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Statistical „Pole Position" Leadership between Lamborghini versus Ferrari

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ABSTRACT

Lamborghini and Ferrari represents two great hyper powers in the worldwide sphere of the firms which product cars of high performance. In each year, the both firms highlight new models cars at the great salons of expositions, where the prototypes innovated fascinate through shapes, horsepower, engine systems, top speed, electrical performances and more indexes which reflect the „implant"concerning the management of the quality.

1. Introduction

This statistical highlight puts in evidence the competition between two great firms which conquered the lovers of performant cars, namely Lamborghini and Ferrari. The target of this research follows the achievement of the forecasts concerning the values of the levels touched in the sales of vehicles by the both firms, Lamborghini and Ferrari, for to reflect the real leadership highlighted in „pole positions". The first side of this statistical research brings in first plane, how we can to select the trend concerning the number of Lamborghini vehicles selled between 2006-2018, at the worldwide level. The second side guides the readers in the achievement of the methodology regarding the selection of the model which reflects the volum of Ferrari vehicles merchandised in all over the world, in the same interval 2006-2018. The methods used are the „Regression Method" and the „Variation Method" for to achieve the forecasts regarding the values of Lamborghini and Ferrari vehicles selled at the worldwide level. In 1823, Johann Carl Friedrich Gauss drawed up the „Least Squares Method", where the target is the identification of the parameters which belong to the model puts in the sphere of the research.

2. The design of the projection concerning the volum of the worldwide sales for the Lamborghini cars, between 2006-2018

Table 1 The values which which have as essence the „fizzy" architectures of the both champions Lamborghini&Ferrari concerning the series of successes in the worldwide sales for vehicles

YEARS	LAMBORGHINI WORLDWIDE NUMBER OF VEHICLES	FERRARI WORLDWIDE NUMBER OF VEHICLES
2006	2087	5671
2007	2406	6465
2008	2430	6587
2009	1515	6250
2010	1302	6461
2011	1602	7001
2012	2083	7318
2013	2121	6922
2014	2530	7255
2015	3245	7664
2016	3457	8014
2017	3815	8398
2018	5750	9251

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Source: „Statista Portal United States of America"

- if the „sophisticated design" for ξ variable, namely the Lamborghini worldwide sales, is this representation $\xi_{t_i} = a + b \cdot t_i$, a and b will be [3]:

$$S = \sum_{i=1}^{n} (\xi_i - \xi_{ti})^2 = \min \Leftrightarrow S = \sum_{i=1}^{n} (\xi_i - a - bt_i)^2 = \min$$

$$\begin{cases} \frac{\partial S}{\partial a} = 0 \\ \frac{\partial S}{\partial b} = 0 \end{cases} \Rightarrow \begin{cases} 2\sum_{1=1}^{n} (\xi_i - a - bt_i)(-1) = 0 / (-\frac{1}{2}) \\ 2\sum_{1=1}^{n} (\xi_i - a - bt_i)(-t_i) = 0 / (-\frac{1}{2}) \end{cases} \Rightarrow \begin{cases} na + b\sum_{i=1}^{n} t_i = \sum_{i=1}^{n} \xi_i \\ a\sum_{i=1}^{n} t_i + b\sum_{i=1}^{n} t_i^2 = \sum_{i=1}^{n} \xi_i t_i \end{cases} \Rightarrow$$

$$a = \frac{\begin{vmatrix} \sum_{i=1}^{n} \xi_i & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} \xi_i t_i & \sum_{i=1}^{n} t_i^{\,2} \end{vmatrix}}{\begin{vmatrix} n & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} t_i^{\,2} \end{vmatrix}} = \frac{\sum_{i=1}^{n} \xi_i \sum_{i=1}^{n} t_i^{\,2} - \sum_{i=1}^{n} \xi_i t_i \sum_{i=1}^{n} t_i}{n\sum_{i=1}^{n} t_i^{\,2} - \left(\sum_{i=1}^{n} t_i\right)^2} \qquad b = \frac{\begin{vmatrix} n & \sum_{i=1}^{n} x_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} \xi_i t_i \end{vmatrix}}{\begin{vmatrix} n & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} t_i^{\,2} \end{vmatrix}} = \frac{n\sum_{i=1}^{n} \xi_i t_i - \sum_{i=1}^{n} t_i \sum_{i=1}^{n} \xi_i}{n\sum_{i=1}^{n} t_i^{\,2} - \left(\sum_{i=1}^{n} t_i\right)^2}$$

Table 2 The „conglomerate" of the values which joins under the incidence of the reflection concerning the linear pattern for the volum of Lamborghini cars selled at worldwide level

YEARS	**LAMBORGHINI WORLDWIDE NUMBER OF VEHICLES (ξ_i)**	*LINEAR TENDENCY*				
		t_i	t_i^2	$t_i \xi_i$	$\xi_{t_i} = a + bt_i$	$\lvert \xi_i - \xi_{t_i} \rvert$
2006	**2087**	-6	36	-12522	1280,362638	807
2007	**2406**	-5	25	-12030	1507,263737	899
2008	**2430**	-4	16	-9720	1734,164835	696
2009	**1515**	-3	9	-4545	1961,065934	446
2010	**1302**	-2	4	-2604	2187,967033	886
2011	**1602**	-1	1	-1602	2414,868132	813
2012	**2083**	0	0	0	2641,769231	559
2013	**2121**	1	1	2121	2868,670330	748
2014	**2530**	2	4	5060	3095,571429	566
2015	**3245**	3	9	9735	3322,472528	77
2016	**3457**	4	16	13828	3549,373627	92
2017	**3815**	5	25	19075	3776,274726	39
2018	**5750**	6	36	34500	4003,175824	1747
TOTAL	**34343**		182	41296	34343	8375

