Artículo **Revista de Planeación y Control Microfinanciero**
Diciembre 2015 Vol.1 No.2 96-103

Fractal complexity of the Financial Aeromexico

LOMELI, América †

Universidad Iberoamericana, México

Recibido 24 de Juuio, 2015; Aceptado 30 de Septiembre, 2015

Abstract

Analyzing investment risks, gives us a more accurate picture of the profit that can be obtained for a specific customer, considering the data displayed on the Mexican stock exchange, through the trading matrix. Its importance lies in the certainty of the actual gain can be obtained and which helps decision-making in future investments.

Fractal, Financial, Aeromexico

Citación: LOMELI, América. Fractal complexity of the Financial Aeromexico. Revista de Planeación y Control Microfinanciero 2015, 1-2: 96-103

† Investigador contribuyendo como primer autor.

Diciembre 2015 Vol.1 No.2 96-103

Introduction

Analyzing investment risks, gives us a more accurate picture of the profit that can be obtained for a specific customer, considering the data displayed on the Mexican stock exchange, through the trading matrix. Its importance lies in the certainty of the actual gain can be obtained and which helps decision-making in future investments.

Analyzing investment risks, gives us a more accurate picture of the profit that can be obtained for a specific customer, considering the data displayed on the Mexican stock exchange, through the trading matrix. Its importance lies in the certainty of the actual gain can be obtained and which helps decision-making in future investments, so you can do the comparative relationship and obtain successful results. It is a highly personalized work, which guarantees applicable to Aeroméxico numbers. Regularmentre companies seek safety in their activities, taking decisions with firm foundations which provide them satisfactory results, but above all to provide them with certainty.

Methodology

Taking as a basis the stock market crash of February matrix was determined using six different mathematical models of calculation. Which provide different scenarios for gains that can be obtained by applying them correctly. Below detail each.

For each of the scenarios developed in this article data from the trading matrix of February are taken the main formula for the application of this method is as follows:

$$\frac{\left\{\left[\frac{\lim PUT+\lim CALL}{(\int x^{PUT})(\int y^{CALL})}\right]^{\ln\frac{PAc}{AC}}\right\}+\left\{\left(\frac{\log PUT}{\log CALL}\right)^{AC}+\left(\frac{PAc}{AC}\right)^{PUT-CALL}\right]}{z}$$

$$3\left(\frac{4}{3}\right)^{n}L_0 \lim_{n\to\infty} 3\left(\frac{4}{3}\right)^{n}L_0=\infty$$

For iteration Ex Ante:

$$A_1=\frac{\sqrt{3}}{4}l_0^2+3\frac{\sqrt{3}}{4}\left(\frac{l_0}{3}\right)^2$$

For iteration Ex Post:

$$A_2=\frac{\sqrt{3}}{4}l_0^2+3\frac{\sqrt{3}}{4}\left(\frac{l_0}{3}\right)^2+3\cdot 4\frac{\sqrt{3}}{4}\left(\frac{l_0}{3^2}\right)^2$$

In combined operation:

$$A_{n=}\frac{\sqrt{3}}{4}l_0^2+\sum_{k+1}^{n}3\cdot 4^{k-1}\frac{\sqrt{3}}{4}\left(\frac{l_0}{3^k}\right)^2$$

$$=\frac{\sqrt{3}}{4}l_0^2\left[1+\frac{3}{4}\sum_{k=1}^{n}\left(\frac{4}{3^2}\right)^k\right]$$

$$=\frac{\sqrt{3}}{4}l_0^2\left[1+\frac{1}{3}\sum_{k=0}^{n-1}\left(\frac{4}{3^2}\right)^k\right]$$

$$A_\infty=\frac{8}{5}\frac{\sqrt{3}}{4}l_0^2=\frac{8}{5}A_0$$

To perform the operation partition must have the detail of the following items:

∫=2.13 Inflation
x=3.36 Cetes
y=3.25 Object rate
z=13.39 Canadian dollar price

Develops the above formula substituting the values of the trading matrix of February 2016. If the result logarithm is applied to smooth the data.

