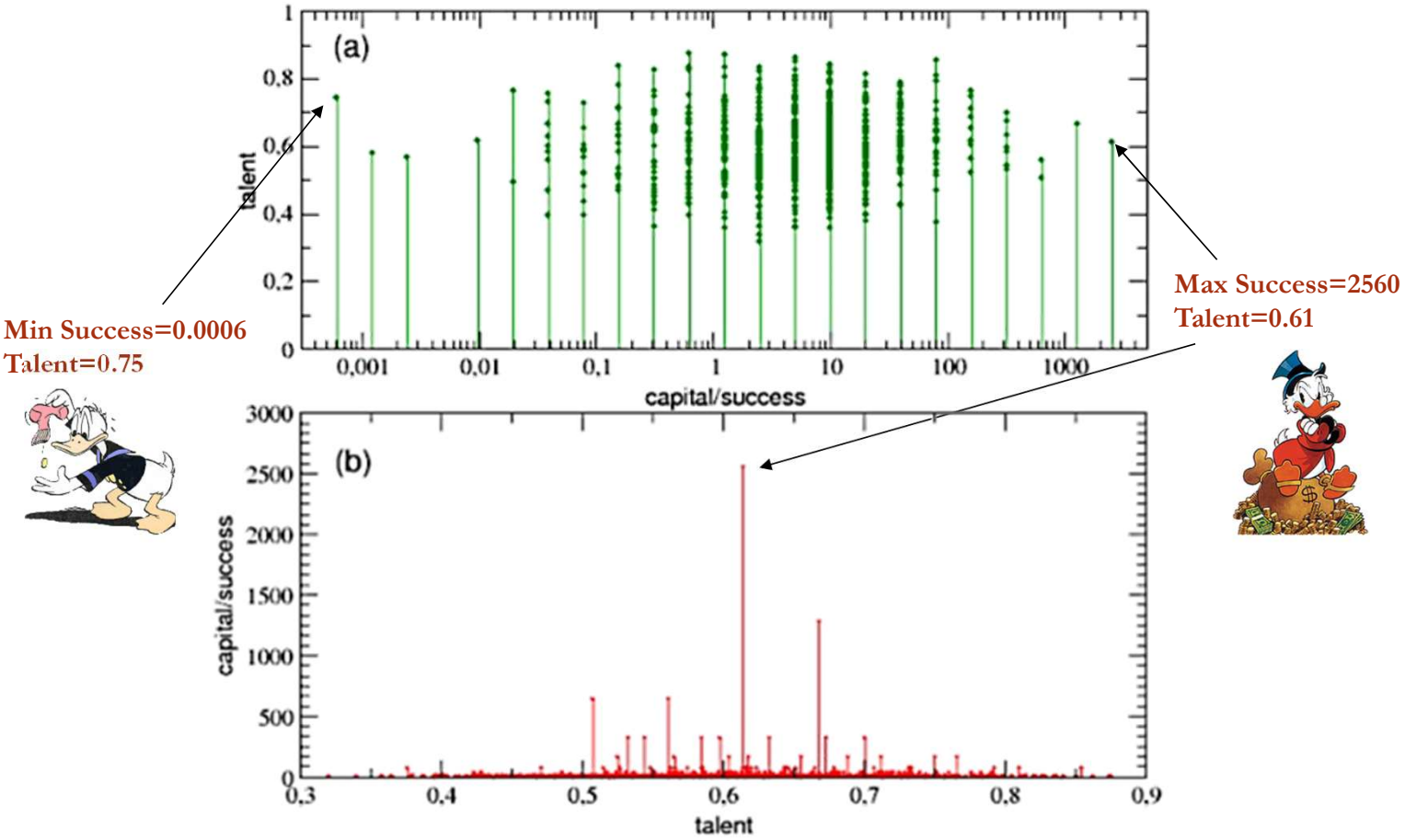
$$C_i(t+1) = 2C_i(t) \quad if \ rand(0,1) < T_i$$