$$a = \frac{34343 \cdot 182 - 41296 \cdot 0}{13 \cdot 182 - 0^2} = 2641{,}769231$$

$$b = \frac{13 \cdot 41296 - 34343 \cdot 0}{13 \cdot 182 - 0^2} = 226{,}9010989$$

$$v_I = \left[\frac{\sum_{i=-m}^{m} \left| \xi_i - \xi_{t_i}^I \right|}{n} : \frac{\sum_{i=-m}^{m} x_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^{m} \left| \xi_i - \xi_{t_i}^I \right|}{\sum_{i=-m}^{m} \xi_i} \cdot 100 = \frac{8375}{34343} \cdot 100 = 24{,}386\%$$

- if the „sophisticated design" for ξ variable, namely the Lamborghini worldwide sales, is this representation $\xi_{t_i} = a + b \cdot t_i + ct_i^2$, *a* and *b* will be [3]:

$$S = \sum_{i=1}^{n} (\xi_i - x_{ti})^2 = \min \Leftrightarrow S = \sum_{i=1}^{n} (\xi_i - a - bt_i - ct_i^2)^2 = \min$$

$$\begin{cases} \frac{\partial S}{\partial a} = 0 \\ \frac{\partial S}{\partial b} = 0 \\ \frac{\partial S}{\partial c} = 0 \end{cases} \Rightarrow \begin{cases} 2\sum_{1=1}^{n} (\xi_i - a - bt_i - ct_i^2)(-1) = 0 / (-\frac{1}{2}) \\ 2\sum_{1=1}^{n} (\xi_i - a - bt_i - ct_i^2)(-t_i) = 0 / (-\frac{1}{2}) \\ 2\sum_{i=1}^{n} (\xi_i - a - bt_i - ct_i^2)(-t_i^2) = 0 / (-\frac{1}{2}) \end{cases} \Rightarrow$$

$$\begin{cases} n \cdot a + b\sum_{i=1}^{n} t_i + c\sum_{i=1}^{n} t_i^2 = \sum_{i=1}^{n} \xi_i \\ a\sum_{i=1}^{n} t_i + b \cdot \sum_{i=1}^{n} t_i^2 + c\sum_{i=1}^{n} t_i^3 = \sum_{i=1}^{n} t_i \cdot \xi_i \\ a \cdot \sum_{i=1}^{n} t_i^2 + b\sum_{i=1}^{n} t_i^3 + c\sum_{i=1}^{n} t_i^4 = \sum_{i=1}^{n} t_i^2 \cdot \xi_i \end{cases}$$

$$a = \frac{\sum_{i=1}^{n} t_i^4 \sum_{i=1}^{n} \xi_i - \sum_{i=1}^{n} t_i^2 \sum_{i=1}^{n} t_i^2 \cdot \xi_i}{n\sum_{i=1}^{n} t_i^{\,4} - \left(\sum_{i=1}^{n} t_i^2 \right)^2} \; ; \quad b = \frac{\sum_{i=1}^{n} \xi_i t_i}{\sum_{i=1}^{n} t_i^{\,2}} \; ; \; c = \frac{n \cdot \sum_{i=1}^{n} t_i^2 \cdot \xi_i - \sum_{i=1}^{n} t_i^2 \cdot \sum_{i=1}^{n} \xi_i}{n\sum_{i=1}^{n} t_i^{\,4} - \left(\sum_{i=1}^{n} t_i^2 \right)^2}$$

Table 3 The „conglomerate" of the values which joins under the incidence of the reflection concerning the quadratic pattern for the volum of Lamborghini cars selled at worldwide level

YEARS	LAMBORGHINI WORLDWIDE NUMBER OF VEHICLES (ξ_i)	*PARABOLIC TENDENCY*					
		t_i	t_i^2	t_i^4	$t_i^2 \xi_i$	$\xi_{t_i} = a + bt_i + ct_i^2$	$\left\| \xi_i - \xi_{t_i} \right\|$
2006	**2087**	-6	36	1296	75132	2521,43956	434
2007	**2406**	-5	25	625	60150	2127,802198	278
2008	**2430**	-4	16	256	38880	1846,990010	583
2009	**1515**	-3	9	81	13635	1679,002997	164
2010	**1302**	-2	4	16	5208	1623,841159	322
2011	**1602**	-1	1	1	1602	1681,504496	79
2012	**2083**	0	0	0	0	1851,993007	231
2013	**2121**	1	1	1	2121	2135,306693	14
2014	**2530**	2	4	16	10120	2531,445554	1
2015	**3245**	3	9	81	29205	3040,409590	205
2016	**3457**	4	16	256	55312	3662,198801	205
2017	**3815**	5	25	625	95375	4396,813187	582
2018	**5750**	6	36	1296	207000	5244,252747	506
TOTAL	**34343**		182	4550	593740	34343	3604

$$a=\frac{\sum_{i=1}^{n}t_i^4\sum_{i=1}^{n}\xi_i-\sum_{i=1}^{n}t_i^2\sum_{i=1}^{n}t_i^2\cdot\xi_i}{n\sum_{i=1}^{n}t_i{}^4-\left(\sum_{i=1}^{n}t_i^2\right)^2}=\frac{4550\cdot34343-182\cdot593740}{13\cdot4550-182^2}=1851{,}993007$$

