

Notes of a Hypothesis

## **What Caused the Bubble?**

(Mainly in the Real Estate Market)

### **“Genes of Speculation, Price, and Value” (Yamaguchi Hypotheses)**

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(Note: I use the word "program" for simplification. In reality, genes are something like "recipes".)

(Note: I use the word "old brain" for simplification. Actually, other organs/cells also affect our mind.)

#### < 1. Analysis of human genes >

A sea urchin which had been thought as a low animal has genes as many as a human! Moreover, 70% of its genes are common with us!! Around 4% of our DNA had come from hybridization with Neanderthal man!!! Complicated phenomena are often made up of piled simple rules which genes and nature create!!!!

Human program is not one that was born as a complete all-in-one design. It is a pile of programs succeeded from our ancestors.

The Human Genome Project finished determining DNA's base sequence, and now, analyses are progressing rapidly as to their functions.

#### < 2. Invisible hands of Genes and Nature >

Herd behavior is made up of simple rules. If it is playing an important role in a bubble, also a bubble would be made up of a pile of simple rules, and some genes must be concerned with them. Items below are my hypotheses as to it.

#### < 3. Some herd/swarm can find the shortest path through a maze >

Lives have tried to respond to every environment. They have succeeded their lives. And, they have changed. Then, how they have tried to respond to an environment that is quite difficult to be responded to? One of these environments is the uncertainty.

(Note: Although natural science includes it into risks, social sciences treat it differently. As human beings are concerned, it becomes another problem than a usual probability.)

(Overcoming the uncertainties)

In mathematics, finding the shortest path is a quite hard problem called the 'combinatorial optimization'. Nevertheless, a herd/swarm can do it, even without nerves. A herd/swarm itself functions as a rough computer which has massive agents carrying 'programs and information

transfer systems'.

\* Acellular Slime mold is capable of finding the shortest path through a maze.

(Hokkaido University Natural Sciences Research Institute)

(See: <http://www.newscientist.com/article/dn25-primitive-intelligence.html> )

\* Why microbes are smarter than you thought?

Communication, Learning and memory, Decision-making, Navigation, etc. (Michael Marshall)

(See: <http://www.newscientist.com/article/dn17390-why-microbes-are-smarter?> )

\* Ant colony, also, can find the shortest path to the best food source.

There is a company which uses ant-based strategy software to manage a complex delivery work.

By setting a swarm algorithm in personal computer's software, we became able to calculate a problem that had needed a super computer, by a PC. (Deborah M. Gordon, Peter Miller)

(See: <http://ngm.nationalgeographic.com/2007/07/swarms/miller-text>)

\* As to cellular slime mold, a recent study revealed that a swarm is organized through chain reactions by a chemical substance called cAMP. Here, we can see a simple form of the 'fear of shortages'.

(See: 'Seimei-shi Journal': [http://www.brh.co.jp/seimeishi/journal/65/research\\_1.html#a01](http://www.brh.co.jp/seimeishi/journal/65/research_1.html#a01))

1. One who felt a food shortage puts out a strong signal.

2. One who noticed a signal also puts out a signal.

3. A chain reaction starts. But, it stops.

4. When foods decrease overall, a chain reaction does not stop. It grows into a whole action.

Agents start to organize a swarm. (Supercriticality > Phase transition)

This system is also working as a rough sensor.

5. Majority begins to move before the food shortage thanks to the information transfer.

6. This is a system like a direct democracy by 100,000 agents, but there is no chairman or prime minister.

7. The soundness of a decision would depend on below.

(1) The subject is simple.

(2) All agents have programs individually.

(3) Information is clear to every agent.

Who is rational in these movements? The herd/swarm is, not particular agent is. <Swarm Intelligence> At the same time, these movements are harsher than we wish. <Rational, Strict, Merciless> So are we when we are confronting an uncertainty. <It enters into inconsistencies>

< Reasons why herds/swarms exist >

Lives form herds/swarms to decrease predation risks or to get an advantage for propagation. These reasons can be observed clearly.

In addition, on its earlier stage, there must be another important reason, that is, to reduce/overcome uncertainties by information and reactions. By reducing/overcoming uncertainties, the possibility of gene's survival must have increased.

