Artículo

Revista de Planeación y Control Microfinanciero

Diciembre 2015 Vol.1 No.2 110-122

Financing Fractal in the IT sector: Case America Movil

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Recibido 04 de Junio 2015; Aceptado 12 de Noviembre, 2015

Abstract

The aim of this article is to develop six mathematical models to predict the value of stocks from one of the leading telecommunication companies on the American continent, America Movil, S.A.B. DE C.V. three months into the future. A proposal comprising three levels will be made based on the results, to determine if the investment is viable. Using as a method the following mathematical models: Miller's partition, Fibonacci, Carnot's cicle, pivot, stock market and fractal analysis. Fractals and the Current Financial Economy (FEFA) will be used as a computer support tool to calculate ecuations automatically in the models that had been mentioned before. After obtaining the results of predictions, we plan to make the proposal of the three risk levels of investment classified into low, medium and high. Finally, all this plus the result of predictions will help us determine if the investment in this telecommunication company is viable, this could be verify after three months.

Government IT, telecommunications, risk, investment

Resumen

El objetivo de este artículo es desarrollar seis modelos matemáticos para predecir el valor de las acciones de una de las emisoras líder en telecomunicaciones en el continente americano AMERICA MOVIL, S.A.B. DE C.V. esto a un futuro de tres meses. En base a los resultados se hará la propuesta en tres niveles de riesgo para poder determinar si la inversión puede ser viable. Empleando como metodología los modelos matemáticos de: partición de Miller, Fibonacci, ciclo de Carnot, pivot, stock market y análisis fractal. Se utilizara como apoyo la herramienta computacional Fractals and the Current Financial Economy (FEFA), para el cálculo automático de ecuaciones en los distintos modelos antes mencionados. Después de haber obtenido los resultados de las predicciones, se espera obtener la propuesta de tres niveles de riesgo de inversión clasificados en bajo, medio y alto. Esto al final nos permitirá determinar en base a los niveles de riesgo, si es viable la inversión en la emisora, lo cual se comprobara transcurrido los tres meses.

Gobierno de T.I., telecomunicaciones, riesgo, inversión

Citación: ARROYO, Alejandro. Financing Fractal in the IT sector: Case America Movil. Revista de Planeación y Control Microfinanciero 2015, 1-2: 110-122

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Introduction

Nowadays, information technology has become a core part of the companies, and at the same time occupies a main part in business strategy. As a consequence, we need to broaden the vision of IT and create a financial approach and also to contemplate the possibility of investment in IT companies not only because of the quality and the services they provide.Clearly in Mexico, two main players can be distinguished in the media and telecommunications: Televisa and America Movil-Telmex. These companies maintain a confrontation that begins in the mexican market and continues in the Spanish-speaking world, said [Huerta-Wong, J. E., & Gómez García, R., 2013].

America Mobile is born from the extinction of telephony values, cable television (Cablevision) and other values from Telmex. The company keeps remained fully in the hands of the financial institution Grupo Carso, even though it becomes an independent company from Telmex and its parent company, America Movil stills having the same stockholders, narrates [López, A., 2015] about the company.As [Casanova, L., 2014] says, America Mobile has taken the advantage of an emergent upper-middle class which needs a mobile phone and with its competitors were able to increase an important penetration of 90 percent in the use of mobile phones, it was more than twice the world average. All this has allowed to position themselves within the global market.

But, is this background enough to motivate us to purchase the stocks of this broadcaster company?

How could I highlighted if the potential risk of investment approximates to the correct thing?.The following provides a possible solution to the problem of price determination and the margin of broadcaster stocks regarding to its price in the market persisting over the maximum stochastic margin of operation to make more efficient the trade activity from the investors on the stock exchange, mentioned by [Escamilla, M. R., et al, 2013]. In this article, it is presented a similar proposal for prediction and price calculation in a future period of three months.The first section of this article shows how the shares of América Movil behaves in the Stock Market. Secondly, in the next section we use six mathematical methods (Miller's partition, Fibonacci, Carnot cycle, pivot, stock market and fractal analysis) to make predictions about the cost per stock for three months. The third section will present the obtained results after determining the risks levels low, medium and high, these results would allow us to make a proposal. In the following section, the conclusions based on the results of the mathematical methods will be explained and finally references are found in the fifth section.