$$b=\frac{\sum_{i=1}^{n}\xi_i t_i}{\sum_{i=1}^{n}t_i{}^2}=\frac{41296}{182}=226{,}9010989$$

$$c=\frac{n\cdot\sum_{i=1}^{n}t_i^2\cdot\xi_i-\sum_{i=1}^{n}t_i^2\cdot\sum_{i=1}^{n}\xi_i}{n\sum_{i=1}^{n}t_i{}^4-\left(\sum_{i=1}^{n}t_i^2\right)^2}=\frac{13\cdot593740-182\cdot34343}{13\cdot4550-182^2}=56{,}41258741$$

$$v_{II}=\left[\frac{\sum_{i=-m}^{m}\left|\xi_i-\xi_{t_i}^{II}\right|}{n}:\frac{\sum_{i=-m}^{m}x_i}{n}\right]\cdot100=\frac{\sum_{i=-m}^{m}\left|\xi_i-\xi_{t_i}^{II}\right|}{\sum_{i=-m}^{m}\xi_i}\cdot100=\frac{3604}{34343}\cdot100=10{,}49\%$$

- if the „sophisticated design" for ξ variable, namely the Lamborghini worlwide sales, is this representation $\xi_{t_i}=ab^{t_i}$, a and b will be [3]:

$$S=\sum_{i=1}^{n}(\lg\xi_i-\lg\xi_{t_i})^2=\min\Leftrightarrow S=\sum_{i=1}^{n}(\lg\xi_i-\lg a-t_i\lg b)^2=\min$$

$$\begin{cases}\dfrac{\partial S}{\partial\lg a}=0\\[2ex]\dfrac{\partial S}{\partial\lg b}=0\end{cases}\Rightarrow\begin{cases}2\sum_{1=1}^{n}(\lg\xi_i-\lg a-t_i\lg b)(-1)=0/(-\frac{1}{2})\\[2ex]2\sum_{1=1}^{n}(\lg\xi_i-\lg a-t_i\lg b)(-t_i)=0/(-\frac{1}{2})\end{cases}\Rightarrow$$

$$\begin{cases}n\cdot\lg a+\lg b\cdot\sum_{i=1}^{n}t_i=\sum_{i=1}^{n}\lg\xi_i\\[2ex]\lg a\sum_{i=1}^{n}t_i+\lg b\cdot\sum_{i=1}^{n}t_i^2=\sum_{i=1}^{n}t_i\cdot\lg\xi_i\end{cases}$$

$$\lg a=\frac{\begin{vmatrix}\sum_{i=1}^{n}\lg\xi_i & \sum_{i=1}^{n}t_i\\ \sum_{i=1}^{n}t_i\lg\xi_i & \sum_{i=1}^{n}t_i{}^2\end{vmatrix}}{\begin{vmatrix}n & \sum_{i=1}^{n}t_i\\ \sum_{i=1}^{n}t_i & \sum_{i=1}^{n}t_i{}^2\end{vmatrix}}=\frac{\sum_{i=1}^{n}\lg\xi_i\sum_{i=1}^{n}t_i{}^2-\sum_{i=1}^{n}t_i\lg\xi_i\sum_{i=1}^{n}t_i}{n\sum_{i=1}^{n}t_i{}^2-\left(\sum_{i=1}^{n}t_i\right)^2}$$

$$\lg b = \frac{\begin{vmatrix} n & \sum_{i=1}^{n} \lg \xi_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} t_i \lg \xi_i \end{vmatrix}}{\begin{vmatrix} n & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} t_i^2 \end{vmatrix}} = \frac{n \cdot \sum_{i=1}^{n} t_i \lg \xi_i - \sum_{i=1}^{n} \lg \xi_i \sum_{i=1}^{n} t_i}{n \sum_{i=1}^{n} t_i^2 - \left(\sum_{i=1}^{n} t_i \right)^2}$$

Table 4 The „conglomerate" of the values which joins under the incidence of the reflection concerning the exponential pattern for the volum of Lamborghini cars selled at worldwide level

YEARS	LAMBORGHINI WORLDWIDE NUMBER OF VEHICLES (ξ_i)	*EXPONENTIAL TENDENCY*				
		$\lg \xi_i$	$t_i \lg \xi_i$	$\lg \xi_{t_i} = \lg a + t_i \lg b$	$\xi_{t_i} = ab^{t_i}$	$\lvert \xi_i - \xi_{t_i} \rvert$
2006	**2087**	3,319522449	-19,91713469	3,190572898	1550,861083	536
2007	**2406**	3,381295623	-16,90647812	3,223240715	1672,017101	734
2008	**2430**	3,385606274	-13,54242509	3,255908532	1802,638042	627
2009	**1515**	3,180412633	-9,541237899	3,288576349	1943,463323	428
2010	**1302**	3,114610984	-6,229221968	3,321244166	2095,290124	793
2011	**1602**	3,204662512	-3,204662512	3,353911983	2258,977904	657
2012	**2083**	3,318689270	0	3,386579800	2435,453264	352
2013	**2121**	3,326540669	3,326540669	3,419247617	2625,715192	505
2014	**2530**	3,403120521	6,806241042	3,451915434	2830,84072	301
2015	**3245**	3,511214701	10,5336441	3,484583251	3051,991017	193
2016	**3457**	3,538699380	14,15479752	3,517251068	3290,417968	167
2017	**3815**	3,581494542	17,90747271	3,549918885	3547,471254	268
2018	**5750**	3,759667845	22,55800707	3,582586702	3824,606000	1926
TOTAL	**34343**	44,0255374	5,945542830			7487

