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Mexican Airlines in the Current Situation of COVID 19. Evolution and Prospects

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Abstract

The present work seeks to analyze and contrast the previous characteristics of the general financial situation of the main Mexican airlines. This is especially relevant, since in general there were problems in leverage and profitability in some of them, since exercises prior to 2020. In this sense, it is important to clarify the conditions in which several surgical surgeries were developed, faced by economic and health crisis of the first decade of this century and finally, they will face this global phenomenon unprecedented in the economic history of this century and much of the previous one. In the part of presenting the figures of reduction in passenger flows today, the characteristics and problems they have faced, as well as some reflections on how they can be better rid. Likewise, a model is presented that emphasizes the change in Aeroméxico's financial situation, towards a critical state in terms of the fall in the activity of commercial aviation worldwide. Finally, there are some reflections and recommendations regarding the possible alternatives for this important sector of the Mexican economy, in general, Aeroméxico in particular, can get out of this difficult and complex current environment.

Keywords: economic and health crisis, main Mexican airlines, Mexican economy, model, possible alternatives

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Introduction

To give an idea of the conjunctural panorama, before the COVID 19 pandemic, a data that sounds very shocking is that of the decrease in the arrival of total passengers, national and international, same as in annual variation, according to Airports and Auxiliary Services, was of the 29%, for the first four months of 2020. In relation to the five most relevant airports in the country (69.5% of the total), namely: México City, Cancun, Guadalajara, Tijuana and Monterrey, the steepest drop corresponds to Cancun (35.0%), followed by Monterrey (31.0%), México City (29.5%), Guadalajara (26.3%) and Tijuana (19.0%). It should be noted that this situation is general in the 30 most important airports, as well as in the rest of them, according to this source. Additionally, generalized falls are seen when said period is compared against that of 2018. (ASA, 2020) By type of flights, the decrease was 26.1% for domestic flights, while international flights accounted for a decrease of 31.5%. Given the steepest drop in this last line, the share of domestic flights, at the end of April 2020 was 50.5% of the total, reversing the highest relative share of international flights, shown in the same period of 2019.

At the national flight level, for the first quarter of 2020, five Mexican lines absorbed 96.7% of passengers, with the following order in their relative participation: Volaris 33.2%, Vivaaerobus 21.0%, Interjet 18.7%, Aeromexico Connect 13.7% and Aeromexico 10.1%. It should be noted that these lines show very pronounced drops in the number of passengers transported, with Vivaaerobus being the least pronounced -14.2%, followed by Volaris with -23.3%, Aeromexico with -29.9%, Interjet with -30.5% and Aeromexico Connect with -32.8%. Another relevant data refers to the fact that in April 2020, the falls in passengers transported compared to the same month of 2019, were more than 86% in the five aforementioned lines, the sharpest being that corresponding to Interjet, with -97.2%. With reference to international flights, for the January-April 2020 period, Mexican lines participated with 30.3% of the passengers transported (against 42.9% of the US ones). Of this percentage, 26.8% was absorbed: Aeromexico 10.3%, Interjet 9.1% and Volaris 7.4%, leaving Aeromexico Connect, Vivaaerobus and Magnicharters with marginal percentage shares. Falls in this area are more severe than for domestic flights. Aeromexico Connect stands out with -47.4%, Aeromexico with -41.5%, Interjet with -24.3% and Volaris with -18.9%. If only the month of April is considered, compared to the previous year, all the lines (except Magnicharters, which has a negligible participation) presented falls of more than 93% in the number of passengers transported. (AFAC, 2020)

Literature review: Current situation of low-cost airlines in the commercial aviation industry

As part of the deregulation process, especially reflected in the liberalization of fares and the expansion of routes to foreign destinations, faced by the commercial aviation industry since the end of the last century, low-cost airlines have observed significant growth, as well as a greater participation in the market. Among the most notable proportions, it can be seen that at the beginning of the last decade one in three passengers traveled in these in the United States, in Europe one in four and in Asia and Oceania one in two. In the case of the Latin American subcontinent, the market is concentrated in very few lines, unlike what happened in Europe, although with an interesting dynamism, which is mainly concentrated in Brazil, México and to a lesser extent in Colombia. In México, just under 2 out of 3 passengers in the domestic market traveled in them in the period indicated above.

