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FINANCIAL AND ECONOMIC INDICATORS

Business Analysis and Financial Ratios

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Juan Gaytán Cortés
Universidad de Guadalajara (México)
http://orcid.org/0000-0001-5614-0959
jgaytan@cucea.udg.mx

Business analysis began its development by supporting its activity in indexes, quotients or financial ratios, also known as ratios. Financial ratios are ways of comparing and investigating the relationships that exist between the different elements of the financial information of organizations. (Ross, Westerfield and Jaffe. 2018).

Financial analysts have used financial ratios since the 19th century to carry out the evaluation, to know the situation, as well as the financial and economic evolution of companies, initially they were used to measure credit liquidity, later under the direction of Alexander Wall, financial of the Federal Reserve Board in the United States, the financial ratios were used as a management technique, (Gremillet, 1989).

Towards the end of the 19th century and until the 1930s, the ability of financial ratios to predict possible business failure was analyzed. Subsequently, the focus was on determining long-term solvency and the possible prediction of bankruptcy, with the traditional approach that used financial ratios as a measure of credit liquidity taking a backseat.

The empirical studies of the financial ratios applied to the prediction of bankruptcies were given at the end of the sixties in the classic works with a predictive approach carried out by Beaver (1966) and Altman (1968).

In the hypothesis used by Beaver, the solvency of companies is linked to a group of independent financial ratios that can be controlled; This hypothesis, according to Bizquerra (1989), represents the beginning of univariate statistical analysis and later the development of multivariate analysis.

The theory of solvency in principle was based on the methodology of financial ratios. Subsequently, given certain weaknesses in the financial ratios in their simple interpretation,

solvency theory began to be enriched with multivariable statistical methods which, together with the development of statistical software (SPSS, SAS, BMPD, LISREL, SPAD, etc.), they provided more powerful and reliable instruments. (Ibarra, 2006)

Univariate analysis is the most elementary approach, and it has the drawback that, despite having a relatively large set of financial indicators, in principle these are basically examined in isolation and later an opinion is issued based on the knowledge and experience financial analyst.

Multivariate analysis is the approach that aims to decipher the links and relationships that exist between the different indicators, in such a way that the evaluation of the financial performance of the companies is carried out in a joint and structured manner, providing an integrating vision and of the different factors that condition life and business dynamics.

Multivariate analysis is part of statistics and data analysis that studies, analyzes, represents, and interprets the data resulting from observing more than one variable on a sample of individuals. (González, Ruiz and Nieto, 2020).

Among the main classifications used in multivariate models are those that divide them into a) descriptive or exploratory methods (no prior hypothesis is established); and b) explanatory or confirmatory methods (they are based on a theoretical framework to support and empirically validate a hypothesis).

Another classification is the one that divides the methods into: a) reductive methods (factorial analysis, main components, canonical correlation, cluster analysis, correspondence analysis); and b) dependency methods (variance analysis, covariance analysis, multiple regression, discriminant analysis, logit conditional probability analysis and probit conditional probability analysis). (Ibarra, 2006)

Economic and financial indicators are useful tools that benefit organizations by facilitating timely and appropriate decision-making in relation to their corporate and financial strategies.

Next, the evolution of some economic and financial indicators of the Mexican environment is described and shown to facilitate decision-making related to personal and business strategies in an integral manner.

1. National Consumer Price Index (INPC, Spanish)
2. The Price and Quotation Index of the Mexican Stock Exchange (IPC, Spanish)
3. Exchange rate
4. Equilibrium interbank interest rate (TIIE, Spanish)
5. CETES rate of return
6. Investment units (UDIS, Spanish)

1. NATIONAL CONSUMER PRICE INDEX (INPC)

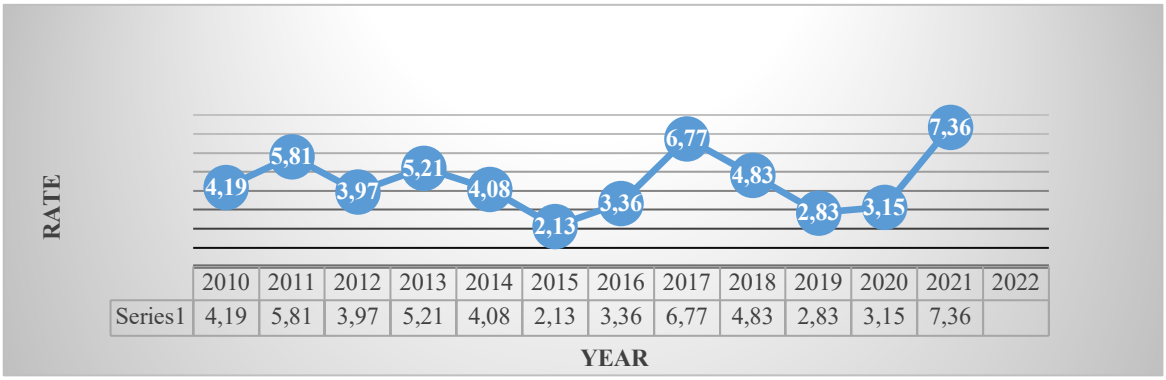
Born in 1995 and reflecting changes in consumer prices, measures the general increase in prices in the country. It is calculated fortnightly by the Bank of Mexico and INEGI (2021). INPC is published in the Official Gazette of the Federation on the 10th and 25th of each month. The reference period is the second half of December 2010.

