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# Species Boundary of Bionic Theory in Provincial Domain Financial Configuration Effectiveness Analysis

[1]Dai Zhi-Min, [2]Guo Lu and [1]Zhang Heng-Feng
[1]School of Economics and Management, Nanchang University, Nanchang, Jiangxi, 330031, China
[2]School of Statistics, Jiangxi university of Finance and Economics, Nanchang, Jiangxi, 330013, China

**Abstract:** From the perspective of financial and ecological, market, legality and government are three different ecosystems; the system functions must be clear according to bionics species boundaries clear request. If the three border fuzzy, market, government and legality will occur with alienation, finance ecological balance will be broken and arouse. Financial ecosystems disorder emergence financial instability with the appearance of variants malignant alienation circumstances. The disappearance of species boundaries blur and convergence will allow the activities of financial institutions, financial product homogeneity and thus falling into the price goal-oriented competition in which it can not extricate. The genetic algorithm in Bionics can be used in financial institutions for the entire process of new business development while working genetic code transfers effectively to conserve excellent biological genes. This difference for marketing of financial enterprises will provide theoretical support and driving force. In this paper, we enhance redundancy and efficiency bionic control and system design based on the major financial institutions and markets in analysis of Jiangxi symbiosis of the financial resources.

**Key words:** Financial ecology, bionics, differentiated marketing, genetic algorithm, performance

## INTRODUCTION

Financial constraints theory studied the financial system and financial markets of developing countries on the use of information economics (Ai *et al.*, 2004); they regarded that the assumed premise of financial deepening market conditions under the Walras equilibrium, which in reality is difficult to set up. Financial constraints theory viewed that market failure as financial information failure essentially, which led to financial market trading system hardly to operate effectively, it must be supplied by the government which should has a formal system to ensure the authority of the market system into full play. They believed that the selective intervention in the financial sector contribute to financial deepening and help financial development and economic growth rather than hinder.

In Policy framework of financial constraints theory, the role of government is neither a "goodwill market theory" that emphasizes the government can only facilitate market development but not intervene in the financial economy (Eiben *et al.*, 1999); nor a "country-driven development" which requires the government to make up market failure. It must always strongly intervene in the financial economy; it should have the point of view "market promotion". Thus the

Government's function is to promote private sector co-ordination and the role of the government is to control the complementary function selectively and to avoid detrimental to the community with moral hazard in the process of economic transition real financial deepening steadily in our country.

## FINANCIAL DEVELOPMENT AND THE ENVIRONMENT FROM THE PERSPECTIVE OF BIONICS SYMBIOSIS AND COORDINATION

Financial ecological balance principle is an important basis for macro-control. Financial ecological imbalance reflected in the price mechanism, the first discovery of financial market failure, prices deviate from value to produce the so-called bubble economy (Ge *et al.*, 2008). Second, the artificial price controls so that the value assigned in uneven distribution of the economic body, affect the natural selection to achieve the goal of profit maximization and micro energy; third the price of structural imbalance will cause financial and ecological deterioration of the financial development of the structural tilt. Therefore, the macro-control to address these three aspects should be adjusted in differential treatment; (2) In case of the financial sector ambiguous property rights,

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**Corresponding Author:** Dai Zhi-Min, School of Economics and Management, Nanchang University, Nanchang, Jiangxi, 330031, China

business, markets, government ill-defined, there will be appropriate across the eco-economy, or government boundaries possession of other economies function or value, the original ecological balance will be break, this Offside "species" or its disappearance, or exterminate the other economies;(3)Species alienation will break the ecological balance. There are two different forms of alienation: one is the innovative sound, the other is a variant type of malignant alienation. It is positive solutions to distinguish between the two different kinds of alienation.