Approximately it is appreciated that more than half of its cost structure is made up of those of flight operation, with the consumption of jet fuel playing a key role here. It is noteworthy that in México this type of air services offer is oligopolistic in nature, having been concentrated since the last decade, especially during the 2008 global crisis, where recession and impact on fuel prices were combined. Among the main advantages that this type of flight has used for its proliferation and presence in the market, the elimination of intermediaries in the sales process, the reduction of costs by offering more basic services, the greater frequency of nonstop flights, the Round-trip flights, as well as the encouragement of flying by socio-demographic strata that previously did not, given the accessibility of fares, competitive even with those of buses, in the Mexican case.

As a problematic situation prior to this global situation, there is not having the cargo market covered, the lack of more comprehensive connectivity in terms of destination airports, consumer complaints, due to the concomitant reduction of the services offered by the fee, as well as those caused by delays and cancellations, among other factors. Another topic that is appreciated is focusing on the tourism market, rather than on business travelers. In general, in the current context, the following statement seems very eloquent: "…these costs may be affected by financial circumstances, as happened between 2007-2008; health crises like influenza and of course due to economic recessions". (Canseco, 2015: 10). For some time now, it has been necessary to rethink the strategic direction of low-cost airlines, by generating competitive advantages that can face the competition and, as it is currently appreciated, face the sharp drop in flows, within a context of high volatility in costs. In this sense, the challenge will be extremely difficult, since among the attributes most indicated by the segment of the market oriented to the "businessman", punctuality, comfort and above all convenient hours are privileged. In general, the latter will be a challenge when facing a return to activities, predicting that these flows will be much more restricted than in the days prior to the current pandemic. Perhaps in the case of the tourist

segment these situations are much less severe. Another issue that has affected since the beginning of the century is the one related to the costs derived from insecurity, following the terrorist attacks of 2001, which add to the volatility indicated in fuels.

In this sense, to account for the vulnerability of this economic activity and unintentionally anticipating what happened in the context of the current situation, we have the following assessment, made in the previous decade: "Unfortunately and without having achieved recovery Overall, airlines around the world are facing a new crisis, this time caused by high fuel costs and in many cases putting them at imminent risk of bankruptcy…" (Urzúa, n.d.: 7). Taking into consideration all the above factors, it is necessary to seek to attend quickly to the two highly relevant segments in this field, namely: the business market, on the one hand, and the tourism market, the latter representing a potential aspect of the How companies that survive can recover. Regarding the tourism market, special attention should be paid to its ability to boost income, since its economic relevance and dynamism are general globally, as stated in the following: "It is one of the most important economic sectors and dynamic in today's world, both for their level of investment, participation in employment, contribution of foreign exchange, and contribution to regional development." (Urzúa, n.d.: 8). Concerted action is required in inter-institutional cooperation (both local, national and international), in the prevailing regulations, in the training of the human factor, in infrastructure as a system, in the marketing mix oriented to the different segments, as well as risk management, among other factors.

In this order of ideas, attention should be paid to the possible reactivation of the tourism sector, in terms of the Mexican air network, and its characteristics of connectivity, centrality and intermediation, due to their impact on the capacity for growth in said activity economic. In general, connectivity fosters a multiplier effect in activity directly related to the airport industry and related services, as well as in the tourist network connected to the place in question. It highlights that in 2012 tourism generated about 2.3 million jobs (about 6% of the national total). One of the possible threats that could be presented in the current scenario is the public policy of "air freedoms", which allows foreign lines to attend local flights. According to data from the Ministry of Communications and Transportation, the air network carries 2.5% of passengers, while only 0.1% of cargo. Relating to connectivity, for 2013, it observed that it is found in the three main cities of the country (with a clear centralizing predominance at the country level, in México City), as well as in Cancun, Puerto Vallarta, Los Cabos, Acapulco and Tijuana. The shorter distances increased their frequency by 22% between 2000 and 2012. Cancun stands out with 100 airports added to its network, reaching the position of being the second airport in the country. With respect to centrality, which measures the relevance as an origin and destination of an airport, the same concentration can be seen in the three main cities in México, with Cancun in second place and Tijuana in fifth. In this sense, it is relevant to take into account that this excess of centrality could be counterproductive in the event of a reactivation of tourism. In fact, ex ante, it had been pointed out that: "The