America mobile in the BMV

The regulations of the Mexican Stock Exchange, indicate that a company can begin to issue stock, once fulfilled of certain specifications for registration and comply with the process which must be authorized by the BMV and the CNBV.Once the company begins trading on the stock exchange must meet the maintenance requirements of registration.

According to these provisions and after consultation on the website of the Mexican Stock Exchange, is determined that these are fulfilled by the company and remains in compliance with a minimum of 12 % of stock capital and at least 100 investors, this according to the 2016 annual review.

Company	Series	Minimum investors 100	12% Stock Capital
AMX	AA	N.A.	✓
AMX	A	✓	✓
AMX	L	✓	✓

Table 1 Maintenance requirements (https://www.bmv.com.mx/es/emisoras/informacionmatenimiento/AMX-6024-CGEN_CAPIT)

Stock performance

The date of quotation on the Mexican Stock Exchange of America mobile company, to establish the market matrix corresponds to February 8th, 2016.

Stock Market Matrix		
Variable	**Concept**	**Value**
V.P.	Volume sales	124777
Put	Position sales	12.86
V.C.	Volume purchases	79595
Call	Position purchases	12.85
Pu^H	Price last fact	12.85
VAR	Variation	-1.30
VOp	Volume operated	13253915
Max	Maximum	13.03
Min	Minimum	12.83
Max^A	Max. previous year	17.32
Min^A	Min. previous year	12.12
Pu	Price/Utility	35.726179
P.V.L.	Price/Book value	8.75
UA	Utility f/Stock	0.36
V.L.A.	Book value f/Stock	1.48
A.C.	Stocks circulation	41,935,402,225

Table 2 Stock Market Matrix (https://www.bmv.com.mx/es/emisoras/estadisticas/AMX-6024)

Mathematical modeling

Sales

To calculate sales, make the subtraction of volume sales divided by weighted average price, raised by the exponent the price of the last fact, to obtain the position of later year sales.

$$P_{radiada} = I^2 R_r \quad (1)$$

$$Ze = Re(w) + Xe(w) = (Rr + Rj) + Xe(w)J \quad (1.1)$$

$$Put = \left(\frac{VP}{PPP}\right)^{Pu^H} \quad (2)$$

$$Put = \left(\frac{5.09}{1}\right)^{12.85} = 9.08$$

It proceeds to makes the subtraction of logarithmic of volume sales plus naperian logarithm of last fact divided by weighted average price on the variable x, to get the position of sales of the previous year.

$$Z_L = jwL\frac{1}{jwC} R_e (w) + jwL R_e (w) - \frac{1}{jwC}$$

$$Put = \frac{\log VP + \ln Pu^H}{\frac{PPP}{x}} \quad (3)$$

$$Put = \frac{\log 5.09 + \ln 12.85}{\frac{1}{x}} = \left[\frac{\log 5.09}{\ln 12.85}\right]^1 = 0.27$$

Calculate purchases, make the subtraction of volume purchases divided by weighted average price, raised by the exponent the price of the last fact, to get the position of later year sales.

$$SWR = \frac{Vmax}{Vmin} \text{ (adimensional)} \quad (4)$$

ISSN-2444-5037

$$\text{Vmax= Ei+Er}\frac{Vmax}{Vmin} = \frac{\text{Ei+Er}}{\text{Ei−Er}}$$

$$\eta = \frac{RL}{RL+Rs}\frac{RL}{Rs+RL} = \frac{RL}{2RL} = 0.5 = 50\% \quad (4.1)$$

$$L(\in) \to \text{(k-1)X/K} \leq x < kX; \frac{(h-1)X}{K} \leq y < \frac{hY}{k} \quad (4.1.1)$$

$$\text{Log(L)= } L_0 \lim_{n\to\infty} \frac{4^n}{3} = \infty$$

$$D=\frac{logN}{log\frac{1}{r}} h^2+\left(\frac{1}{2}\right)^2 \qquad h = \sqrt{l^2} - \left(\frac{1}{2}\right)^2 = \sqrt{l^2} - \frac{l^2}{4} = \sqrt{\frac{3}{4}l^2} = \frac{1\sqrt{3}}{2} \quad (4.1.2)$$

$$A=\frac{B.h}{2} = \frac{l\frac{l\sqrt{3}}{2}}{2} = \frac{l^2\sqrt{3}}{4} \text{ A+}\sum_{n=1}^{\infty}\left(\frac{4^{n-1}}{3^{2n-1}}\right) A$$

$$Call = \left(\frac{VC}{PPP}\right)^{Pu^H} \left(\frac{4.90}{1}\right)^{12.85} = 8.86 \quad (5)$$