Table 1. Accumulated inflation in the year (Base: 2nd. Fortnight of December 2010 = 100 with data provided by *Banco de México*)

Periodo	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*
Enero	1.48	0.77	0.98	0.79	0.90	-0.09	0.38	1.70	0.53	0.09	0.48	0.86	0.59
Febrero	2.15	1.42	1.47	1.46	1.15	0.09	0.82	2.29	0.91	0.06	0.90	1.50	1.43
Marzo	2.52	1.84	1.55	1.99	1.43	0.51	0.97	2.92	1.24	0.44	0.85	2.34	2.43
Abril	1.98	0.72	0.69	1.81	1.24	0.25	0.65	3.04	0.90	0.50	-0.17	2.67	2.98
Mayo	0.60	-0.70	-0.65	0.95	0.91	-0.26	0.20	2.92	0.73	0.21	0.22	2.88	
Junio	0.49	-0.41	-0.41	1.12	1.09	-0.09	0.31	3.18	1.12	0.27	0.76	3.43	
Julio	0.56	-0.04	0.32	1.14	1.42	0.06	0.57	3.57	1.66	0.65	1.43	4.04	
Agosto	0.91	0.30	0.92	1.31	1.73	0.27	0.86	4.08	2.26	0.63	1.82	4.24	
Septiembre	1.27	0.73	1.12	1.61	2.18	0.27	1.47	4.41	2.69	0.89	2.06	4.88	
Octubre	2.35	2.33	2.12	2.77	2.74	1.16	2.09	5.06	3.22	1.44	2.68	5.76	
Noviembre	3.89	4.87	3.86	4.57	3.57	1.71	2.89	6.15	4.10	2.26	2.76	6.97	
Diciembre	4.19	5.81	3.97	5.21	4.08	2.13	3.36	6.77	4.83	2.83	3.15	7.36	

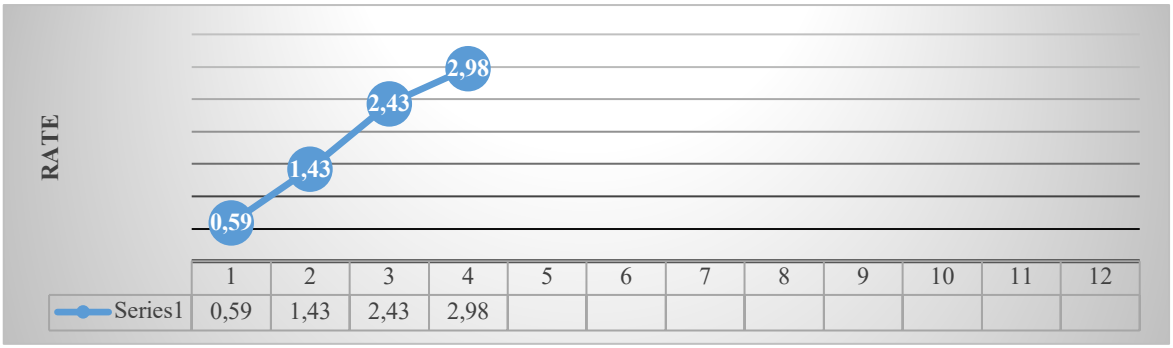
Source: Own elaboration (INEGI, 2022). Route: Indicadores económicos de coyuntura > Índices de precios > Índice nacional de precios al consumidor. Base segunda quincena de julio de 2018=100 > Mensual > Índice > Índice general

Graph 1. Inflation in Mexico (2010-2021 accumulated at the end of the year)



Source: Own elaboration (INEGI, 2022). Route: Indicadores económicos de coyuntura > Índices de precios > Índice nacional de precios al consumidor. Base segunda quincena de julio de 2018=100 > Mensual > Índice > Índice general

Graph 2. Inflation in Mexico (accumulated January-April 2022)



Source: Own elaboration (INEGI, 2022). Route: Indicadores económicos de coyuntura > Índices de precios > Índice nacional de precios al consumidor. Base segunda quincena de julio de 2018=100 > Mensual > Índice > Índice general