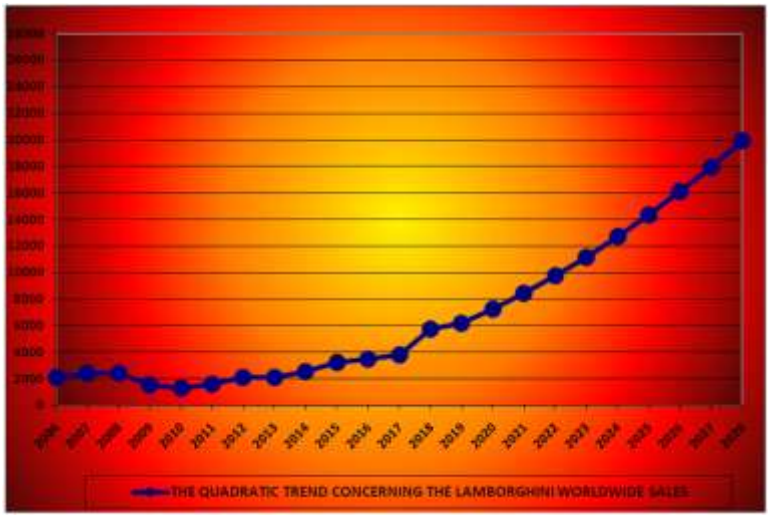
$$\lg a = \frac{44{,}0255374 \cdot 182 - 5{,}94554283 \cdot 0}{13 \cdot 182 - 0^2} = 3{,}3865798$$

$$\lg b = \frac{13 \cdot 5{,}94554283 - 44{,}0255374 \cdot 0}{13 \cdot 182 - 0^2} = 0{,}032667817$$

$$v_{\exp} = \left[\frac{\sum_{i=-m}^{m} \left| \xi_i - \xi_{t_i}^{\exp} \right|}{n} : \frac{\sum_{i=-m}^{m} x_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^{m} \left| \xi_i - \xi_{t_i}^{\exp} \right|}{\sum_{i=-m}^{m} \xi_i} \cdot 100 = \frac{7487}{34343} \cdot 100 = 21{,}81\%$$

$$v_{II} = 10{,}49\% < v_{\exp} = 21{,}81\% < v_I = 24{,}386\%$$

The „design of the rally" regarding the projection which belongs to the Lamborghini worldwide sales, reveals a quadratic pattern $\xi_{t_i} = a + b \cdot t_i + ct_i^2$



Graph 1 The design of the quadratic pattern concerning the worldwide sales for the Lamborghini cars

. The design of the projection regarding the worldwide sales for the Ferrari cars, between 2006-2018

- if the „sophisticated design" for ω characteristic, namely the Ferrari worldwide sales, is this mirroring $\omega_{t_i} = a + b \cdot t_i$, a and b will be [3]:

$$S = \sum_{i=1}^{n} (\omega_i - \omega_{ti})^2 = \min \Leftrightarrow S = \sum_{i=1}^{n} (\omega_i - a - bt_i)^2 = \min$$

$$\begin{cases} \dfrac{\partial S}{\partial a} = 0 \\ \dfrac{\partial S}{\partial b} = 0 \end{cases} \Rightarrow \begin{cases} 2\sum\limits_{1=1}^{n} (\omega_i - a - bt_i)(-1) = 0 / (-\dfrac{1}{2}) \\ 2\sum\limits_{1=1}^{n} (\omega_i - a - bt_i)(-t_i) = 0 / (-\dfrac{1}{2}) \end{cases} \Rightarrow \begin{cases} na + b\sum\limits_{i=1}^{n} t_i = \sum\limits_{i=1}^{n} \omega_i \\ a\sum\limits_{i=1}^{n} t_i + b\sum\limits_{i=1}^{n} t_i^2 = \sum\limits_{i=1}^{n} \omega_i t_i \end{cases} \Rightarrow$$

$$a = \frac{\begin{vmatrix} \sum\limits_{i=1}^{n} \omega_i & \sum\limits_{i=1}^{n} t_i \\ \sum\limits_{i=1}^{n} \omega_i t_i & \sum\limits_{i=1}^{n} t_i^{\,2} \end{vmatrix}}{\begin{vmatrix} n & \sum\limits_{i=1}^{n} t_i \\ \sum\limits_{i=1}^{n} t_i & \sum\limits_{i=1}^{n} t_i^{\,2} \end{vmatrix}} = \frac{\sum\limits_{i=1}^{n} \omega_i \sum\limits_{i=1}^{n} t_i^{\,2} - \sum\limits_{i=1}^{n} \omega_i t_i \sum\limits_{i=1}^{n} t_i}{n\sum\limits_{i=1}^{n} t_i^{\,2} - \left(\sum\limits_{i=1}^{n} t_i\right)^2} \qquad b = \frac{\begin{vmatrix} n & \sum\limits_{i=1}^{n} \omega_i \\ \sum\limits_{i=1}^{n} t_i & \sum\limits_{i=1}^{n} \omega_i t_i \end{vmatrix}}{\begin{vmatrix} n & \sum\limits_{i=1}^{n} t_i \\ \sum\limits_{i=1}^{n} t_i & \sum\limits_{i=1}^{n} t_i^{\,2} \end{vmatrix}} = \frac{n\sum\limits_{i=1}^{n} \omega_i t_i - \sum\limits_{i=1}^{n} t_i \sum\limits_{i=1}^{n} \omega_i}{n\sum\limits_{i=1}^{n} t_i^{\,2} - \left(\sum\limits_{i=1}^{n} t_i\right)^2}$$