ISSN-2444-5037

$$D = \lim_{n\to\infty} -\frac{\log(3\cdot 4^n)}{\log 3^{-n}} = \lim_{n\to\infty} \frac{\log 3 + n\log 4}{n\cdot \log 3} = \frac{\log 4}{\log 3} = 1{,}26186$$

$D_A = u_{1,A} - U_{2,A}$

$P_i \equiv u_{i(2)-U_{I(0)}} P_1 - P_2$(U-i)/I

Developing the equivalent integral whole, we get:

$$\left\{\left[\frac{3.46+4.61}{\left(\int (2.13)^{3.46}\right)\left(\int (2.13)^{4.61}\right)}\right]^{\ln\frac{4.00}{0.1}}\right\} + \frac{\left\{\left(\frac{3.46}{4.61}\right)^{AC} + \left(\frac{4.00}{0.1}\right)^{3.46-4.61}\right]}{13.39}$$

$$\left\{\left[\frac{8.07}{\left(\int 13.68\right)\left(\int 32.64\right)}\right]^{\ln 40}\right\} + \frac{\{(.75)^{8.85} + (40)^{1.15}]}{13.39}\left\{\left[\frac{8.07}{\left(\int 13.68\right)\left(\int 32.64\right)}\right]^{\ln 40}\right\} + \frac{\{0.07+69.56]}{13.39}$$

$$\left\{\left[\frac{8.07}{\left(\int 446.92\right)}\right]^{3.68}\right\} + 5.26\left\{\left[\frac{8.07}{\left(\int 446.92\right)}\right]^{3.81}\right\}\{[0.01]^{3.81}\} = 2.39$$

Iterating the system:

$$\left(\frac{sen\,3.46 + cos\,3.46}{(3.46-3.36)^{2.13}} + \frac{sen\,4.61 + cos\,4.61}{(4.61-3.25)^{2.13}}\right)^{ln\left(\frac{4.00}{0.1}\right)} + \frac{(3.46/4.61)^{8.85} + (4.00)^{3.46-4.61}}{13.39} =$$

$$\left(\frac{0.31+0.94)}{(0.1)^{2.13}} + \frac{0.99+0.10}{(1.36)^{2.13}}\right)^{ln(40)} + \frac{(.75)^{8.85} + (4.00)^{1.15}}{13.39} =$$

$$\left(\frac{1.25)}{.007} + \frac{1.09}{1.92}\right)^{3.68} + \frac{0.07+4.92}{13.39}$$

$(178.57 + 0.56)^{3.68} + 0.37$
$(179.13)^{4.05}$ = 1334540383 → ln 21.01 = log .12

The result for the first scenario is .12, in this case the F2 fractal and finance tool to obtain data that allowed us to determine the values of Exante (Down / Base) and ExPost (Up / Base) is used. On the trading data matrix maximum (a), Minumum (b) and Range (c) in the tool, which are captured in the fields of values for the Upward Trend and Downward Trend are obtained.

$$dx/dt = s(y - xy + x - qx^2)\ 1/(1 + x^{*2})\begin{vmatrix} 3x^{*2} - 5 & -4x^* \\ 2bx^{*2} & -bx^* \end{vmatrix}$$

$$dy/dt = 1/s\,(-y - xy + vz)\,w(x-z)\,b - ay - x^2y\,bx(1 - y/(1+x^2)$$

$$dx/dt = -x + ay + x^2y\,a - x - 4xy/(1 + x^2)$$

When applying the calculation tool shows the results of 200%, 100% and 50%, which are added together and divided by 3 gives us as a result the EXANTE (Down / Base) and ExPost (Up / Base).

ExAnte (Down/Base)		
%	Regression	Extension
200	1	37.63
100	39.47	38.99
50	39.89	1

Table 1 ExAnte (Down/Base) Fibonacci Aeromexico

$S(a) = \sum a^2$ +a$\lfloor I(x+1,y) - I(xy)\rfloor$+∑a $\lfloor I(x,y+1) - I(x,y)\rfloor < flg >:=$
$\int f\,(x)g(x)dm\Omega$(x)>

ISSN-2444-5037

$P_{sa} = D_{sa,1} - D_{sa,2}$

Optimizando con operadores , nnx:

$i^{12nnx}: n = 0,1,2,3$

$$\frac{37.63 + 36.95 + 1}{3} = 25.19$$
$$\frac{1 + 39.63 + 39.89}{3} = 26.84$$

$$€ \rightarrow \frac{1}{i^{i-€x.x}} f(x)dx, € L^2(\Omega)\ F\mu f: \lambda \rightarrow \int_x^{-2\lambda} \lambda \rightarrow f(xld\, m\lambda)$$