2. THE PRICE AND QUOTATION INDEX OF THE MEXICAN STOCK EXCHANGE (IPC)

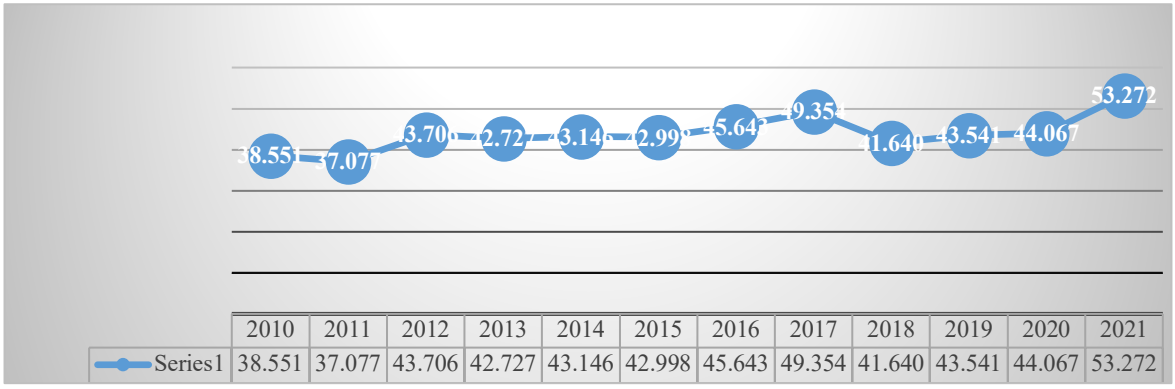
Represents the change in the values traded on the Mexican Stock Exchange concerning the previous day to determine the percentage of rising or fall of the most representative shares of the companies listed therein.

Table 2. The Price and Quotation Index of the Mexican Stock Exchange (Base: October 1978, 0.78=10*0)*

Periodo	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*
Enero	30,392	36,982	37,422	45,278	40,879	40,951	43,631	47,001	50,456	43,988	44,862	42,986	51,331
Febrero	31,635	37,020	37,816	44,121	38,783	44,190	43,715	46,857	47,438	42,824	41,324	44,593	53,401
Marzo	33,266	37,441	39,521	44,077	40,462	43,725	45,881	48,542	46,125	43,281	34,554	47,246	56,537
Abril	32,687	36,963	39,461	42,263	40,712	44,582	45,785	49,261	48,354	44,597	36,470	48,010	51,418
Mayo	32,039	35,833	37,872	41,588	41,363	44,704	45,459	48,788	44,663	42,749	36,122	50,886	
Junio	31,157	36,558	40,199	40,623	42,737	45,054	45,966	49,857	47,663	43,161	37,716	50,290	
Julio	32,309	35,999	40,704	40,838	43,818	44,753	46,661	51,012	49,698	40,863	37,020	50,868	
Agosto	31,680	35,721	39,422	39,492	45,628	43,722	47,541	51,210	49,548	42,623	36,841	53,305	
Sep.	33,330	33,503	40,867	40,185	44,986	42,633	47,246	50,346	49,504	43,011	37,459	51,386	
Oct.	35,568	36,160	41,620	41,039	45,028	44,543	48,009	48,626	43,943	43,337	36,988	51,310	
Nov.	36,817	36,829	41,834	42,499	44,190	43,419	45,286	47,092	41,733	42,820	41,779	49,699	
Dic.	38,551	37,077	43,706	42,727	43,146	42,998	45,643	49,354	41,640	43,541	44,067	53,272	

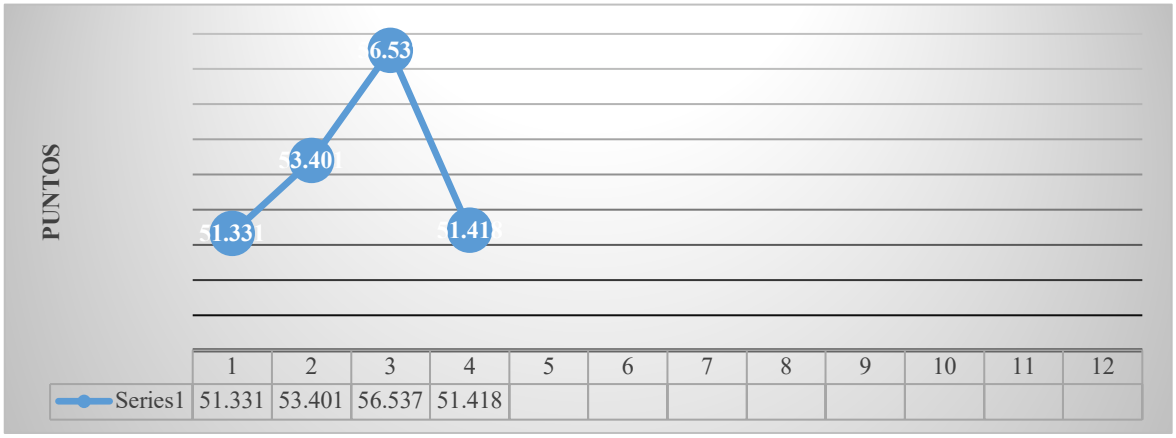
Source: Own elaboration (BANXICO, 2022).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=7&accion=consultarCuadro&idCuadro=CF57&locale=es

Graph 3. The Price and Quotation Index of the Mexican Stock Exchange, 2010 - 2021 (Score at the end of each year)



Source: Own elaboration (BANXICO, 2022).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=7&accion=consultarCuadro&idCuadro=CF57&locale=es

Graph 4. The Price and Quotation Index of the Mexican Stock Exchange, January-April 2022 (Score at the end of each month)



Source: Own elaboration (BANXICO, 2022).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=7&accion=consultarCuadro&idCuadro=CF57&locale=es

3. EXCHANGE RATE

It is the value of the Mexican peso with respect to the dollar calculated with the daily average of the five most important banks in the country, which reflects the spot price (cash), negotiated between banks. It is highly related to Inflation, the interest rate, and the Mexican Stock Exchange.