(I think that the herd behavior is working as a human basic program to reduce/overcome uncertainties in our economy.) (Y. Hypotheses No.3)

< Territory and herd/swarm oppositely coexist, and many lives come and go between them >

Humans, ordinarily, are living in both of them. We can easily recognize the existence of the former in our mind. We usually feel a sense of territory on individuals or on some related groups.

On the other hand, we can not recognize the latter easily, since it had changed its state largely. However, the herd behavior must have been affecting our economic activities in unconscious ways.

< Behavior of lives vs. our speculation/price/value >

I suppose, several groups of genes (like clock genes) would be participated in our speculation, price, and value. The genes below would be respectable candidates for them.

Prerequisite conditions here are: 1. Individual agents carry their own programs. 2. Existence of the 'want, predation, and reproduction'. 3. Existence of the 'struggle for existence'.

(Pattern 1)

(a) Every agent finds foods individually without any leaders.

(b) One who felt a food shortage puts out a strong signal.

One who noticed a signal also puts out a signal.

(c) Signals form a chain reaction. Then agents start to gather (to do something same).

(d) A herd/swarm is assembled. The herd/swarm starts to move seeking for foods.

(Pattern 2)

(a) Every agent finds foods individually without any leaders.

(b) One who discovered special foods puts out a strong signal.

One who noticed a signal also puts out a signal.

(c) Signals form a chain reaction. Then agents start to gather (to do something same).

(d) A herd/swarm is assembled. Some forces work to create a shortest path, etc.

I think this process must be concerned with our speculative price-hike. Particularly, '(b) (c)' is important. As for (a), it is a fundamental form among early lives. As for (d), latest findings revealed

that genes are employing the laws of nature to create organs/movements. (Y. Hypotheses No.1)

(Considerations)

1. There are many lives which originate a strong herd behavior to travel before a food shortage. Travels are accompanied by uncertainties. Strong herding behaviors break out from a shortage, that is, difference of the number between their predations and their prey's proliferations. So do we. A shortage of supply makes us feel a fear. We are apt to start some same actions.
2. There are many lives which originate a strong herd behavior when special foods appear, a fear of predation/life-crisis occurs, or a breeding season comes.  
(Note: Special foods: big catches, lacking foods, etc.)
3. There are some microbes which usually propagate asexually, but when a food shortage occurs, begin sexual reproductions. It is widely accepted that the beginning of the sexual reproduction was the bacterial conjugation (feeding on each other) in a food shortage. Two which survived a certain circumstance conjugate into one. (> want, scarcity, and status)  
<Lives have basic reactions/emotions to preserve their lives. So do we.>  
<In us, 1 occurs from fear. 2 and 3 occurs from flash/delight /confidence, fear, and mania.>
4. A speculative price-hike is diffused and amplified by human herd behaviors. Value would exist prior to it. I suppose, value's genic source would come from the sense of balance of 'want, work, and income' which lead to dynamic equilibrium. Divergence doesn't give birth to the dynamic equilibrium (lives).
5. When a strong herding behavior arises, the law of supply and demand does not work well, or really works after a time lag.
6. A price-hike and a feeling of strong want are two sides of the same coin. In Japan's bubble;  
On one hand, affordable homes went away to areas where commuting times were over two hours. On the other hand, real estate price-hikes brought about significant alchemy.
7. Under the economic slump after the bubble burst, sense of territory appears intensely. Everyone begins to protect things within his/her territory. > Fear, Anger > Action, Reaction, Overreaction > Cooperation with Herd behavior, New brain, Leader. (At worst, it leads to a war.)
8. Humans are mostly adapted to Pleistocene environments. So, our psychological mechanisms sometimes exhibit mismatches to the modern environment. (See: Evolutionary psychology)  
Ex.: Our brain is weak in watching complicated contents without writing. We tend to react to their labels in this modern environment. This mismatch often plays an important role in a bubble formation. When an article's price starts to rise because its value has risen, other similar articles' prices also tend to rise although their values have not risen. This bias often troubles our rational pricing.  
Ex.: A sense of crisis arises in order that we survive the crisis. But it sometimes has mismatches

to this modern environment. So it sometimes panics us and amplifies the crisis.