projections proposed by Aviasolutions suggest that during the period 2009-2020 we will face a growth rate of 6.1% ... double the traffic over the next 10 years..." (Lichtle, 2015: 9) Evidently it is clear that this will not be achieved, although it reflects the inertia that prevailed in the market. Regard to intermediation, Cancun, Los Cabos and Puerto Vallarta stand out. Only 8% of flights can be direct from origin to destination, the rest requires two or more stops.

Another interesting aspect is the one regarding the correlation between the arrival of national flights and hotel occupancy in national tourist destinations. In this regard, however, and evidently reflecting the drop in airline activity, it should be noted that: "However, there is a divergence between both series as of 2008, as a result of the negative impact of the health crisis in México during 2009 derived from the outbreak of influenza…From 2012 the behavior of the number of flights and the arrival of national tourists began to move in the same direction, as a result of the improvement in economic conditions…" (Lichtle, 2015: 10). Without being able to obtain an accurate forecast of the duration and magnitude of the current economic recession, what is evident is that it will be much more severe than that of 2008.

Within this context, the strong impact that exogenous aspects to the industry have generated on it can be seen, particularly the fall in the markets, the result of global confinement. Likewise, the effect of public policies around the concentration of the Mexican air network, described above, can be seen intertwined. To this are added endogenous aspects, mainly in matters of managing the financial function of companies, although at this point each economic entity entails the consequence of its own organizational management, regardless of the situation the referred sector.

In this order of ideas and admitting the synergistic causality of external and external factors, the following seems plausible: "It is necessary to monitor and detect all those events that occur outside the company and that may affect it, but cannot always be controlled from a company in particular; from this, strategies can be developed to face these events." (Alvarez, 1997: 8). Of course, an event like the current one goes far beyond the proportions that occurred before, at least since the first half of the last century. Finally, it is convenient to articulate alternatives between internal strategies that generate a critical mass of survival, and incidents of public policy in the area of communications and transportation, that support the Mexican airline industry in particular and tourism in general.

Methodology

Vector Autoregressive Model (VAR)

To analyze the way in which the evolution of each of the selected independent variables (as described below) influence Aeromexico's share price, the Autoregressive Vectors methodology was used, which is explained in more detail. then:

At first glance, the VAR methodology (Joselius, K. (2006); Neusser, K. (2016)) is similar to the simultaneous equation models, since it considers various endogenous variables together. But each endogenous variable is explained by its lagged or past values, and by the lagged values of all the other endogenous variables in the model; there are usually no exogenous variables in the model. When considering models of simultaneous or structural equations, some variables are treated as endogenous and others as exogenous or predetermined (exogenous and endogenous lagging. The term "autoregressive" refers to the appearance of the lagged value of the dependent variable on the right side, and the term "vector" is attributed to the fact that we are dealing with a vector of two (or more) variables, mathematically the model is summarized as follows.

$$A_0 X_t = \sum_{j=1}^{m} A_j X_{t-j} + \varepsilon_t$$

With $E(\varepsilon_t{}'\varepsilon_s) = I \; if \; t = s \; and \; E(\varepsilon_t{}'\varepsilon_s) = 0 \; if \; t \neq s \; and$

Where $A_0 \; y \; A_j$ are matrices and ε_t is the unexplained part of the model, which is included as a vector of white noise variables. As mentioned in the VAR model, it is expressed as a linear variable of its own past values, of all other variables, and of a stochastic error term. Formally the VAR is presented as:

$$B_0 y_t = Z + B_1 y_{t-1} + B_2 y_{t-2} + \cdots + B_p y_{t-p} + e_t$$

Where B_0 is a matrix of $k \; x \; k$ of coefficients of the variables included in the VAR, Z is a vector of constants, $B_1 . \beta_2 \ldots, \beta_p$ are matrices of lag coefficients and e_t is a vector of white noise errors. Furthermore, it is supposed to follow an autoregressive process of order r.