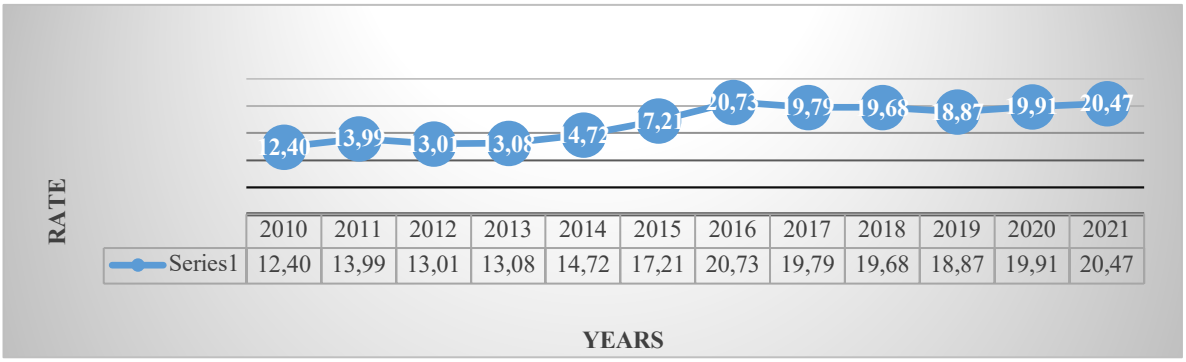
Table 3. Exchange rate (National currency per US dollar, parity at the end of each period)

Periodo	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*
Enero	12.81	12.02	12.95	12.71	13.37	14.69	18.45	21.02	18.62	19.04	18.91	20.22	20.74
Febrero	12.96	12.17	12.87	12.87	13.30	14.92	18.17	19.83	18.65	19.26	19.78	20.94	20.65
Marzo	12.61	11.97	12.80	12.36	13.08	15.15	17.40	18.81	18.33	19.38	23.48	20.44	19.99
Abril	12.24	11.59	13.20	12.16	13.14	15.22	19.40	19.11	18.86	19.01	23.93	20.18	20.57
Mayo	12.68	11.63	13.91	12.63	12.87	15.36	18.45	18.51	19.75	19.64	22.18	19.92	
Junio	12.72	11.84	13.66	13.19	13.03	15.57	18.91	17.90	20.06	19.21	23.09	19.91	
Julio	12.83	11.65	13.28	12.73	13.06	16.21	18.86	17.69	18.55	19.99	22.20	19.85	
Agosto	12.73	12.41	13.27	13.25	13.08	16.89	18.58	17.88	19.07	20.07	21.89	20.06	
Septiembre	12.86	13.42	12.92	13.01	13.45	17.01	19.50	18.13	18.90	19.68	22.14	20.56	
Octubre	12.45	13.20	13.09	12.89	13.42	16.45	18.84	19.15	19.80	19.16	21.25	20.53	
Noviembre	12.33	14.03	13.04	13.09	13.72	16.55	20.55	18.58	20.41	19.61	20.14	21.45	
Diciembre	12.40	13.99	13.01	13.08	14.72	17.21	20.73	19.79	19.68	18.87	19.91	20.47	

NOTE: Exchange rate FIX by The Banco de México, used for settle obligations denominated in foreign currency. Quote at the end

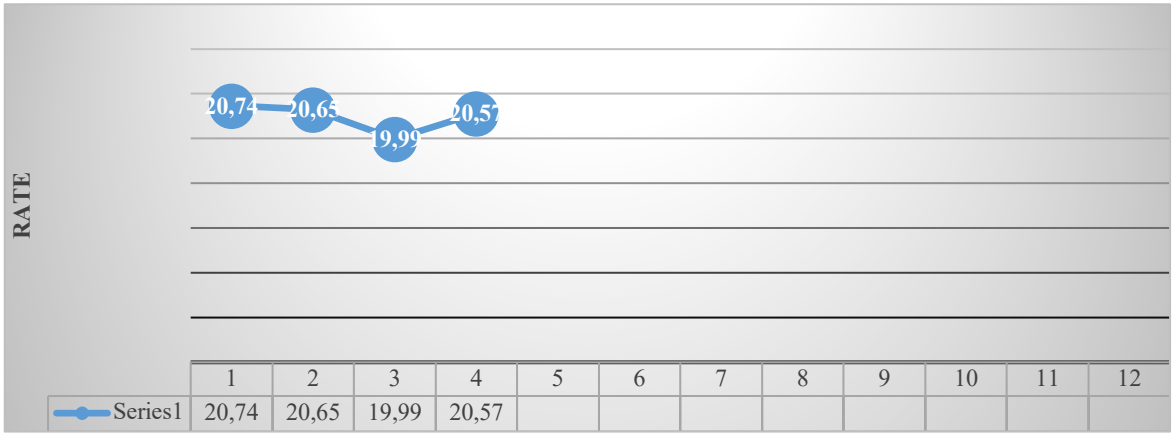
Source: Own elaboration (BANXICO, 2022).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=6&accion=consultarCuadro&idCuadro=CF102&locale=es