It proceeds to make the subtraction of logarithmic of volume purchases plus naperian logarithm of last fact divided by weighted average price on the variable y, to get the position of purchases of the previous year.

$$Call = \frac{\log VC + \ln Pu^H}{\frac{PPP}{y}} \quad (6)$$

$$Call = \frac{\log 4.90 + \ln 12.85}{\frac{1}{x}} = .27$$

By calculate the prices, firstly substract the sum of the maximum and the minimum of the previous year, divided by the subtraction of the maximum divided by the minimum raised by the variation. The result of this is raised by the exponent of the ½.

$$\sum_{n=1}^{\infty} ar^{n-1} \quad (7)$$

$$\text{P(Kn)=}\lim_{n\to\infty} long\ (k_n) = \lim_{n\to\infty} 3\left(\frac{4^n}{3^n}\right) = \infty$$

$$D=\frac{logN}{\log\left(\frac{1}{r}\right)} \quad (7.1)$$

$$A_2=\frac{3A_0}{4} - \frac{3A_0}{16} = \frac{9A_0}{16} = \frac{3}{4}^2 A_0A_k - 3^k\frac{A_0}{4^{k+1}} = \frac{3^k}{4^k}A_0 - \frac{3^k}{4^{k+1}}A_0 = \frac{4(3^k)-3^k}{4^{k+1}}A_0$$

$$A_{k+1} = \left(\frac{3}{4}\right)^{k+1} A_0 \lim_{k\to\infty} A_k = A_0 \lim_{k\to\infty}\left(\frac{3}{4}\right)^{k+1} = 0 \quad (7.1.1)$$

$$P^I = \left[\frac{Max^A+Min^A}{\left(\frac{Max}{Min}\right)^{VAR}}\right]^{\frac{1}{2}} = \left[\frac{17.32+12.12}{\left(\frac{13.03}{12.83}\right)^{1.3}}\right]^{\frac{1}{2}} = 5.37 \quad (8)$$

It proceeds to subtract the maximum of the previous year divided by the logarithm of maximum plus the minimum of the previous year, divided by the naperian logarithm of the minimum. The result of this, is the subtraction of the variation divided by the two. The result is raised by the exponent fractional of the ½.

$$P_1=\frac{P_0}{4} = \frac{P_0}{2} \quad (8.1)$$

$$\frac{P_n}{2} = \frac{P_{n-1}}{4} \to P_n = \frac{P_0}{(2)^n}\lim_{n\to\infty} P_n = \lim_{n\to\infty}\left(\frac{3}{2}\right)^n = \infty$$

$$Q=\frac{1}{k^3a^3} + \frac{1}{ka} \quad (8.2)$$

$$PF=\left(\frac{2\pi a}{\lambda}\right)^3=k^3a^3$$

$$PF =\frac{1}{Q} \quad (8.2.1)$$

$$\delta = \frac{f_{n+1}}{f_n} \approx 2\ k\frac{c}{f_n}\cos\left(\frac{\propto}{2}\right)\delta^n$$

$$P^{II} = \left[\frac{\left(\frac{Max^A}{logMax}\right)+\left(\frac{Min^A}{lnMin}\right)}{\frac{VAR}{2}}\right]^{\frac{1}{2}} =$$

$$\left[\frac{\left(\frac{17.32}{log13.03}\right)+\left(\frac{12.12}{ln12.83}\right)}{\frac{1.3}{2}}\right]^{\frac{1}{2}} = 5.58 \quad (9)$$

Subtract P^I divided by P^{II} for the price value.