Ex.: Invention of money > Though enough food makes us a full stomach, this brake does not work in money. > Nonconformity occurs against our inborn program "fairness" which our remote ancestors had cultivated in a very long history.

Ex.: Programs that had been suitable in the economy of the predation & prey come out into the economy of the creativity & exchange.

Ex.: Our new brain changes systems continuously. If we do nothing, the market could become relatively opaque despite in this cascade of information.

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< Lives' behavior vs. human behavior >

I examined the correspondence of behaviors of lives to those of humans, on the premise that changes occur as utilizing the previous one.

(Basic matters)

Maze: Uncertainty. \_ Food: Income. \_ Want: Want creates Utility, Scarcity, and Demand. \_ Shortest: Efficient. \_ Distance: Work: Cost.

While as for humans they drastically changed, as for lives, predation-prey-symbiosis relationships are supply and demand. The supply and demand are carried out efficiently in a herd/swarm and in a territory. It corresponds to our market. Our market's drastic change has been evolved by our 'creativity' & 'exchange'. Our new brain's creativity has progressed by an accelerative speed in a long human history. Acceleration = Some force has been working.

(To reduce/overcome uncertainties < Human acts now while looking into the future < Gene's survival)

Lives save surplus energy inside their bodies, and repeat a physical change of 'small to large' to reproduce them. As using the natural energy, they form a food chain and create an ecosystem. Supposing that their currency is 'xx calorie', these correspondences are so like that they seem to be able to submit financial statements. Energy: Money.

(Pattern 1) Comparison from the view point of the 'fear of shortages'

- (a) There is no commander in human speculative market, or the commands/controls are weak.
- (b) Some event appears which makes agents fear a future shortage.

Some agent who felt a fear starts to worry about it, and wants to tell it to someone.

- (c) Stories and emotions start to spread. "First come, first served!" occurs.

(Humans are able to create values, but some goods can't be supplied within a short time.)

(Humans save money, expect future, and react to an uncertain future income.)

(Humans have different transfer speeds of information, and different personalities like the diffusion of innovations theory. Persons appear one after another to get on the boom.)

“It will rise beyond my affordability!” “It will rise more in the future!” Everyone wants to buy it now, wants to sell it after the rise, so the price rises now (not in the future).

The reckless mass rush is not stopped by one person’s good conduct.

The unstable sense of value creates speculative prices.

(d) At last, some powers work toward the efficiency or opposite interest. So, it does not diverge.

(Ex: ending of the boom, long-term adjustment of supply and demand, cost reduction, etc.)

Events are always changing. So, it does not converge.

The swarm intelligence seeks answers (settlements) forever. So, it fluctuates.

(Pattern2) Comparison from the view point of ‘gain from resale’

(a) There is no commander in human speculative market, or the commands/controls are weak.

(b) Something appears which looks like an alchemy (special foods).

Some agent who discovered it becomes elated (flash/delight/confidence), and wants to tell it to someone (success stories, boasts, etc.).

(c) Stories and emotions start to spread. “First come, first served!” occurs.

(Humans are able to create values, but some goods can not be supplied in a short term.)

(Humans save money, expect future, and react to an uncertain future income.)

(Humans have different transfer speeds of information, and different personalities like the diffusion of innovations theory. Persons appear one after another to get on the boom.)

Worries arise not to fall behind in getting a gain. Rush! Boom!

Unstable sense of value creates speculative prices.

(d) At last, some powers work toward the efficiency or opposite interest. So, it does not diverge.

(Ex: ending of the boom, long-term adjustment of supply and demand, cost reduction, etc.)

Events are always changing. So, it does not converge.

The swarm intelligence seeks answers (settlements) forever. So, it fluctuates.

Besides above, in a mania (extremely strong enthusiasm often shared by a lot of people at the same time), a program, in which another gene would be involved, might be working in response to some unusual situation. (Y. Hypotheses No.2)

(x) A feeling of want swells up.

(y) Feelings of scarcity and status tone up.

(z) Blindness occurs.

If it is proven, price created in this state should be called a mania price. It comes from an

extremely strong want and enthusiasm (a lump of excitement and confidence). It paralyzes feelings of risks.