Financial ecological cycle need to clarify the market requirements, the government and legal boundaries to prevent the financial ecology of variation in different systems(Gong and Sun, 2006). Border market is market failure and its own inherent limitations. Mainly refers to information asymmetry market failures, externalities, internal, public goods and monopolies, in these circumstances, market efficiency is not optimal, the allocation of resources requires the involvement of government and law; market limitations inherent in the futures market and innate to the problem of the inadequate information, transaction costs, limited effective demand, "Scarcity Illusion" and the opportunity value of the existence of these limitations so that the market itself requires the involvement of government and law.

The first task of the law is to clear the financial and ecological boundaries and work out an accurate definition of ecological balance on the existing financial balance, such as property rights, market rules. In this sense the law is the premise of the market there, because it is strictly defined boundaries of the various market systems; second, the law can not be completed to fulfil the economic function of markets, elimination of market failure and the market limited the impact of the financial sector. Government has two basic functions, one within the market itself to eliminate the limitations of macro-control functions in regulation and the second is full of financial eco-system of social functions and natural features (Han, 2002). Speaking from the division of labour, the law is aimed at stability and systematic "common choice" social order and the natural order.

Market has its own limitations; such limitations are not fully reflected in the information, asymmetric, internal and external issues. Further speaking, the market will be a "distortion effect" and so on, so that cash flow low efficiency, in this case, the Government must dispatch funds. Therefore, the Government is not a measure of how much money scheduling financial efficiency standards, the standards can be achieved in a market economy, social and natural space in the best three goals. Because

of China's financial integration is not high or even regression in some Western scholars saying, it requires government intervention to improve the efficiency of funds to address the market that can not solve the problem. Capital flows in the central and western China. It is necessary to the productivity of the in-depth analysis and research than enhance the government's information capacity and the ability to identify when the Government's information is better than the market. At that time, the government's control is meaningful.

**Economies of scale and financial development:** The next maps are the loan balance scatter between Jiangxi and the national GDP in 1990-2008.

From the map, we can see the end of the balance of loans with GDP have a linear relationship.

Comprised with the end of the loan balance of GDP and linear regression analysis in Jiangxi 1990-2008 and the national GDP in 1990-2008 and at the end of the loan balance of linear regression analysis, the scale of the national GDP growth and credit growth is more relevant; Since the variable coefficient of the national GDP growth on the scale of credit growth is higher than 43.8% in Jiangxi. Overall comparison, driving economies of scale on the role of credit, Jiangxi Province is lower.

## SPECIES BORDER BIONIC EXPLAINED BASED ON GENETIC ALGORITHM THEORT

Genetic algorithms (GA) are made 70's imitation of biological evolution process optimization by Holland in the United States in 20th century (Orvosh and Davis, 1994). The main idea is based on Darwin's theory of evolution and Mendel's genetics. Genetic algorithm is based on natural selection, searching optimization of biological evolution mechanisms by the computer simulation. Using genetic algorithms to optimize the calculations, only the fitness value, without the need for derivative information and does not need the continuity of the design space or function conditions, as long as each generation of genetic evolution consists of the previous generation's best individual algorithm could implementation of search optimization. Thus genetic algorithm optimization has been widely used (Wang and Cao, 2002).

**Transfer hybridization:** Multi-group parallel genetic algorithm is proposed in recent years, an improved genetic algorithm performance better by other method. Several different populations expand search space. But how to ensure the independence of the various species

based on a variety of groups Collaborative development is a multi-Population Parallel Genetic Algorithm for important issues.

In this paper, we make a hybrid migration strategy, making the elite of various species to learn from each other and widen the evolutionary direction without affecting the evolution of the original direction of the various groups(Yuan, 2002).Concrete realization is as follows:

- Half of the populations using roulette wheel selection while half of the population by sorting options
- Once every few generations hybrid migration, the population in the roulette wheel selection and sorting of random were matching between the selected populations
- Each transfers hybridization which has the optimal matching of their respective populations of individuals of uniform crossover resulting in sub-individual
- Replace the two worst individuals with the individual sub-populations

**Polymorphic variation:** Usually the mutation probability is set to a variation of populations of each individual according to the probability of mutation. But the mutation probability setting is a difficult problem: the mutation probability is too small, so that solution has some limitations, ergodicity is poor; mutation probability is wild and the increased randomness of evolution makes it not easy to obtain a stable solution.