$$e_t = F_1 e_{t-1} + F_2 e_{t-2} + \cdots + F_p e_{t-r} + u_t$$

Once the system is solved the reduced form is found:

$$y_t = c + \emptyset_1 y_{t-1} + \emptyset_2 y_{t-2} + \cdots + \emptyset_p y_{t-p} + \varepsilon_t$$

Where $c = \beta_0^{-1} Z : \emptyset = \beta_0^{-1} \beta \; s; \; \varepsilon_t = \; \beta_0^{-1} e_t$.

Analysis

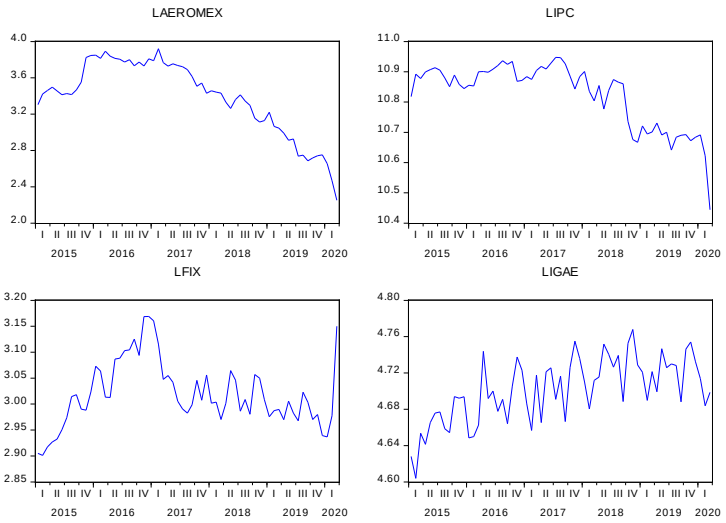
Econometric Model

The aim of this model is to analyze the impact that the macroeconomic environment has on the market value of Aeromexico and thereby determine whether the country's economic conditions are decisive in the level of Aeromexico's share price. For this, an Autoregressive Vectors model is proposed with monthly data in the period from January 2015 to March 2020. The variables used to build the model are: AEROMEX (monthly closing price), IPC (Price Index and Quotes), FIX (peso-dollar exchange rate) and IGAE (Global Index of Economic Activity). The following graph shows the

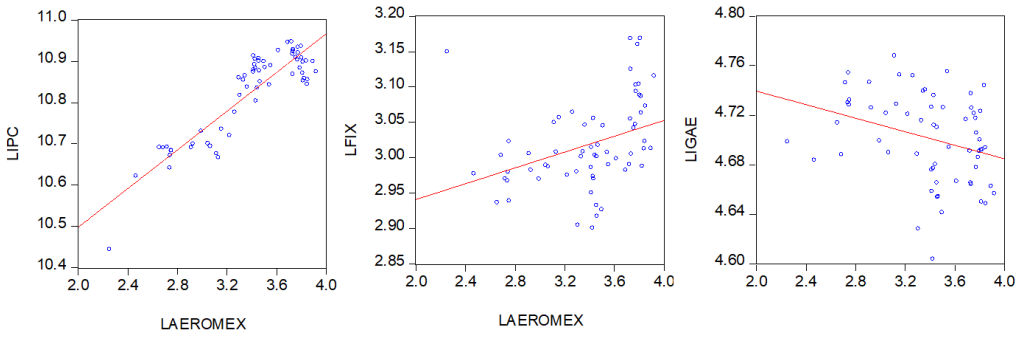
variables in their logarithmic version to illustrate their behavior. In it, it is possible to observe that the market value problems in Aeromexico come from the end of 2016 and have not recovered. Likewise, the Scatter is presented where we can observe the most significant functional is that of Aeromexico with the IPC. The next procedure was to calculate the yields and growth rates of the variables, but before that, the unit root tests were performed. The test results show that the variables have order of integration 1, so it is possible to include them in the model with a difference.