Graph 5. Exchange rate (National currency per US dollar, 2010-2021, FIX parity at the end of each year)



Source: Own elaboration (BANXICO, 2022).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=6&accion=consultarCuadro&idCuadro=CF102&locale=es

Graph 6. Exchange rate (National currency per US dollar, January-April 2022, FIX parity at the end of each month)



Source: Own elaboration (BANXICO, 2022).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=6&accion=consultarCuadro&idCuadro=CF102&locale=es

4. EQUILIBRIUM INTERBANK INTEREST RATE (TIIE).

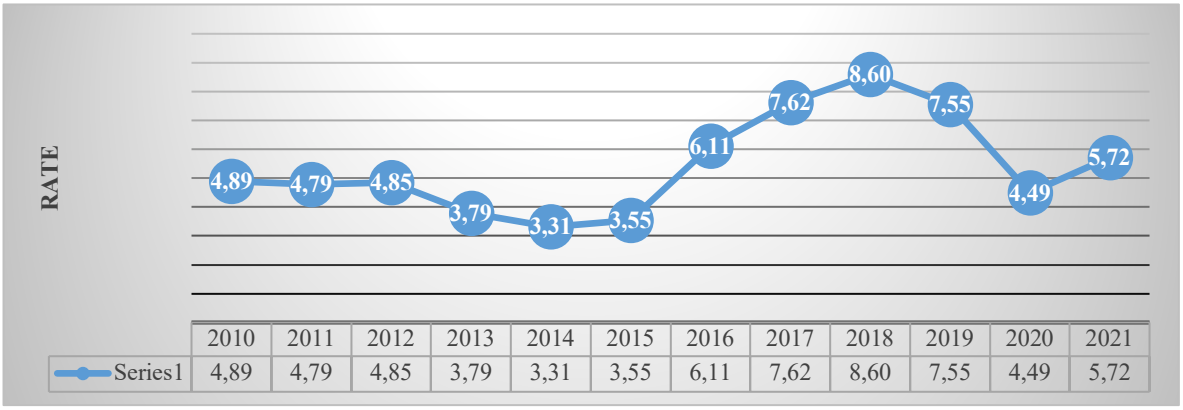
On March 23, 1995, the Bank of Mexico, to establish an interbank interest rate that better reflects market conditions, released the Interbank Equilibrium Interest Rate through the Official Gazette of the Federation.

Table 4. Equilibrium interbank interest rate (28-day quote)

Periodo	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*
Enero	4.91	4.86	4.79	4.84	3.78	3.29	3.56	6.15	7.66	8.59	7.50	4.47	5.73
Febrero	4.92	4.84	4.78	4.80	3.79	3.29	4.05	6.61	7.83	8.54	7.29	4.36	6.23
Marzo	4.92	4.84	4.77	4.35	3.81	3.30	4.07	6.68	7.85	8.51	6.74	4.28	6.73
Abril	4.94	4.85	4.75	4.33	3.80	3.30	4.07	6.89	7.85	8.50	6.25	4.28	6.75
Mayo	4.94	4.85	4.76	4.30	3.79	3.30	4.10	7.15	7.86	8.51	5.74	4.29	
Junio	4.94	4.85	4.77	4.31	3.31	3.30	4.11	7.36	8.10	8.49	5.28	4.32	
Julio	4.92	4.82	4.78	4.32	3.31	3.31	4.59	7.38	8.11	8.47	5.19	4.52	
Agosto	4.90	4.81	4.79	4.30	3.30	3.33	4.60	7.38	8.10	8.26	4.76	4.65	
Septiembre	4.90	4.78	4.81	4.03	3.29	3.33	4.67	7.38	8.12	8.04	4.55	4.75	
Octubre	4.87	4.79	4.83	3.78	3.28	3.30	5.11	7.38	8.15	7.97	4.51	4.98	
Noviembre	4.87	4.80	4.85	3.80	3.31	3.32	5.57	7.39	8.34	7.78	4.48	5.13	
Diciembre	4.89	4.79	4.85	3.79	3.31	3.55	6.11	7.62	8.60	7.55	4.49	5.72	