	ExPost (Up/Base)	
	Regression	Extension
200	1	39.67
100	39.47	36.95
50	39.81	1

Table 2 ExPost (Up/Base) Fibonacci Aeromexico

$$\frac{1 + 39.47 + 39.81}{3} = 26.76$$
$$\frac{39.67 + 36.95 + 1}{3} = 25.87$$

Then both results are added, divided by two and is applied to smooth the data log. It develops so on until the value of .54

$$\int lfx^2\ d\mu(x) = \int I(F\ \mu_F)(\lambda)I^2\ d\upsilon(\lambda)$$

$$A, BC\mathbb{R}^d. If - {}_\chi Af\|\mu \leq € \|Ff - {}_\chi BFf\|\mu \leq \delta, (1 - \varepsilon - \delta)^2 \leq \mu(A)v(B)$$

$$\frac{(2.54+4.54)}{2} = 3.54 = \log .54$$

The Stock Market tool used in this exercise is fueled by the values Maximum Price, Minimum Price, Maximum Price Ranges, Circulation Volume Log, Log Broadcasters Stock Market, Share Market and Minimum Price Range Log.

As in previous cases they are based on the trading matrix.5 large totals are added together and then divided among the 50 originally resulting operations. The end result is large so 2 times the logarithm is applied to soften the final data .99

$$L = X_r := \left\{ \sum_{x=0}^{n} R^{*k} l_k € L \right\} \mu = N^{-1} \sum_{b€B} \mu\ o\sigma_b^{-1}$$

$$\frac{7852.51 + 6196.47 + 3559.18 + 588.92 + 372.66}{50} = 18204.52 = \log 9.80 = \log .99$$

This calculation as above is obtained through a tool named Pivot Calculator, similarly to the above cases the data are taken from the trading matrix. Maximum, minimum, closure and opening are the values that are placed to obtain the desired results. There are two concepts that are handled are the resistance (4) and the support (4), these are derived harmonic, Brownian, recursive and fractals. To select which concept is taken to make the prediction should be considered that both contain results in the 4 variables mentioned above.

	Armonico	Brownian	Recursive	Fractal
Resistance	40.25	40.30	40.08	40.05
Support	39.57	39.62	39.89	39.37
Total	79.82	79.92	79.97	79.42

Table 4 Pivot Aeromexico

ISSN-2444-5037

Continues summing two values (resistance and support), for a total of 4 fields, is added and finally divided by 4. smoothing values is performed until the minimum 0.27.

$$X_P := \left\{ \sum_{k=0}^{\infty} R^{*-k} l_k : l_k \in L \right\}$$

$$2\pi \, \mathrm{d(B)} \max_{\substack{b,b' \in B \\ l \in L}} \| \sin(2\pi(b-b')(.-l)\|\infty$$

$$\frac{(79.82 + 79.92 + 79.97 + 79.42)}{4} = 79.78$$
$$= 1.90 = \log .27$$

The method to obtain the result of Carnot is made by applying the following formula:

$$L_r := \left\{ \sum_{k=0}^{n} (r\, R^{*})\, l_k : n \in \mathbb{m} l_k \in L \qquad N^{-1} \sum \mathrm{b} \in \right.$$
$$\beta \mu_r \circ \alpha, b(x) := (r\,R)^{-1}\, x + b$$

$$GISF = \frac{(\mathrm{PUT} + \mathrm{CALL})^{\frac{1}{2}}}{\left(\frac{\mathrm{VCALL} - \mathrm{VPOST}}{2}\right)^{\frac{3}{4}}}$$

$$\mathrm{GISF} = \frac{(39.96 + 39.96)^{\frac{1}{2}}}{\left(\frac{2.9 - 3.94}{2}\right)^{\frac{3}{4}}} = \frac{8.93}{0.61}$$
$$= 14.63 \rightarrow \ln 2.68$$

Cycle in Carnor the maximum and minimum of the trading matrix is placed as well as the call and put the same source and the value of GIS'F that is the result of the application of the formula indicated start.With the values resulting from the calculation of the tool, they field C and D. fill amounts volume and high power GIFS to PUT are performed. MaxExPos later, the MaxExAnte, MinExPost and MinExAnte is calculated. final results are subtracted, divided between 2 and is smoothed to reach number 00.