Table 5 The „conglomerate" of the statistical data which joins under the incidence of the reflection concerning the linear pattern for the volum of Ferrari cars selled at worldwide level

YEARS	FERRARI WORLDWIDE NUMBER OF VEHICLES (ω_i)	*LINEAR TENDENCY*				
		t_i	t_i^2	$t_i \omega_i$	$\omega_{t_i} = a + bt_i$	$\lvert\omega_i - \omega_{t_i}\rvert$
2006	**5671**	-6	36	-34026	5769,195978	98
2007	**6465**	-5	25	-32325	6003,12088	462
2008	**6587**	-4	16	-26348	6237,219781	350

YEARS	FERRARI WORLDWIDE NUMBER OF VEHICLES (ω_i)	*LINEAR TENDENCY*				
		t_i	t_i^2	$t_i\omega_i$	$\omega_{t_i} = a + bt_i$	$\lvert\omega_i - \omega_{t_i}\rvert$
2009	**6250**	-3	9	-18750	6471,318682	221
2010	**6461**	-2	4	-12922	6705,417583	244
2011	**7001**	-1	1	-7001	6939,516484	61
2012	**7318**	0	0	0	7173,615385	144
2013	**6922**	1	1	6922	7407,714286	486
2014	**7255**	2	4	14510	7641,813187	387
2015	**7664**	3	9	22992	7875,912088	212
2016	**8014**	4	16	32056	8110,010989	96
2017	**8398**	5	25	41990	8344,109891	54
2018	**9251**	6	36	55506	8578,208792	673
TOTAL	**93257**		182	42606	93257	3488

$$a = \frac{93257 \cdot 182 - 42606 \cdot 0}{13 \cdot 182 - 0^2} = 7173{,}615385\,;\ \ b = \frac{42606}{182} = 234{,}0989011$$

$$v_I = \left[\frac{\sum_{i=-m}^{m} \left| \omega_i - y_{t_i}^I \right|}{n} : \frac{\sum_{i=-m}^{m} \omega_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^{m} \left| \omega_i - \omega_{t_i}^I \right|}{\sum_{i=-m}^{m} \omega_i} \cdot 100 = \frac{3488}{93257} \cdot 100 = 3{,}74\%$$

- if the „sophisticated design" for ω characteristic, namely the Ferrari worldwide sales, is this mirroring $\omega_{t_i} = a + b \cdot t_i + ct_i^2$, a and b will be [3]:

$$\begin{cases} n \cdot a + b\sum_{i=1}^{n} t_i + c\sum_{i=1}^{n} t_i^2 = \sum_{i=1}^{n} \omega_i \\ a\sum_{i=1}^{n} t_i + b \cdot \sum_{i=1}^{n} t_i^2 + c\sum_{i=1}^{n} t_i^3 = \sum_{i=1}^{n} t_i \cdot \omega_i \\ a \cdot \sum_{i=1}^{n} t_i^2 + b\sum_{i=1}^{n} t_i^3 + c\sum_{i=1}^{n} t_i^4 = \sum_{i=1}^{n} t_i^2 \cdot \omega_i \end{cases}$$

$$a = \frac{\sum_{i=1}^{n} t_i^4 \sum_{i=1}^{n} \omega_i - \sum_{i=1}^{n} t_i^2 \sum_{i=1}^{n} t_i^2 \cdot \omega_i}{n\sum_{i=1}^{n} t_i{}^4 - \left(\sum_{i=1}^{n} t_i^2 \right)^2}\ ; \quad b = \frac{\sum_{i=1}^{n} \omega_i t_i}{\sum_{i=1}^{n} t_i{}^2}\ ; \quad c = \frac{n \cdot \sum_{i=1}^{n} t_i^2 \cdot \omega_i - \sum_{i=1}^{n} t_i^2 \cdot \sum_{i=1}^{n} \omega_i}{n\sum_{i=1}^{n} t_i{}^4 - \left(\sum_{i=1}^{n} t_i^2 \right)^2}$$

Table 6 The „conglomerate" of the statistical data which joins under the incidence of the reflection concerning the quadratic pattern for the volum of Ferrari cars selled at worldwide level

YEARS	FERRARI WORLDWIDE NUMBER OF VEHICLES (ω_i)	*PARABOLIC TENDENCY*					
		t_i	t_i^2	t_i^4	$t_i^2\omega_i$	$\omega_{t_i} = a + bt_i + ct_i^2$	$\lvert\omega_i - \omega_{t_i}\rvert$
2006	**5671**	-6	36	1296	204156	6107,461538	436
2007	**6465**	-5	25	625	161625	6172,340659	293
2008	**6587**	-4	16	256	105392	6267,987013	319
2009	**6250**	-3	9	81	56250	6394,400599	144
2010	**6461**	-2	4	16	25844	6551,581418	91
2011	**7001**	-1	1	1	7001	6739,50947	262
2012	**7318**	0	0	0	0	6958,244755	360
2013	**6922**	1	1	1	6922	7207,727272	286
2014	**7255**	2	4	16	29020	7487,977023	233
2015	**7664**	3	9	81	68976	7798,994006	135
2016	**8014**	4	16	256	128224	8140,778221	127
2017	**8398**	5	25	625	209950	8513,32967	115
2018	**9251**	6	36	1296	333036	8916,648351	334
TOTAL	**93257**		182	4550	1336396	93257	3135