Graph 1

Variable behavior



Scatter diagrams



Source: Own elaboration with Eviews

Table 1

Unit Roots Test

Variable	*ADF*	*Phillips-Perron*	*KPSS*	*Integration order*
laeromex	*-7.644806 (0.0000)*	*-6.259836 (0.0000)*	*0.085560 (0.146000*)*	*I(1)*
lipc	*-7.752026 (0.0000)*	*-6.280828 (0.0000)*	*0.058404 (0.146000*)*	*I(1)*
lfix	*-6.499266 (0.0000)*	*-6.093774 (0.0000)*	*0.143522 (0.463000*)*	*I(1)*
ligae	*-6.309609 (0.0000)*	*-15.85080 (0.0000)*	*0.360857 (0.463000*)*	*I(1)*

Source: Own elaboration with data from Eviews

The specification of the model obtained is as follows:

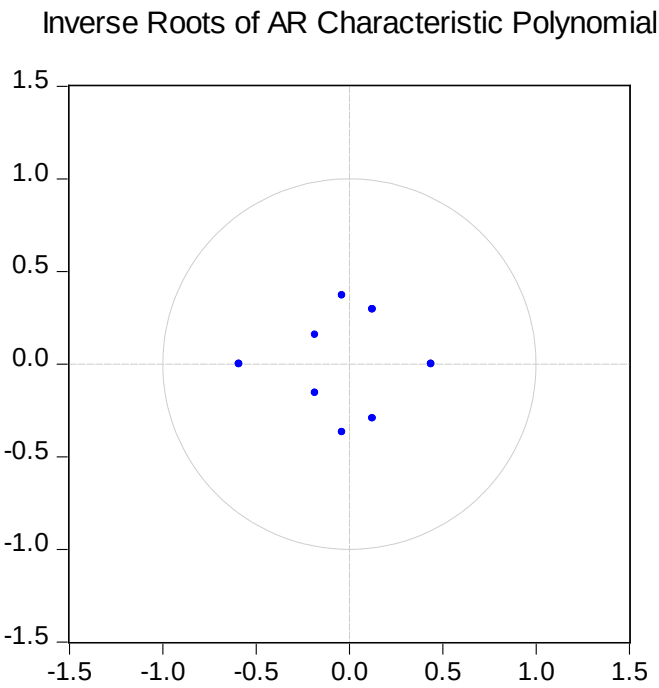
D(LAEROMEX) = C(1,1)*D(LAEROMEX(-1)) + C(1,2)*D(LAEROMEX(-2)) + C(1,3)*D(LFIX(-1)) + C(1,4)*D(LFIX(-2)) + C(1,5)*D(LIGAE(-1)) + C(1,6)*D(LIGAE(-2)) + C(1,7)*D(LIPC(-1)) + C(1,8)*D(LIPC(-2)) + C(1,9) + C(1,10)*DUM2

D(LFIX) = C(2,1)*D(LAEROMEX(-1)) + C(2,2)*D(LAEROMEX(-2)) + C(2,3)*D(LFIX(-1)) + C(2,4)*D(LFIX(-2)) + C(2,5)*D(LIGAE(-1)) + C(2,6)*D(LIGAE(-2)) + C(2,7)*D(LIPC(-1)) + C(2,8)*D(LIPC(-2)) + C(2,9) + C(2,10)*DUM2

D(LIGAE) = C(3,1)*D(LAEROMEX(-1)) + C(3,2)*D(LAEROMEX(-2)) + C(3,3)*D(LFIX(-1)) + C(3,4)*D(LFIX(-2)) + C(3,5)*D(LIGAE(-1)) + C(3,6)*D(LIGAE(-2)) + C(3,7)*D(LIPC(-1)) + C(3,8)*D(LIPC(-2)) + C(3,9) + C(3,10)*DUM2