Volumen	GIFS
C=41.17	2.55
D=40.99	2.56
A=CALL	39.96
B=PUT	39.96

Table 5 Carnot Cycle Aeromexico

$$\mathrm{f(x)} = \sum \lambda \in L < e\lambda | f > \mu_z^{\lambda}$$
$$m(\Delta \frown \Omega), v(\Delta) := \sum_{k=0}^{\alpha} = o\mu 0(\Delta + k)$$

$$\frac{H = In(b_y)}{In(b_x)}$$

$$(41.17 + 2.55)^{2.66} = 23131.78$$
$$(40.99 + 2.56)^{2.66} = 22893.30$$

Fractal analysis is the latest method used in this exercise; in this case 169 calculation variables on the values of the following fields are present: maximun Price, minimun Price, maximun Price range, stock market broadcasters logs, share market log and Minimum Price range.

The results are divided into four quadrants,these are summed and the result following ranges:

Fractal Matrix	
N->	5.74
E->	4.26
S->	1.00
O->	1.26

Table 6 Quadrants Fractal

The following formula applies formulated by replacing the values with the results obtained in each quadrant. The log is again applied to soften the amount obtained as a result .35.

$$f(x,r) = \alpha^{f^2}(x/\alpha, R_1)\alpha^n f^{2n}(x/\alpha^n; R_n)\alpha^n f^{2n}(x/\alpha^n, R_{n+1}) = \alpha g^2(x/\alpha)$$

ISSN-2444-5037

$$\frac{[1(N)+(90(E)]^{\frac{3}{4}}}{[(80(S))-(270(O))]^{\frac{1}{2}}}$$
$$=\frac{[1(5.74)+(90(4.26))]^{\frac{3}{4}}}{[(80(1.00))-(270(1.26))]^{\frac{1}{2}}}=6.18*4$$
$$=24.73=(\log 24.73)=1.39$$

$$\frac{(5.74+340.2)^{\frac{3}{4}}}{[(80)-(340.2\ )]^{\frac{1}{2}}}\frac{291.85}{130.1}=2.24=\log .35$$

Finally we get the levels of risk for stochastic modeling of financial market:

$$.99\ \frac{log.54}{ln.99}=\frac{0.26+0.01}{2}=\frac{0.13*100}{100}=0.13\%$$
$$.66\rightarrow\frac{log.27}{ln.35}=\frac{0.56+1.04}{2}=\frac{0.8*100}{100}=0.8\%$$
$$.33\ \frac{log.12}{\ln.00}=\frac{-0.92+0}{2}=\frac{-0.46*100}{100}=-0.46\%$$

Results

The result obtained from the application of the 6 methods mentioned above is as follows: Fibonacci .54, Miller.12, Pivot.27, Stock.99, Carnot .00 and Fractal .35, each shows the smoothed values, because the overall result that was obtained was extensive.

Conclusions

In making the 6 methods proposed for the company AeroMexico is concluded that the high investment risk shows Fibonacci models and Stock; Pivot, Fractal way while Carnot and Miller are at low risk. Thus it is determined that the calculated profit margin is 0.13%, using fractal methodology.

References

Burkle-Elizondo, G., Sala, N., & Valdez-Cepeda, R. D. (2015). Geometric and complex analyses of Maya architecture: some examples. In Architecture and Mathematics from Antiquity to the Future (pp. 113-125). Springer International Publishing.

Cabrera, A. (2015). Financial Engineering case study: Alcatel-Lucent, SA Mexican Capital Market (BMV). In Tópicos Selectos de Economía: Volumen III (pp. 165-181). ECORFAN.

Díaz, A. F. (2015). Chaos and Fractal Impact on Economics. Documentos de trabajo de la Facultad de Ciencias Económicas y Empresariales, (2), 1-34.

Díaz, A. F. (2015). Chaos and Fractal Impact on Economics [El impacto en la ciencia económica de la teoría del caos y de los fractales: Teoría y aplicaciones] (No. 15-02). Universidad Complutense de Madrid, Facultad de Ciencias Económicas y Empresariales.

