Impact of gasoline prices on the economy of the academic staff of civil engineering, of the Coatzacoalcos region Engineering Faculty, of the Universidad Veracruzana

Impacto de los precios de la gasolina en la economía del personal académico de ingeniería civil, de la Facultad de Ingeniería región Coatzacoalcos, de la Universidad Veracruzana

MENDOZA-GONZÁLEZ, Felipe†*, CÓRDOVA-ESCOBEDO, Jesús Fausto, GOMEZ-RODRIGUEZ, Cristian and LÓPEZ-LIÉVANO, Adolfo

Universidad Veracruzana, Faculty of Engineering región Coatzacoalcos - Minatitlán, México.

ID 1st Author: Felipe, Mendoza-González / **ORC ID:** 0000-0003-1172-6782, **Researcher ID:** S-6747-2018, **CVU CONACYT ID:** 947336

ID 1st Co-author: Jesús Fausto, Córdova-Escobedo / **ORC ID:** 0000-0002-7456-6897, **Researcher ID Thomson:** S-6737-2018, **CVU CONACYT ID:** 511561

ID 2^{nd} Co-author: Cristian, Gomez-Rodriguez / ORC ID: 0000-0001-9124-6037, Researcher ID Thomson: S-6787-2018, CVU CONACYT ID: 210208

ID 3rd Co-author: *Adolfo, López-Liévano /* **ORC ID:** 0000-0003-3979-4285, **Researcher ID Thomson:** GOV-6323-2022, **CVU CONACYT ID:** 420539

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Abstract

The savings that civil engineering academics have had to implement due to gasoline prices were determined, and the price policies of gasoline and diesel in Mexico were shown, with the history of prices, history of taxes, the regulatory framework on prices, and the composition of the price of gasoline and diesel in Mexico, in the methodological aspect for the confirmatory empirical research, the survey was elaborated in which it was also questioned if they consider the prices of Magna and Premium gasoline and high diesel, and if they have perceived any benefit with the implementation of the energy reform with respect to fuel prices in Mexico. The survey was applied to 15 academics of the 35 that make up the civil engineering staff, with results that corroborate the hypothesis that derived from gasoline prices, teachers have taken actions that lead to savings, such as that 33.33 % will buy compact vehicles, 83.33% consume magna gasoline instead of Premium, and others.

Resumen

Se determinaron los ahorros que los académicos de ingeniería civil han tenido que implementar debido a los precios de la gasolina, y se mostró las políticas de precios de las gasolinas y Diesel en México, con los antecedentes de los precios, antecedentes de los impuestos, el marco normativo sobre los precios, y la composición del precio de la gasolina y el Diesel en México, en el aspecto metodológico para la investigación empírica confirmatoria, se elaboró la encuesta en la que también se interrogo si consideran los precios de la gasolina Magna y Premium y del Diesel altos, y si han percibido algún beneficio con la implementación de la reforma energética con respecto a los precios de los combustibles en México. La encuesta se aplicó a 15 académicos de los 35 que integran la plantilla de ingeniería civil, con resultados que corroboran la hipótesis de que derivado de los precios de las gasolinas, los docentes han tomado acciones que los llevan al ahorro, como son que el 33.33% comprara vehículos compactos, el 83.33% consuma gasolina magna en lugar de Premium, y otros más.

Prices, Gasoline, Save money

Precios, Gasolina, Ahorrar

^{*} Author's Correspondence (E-mail: femendoza@uv.mx)

[†] Researcher contributing as first author.

Introduction

The first step is to describe the history of gasoline prices in Mexico, starting with the expropriation of the oil industry in 1938, in order to keep fuel prices low as one of its objectives, indicating the events that took place in 1958, 1974, 1981 and 1982.

In the background of taxes on petrol and diesel, it explains the taxes that were applied since the 1970s, until 1993 when the IEPS law was modified, being the VAT and the variable IEPS paid by consumers.

For the regulatory framework on prices, reference is made to the Political Constitution of the United Mexican States, the Organic Law of Petróleos Mexicanos and Subsidiary Organisms, the Law of Petróleos Mexicanos, the Internal Regulations of the Ministry of Finance and Public Credit, the Organic Law of the Federal Public Administration, the Planning Law, the Federal Law of Parastatal Entities, the Federal Law of Economic Competition and the Energy Reform.

The composition of the price of gasoline and diesel is also presented, based on the Energy Regulatory Commission and the Ministry of Finance and Public Credit (SHCP).

A survey was prepared and applied to a sample of the academic population of the Civil Engineering Educational Programme of the Faculty of Engineering, to obtain the measures they have had to implement to save, due to petrol prices, such as selling their vehicle, using public transport more frequently, carpooling and even changing their home.

From the same survey, it was determined that for 93% of the teachers, the increase in the minimum wage has not been enough to cover petrol prices, which has had a considerable impact.

Finally, 100% of academics consider that there has been no benefit from the Energy Reform implemented in Mexico with respect to petrol and diesel prices.

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Gasoline and diesel price policies in Mexico

Background on gasoline prices in Mexico

Before explaining the composition of gasoline and diesel prices in Mexico, we will present their background, which according to Palomares (2014) begins with the oil expropriation in 1938, with two main objectives: to satisfy the country's demand and also to maintain low fuel and gas prices, in order to encourage the growth of industry, the transport system and the economy in Mexico.