$$a = \frac{\sum_{i=1}^{n} t_i^4 \sum_{i=1}^{n} \xi_i - \sum_{i=1}^{n} t_i^2 \sum_{i=1}^{n} t_i^2 \cdot \xi_i}{n\sum_{i=1}^{n} t_i{}^4 - \left(\sum_{i=1}^{n} t_i^2\right)^2} = \frac{4550 \cdot 93257 - 182 \cdot 1336396}{13 \cdot 4550 - 182^2} = 6958{,}244755$$

$$b = \frac{\sum_{i=1}^{n} \xi_i t_i}{\sum_{i=1}^{n} t_i{}^2} = \frac{42606}{182} = 234{,}0989011$$

$$c = \frac{n \cdot \sum_{i=1}^{n} t_i^2 \cdot \xi_i - \sum_{i=1}^{n} t_i^2 \cdot \sum_{i=1}^{n} \xi_i}{n\sum_{i=1}^{n} t_i{}^4 - \left(\sum_{i=1}^{n} t_i^2\right)^2} = \frac{13 \cdot 1336396 - 182 \cdot 93257}{13 \cdot 4550 - 182^2} = 15{,}38361638$$

$$v_{II} = \left[\frac{\sum_{i=-m}^{m} \left|\omega_i - \omega_{t_i}^{II}\right|}{n} : \frac{\sum_{i=-m}^{m} \omega_i}{n}\right] \cdot 100 = \frac{\sum_{i=-m}^{m} \left|\omega_i - \omega_{t_i}^{II}\right|}{\sum_{i=-m}^{m} \omega_i} \cdot 100 = \frac{3135}{93257} \cdot 100 = 3{,}36\%$$

- if the „sophisticated design" for ω characteristic, namely the Ferrari worldwide sales, is this mirroring $\omega_{t_i} = ab^{t_i}$, a and b will be [3]:

$$\begin{cases} n \cdot \lg a + \lg b \cdot \sum_{i=1}^{n} t_i = \sum_{i=1}^{n} \lg \omega_i \\ \lg a \sum_{i=1}^{n} t_i + \lg b \cdot \sum_{i=1}^{n} t_i^2 = \sum_{i=1}^{n} t_i \cdot \lg \omega_i \end{cases}$$

,

$$\lg a = \frac{\begin{vmatrix} \sum_{i=1}^{n} \lg \omega_i & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} t_i \lg \omega_i & \sum_{i=1}^{n} t_i^{\,2} \end{vmatrix}}{\begin{vmatrix} n & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} t_i^{\,2} \end{vmatrix}} = \frac{\sum_{i=1}^{n} \lg \omega_i \sum_{i=1}^{n} t_i^{\,2} - \sum_{i=1}^{n} t_i \lg \omega_i \sum_{i=1}^{n} t_i}{n \sum_{i=1}^{n} t_i^{\,2} - \left(\sum_{i=1}^{n} t_i \right)^2}$$

$$\lg b = \frac{\begin{vmatrix} n & \sum_{i=1}^{n} \lg \omega_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} t_i \lg \omega_i \end{vmatrix}}{\begin{vmatrix} n & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} t_i^{\,2} \end{vmatrix}} = \frac{n \cdot \sum_{i=1}^{n} t_i \lg \omega_i - \sum_{i=1}^{n} \lg \omega_i \sum_{i=1}^{n} t_i}{n \sum_{i=1}^{n} t_i^{\,2} - \left(\sum_{i=1}^{n} t_i \right)^2}$$

Table 7 The „conglomerate" of the statistical data which joins under the incidence of the reflection concerning the exponential pattern for the volum of Ferrari cars selled at worldwide level

YEARS	FERRARI WORLDWIDE NUMBER OF VEHICLES (ω_i)	*EXPONENTIAL TENDENCY*				
		$\lg \omega_i$	$t_i \lg \omega_i$	$\lg \omega_{t_i} = \lg a + t_i \lg b$	$\omega_{t_i} = ab^{t_i}$	$\lvert \omega_i - \omega_{t_i} \rvert$
2006	**5671**	3,753659647	-22,52195788	3,768256187	5864,840249	194
2007	**6465**	3,810568529	-19,05284265	3,782241521	6056,776122	408
2008	**6587**	3,818687663	-15,27475065	3,796226855	6254,993389	332
2009	**6250**	3,795880017	-11,38764005	3,810212189	6459,697619	210
2010	**6461**	3,810299741	-7,620599482	3,824197523	6671,101109	210
2011	**7001**	3,845160078	-3,845160078	3,838182857	6889,423102	112
2012	**7318**	3,864392405	0	3,852168191	7114,890016	203
2013	**6922**	3,840231595	3,840231595	3,866153525	7347,735679	426
2014	**7255**	3,860637417	7,621274834	3,880138859	7588,201574	333
2015	**7664**	3,884455960	11,65336649	3,894124193	7836,537082	173
2016	**8014**	3,903849338	15,61539735	3,908109527	8092,999750	79
2017	**8398**	3,924175870	19,62087935	3,922094861	8357,855552	40
2018	**9251**	3,966188681	23,79713209	3,936080195	8631,379165	620
TOTAL	**93257**	50,078186480	2,545330915			3340