Enriquez, J. I. G., Al Rey Villagracia, R. R., & Culaba, A. B. (2015). A dynamic Leontief model with stochastic extensions for sustainable Jatropha curcas biofuel supply chain.

Escamilla, M. R. (2013). Frontera estocástica del I+ D con cotas fractales para la innovación tecnológica. Economía Informa, 2013(382), 55-75.

Escamilla, M. R., & García, M. M. (2015). Tópicos Selectos de Economía: Volumen III.
Escamilla, M. R., & Méndez, R. L. (2015). Modelación fractal de las fuentes de financiamiento en México. Investigación: cultura, ciencia y tecnología, (14), 35-39.

Escamilla, M. R., & Torrado, F. M. (2012). Tecnología fractal aplicada a los precios del consumidor racional. Investigación: cultura, ciencia y tecnología, (8), 32-37.

Escamilla, M. R., & Torrado, F. M. (2013). Tecnología de innovación fractal en el sector agrícola europeo. Investigación: cultura, ciencia y tecnología, (9), 26-31.

Escamilla, M. R., & Vargas, O. R. (2013). GIS'F FRACTAL ANALYSIS WITH PIVOTING GRAPHIC. Rect@, (4), 209.

Escamilla, M. R., Vargas, M. J. S., & García, M. M. (2013). ITERACIÓN FRACTAL DE COMPUTO IFS EN LOS MERCADOS FINANCIEROS. Rect@, (4), 223.

Felix, R., & Hinck, W. (2016). Attention to Print Advertising: An Eye Tracking Study in the Context of Airline Advertisements. In Thriving in a New World Economy (pp. 252-255). Springer International Publishing.

Ferreiro, J. C., Macedo, J. M., & Jiménez, R. A. G. (2015). Factores que Inhiben el Crecimiento del Mercado de Capitales en la Bolsa Mexicana de Valores (BMV). Revista de la Facultad de Contaduría y Ciencias Administrativas, 1(1), 211-229.

Frausto, J., Álvarez, E., Sánchez, J., Limonchi, P., & Lebrun, J. (2015). Análisis de Portafolios de Inversión para la Bolsa Mexicana de Valores. InTópicos Selectos de Economía: Volumen III (pp. 1-15). ECORFAN.

García, M. M., Escamilla, M. R., Vargas, M. J., Vargas, Ó., & García, L. (2013). Modelación fractal de los precios en el sector eléctrico de España vs. Galicia. Enlaces: revista del CES Felipe II, (15), 4.

Leibold, A. O. S., López, Y. A., & Flores, M. (2016). Low Cost Carriers in Mexico. The Low Cost Carrier Worldwide, 97.

López, A. (2015). Análisis de América Movil. In Tópicos Selectos de Economía: Volumen III (pp. 76-96). ECORFAN.

López, A. (2015). Análisis de América Movil. In Tópicos Selectos de Economía: Volumen III (pp. 76-96). ECORFAN.

Ramírez, R. P., & Escamilla, M. R. (2015). La retracción del Estado ante las nuevas tendencias del mercado global. Investigación: cultura, ciencia y tecnología, (13), 52-57.

Ramos Escamilla, M. (2013). Mapeo fractal con IFS de precios bursátiles. ISO 690

RAMOS ESCAMILLA, M. D. J. (2013). DINAMICA ECONOMICO FINANCIERA ACTUAL (Doctoral dissertation).

Ramos, G. (2015). Análisis financiera Axtel. In Tópicos Selectos de Economía: Volumen III (pp. 45-56). ECORFAN.

Ramos-Escamilla, M. (2015). Stochastic Frontier I & D of fractal dimensions for technological innovation. arXiv preprint arXiv:1509.01212.

Schmitt, D., & Gollnick, V. (2016). Challenges and Competition of Air Transport. In Air Transport System (pp. 347-377). Springer Vienna.

Soto, P. F. S. (2010). Ciencias de la Tecnologia de Información: Handbook T-1.

Torrado, F. M., & Escamilla, M. R. (2012). Concatenación fractal aplicada a la interpolación de los precios en la Bolsa de Valores de Londres. Ecorfan Journal, 3(6), 48-77.

Xiao, G., & Gong, J. (2015). Construction and optimization of a quantum analog of the Carnot cycle. Physical Review E, 92(1), 012118.