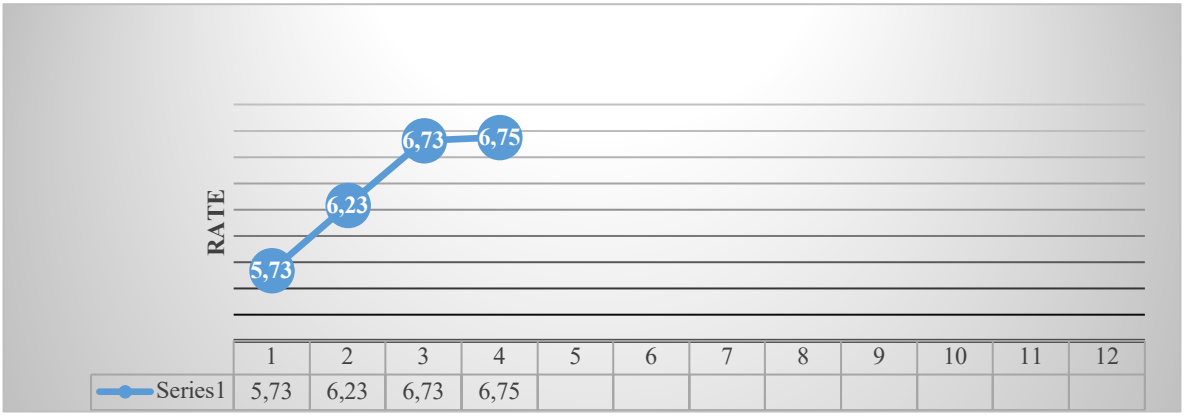
Source: Own elaboration (BANXICO, 2022).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=18&accion=consultarCuadro&idCuadro=CF101&locale=es

Graph 7. Equilibrium interbank interest rate, 2010- 2021 (at the end of each year)



Source: Own elaboration (BANXICO, 2022).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=18&accion=consultarCuadro&idCuadro=CF101&locale=es

Graph 8. Equilibrium interbank interest rate, January-April 2022 (28-day quote)



Source: Own elaboration (BANXICO, 2022).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=18&accion=consultarCuadro&idCuadro=CF101&locale=es

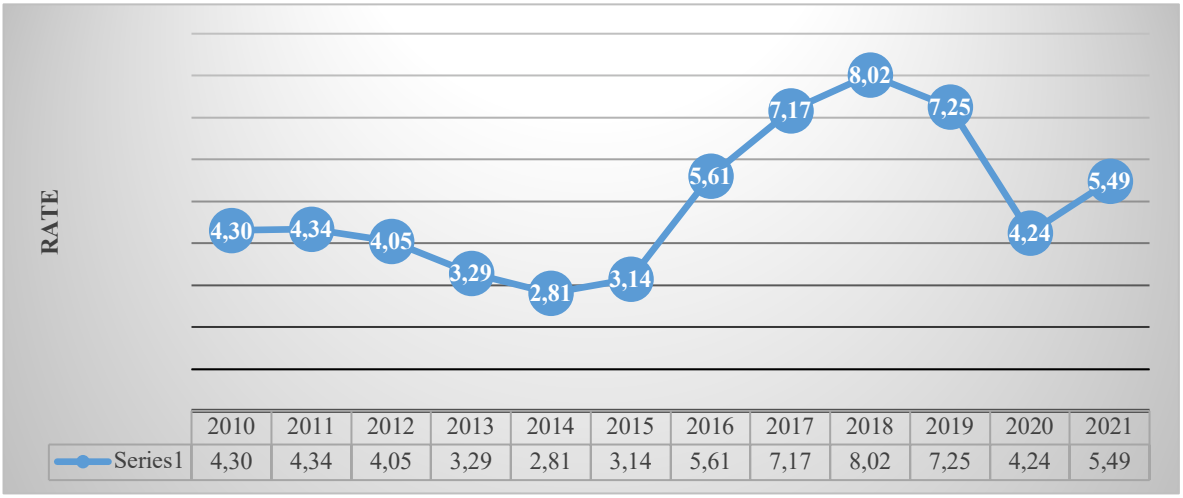
5. CETES RATE OF RETURN

Table 5. CETES rate of return (28-day)

Periodo	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*
Enero	4.49	4.14	4.27	4.15	3.14	2.67	3.08	5.83	7.25	7.95	7.04	4.22	5.50
Febrero	4.49	4.04	4.32	4.19	3.16	2.81	3.36	6.06	7.40	7.93	6.91	4.02	5.94
Marzo	4.45	4.27	4.24	3.98	3.17	3.04	3.80	6.32	7.47	8.02	6.59	4.08	6.52
Abril	4.44	4.28	4.29	3.82	3.23	2.97	3.74	6.50	7.46	7.78	5.84	4.06	6.68
Mayo	4.52	4.31	4.39	3.72	3.28	2.98	3.81	6.56	7.51	8.07	5.38	4.07	
Junio	4.59	4.37	4.34	3.78	3.02	2.96	3.81	6.82	7.64	8.18	4.85	4.03	
Julio	4.60	4.14	4.15	3.85	2.83	2.99	4.21	6.99	7.73	8.15	4.63	4.35	
Agosto	4.52	4.05	4.13	3.84	2.77	3.04	4.24	6.94	7.73	7.87	4.50	4.49	
Septiembre	4.43	4.23	4.17	3.64	2.83	3.10	4.28	6.99	7.69	7.61	4.25	4.69	
Octubre	4.03	4.36	4.21	3.39	2.90	3.02	4.69	7.03	7.69	7.62	4.22	4.93	
Noviembre	3.97	4.35	4.23	3.39	2.85	3.02	5.15	7.02	7.83	7.46	4.28	5.05	
Diciembre	4.30	4.34	4.05	3.29	2.81	3.14	5.61	7.17	8.02	7.25	4.24	5.49	