Srinvivas put an adaptive genetic algorithm, so that in concentration associated with crossover and mutation probability population. However, the algorithm is still given the uniform mutation probability with the same individual bits; the jump was still difficult for binary encoding into a local optimum while the chromosome corresponding to the weight of different places very is different. This article proposes a strategy of genetic polymorphism by the way of reference triangular wave shift. According to the size of fitness, different bits for the same individual, we give the different mutation probability, allowing individuals to adapt to high variation of small steps, in the vicinity of the most advantage of fine-tuning to achieve the most advantage; to try to find the most advantage of the global in low fitness individual variation step large. Realization method is as following:

- Individual in population by adaptation sequence
- To determine the length of the main variants according to the fitness of each individual chromosome, the weight variation of the bit is set to chromosome length value

- From the main variants of each shift to one side, by a variation of weights one
- To determine the mutation probability of each one according to the proportion of the weight value variance after setting all the bits of the variability of the individual weights(Zhou and Sun, 1999)

**Group's mutation:** In this study, we put forward mutation strategy group. If the optimal solution species remain unchanged for several generations sustained, we believe that it can not evolve on their own(Zeng, 2007). On contrary, it may fall into local optimum and need disruptive change on populations which may jump into the local best. Concrete implementation methods are:

- Optimal solution of each generation are carried out to check. If a row of several generations are unchanged, then we can get the choice of mutation operators after the trigger group
- Group's mutation, small elite (the user can set the percentage) will directly keep the next generation to avoid the loss of the original optimal solution
- Mutation groups, individuals outside the elite are using probability a much larger variation than the original mutation, mutation probability is generally about 0.6.Thus these individuals are subversive

## ECOLOGICAL CONDITIONS IN THE FINANCIAL SYSTEMS IN JIANGXI PROVINCE

First, it is described from the overview of the financial system in Jiangxi Province. After the evaluation to measure the level of financial development, we select economic indicators of credit-based DTG, financial institution's loan size indicators LTG, credit conversion rate index SLR, the proportion of commercial bank credit indicators BANK, direct financing ratio index of RDF, the non-public economy the proportion of indicators of credit financing PRI level of financial development in Jiangxi single indicator in accordance with the mainstream method(Zhang, 2001) and based on quantitative evaluation, respectively GDPP and technological progress as the dependent variable, then the establishment of multiple linear regression model structured with the situation in Jiangxi empirical analysis of financial slacks.

**Algorithm complexity analysis:** Financial ecosystem of money circulating in the various departments can be described in monetary circulation flow model (below) (Zhang, 2003). By analyzing the various departments within the system size and volatility of capital flows, we can know whether the system is in normal operation or not. In accordance with this idea, from the perspective of

monetary circulation flow of money circulating flow model constructed to analyze the currency in circulation throughout the functioning structure of economic system.

In Model, the economic system is divided into the real economy and virtual economy, where the former including sub-family and the business sector, the latter including stocks, bonds, futures market, real estate, financial sector including sub-financial institutions and non-financial intermediaries. Parameter variables: Income $(Y_T)$; Consumption $(C_T)$; Save $(S_T)$; Government budget deficit $(GD_T)$; Net foreign capital inflows and the sum of import and export $(NF_T+(X_t-IM_t))$; the amount of net capital investment in virtual economy $(\Delta F_T)$; Net money supply financial sector $(\Delta M_T)$, Enterprises financing constraint equations are:

$$S_T+\Delta M_T+\Delta F_T+NF_T+(X_t-IM_t) = Y_T+GD_T$$

First, analysis and explain the complexity of the algorithm parameters used.

- **SIZE:** The number of individuals in each Stock
- **NUM:** No. of Stocks

$N_m$ is migration interval algebra hybrid; $N_g$ is groups mutation interval algebra; $N_t$ is the total runs algebra, sett as constant.