$$D = \frac{\log N}{\log\frac{1}{r}} = \lim_{r\to 0} - \frac{\log N}{\log\ r} \quad (10)$$

$$A_n = \left(\frac{3}{4}\right)^n = \lim_{n\to\infty} A_n = A_0 \lim_{n\to\infty}\left(\frac{3}{4}\right)^n =$$
$$3^n\left(\frac{1}{2}\right)^n = P_0 = P_0\left(\frac{3}{2}\right)^n \quad (10.1)$$

$$P_\infty = \lim_{n\to\infty} P_n = P_0 \lim_{n\to\infty}\left(\frac{3}{2}\right)^n \lim_{n\to\infty} - \frac{\log 3^n}{\log 2^{-n}}$$
$$= \frac{\log 3}{\log 2} = 1{,}58496$$

$$P = \left(\frac{P^I}{P^{II}}\right)\left(\frac{5.37}{5.58}\right) = .99 \quad (11)$$

By calculate the stocks, firstable subtract the volume operation subtraction raised by the exponent of the ½ divided by the average of the weighted average price raised by the exponent of the ¾, all this raised by the exponent of the value of the price

$$AC^I = \left[\frac{VOp^{\left(\frac{1}{2}\right)}}{PPP^{\left(\frac{3}{4}\right)}}\right]^P = \left[\frac{7.12^{\left(\frac{1}{2}\right)}}{1^{\left(\frac{3}{4}\right)}}\right]^{.99} = 2.64 \quad (12)$$

After this, make the subtraction of the multiplication of the ½ by the logarithm of the operation volume divided by the naperian logarithm of the weighted average price, all of this raised by the exponent fractional of the ¾, divided by the subtraction of the price divided by the two.

$$L_n = 4^n\left(\frac{1}{3}\right)^n L_0 = \left(\frac{4}{3}\right)^n L_0$$

$$L_\infty = L_0 \lim_{n\to\infty}\left(\frac{4}{3}\right)^n = \infty \quad (12.1)$$

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

$$AC^{II} = \left\{\frac{\left[\left(\frac{1}{2}\right)\left(\frac{\log VOp}{\ln PPP}\right)\right]^{\frac{3}{4}}}{\frac{P}{2}}\right\}\left\{\frac{\left[\left(\frac{1}{2}\right)\left(\frac{\log 7.12}{\ln 1}\right)\right]^{\frac{3}{4}}}{\frac{.99}{2}}\right\} = .5 \quad (12.1.1)$$

$$A_\infty = \lim_{n\to\infty} A_n = \frac{\sqrt{3}}{4^2} l_0^2 \lim_{n\to\infty} \sum_{k=1}^{n}\left(\frac{4}{3^2}\right)^k =$$
$$\frac{4}{3^2}\frac{\sqrt{3}}{4^2} l_0^2 \lim_{n\to\infty} \sum_{k=0}^{n-1}\left(\frac{4}{3^2}\right)^k \quad (13)$$

$$A_\infty = \frac{4}{3^2}\frac{\sqrt{3}}{4^2} l_0^2 \frac{1}{1-\frac{4}{3^2}} = \frac{1}{5}\cdot\frac{\sqrt{3}}{4} l_0^2$$

$$AC = \frac{\log AC^I}{\ln AC^{II}} \quad (14)$$

$$AC = \frac{\log 2.64}{\ln .57} = .75$$

To calculate the average of put, make the subtraction of the addition from the position of previous year sale, plus the position of the next year sale divided by two.

$$R = \frac{PutExAnte + PutExPost}{2} \quad (15)$$

$$R = \frac{9.08 + .27}{2}\frac{4.67x100}{100} = 4.67\%$$

To calculate the average of call, make the subtraction of the sum of the position of previous purchase year, plus the position of the next purchase year divided by two.

$$R = \frac{CallExAnte + CallExPost}{2} \quad (15.1)$$

$$R = \frac{8.86 + .27}{2}\frac{4.56x100}{100} = 4.56\%$$

To calculate the average of price, the sum of P^I is substracted, plus P^{II} divided by two. All this, is raised to value of price.

$$R = \left(\frac{P^I+P^{II}}{2}\right)^P \left(\frac{5.37+5.58}{2}\right)^{.99} \frac{5.38x100}{100} = 5.38\% \quad (16)$$

To calculate the average of stock, the sum of AC is substracted, plus AC^{II} divided by two, all of this is raised to value of the stock.

$$R = \left(\frac{AC^I+AC^{II}}{2}\right)^{AC} = \left(\frac{2.64+.57}{2}\right)^{.75} \frac{1.42x100}{100} = 1.42\% \quad (16.1)$$

Miller Partition

For our mathematical model, were use the variable shown on the table 3, which were quoted on February 8th, 2016 in the website of Banxico, the following variables will be used: sale position, purchase position, stock value and price value, previously calculated.