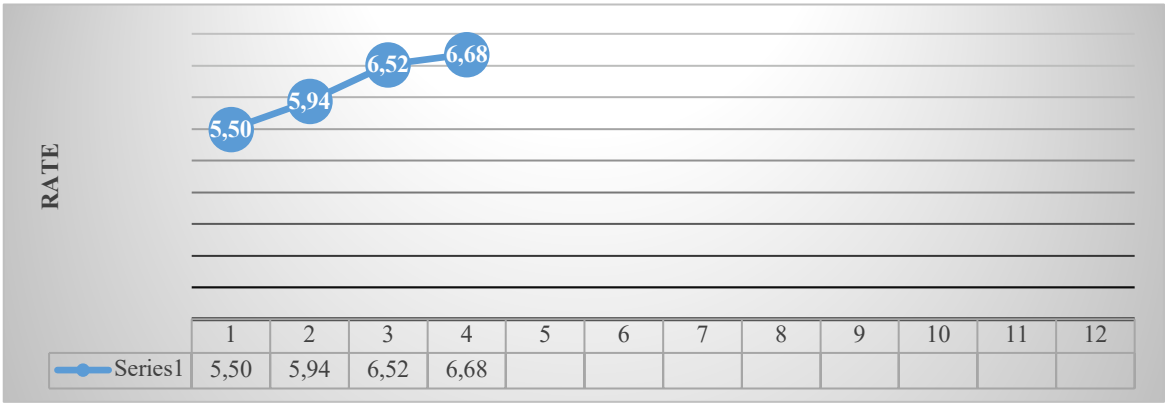
Source: Own elaboration (BANXICO, 2022).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=22&accion=consultarCuadro&idCuadro=CF107&locale=es

Graph 9. CETES rate of return 2010- 2021 (at the end of each year)



Source: Own elaboration (BANXICO, 2022).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=22&accion=consultarCuadro&idCuadro=CF107&locale=es

Graph 10. CETES rate of return, January-April del 2022 (at the end of each month)



Source: Own elaboration (BANXICO, 2022).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=22&accion=consultarCuadro&idCuadro=CF107&locale=es

6. INVESTMENT UNITS (UDIS)

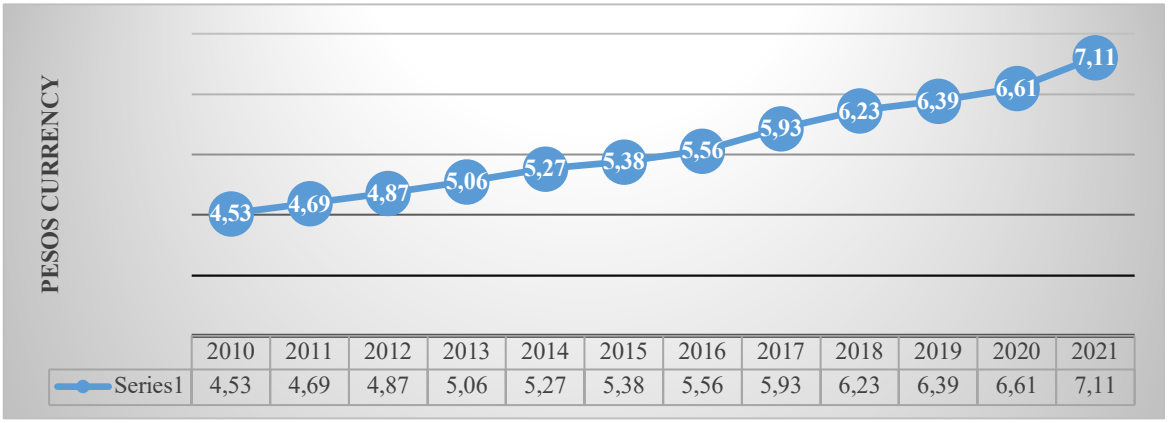
The UDI is a unit of account of constant real value to denominate credit titles. It does not apply to checks, commercial contracts, or other acts of commerce.