D(LIPC) = C(4,1)*D(LAEROMEX(-1)) + C(4,2)*D(LAEROMEX(-2)) + C(4,3)*D(LFIX(-1)) + C(4,4)*D(LFIX(-2)) + C(4,5)*D(LIGAE(-1)) + C(4,6)*D(LIGAE(-2)) + C(4,7)*D(LIPC(-1)) + C(4,8)*D(LIPC(-2)) + C(4,9) + C(4,10)*DUM2

According to the unit circle, the model is stable with two lags, as shown below:



Source: Own elaboration with Eviews

To ensure that the model is not expurious, the Autocorrelation tests were performed, with four lags, and the results show that none of these is statistically significant, so it can be said that the model does not present autocorrelation problems in the residuals.

Table 2

VAR Residual Serial Correlation LM Tests

Null hypothesis: No serial correlation at lags 1 to h

Lag	*LRE* stat*	*Df*	*Prob.*	*Rao F-stat*	*Df*	*Prob.*
1	*20.74978*	*16*	*0.1883*	*1.328223*	*(16, 132.0)*	*0.1893*
2	*39.36250*	*32*	*0.1736*	*1.263773*	*(32, 145.4)*	*0.1776*
3	*60.86734*	*48*	*0.1006*	*1.321233*	*(48, 136.9)*	*0.1086*
4	*71.66033*	*64*	*0.2388*	*1.138784*	*(64, 123.6)*	*0.2669*

**Edgeworth expansion corrected likelihood ratio statistic.*

Source: Own elaboration with data from Eviews

The following correctly specified tests are those corresponding to Normality and Heteroskedasticity. The following table shows the statistics obtained and the p-values that show normal residuals without heteroskedasticity.

Table 3

Normality and Heteroskedasticity Tests

Test	*Value*
White Heteroskedasticity (with cross terms)	*577.9712 (0.1252)*
Jarque – Bera	*3.587681 (0.8923)*

Source: Own elaboration with data from Eviews

Once the correct specification was determined, the Granger Causality test was performed to determine if there was a correlation between Aeromexico's behavior (yields) and the movements that occurred in the macroeconomic variables during the analysis period. The results show that the null hypothesis that indicates that the No Granger variables cause Aeromexico cannot be rejected, which implies that the behavior in the market of this issuer is not correlated to variations in the exchange rate, the IPC or the economic activity.

Table 4

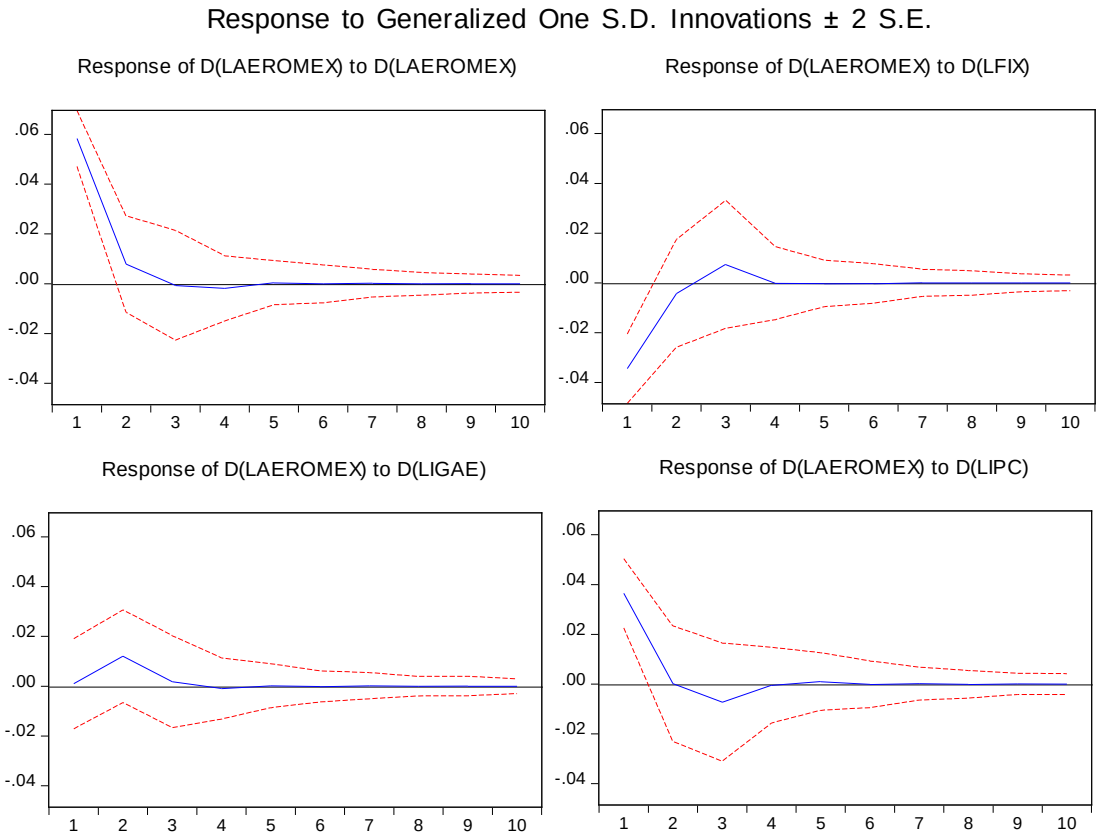
VAR Granger Causality/Block Exogeneity Wald Test