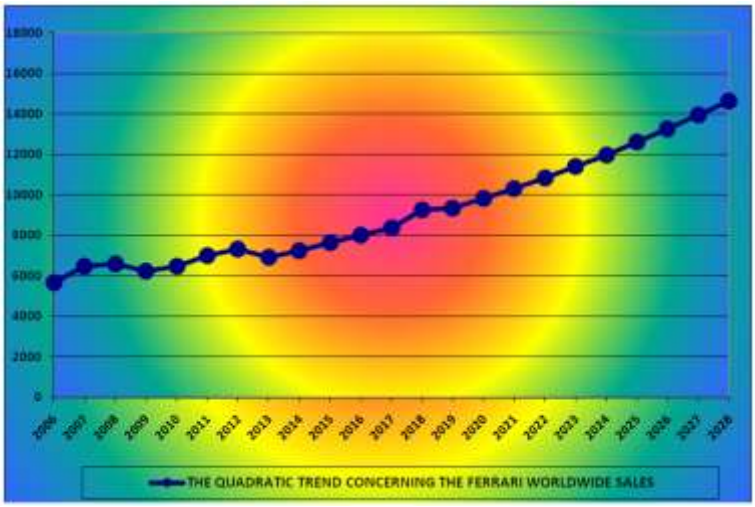
$$\lg a = \frac{50{,}07818648 \cdot 182 - 2{,}545330915 \cdot 0}{13 \cdot 182 - 0^2} = 3{,}85216191$$

$$\lg b = \frac{13 \cdot 2{,}545330915 - 50{,}07818648 \cdot 0}{13 \cdot 182 - 0^2} = 0{,}013985334$$

$$v_{\exp} = \left[\frac{\sum_{i=-m}^{m} \left| \omega_i - \omega_{t_i}^{\exp} \right|}{n} : \frac{\sum_{i=-m}^{m} \omega_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^{m} \left| \omega_i - \omega_{t_i}^{\exp} \right|}{\sum_{i=-m}^{m} \omega_i} \cdot 100 = \frac{3340}{93257} \cdot 100 = 3{,}58\%$$

$$v_{II} = 3{,}36\% < v_{\exp} = 3{,}58\% < v_I = 3{,}74\%$$

The „design of the rally" concerning the projection for ω factor, which belongs to the Ferrari worldwide sales, is a quadratic pattern $\omega_{t_i} = a + b \cdot t_i + ct_i^2$



Graph 2 The design of the quadratic pattern regarding the worldwide sales for the Ferrari cars

Because the design of the modelling for the values of Lamborghini and Ferrari cars selled at worldwide level shows a quadratic pattern $\xi_{t_i} = a + b \cdot t_i + ct_i^2$, the forecasts projected will be:

$$\xi_{2019}^{LAMBORGHINI} = 1851{,}993007 + 226{,}9010989 \cdot 7 + 56{,}41258741 \cdot 7^2 = 6204{,}517482 \approx 6204 vehicles$$
$$\xi_{2020}^{LAMBORGHINI} = 1851{,}993007 + 226{,}9010989 \cdot 8 + 56{,}41258741 \cdot 8^2 = 7277{,}607392 \approx 7277 vehicles$$
$$\xi_{2021}^{LAMBORGHINI} = 1851{,}993007 + 226{,}9010989 \cdot 9 + 56{,}41258741 \cdot 9^2 = 8463{,}522477 \approx 8463 vehicles$$
$$\xi_{2022}^{LAMBORGHINI} = 1851{,}993007 + 226{,}9010989 \cdot 10 + 56{,}41258741 \cdot 10^2 = 9762{,}262737 \approx 9762 vehicles$$
$$\xi_{2023}^{LAMBORGHINI} = 1851{,}993007 + 226{,}9010989 \cdot 11 + 56{,}41258741 \cdot 11^2 = 11173{,}82817 \approx 11174 vehicles$$
$$\xi_{2024}^{LAMBORGHINI} = 1851{,}993007 + 226{,}9010989 \cdot 12 + 56{,}41258741 \cdot 12^2 = 12698{,}21878 \approx 12698 vehicles$$
$$\xi_{2025}^{LAMBORGHINI} = 1851{,}993007 + 226{,}9010989 \cdot 13 + 56{,}41258741 \cdot 13^2 = 14335{,}43457 \approx 14335 vehicles$$
$$\xi_{2026}^{LAMBORGHINI} = 1851{,}993007 + 226{,}9010989 \cdot 14 + 56{,}41258741 \cdot 14^2 = 16085{,}47552 \approx 16085 vehicles$$
$$\xi_{2027}^{LAMBORGHINI} = 1851{,}993007 + 226{,}9010989 \cdot 15 + 56{,}41258741 \cdot 15^2 = 17948{,}34166 \approx 17948 vehicles$$
$$\xi_{2028}^{LAMBORGHINI} = 1851{,}993007 + 226{,}9010989 \cdot 16 + 56{,}41258741 \cdot 16^2 = 19924{,}63297 \approx 19924 vehicles$$
$$\xi_{2029}^{LAMBORGHINI} = 1851{,}993007 + 226{,}9010989 \cdot 17 + 56{,}41258741 \cdot 17^2 = 22012{,}54945 \approx 22012 vehicles$$
$$\xi_{2030}^{LAMBORGHINI} = 1851{,}993007 + 226{,}9010989 \cdot 18 + 56{,}41258741 \cdot 18^2 = 24213{,}89111 \approx 24214 vehicles$$
$$\omega_{2019}^{FERRARI} = 6958{,}244755 + 234{,}0989011 \cdot 7 + 15{,}38361638 \cdot 7^2 = 9350{,}734265 \approx 9351 vehicles$$
$$\omega_{2020}^{FERRARI} = 6958{,}244755 + 234{,}0989011 \cdot 8 + 15{,}38361638 \cdot 8^2 = 9815{,}587412 \approx 9816 vehicles$$
$$\omega_{2021}^{FERRARI} = 6958{,}244755 + 234{,}0989011 \cdot 9 + 15{,}38361638 \cdot 9^2 = 10311{,}20779 \approx 10311 vehicles$$
$$\omega_{2022}^{FERRARI} = 6958{,}244755 + 234{,}0989011 \cdot 10 + 15{,}38361638 \cdot 10^2 = 10837{,}5954 \approx 10838 vehicles$$
$$\omega_{2023}^{FERRARI} = 6958{,}244755 + 234{,}0989011 \cdot 11 + 15{,}38361638 \cdot 11^2 = 11394{,}75025 \approx 11395 vehicles$$
$$\omega_{2024}^{FERRARI} = 6958{,}244755 + 234{,}0989011 \cdot 12 + 15{,}38361638 \cdot 12^2 = 11982{,}67233 \approx 11983 vehicles$$
$$\omega_{2025}^{FERRARI} = 6958{,}244755 + 234{,}0989011 \cdot 13 + 15{,}38361638 \cdot 13^2 = 12601{,}36164 \approx 12601 vehicles$$
$$\omega_{2026}^{FERRARI} = 6958{,}244755 + 234{,}0989011 \cdot 14 + 15{,}38361638 \cdot 14^2 = 13250{,}81818 \approx 13251 vehicles$$
$$\omega_{2027}^{FERRARI} = 6958{,}244755 + 234{,}0989011 \cdot 15 + 15{,}38361638 \cdot 15^2 = 13931{,}04196 \approx 13931 vehicles$$
$$\omega_{2028}^{FERRARI} = 6958{,}244755 + 234{,}0989011 \cdot 16 + 15{,}38361638 \cdot 16^2 = 14642{,}03297 \approx 14642 vehicles$$
$$\omega_{2029}^{FERRARI} = 6958{,}244755 + 234{,}0989011 \cdot 17 + 15{,}38361638 \cdot 17^2 = 15383{,}79121 \approx 15384 vehicles$$
$$\omega_{2030}^{FERRARI} = 6958{,}244755 + 234{,}0989011 \cdot 18 + 15{,}38361638 \cdot 18^2 = 16156{,}31668 \approx 16156 vehicles$$