∫ =	Inflation	2.87
x =	Cetes	3.93
y =	Object Rate	3.25
z =	Canadian Dollar	13.38

Table 3 Modeling variables Miller partition (https://www.banxico.org.mx/)

Miller's partition model would be applied when making the substraction of the sales position limit plus the purchase position limit. All this mentioned, divided by the Cetes integral value, raised to the sales position multiplied by the integral of the target rate, raised to the purchase position. The result is raised to the naperian algorithm from the action values substraction on the price.

All of this is added to the result of the substraction of the position sales logarithm division on the position purchase logarithm, rised to the value of the price, plus value of the stock division on the enhanced price value, to the sales position difference less the purchase position. All this divided by Canadian dollar price.

$$D = \lim_{n-\infty} -\frac{\log 4^n}{\log 3^{-n}} = \frac{\log 4}{\log 3} = 1{,}26186 \left(\frac{4}{3}\right)^n L_0$$

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

(17)

$$A_1 = \frac{\sqrt{3}}{4} l_0^2 + 3\frac{\sqrt{3}}{4}\left(\frac{l_0}{3}\right)^2 \frac{\sqrt{3}}{4} l_0^2 + 3\frac{\sqrt{3}}{4}\left(\frac{l_0}{3}\right)^2 + 3 * 4\frac{\sqrt{3}}{4}\left(\frac{l_0}{3^2}\right)^2 \sum_{k+1}^{n} 3 * 4^{k-1}\frac{\sqrt{3}}{4}\left(\frac{l_0}{3^k}\right)^2 = \frac{\sqrt{3}}{4} l_0^2 \left[1 + \frac{3}{4}\sum_{k=1}^{n}\left(\frac{4}{3^2}\right)^k\right]$$

$$\frac{\sqrt{3}}{4} l_0^2 \left[1 + \frac{1}{3}\sum_{k=0}^{n-1}\left(\frac{4}{3^2}\right)^k\right] \quad (17.1)$$

$$A_\infty = \frac{8}{5}\frac{\sqrt{3}}{4} l_0^2 = \frac{8}{5} A_0 \lim_{n\to\infty} -\frac{\log(3 * 4^n)}{\log 3^{-n}} = \lim_{n\to\infty} \frac{\log 3 + n\log 4}{n * \log 3} =$$

$$D_{A^=} = 0.31$$

The first result that gives us an increase in stock value of 0.31 cents on the quoted price action is obtained, the Fibonacci sequence is a ordering of numbers, beginning with a number with which the following is equal to the sum of the two immediately preceded.

ISSN-2444-5037

By using higher numbers, it will be seen that the predecessor on a number it is to limit 0.618; the first number on the result is equal to 0.382; the number on predecessor tends to be 1.68; the square root of 0.618 is 0.786; the square root of 1.68 is equal to 1.27. These resulting numbers, are used to predict stock markets, when adding three numbers in a row of sequence is divided by two, the result is equal to the last number added, tells us [Brieva, F. M., et a, 2014].

To calculate the retrogression and extension previous year, is entering the maximum, minimum and price range of the stock market, which are described on table 2, in the computing tool FEFA, to obtain the amounts specified in the table 4.

ExAnte (Down/Base)		
%	**Retrogression**	**Extension**
200	1	12.73
100	12.87	12.53
50	12.95	1

Table 4 ExAnte in Miller Partition

Retrogression ExAnte

Add two hundred, plus one hundred and the fifty percent of the retrogression of the previous year, doing the subtraction divided by the number of added amounts

$$P_i \equiv u_{i(2)-U_{I(0)}} P_{1-} P_2 \frac{\mathrm{U-i}}{\mathrm{I}}$$

$$S(a) = \sum a^2 + a\lfloor I(x+1,y) - I(xy) \rfloor + \sum a \lfloor I(x,y+1) - I(x,y) \rfloor \quad (20.1)$$

$$\frac{1 + 12.87 + 12.95}{3} = 8.94$$

Extension Ex Ante

Add the two hundred, plus one hundred and the fifty percent of the extension of the previous year, making the subtraction divided by the number of added amounts.

$$\frac{12.73 + 12.53 + 1}{3} = 8.75$$

Naperian logarithm and logarithm are applied to results and then summed to obtain the total.