Dependent variable: D(LAEROMEX)			
Excluded	*Chi-sq*	*df*	*Prob.*
D(LFIX)	*0.984377*	*2*	*0.6113*
D(LIGAE)	*2.000652*	*2*	*0.3678*
D(LIPC)	*0.551446*	*2*	*0.7590*
All	*4.491112*	*6*	*0.6105*

Source: Own elaboration with data from Eviews

To expand the previous analysis, the Impulse-Response Functions were listed, shown below. In it we can observe that Aeromexico to a shock in the exchange rate in negative terms and in the third month it takes positive values but that effect is diluted from the fourth month. As for the market, a shock in the IPC implies a fall in aeromexico that is only perceived for three periods and is diluted as of the fourth month. And finally, the effect of a shock on economic activity does not statistically influence Aeromexico's market value.

Graph 2



Source: Own elaboration with data from Eviews

Conclusion

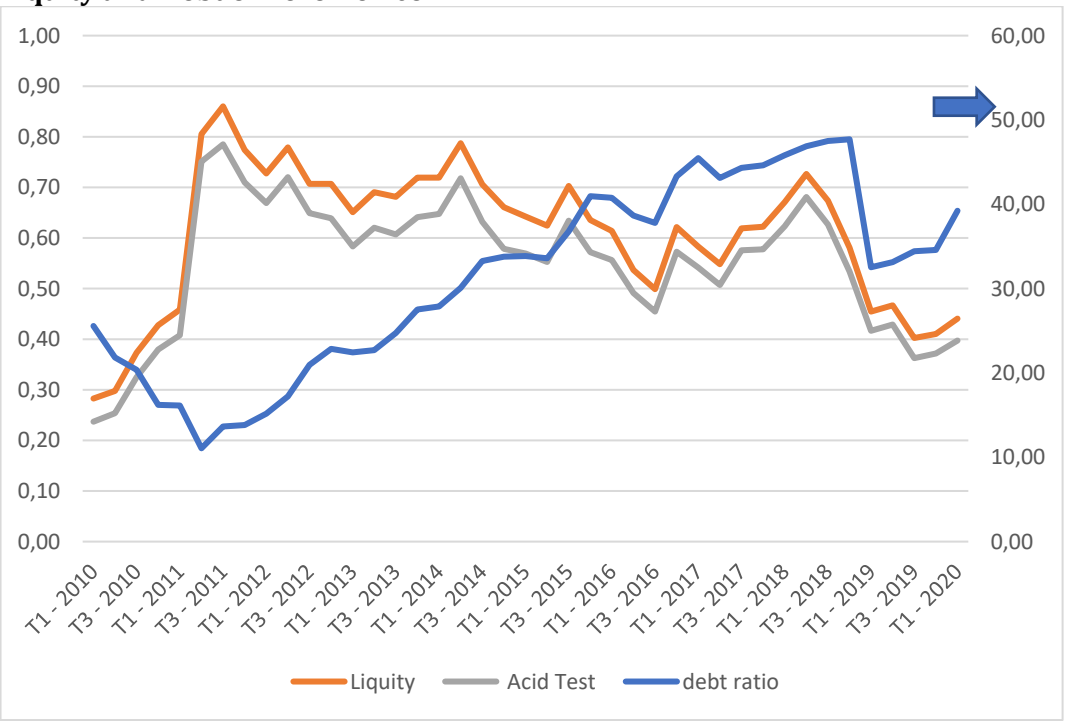
The results obtained with the Autoregressive Vector Model give us indications that external factors have not been the cause of the loss in value of Aeromexico's Market, but rather internal factors and investment decisions over the past ten years. This is evident in the following graphs, in the first the liquidity and the level of indebtedness of the company are presented and in the second the reasons of profitability that Aeromexico has offered in the last five years are presented. As can be seen, liquidity has had a downward trend which, together with the increase in debt, has caused it problems in solving its short-term commitments. In terms of profitability, net margin and return on assets have been on a ten-year downward trend for ten years, and the deepest problem is seen in the return on capital that fell in negative terrain since 2017 and has not achieved recover to positive values.