Table 6. Investment units (value concerning pesos)

Periodo	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*
Enero	4.37	4.56	4.73	4.89	5.10	5.29	5.41	5.62	5.97	6.25	6.44	6.64	7.12
Febrero	4.41	4.57	4.75	4.92	5.13	5.29	5.43	5.69	6.00	6.25	6.46	6.70	7.18
Marzo	4.44	4.59	4.75	4.94	5.15	5.30	5.44	5.71	6.02	6.26	6.49	6.75	7.24
Abril	4.46	4.59	4.75	4.97	5.15	5.32	5.45	5.75	6.03	6.28	6.43	6.79	7.31
Mayo	4.43	4.58	4.71	4.96	5.13	5.29	5.42	5.75	6.01	6.27	6.42	6.81	
Junio	4.41	4.55	4.74	4.95	5.13	5.28	5.42	5.75	6.01	6.26	6.44	6.83	
Julio	4.42	4.57	4.77	4.95	5.14	5.28	5.42	5.76	6.04	6.27	6.49	6.87	
Agosto	4.43	4.58	4.78	4.95	5.16	5.29	5.44	5.79	6.07	6.29	6.52	6.90	
Septiembre	4.44	4.59	4.80	4.97	5.18	5.31	5.45	5.82	6.11	6.29	6.55	6.92	
Octubre	4.47	4.61	4.83	4.99	5.20	5.33	5.49	5.84	6.13	6.31	6.57	6.97	
Noviembre	4.50	4.64	4.85	5.02	5.23	5.36	5.53	5.89	6.17	6.35	6.60	7.04	
Diciembre	4.53	4.69	4.87	5.06	5.27	5.38	5.56	5.93	6.23	6.39	6.61	7.11	

Source: Own elaboration (BANXICO, 2022).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?accion=consultarCuadro&idCuadro=CP150&locale=es

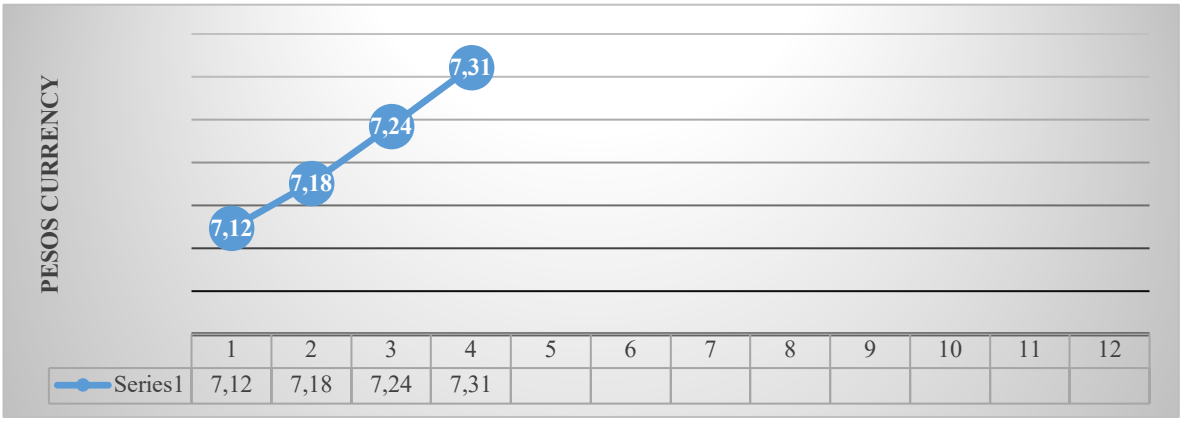
Graph 11. Investment units 2010-2021 (At the end of the year)



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Series1	4,53	4,69	4,87	5,06	5,27	5,38	5,56	5,93	6,23	6,39	6,61	7,11

Source: Own elaboration (BANXICO, 2022).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?accion=consultarCuadro&idCuadro=CP150&locale=es

Graph 12. Investment units, January-April 2022



	1	2	3	4	5	6	7	8	9	10	11	12
Series1	7,12	7,18	7,24	7,31								

Source: Own elaboration (BANXICO, 2022).
https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?accion=consultarCuadro&idCuadro=CP150&locale=es

On April 1, 1995, the Decree establishing the obligations corresponding to the UDIS was published in the Official Gazette of the Federation. Since April 4, 1995, the Bank of Mexico publishes in the Official Gazette of the Federation the value in the national currency of the Investment Unit, for each day.

The financial ratios over time with the purpose of facilitating their application in the various sections of the organizations have been classified to measure liquidity, asset management, profitability, the market, etc.

The survival, growth and obtaining profits in organizations requires the use and interpretation of financial and economic indicators that allow deciphering the external and internal

environments of organizations. At the beginning of the 20th century, the use of financial ratios became clear and, with the intention of facilitating their application, they have been standardized and classified with the intention of measuring liquidity, asset management, profitability, the market, etc. However, taking into consideration the many differences that exist in organizations, the current use of these ratios cannot or should not be standardized, since each company or entity has characteristics that identify it, being able to mention, among others, the sector to which it belongs, the productive activity or services that it develops, etc. Although the usefulness of financial ratios is recognized, finally, according to the study carried out by Alberto Ibarra Mares (2006), we can mention that the potential of this tool is only in an initial phase of conceptual and empirical development.

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