Logarithmic	Result retrogression	Result extension	Total
log	0.95	0.94	1.89
ln	2.19	2.17	4.36

Table 5 ExAnte Logarithmic

$$\frac{(4.36-1.89)}{2} = 1.23$$

Retrogression and the extension of the next year are calculated, with the amounts shown on table 6.

ExPost (Up/Resistance)		
%	**Retrogression**	**Extension**
200	1	13.32
100	12.83	13.12
50	12.93	1

Table 6 ExPost in Miller Partition

(20)

etrogression ExPost

Add the two hundred, plus one hundred and the fifty percent of the retrogression of the later year, doing the subtraction divided by the number of added amounts.

$$D_{sa=2-mD_{sa,1}-\,D_{sa,2}} \qquad (20.2)$$

$$\frac{d}{dxi} < flg >:= \int f\,(x)g(x)dm\Omega(\mathrm{x})>$$

Extension Ex Post

Add the two hundred, plus one hundred and the fifty percent of the extension from the next year, making the subtraction divided by the number of amounts.

$$\frac{13.32 + 13.12 + 1}{3} = 9.14$$

Naperian logarithm and the logarithm are applied to results then are summed to obtain the total.

Logarithmic	Result retrogression	Result extension	Total
log	0.95	0.96	1.91
ln	2.19	2.21	4.40

Table 7 ExPost Logarithmic

$$\frac{(4.40 - 1.91)}{2} = 1.24$$

The difference is calculated from the total of the following year, less the total from previous year $-1.24 + 1.23 \; = |-0.01\,| \to 0.01$, the result that shows an increase in stock value of 0.01 cents on the quoted price action, then is obtained this method the computing tool used is FEFA. Selecting the Stock market option, where we enter the maximum price, minimum price, maximum range and the maximum range, the outstanding shares, the volume operation and the weighted average price.

Concept	Value
Maximum price	13.03
Minimum price	12.83
Maximum price range	15.17
Minimum price range	12.47
Circulation volume log	10.62
Stock market broadcasters log	7.12
Stock market log	1

Table 8 Modeling variables Stock Market

After calculation of the equation by the computing tool FEFA, it shows us a series of results ranging of z_1 to z_{50}, which are summed in ranged in ten.

$$\{e\lambda : \lambda€A\} \qquad (20.3)$$

$$\{\Omega + T : +€\,T\}$$

$$CA - A2^{d} = \Phi \qquad (20.3.1)$$

$$€ \to \frac{}{i^{i-€x.x}} f(x)dx, € \,L^{2}(\Omega) \qquad (20.3.2)$$

$$F\mu f : \lambda \to \int^{-\,2\,\lambda} \lambda \to f(xld\,m\lambda) \int lfx^{2}\;d\mu\,(x)$$
$$= \int I(F\,\mu_{F})(\,\lambda)I^{2}\,d\upsilon(\,\lambda)$$
$$= \;\mu(\mathcal{O} + t)$$

$$\mathrm{A}_{,}\mathrm{B}C\mathbb{R}^{d}.If - {}_{\chi}Af\|\mu \leq €\|Ff - {}_{\chi}BFf\|\mu \leq \delta(1 - \varepsilon - \delta)^{2} \leq \mu(A)v(B) \qquad (21)$$

$$R^{n} + €\mathbb{Z}N^{-1/4}(e^{i2\Pi b-l})$$

$$\mathrm{L}{=}X_r := \left\{ \sum_{x\,=\,0}^{n} R^{*k} l_k € \,L \right\} \qquad (21.1)$$

ISSN-2444-5037

$\mu =$

$N^{-1} \sum_{b\in B} \mu \ o\sigma \overset{-1}{b} N^{-1} \sum_{b\in B} eb(\mathrm{t}) \prod_{k\_0}^{\infty} XB\,($