$$C_i(t+1) = \frac{C_i(t)}{2} \quad \forall T_i$$

PARETO-LIKE FINAL DISTRIBUTION OF SUCCESS IN SINGLE RUN SIMULATIONS



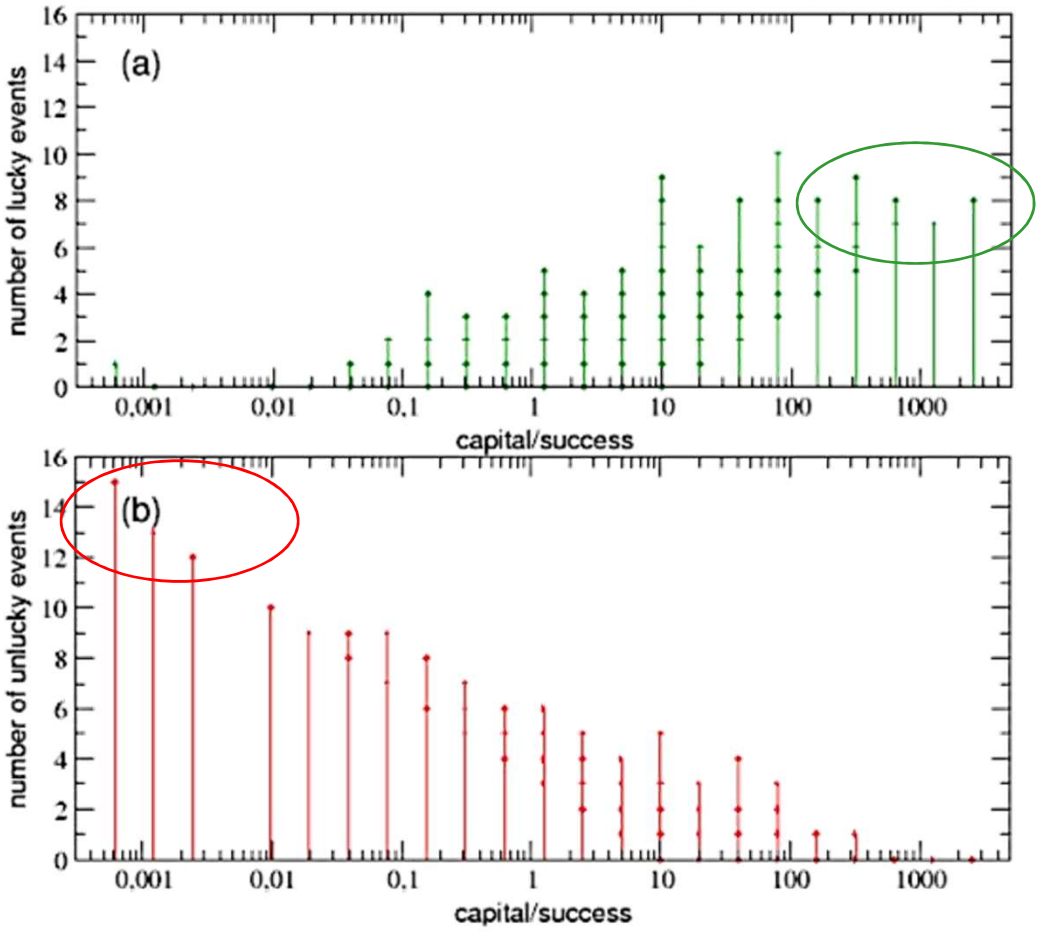
SUCCESS AND TALENT SEEM TO BE NOT CORRELATED…



Min Success=0.0006
Talent=0.75

Max Success=2560
Talent=0.61

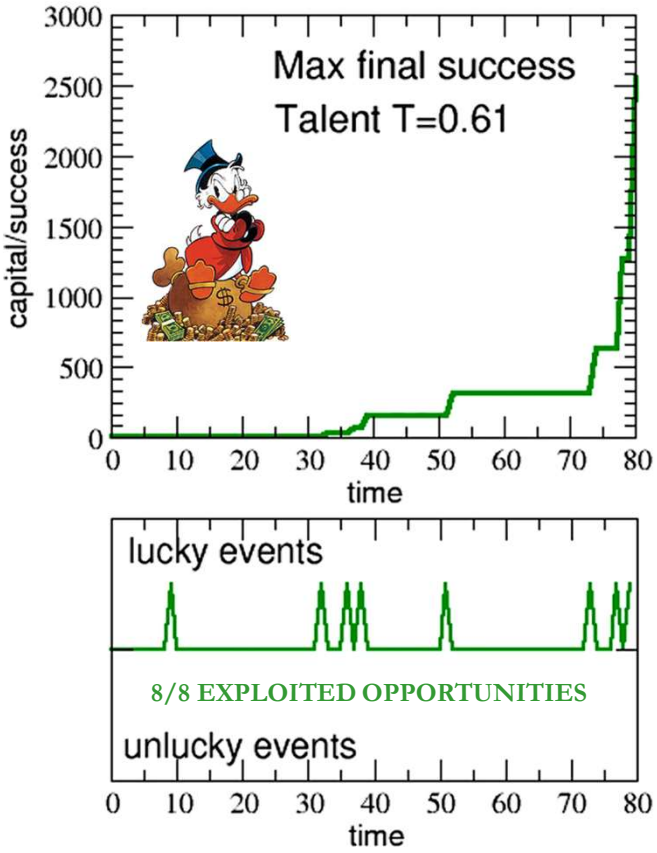
…BUT SUCCESS AND LUCK ARE STRICTLY CORRELATED!