Once recovery features are reported, Aeromexico must focus on covering the tourism market, in combination with the business-oriented one, so that it can reactivate with

the expected increase in its income. Likewise, efforts should be focused in order to exercise greater control over its main operating costs, to the extent possible. Another factor of central importance is to seek certification of the aircraft in its fleet, to be in a position to use them in planning its operations. In this sense, there is a component of an endogenous nature, very important in the financial situation of the main Mexican airline. However, public policy actions must also be articulated, aimed at creating a less adverse environment for the development of the aviation industry in Mexico.

Graph 3

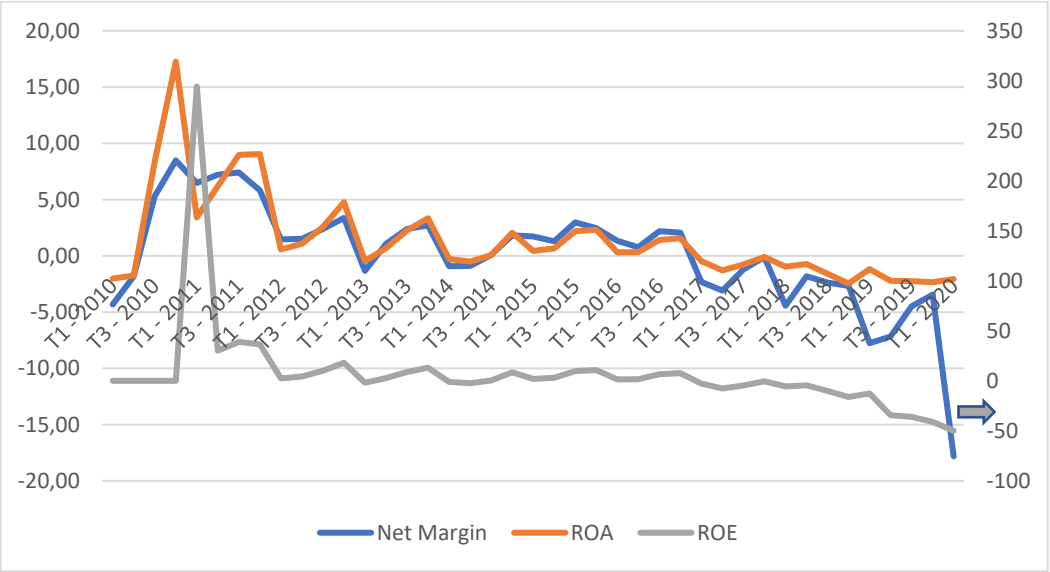
Liquity and Debt of Aeromexico



Source: Own elaboration with data from Economatica

Graph 4

Rentability of Aeromexico



Source: Own elaboration with data from Economatica

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