$R^{*}k_t) \ \sum_{\lambda\in L} |\hat{\mu}(t-\lambda]^2 \ T \in \mathbb{R}^2$

$(Cq)(t) := \sum_{I\in L} |XB(t$

$- l)^2 \, q(p_{l\,(t)}) \left\{ \sum_{k\,=\,0}^{\infty} \ R^{*-k} l_k : l_k \ \in \ L \right\}$

$= \| |\nabla q|_2 \| \infty$

z1=	180.72	z11=	193.17	z21=	180.72
z2=	169.78	z12=	298.62	z22=	178.86
z3=	22.68	z13=	7.69	z23=	13.03
z4=	9.31	z14=	7.79	z24=	13.03
z5=	10.39	z15=	12.04	z25=	12.93
z6=	186.46	z16=	8.68	z26=	10.14
z7=	205.76	z17=	9.51	z27=	10.64
z8=	22.84	z18=	9.56	z28=	11.03
z9=	9.84	z19=	7.68	z29=	13.03
z10=	10.36	z20=	9.09	z30=	13.03
Total	828.13	Total	563.83	Total	456.43

z31=	25.81	z41=	13.19
z32=	25.58	z42=	13.16
z33=	25.49	z43=	13.25
z34=	26.18	z44=	13.14
z35=	25.87	z45=	12.6
z36=	12.3	z46=	12.61
z37=	12.29	z47=	12.6
z38=	12.82	z48=	19.2
z39=	13.15	z49=	13.16
z40=	50.1	z50=	13.04
Total	229.59	Total	135.95

Table 9 Stock Market FEFA

The values are summed and subtracted on the number of results is made. And finally the result is smoothed by applying logarithm.

$$\frac{828.13 + 563.83 + 456.43 + 229.59 + 135.95}{50} = 44.28 = log44.28 = 1.64$$

The result that gives us an increase in stock value of 1.64 cents on the quoted price action, is obtained, using the computing tool FEFA, select the Pivot Calculator option and enter values maximum, minimum, closure and opening, once the calculation has been done by the tool. We use values of resistance1 y support1, which are summed and then divided by harmonics, brownian, recursive and fractals.

	Harmonics	**Brownian**	**Recursive**	**Fractals**
Resistance	9.35	7.51	2.19	7.01
Support	-3.67	-5.51	-0.19	-6
Total	5.68	2	2	1.01

Table 10 Pivot FEFA

The totals are summed and the subtraction is made on the total amount.

$$\frac{(5 + 2 + 2 + 1.01)}{4} = \frac{2.67}{2} = 1.33$$

The result shows an increase in the value of the stock of 1.33 cents over the quoted price of the stock.

Carnot Cycle

The GISF is presented as an interesting alternative in the current context, in which many fractal space investigations or cut, geographic emphasize the importance of the local and global or fractal on aggregate [Escamilla, M. R., 2011].We employ the GISF (Geographic Information System Fractal) to our mathematical model.

The position sales and position purchases are summed, raised by ½, of this result makes the subtraction of the difference of volume sales minus the volume purchases divided by two, raised by ¾.

$$GISF = \frac{(Put+Call)^{\frac{1}{2}}}{\left(\frac{VCall-VPut}{2}\right)^{\frac{3}{4}}} \frac{(12.86+12.85)^{\frac{1}{2}}}{\left(\frac{4.90-5.09}{2}\right)^{\frac{3}{4}}} = 29.63$$

(22)

The result is smoothed by using the naperian algorithm.

$\rightarrow ln29.63 \rightarrow 3.38$

Once the GISF is obtained, we place it in the tool FEFA, in the Carnot cycle option, next to the maximum range, minimum range, sales and purchase volume.

Concept	Value
Range maximum	15.17
Range minimum	12.47
Volume A	4.9
Volume B	5.09
GISF	3.38

Table 11 Modeling variables Carnot Cycle

The tool will shows several values, for which we would only use the market value of the oustanding shares, cost, margin, range and Carnot's volatility.