To the migration of hybridization, set each operation to increase the algorithm complexity is O(NUM); Iteration conducted each interval $N_m$. Therefore, the total increase in algorithm complexity is $N_t/N_m$*O(NUM).

For groups' mutations, because of its computational complexity and considerable variation, replace the original mutation, the increase in complexity of the algorithm is only triggered by each generation of the test groups of mutations, a total increase of computational complexity as: $N_t$*O(NUM).

For the genetic polymorphism, each operation increase the computational complexity is O(SIZE*NUM) and conducted every generation, therefore, a total increase of computational complexity is $N_t$*O(SIZE*NUM).

**Case verification:** We draw various types of banking financial institutions as samples of different species. These species are: State-owned Com-banks as $X_1$; None State-owned Com-banks as $X_2$; None Financial Corporation as $X_3$; foreign banks as $X_4$. It runs the algebra of all species in fiscal year. Moreover to the species newly opened branch interval acts as the migration of cross algebra; And to the formation of mixed species, long-term financial cluster centres spares time for the group

Table 1: Results and compared of diversified growth strategy with genetic algorithm

| Index | Traditional genetic algorithm | Diversified growth strategy |
|---|---|---|
| **Worst results** | | |
| Running time (sec) | 3.5 | 12.8 |
| Iterations | 192 | 167 |
| Optimal solution | $X_1 = 1.0034$ | $X_1 = 2.6532*10^{-3}$ |
| | $X_2 = 1.0183$ | $X_1 = 2.8271*10^{-3}$ |
| | $X_3 = 1.0231$ | $X_3 = 2.7046*10^{-3}$ |
| | $X_4 = 1.0175$ | $X_4 = 2.7675*10^{-3}$ |
| | $X_1 = -1.1146$ | $X_1 = 2.4552*10^{-3}$ |
| | $X_2 = -1.1538$ | $X_2 = -2.5183*10^{-3}$ |
| | $X_3 = -1.2473$ | $X_3 = -2.4792*10^{-3}$ |
| | $X_4 = -1.2161$ | $X_4 = -2.5036*10^{-3}$ |
| Objective function value | $Y = -0.9935$ | $Y = -0.9978$ |
| Accuracy (%) | 40 | 94 |
| Ideal target | $Y = -1.0000$ | $Y = -1.0000$ |

mutation algebra. Government policies regulating the number and timing algebra, algebraic laws run the number and time of each species as a basis for species movement and mixed together.

In order to test the genetic algorithm optimization performance with diversified growth strategy, this paper adopts the following test case:

$$g_1(x) = x_1^2 - x_2^2 - x_3^3 - x_4^2 - 0.10 \leq 0;$$
$$g_2(x) = x_1^2 + x_2 + x_3 + x_4 + 1 \geq 0;$$
$$-10 \leq x_1, x_2, x_3, x_4 \leq 10.$$

$$f(x) = \frac{Sin^2\sqrt{x^2+y^2} - 0.6}{(1+0.01(x^2+y^2))^2} - 0.6 \rightarrow min$$

That is shaffer's function. Only point (0, 0) for the global minimum. Minimum ridge around a circle, values are -0.9935, It is easy to stop at this local minimum point.

**Test results:** The traditional genetic algorithm and genetic algorithm diversification growth strategy for testing were tested 10 times each. The following table lists two kinds of algorithms in the worst result of 10 times and 10 times correction rate.

As can be seen from the results, diversified growth strategy can get better negative entropy which in theory in line with the main competition in a variety of different socio-economic benefits for the entire benefit than the traditional genetic algorithm genetic algorithm; Overall, from other four categories with different financial species: species boundaries of state-owned commercial banks is shrinking, there were trends in the relative expansion of activities in the border rather than financial institutions (mainly finance company); foreign banks as the number of samples limited, no more from the data perspective clues for the time being, it embodies a kind of detection in the market situation.

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