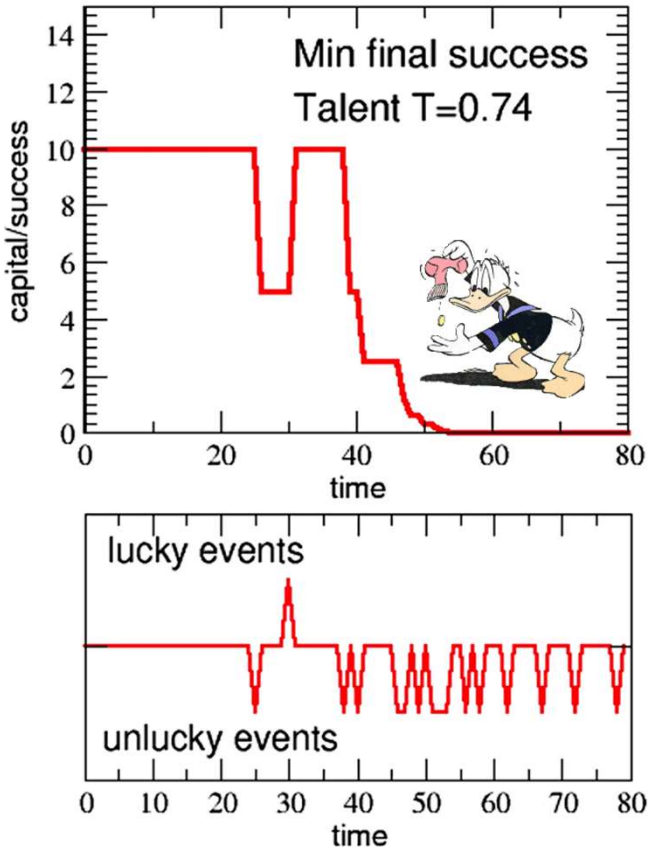


High success
=
Very lucky

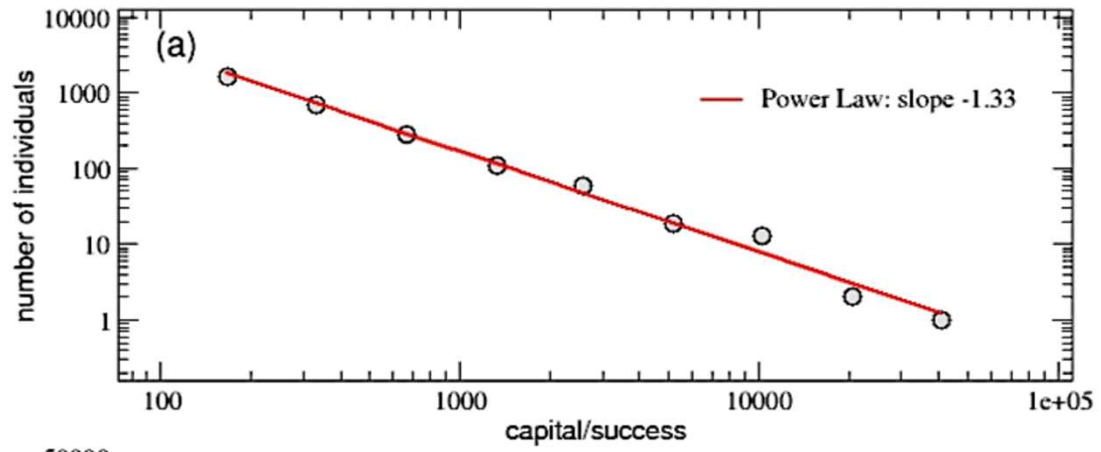
Low success
=
Very unlucky

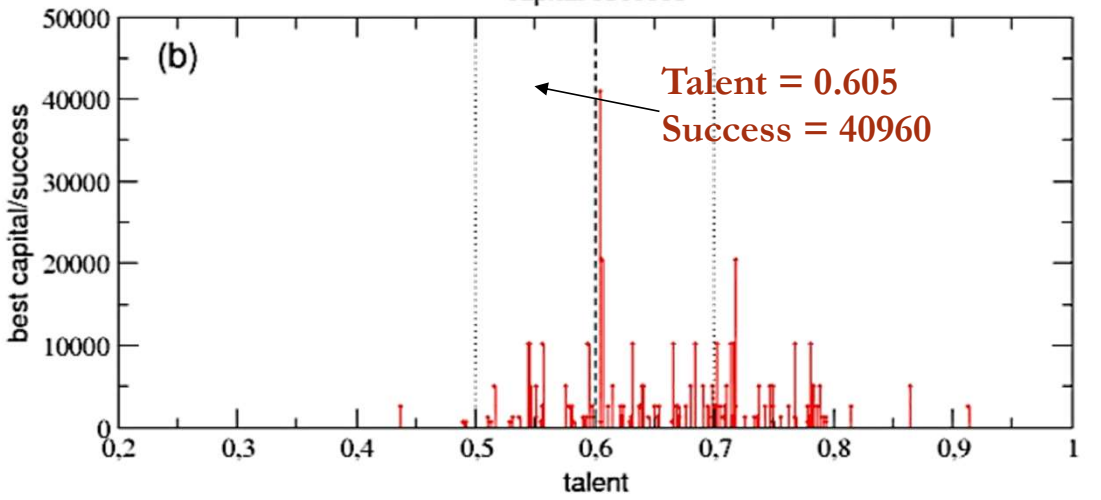
A COMPARISON BETWEEN LUCKY AND UNLUCKY INDIVIDUALS



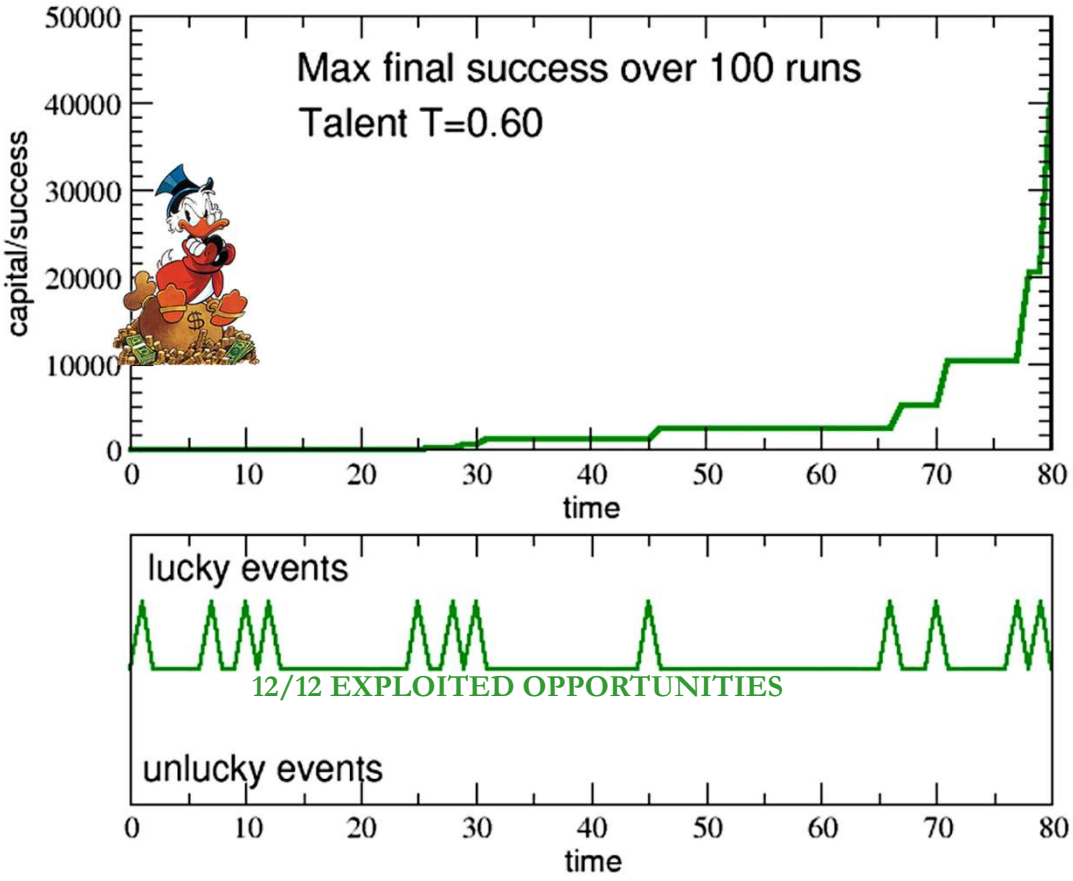


SIMULATIONS RESULTS OVER 100 RUNS





SIMULATIONS RESULTS OVER 100 RUNS



TVL GAME:
THE ROLE OF LUCK IN SUCCESS

Jeff Bezos, who is the well known founder, chairman, CEO, and president of AMAZON.COM, became the world's wealthiest person on July 2017, when his estimated net worth increased to just over $90 billion.

Could you say what his wealth was just a year later, on July 2018?

A. $100 billion
B. $110 billion
C. $120 billion
D. $130 billion
E. $140 billion
F. $150 billion

?

TVL GAME:
THE ROLE OF LUCK IN SUCCESS