Concept	Value
Market acc circ	0.11
Cost	0.31
Margin	0.31
Range	0.63
Carnot volatility	0.17

Table 12 Carnot Cycle FEFA

The difference of the margin, less the cost, is substracted and divided by the market value of the oustanding shares is obtained.

$$\left(\frac{Margin-Cost}{MAC}\right)^{CV} \left(\frac{0.31-0.31}{0.11}\right)^{0.17} = 1.95 \qquad (23)$$

Consequently, it is shown a result with an increase in the value of the stock of 1.95 cents over the quoted price.Such ensembles are characterized for having a wide scale similarity, also for not being differentiable and because the exhibit the ¾ fractional dimension Escamilla M. R., et al(2013).

Concept	Value
Maximum price	13.03
Minimum price	12.83
Maximum price range	15.17
Minimum price range	12.47
Circulation volume log	10.62
Stock market broadcasters log	7.12
Stock market log	1

Table 13 Modeling variables Fractal Analysis

The values are placed in FEFA, in the Fractal Analysis option, where we can observe 169 amounts, which would be divided into four groups: North from Z_1 to Z_{43}, East from Z_{44} to Z_{86}, South from Z_{87} to Z_{129} and West from Z_{130} to Z_{169}.

$$\beta \coloneqq 2\pi \text{ (B) } \max_{\substack{b,b' \in B \\ l \in L}} \| \sin(2\pi(b-b')(.-l)\|\infty$$
$$\leq |(N-1)^2 N^{-1} \beta \| R^{-1} \| \ (23.1)$$

The group is averaged and smoothed using the naperian logarithm, in order to unify the amounts.

Pole	Value	Angle
North	91.33	1
East	23.87	90
South	75.12	180
West	42.11	270

Table 14 Fractal Analysis FEFA

ISSN-2444-5037

Each pole value is multiplied by the angle that represents. Immediately, the North Poles are added and rised to the fractional ¾ amount. After this, we would make the subtraction divided by the South Pole difference, less the West Pole rised to the ½ fractional amount.

$$\frac{[1(91.33)+(90(23.87))]^{\frac{3}{4}}}{[(180(75.12))-(270(42.11))]^{\frac{1}{2}}}=7.01*4 = 28.07 = (\log 28.07) = 1.44$$

The result is smoothed applying the algorithm, shows an increase in the value of the stock of 1.44 cents over the quoted price.

Mathematical Modeling	**Value**
Fibonacci	0.01
Miller	0.31
Pivot	1.33
Fractal Analysis	1.44
Stock Market	1.64
Carnot Cycle	1.95

Table 15 Results mathematical modeling

High Risk:Taking the two results that reflect the smallest amount, the logarithm is applied to the smallest one and the preceeded amount is added while applying the naperian logarithm. All of this divided by two.

$$R^n \text{ b.l= Rb } .R^{*(n-1)} \quad (24)$$

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

$$L = M * G(1-D)\ \log(I) = \log(M) + \log(G) * (1-D)$$

$$.99\ High \rightarrow \frac{log 0.01}{ln 0.31} = \frac{-2+1.17}{2} = \frac{-0.41*100}{100} = -41\%$$

In this case, the capital investment of 12% is not reached, so it is not a promising company, therefore the risk investment is high and it is not viable.

Medium Risk:Taking the two results of median amount applied to the logarithm of lesser value and the amount that preceded after applying the natural logarithm adds, this divided by two

$$.66\ Medium \rightarrow \frac{log 1.33}{ln 1.44} = \frac{0.12+0.36}{2} = \frac{0.24*100}{100} = 24\%$$

Low Risk:Taking the two largest amounts, the logarithm is applied to the smallest one and the preceded amount is added. Once the naperian logarithm is applied, all of this divided by two.

$$.33\ Low \rightarrow \frac{log 1.64}{ln 1.95} = \frac{0.21+0.66}{2} = \frac{0.44*100}{100} = 44\%$$

Conclusions

Once that the six proposed mathematical models have been developed, and the level of risk investment was determined, now an investment proposal can be done. After two months from the parent market consulting, it is proved that the value is increasing with the date being April 4th; the purchase value was priced in 13.69 an increase of .84 was observed with regard to 12.85, leaning favorably to the mathemathical models Pivot and Fractal Analysis.Assuming these results, it can be determined that the risk investment in America Movil corresponds to a medium level and it is a viable investment.

ISSN-2444-5037

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