Table 8 Statistical pol position leadership between Lamborghini & Ferrari, in the period 2006-2030

YEARS	LAMBORGHINI WORLDWIDE NUMBER OF VEHICLES	FERRARI WORLDWIDE NUMBER OF VEHICLES	THE DYNAMICS CONCERNING THE LEADERSHIP					
			$I^{CARS}_{Ferrari\,/\,Lambo}$	$I^{CARS}_{Lambo\,/\,Ferrari}$	(RELATIVE RISES) (%)		$\Delta^{CARS}_{Ferrari\,/\,Lamb}$	$\Delta^{CARS}_{Lambo\,/\,Ferrari}$
							(ABSOLUTE RISES) (NUMBER OF VEHICLES)	
2006	2087	5671	271,73		171,73		3584	
2007	2406	6465	268,70		168,70		4059	
2008	2430	6587	271,07		171,07		4157	
2009	1515	6250	412,54		312,54		4735	
2010	1302	6461	496,24		396,24		5159	
2011	1602	7001	437,02		337,02		5399	
2012	2083	7318	352,32		252,32		5235	
2013	2121	6922	326,36		226,36		4801	
2014	2530	7255	286,76		186,76		4725	
2015	3245	7664	236,18		136,18		4419	
2016	3457	8014	231,82		131,82		4557	
2017	3815	8398	220,13		120,13		4583	
2018	5750	9251	160,89		60,89		3501	
2019	6244	9351	149,76		49,76		3107	
2020	7277	9816	134,89		34,89		2539	
2021	8463	10311	121,84		21,84		1848	
2022	9762	10838	111,02		11,02		1076	
2023	11174	11395	101,98		1,98		221	
2024	12698	11983		105,97		5,97		715
2025	14335	12601		113,76		13,76		1734
2026	16085	13251		121,39		21,39		2834
2027	17948	13931		128,83		28,83		4017
2028	19924	14642		136,07		36,07		5282
2029	22012	15384		143,08		43,08		6628
2030	24214	16156		149,88		49,88		8058

5. Conclusions

The profile of the pattern which paints the values of the worldwide sales regarding the Lamborghini cars, between 2006-2018, unveils a propensity to the quadratic representation. The configuration of the design which is projected on the volum of the worldwide sales concerning the Ferrari cars, between 2006-2018, reveals a proclivity to the quadratic tendency. We can see that in 2018, Ferrari had a rise with 60,89 %, comparative to Lamborghini, of the value concerning the number of cars selled in the worldwide sphere. Also, in 2024 Lamborghini will obtain a rise with 5,97 % comparative to Ferrari, of the value regarding the number of cars selled at the worldwide plan. If we analysis the forecasts regarding the number of cars selled at the worlwide level, in 2030 Lamborghini will achieve a growth with 49,88% comparative to Ferrari. So, we can say that, there is a strong meeting in pol position concerning the leadership between these two great „hypersonic" leaders and this competition will be forever with effects on the adrenalin for the lovers of super exotic cars.

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