In 1995, Joanne Rowling finished her manuscript "Harry Potter and the Philosopher's Stone" and the Christopher Little Literary Agency agreed to represent Rowling in her quest for a publisher.

Could you say how many publishing houses rejected the manuscript before Bloomsbury decided to publish it?

A. None
B. One
C. Two
D. Six
E. Twelve
F. Twenty

?

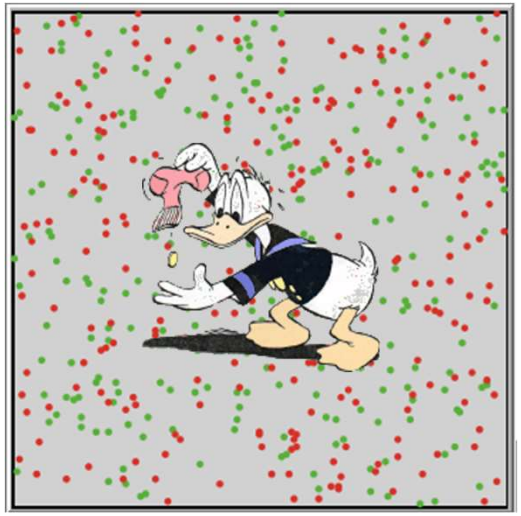
TVL MODEL:
CONCLUSIONS

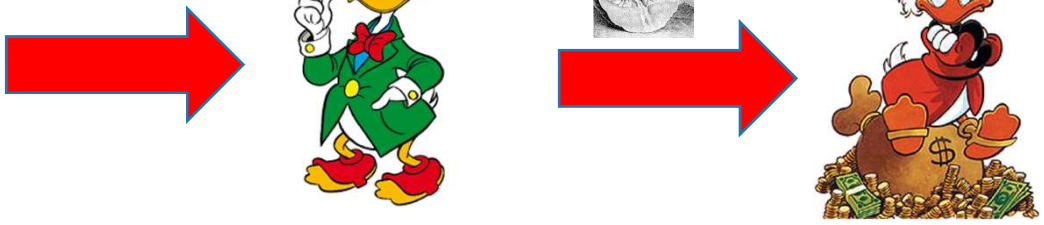
MICRO point of view: a **talented individual** has (by definition) a greater *a-priori* probability to reach a high level of success than a moderately gifted one… but…

MACRO point of view: the *a-posteriori* probability to find **moderately gifted, but very lucky**, individuals at the top levels of success results to be greater than that of finding very talented, but unlucky, ones!

TVL MODEL:
TAKE HOME MESSAGE

From the individual point of view, being impossible (by definition) to control the occurrence of lucky events, the best strategy for increasing the probability of success (at any talent level) is to broaden the personal activity, the production of ideas, the communication with other people, seeking for diversity and mutual enrichment. In other words, to be an open-minded person, ready to be in contact with others, exposes to the highest probability of lucky events (to be exploited by means of the personal talent).





TVL MODEL:
TAKE HOME MESSAGE

THE EUROPEAN LOTTERIES

But of course one can also, simply, buy a ticket for the LOTTERY!

THANKS FOR THE ATTENTION AND … GOOD LUCK!

http://www.pluchino.it/talent-vs-luck-eng.html