(Backgrounds: A program that competes for ranks joins in amplification factors. Increase of financial leverage. Historical backgrounds.)

Analysis is needed on the lives' cycle of the 'want, predation, and reproduction'. 'Food shortages' and 'reduction of uncertainties' had a strong relation to the sexual reproduction in the early stage of lives. Asexual reproduction can make lives proliferate faster. But, as the sexual reproduction can reduce uncertainties by creating diversity faster, it reduces a possibility of extinction of lives.

As mentioned above, some part of original forms of human economic activities (value, supply and demand, territory, herd, mania, etc.) would have been born in the age of single-celled organism.

In addition, against uncertainties, lives acquired more efficient programs during quite a long time. For example:

1. Fishes/birds have other more efficient programs to move some thousand kilo meters.
2. Many lives which have large cerebra started to have leaders/tactics/learning of experiences.
3. We sometimes cooperate with each other beyond our own present interests. A feeling of fairness sometimes conflicts with speculations, intensely. These are programs which might have been deepened in/before the Pleistocene (+ culture). Though they may be seldom observed in speculations on a surface impression, relief, bailouts, etc., at bankruptcy may be sons of these programs. Other lives seldom have "these programs + future prospects" at a strength of us.
4. Moreover, humans advanced a new brain, and developed sciences. But, still now, we are suffering from and troubled by uncertainties.

So, I think, above mentioned 'basic program to conquer uncertainties' would appear strongly, occasionally, when it is needed.

< From the Selfish Gene >

To borrow terms in 'The Selfish Gene' written by Richard Dawkins, shortly;

1. The combination of genes may be short-lived, but the genes themselves are potentially very long-lived.
2. Genes built survival machines (lives) for themselves to live in. Survival machines got bigger and more elaborate.
3. Genes had been competing directly with their alleles for survival in environments of natural selection, surviving through a large number of successive individual bodies.  
... is the history of lives.

The gene of the herd behavior must be one of the most epoch-making one in the lives' history. It might be still living in us, or, it might have created some similar structures in us. Humans, at now, are analyzing its actions and put them into computer programs to make up for own weak points, and are surprising at its breathtaking functions.

(2001: A Space Odyssey): Humans discovered that someone came to the moon 4 million years ago!

(This Case): Humans came to know that lives had arrived here X,XXX million years ago!

#### < Independently Coexisting >

Up to here, in humans' herd behavior concerning speculations, at least four large subroutines independently coexist. They sometimes oppose each other and sometimes co-operate.

(Thus, humans are born having spaces in which one can not get a certain answer concerning "it is right" or "it is wrong".)

##### 1. Herd behavior vs. Programs that create territory

The former is a collective movement. The latter is an individual movement.

##### 2. Herd behavior vs. Programs that create leaders

The former does not have commands/controls. The latter has commands/controls.

##### 3. Herd behavior vs. our New brain

The former may get an answer after a long wandering.

The latter can get an answer first, then, start to act.

An inconsistency comes out. Our very old natural reactions start to dance on a stage which our new brain created. (Besides, the power law is working, too.)

1. Bubble does not last. It collapses. Speculative herds are rational when looking from a long term.

2. But, when looking from a level which our new brain wants, it is very wild and irrational.

#### < Our new brain vs. Instinctive speculations >

As for acellular slime molds, they all could have reached the foods far faster if anyone handed over and explained a map to them. (A good point of our new brain)

But, uncertainties are still troubling us. Our new brain can not draw a map. It halts. Even so, our animal spirits (with biases/herding-behaviors) will do something. "From the gut!" "Follow others!"

(A good point of the speculation)

Complicated systems, that our new brain created, sometimes include mistakes, or, are often unchangeable automatically even if they turned into inefficient. (A weak point of our new brain)

Under a complex economic system, we have a history in which a collapse of speculative prices led to a global depression. Insane politics arose like a storm. A war devastated the world. (A weak point

of the speculation)

There is a possibility of the mania price. There would be a problem of the inconsistency between complicated systems and our reflex actions. Why did the bubble begin in the 17<sup>th</sup> century? We need to solve its cause, and manage it.

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(P.S.)

1. Humans exchange goods (Feb. 2012)

Chimpanzees have the ability to barter foods.

But, they seldom barter unless the buying goods are extremely better than the selling goods.

Theory (1): The risk of defection (absconding) is quite high. (See: "Chimpanzee Autarky")

Theory (2): They have possession norms, but do not have ownership norms.

(When they part with the food (little added value), they lose the right for it.)

We obtained ownership norms since we have "ability to add value" and we "protect the adder". ?

"New Brain's Creativity " and " Ability to Exchange" changed the form of supply and demand. ?

2. We can imagine things not being in our presence. We act now while looking into the future. (Feb. 2012)

Chimpanzee's gene differs from that of man only by 1.2%. However, the former who has lived in the stable forest acts as watching the present, the latter who advanced into the grassland's harsh environment acts while looking into the future. (To be precise, they are different in degree. Chimpanzees do not act as looking the far future.) (See: "Sozo-suru Chikara" written by T. Matsuzawa)

Lives rarely worry about their children's educational expenses, their housing loans, or their old ages ahead of 10-20 years.

On the other hand, the present is apt to become more important for us. We are not apt to look into the far future. (Ex.: Charging to the future generation. Ex.: We are now paying the purification costs of the soil contaminations of 40-50 years ago.)

3. Fallacy of composition (Note the relations with herd behaviors) (Feb. 2012, Jan. 2013)

There are phenomena in which reasonable actions in micro sometimes synthesize into irrational results in macro.

Ex.: When a recession seems to come, it is good for one person to save his money. However, if everyone starts to do the same thing, it amplifies the recession.

4. Self-fulfilling prophecy (Note the relations with herd behaviors) (Feb. 2012, Jan. 2013)

There are phenomena in which a first wrong prediction causes other new actions, and then the new actions make the first prediction become true.

Ex: "Toilet paper will run short!" > Everyone starts to hoard it. > It runs short. (Toilet paper panic in Japan in 1973)

Ex: "Land sharking has started! Land price will rise!" > Everyone begins to want to buy lands

before they rise. Everyone begins to want to sell lands after they rise. > Land price rises!  
Ex: "Recession will come! Feel a sense of crisis!" > Everyone tightens their purse strings  
(consumption & investment). > It amplifies the recession.  
Ex: "XX-Bank is going bankrupt!"> Everyone rushes to the bank to withdraw their deposits. >  
Even a bank which really is not in bad financial condition goes bankrupt.

#### 5. Cognitive behavioral therapy (Feb. 2012, Nov. 2012)

CBT involves helping patients develop skills for modifying/identifying distorted thinking and changing behaviors. There are even such cases; "To recognize the cause which causes one's fear" cut off a chain of the amplification of the fear. So an anxiety disorder starts to ease.

This is important when fears diffuse after a bubble crash. If we apply this theory to the chain reaction of fears after a bubble-burst;

1. Burst of labels that everyone trusted without seeing their contents generates strong fears. >
2. Sense of crisis swells up. > It does not fit for the modern circumstances. > It amplifies the sense of crisis farther. > People start to tighten their purse strings.
3. People do not realize what causes their fears. > It amplifies the fears farther. > Doubts beget doubts. > Money starts to stagnate its moving.
4. Thus, for example, GDP-2% might be amplified to GDP-6% by our psychological factors.

If the cause of a bubble becomes clear, is analyzed, and is succeeded, the wave will become smaller!

#### 6. BOIDS & Inflationary Expectations (Jan. 2013)

If inflationary expectations are moving like BOIDS, inflation target will be realizable also in Japan. We need to remove our fear/pessimism which is amplifying the current recession!

What generates our fear is that we can not realize its causes. One of them may be a mental aftereffect of the bubble which we suffered. Once, we had a terrible experience by "having flown upward!" A sense that a bubble will repeat may prevent us from "flying upward".

About the general prices in the bubble period, many people say, "It soared" or "I don't know." In reality, it was relatively steady. There is a strange self-locking structure. While low interest rate is said to be the cause of the bubble, we are in low interest rates now.

See: BOIDS & Inflationary Expectations (Y. Hypotheses No.4)

We need to build a system for the future, which makes us realize the mechanism of a bubble.  
(Ex: Big Data Analysis of Real Estate Transactions)