It remained that way until 1958 with a significant rise in prices, due to financial problems in Pemex. In 1974, another increase was produced by the modification of the tax on gasoline sales, increasing federal income. By 1981, the federal government faced the problem of falling international oil prices and therefore a decrease in exports, which resulted in lower revenues, having to reduce the budget, increase import tariffs and increase gasoline and diesel (Palomares, 2014).

Another important increase occurred in 1982, according to the Bank of Mexico (1983) cited by Palomares (2014) "the price of gasoline increased 52.7%, in August 65.7% and in December 100%" (p. 17).

In 1981 the energy programme was established, and for Palomares (2014): This pricing policy sought to moderate the growth of demand. Since then, the aim was to reduce the gap between international prices and domestic prices, as well as to update prices according to inflation so that they did not decrease in real terms (p. 17).

History of gasoline and diesel taxes in Mexico

The taxes applied in Mexico in the 1970s consisted of the Value Added Tax (VAT) and the Tax on Gasoline Sales (IVG). Later, in 1980, the IVG was replaced by the Special Tax on Production and Services (IEPS), a tax with a fixed percentage of 50% for gasoline not exceeding 82 octane, and 138.3% for gasoline over 82 octane.

By 1990, the Regulation of the Federal Law of Parastatal Entities was published, with Article 26 to consider the international reference price as part of the production costs.

Palomares (2014) indicates that:

Likewise, since 1992 the pricing policy of goods and services offered by the Federal Public Administration aims to reduce possible inefficiencies of public bodies and the establishment of parameters for measuring efficiency for which international market prices are used (p. 18).

Thus, in 1993, the IEPS law was modified so that the price of Magna, Premium and Diesel gasoline is determined with the international reference price, changing the tax rate to a variable percentage that varies monthly.

Retail prices from then until 2007 were updated monthly according to expected inflation. The retail tax scheme continued to be VAT and variable STPS (Palomares, 2014, p. 18-19).

Regulatory framework on prices in Mexico

The Political Constitution of the United Mexican States (2021) states that:

The Nation has direct dominion over all natural resources of the continental shelf..., oil and all solid, liquid or gaseous hydrogen carbides; and the space located over the national territory, to the extent and under the terms established by International Law (p. 31).

In turn, the Organic Law of Petróleos Mexicanos and Subsidiary Organisms (2008) in article 3, section 2, establishes that Pemex - Refining will be in charge of the industrial refining processes, of elaborating petroleum products and derivatives that can serve as industrial raw materials, of storing, transporting, distributing and commercialising the aforementioned.

Setting and adjusting the prices of goods and services produced or provided by Petróleos Mexicanos and its subsidiary productive companies, or the rules for this purpose, except those that must be determined in terms of the laws of the matter (Ley de Petróleos Mexicanos, 2014, p. 5).

According to the Internal Regulations of the Ministry of Finance and Public Credit (2017), the Economic Planning Unit of the Public Treasury is responsible for:

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To give an opinion on the policy guidelines for prices and tariffs of goods and services of the public sector, in coordination with the competent administrative units of the Ministry, in order to provide elements for the participation that the latter and the entities coordinated by it are responsible for in the formulation of the National Development Plan (p. 38).

In addition, the Organic Law of the Federal Public Administration (2022) allows the Ministry of Finance and Public Credit to "establish and review the prices and tariffs of goods and services of the federal public administration, or the basis for setting them, in consultation with the Ministry of Economy and with the participation of the corresponding agencies" (p. 21).

"Consider the effects of monetary and credit policy, as well as the prices and tariffs of goods and services of the Federal Public Administration, on the achievement of the objectives and priorities of the Plan and programmes" (Ley de Planeación, 2018, p. 5).

According to the Federal Law on Parastatals (2019), the governing bodies of parastatals may "set and adjust the prices of goods and services produced or provided by the parastatal with the exception of those determined by agreement of the Federal Executive" (p. 12).

The Federal Economic Competition Law (2021), in article 9 in its two sections, mentions that it is exclusively up to the Federal Executive to determine by decree the goods and services that may be subject to maximum prices, as long as there are no conditions of effective competition in the relevant market in question. The Commission shall determine by means of a declaration if there are no conditions of effective competition, based on criteria that avoid insufficient supply.

"The Ministry may agree and coordinate with producers or distributors the actions or modalities that are necessary in this matter, trying to minimise the effects on competition and free competition" (Ley Federal de Competencia Económica, 2021, p. 4).

The Energy Reform (2013) explains that there is a risk that in places where only one company sells gasoline and diesel, prices will be higher in the absence of competition, and that is why from 2015 to 2017 there will be maximum prices, which will then be liberalised.

Finally, the Chamber of Deputies will review, adjust if necessary, and approve the Federal Expenditure Budget Bill, as well as the Revenue Law.

Gasoline and diesel price composition in Mexico

According to the Energy Regulatory Commission and the Ministry of Finance and Public Credit (SHCP), according to Patiño (2018) the price of gasoline and diesel in Mexico is composed of four factors, the first is the reference price, which is an average of gasoline prices on the Gulf Coast of the United States in dollars with their respective conversion to Mexican currency; the second is the federal IEPS (Special Tax on Production and Services), the state and municipal IEPS, and the tax on fossil fuels for environmental damage; the third is the VAT (Value Added Tax) of 16% on the final price; and the fourth is the distribution and logistics costs, which are considered in the VPM (Venta de Primera Mano) rate and charged by PEMEX depending on how the fuel is transported to the station.

Methodology

The empirical confirmatory research will be carried out with the statistical analysis that will be elaborated from the survey that was applied to determine if the price increases in Mexico of Magna and Premium gasoline have encouraged consumers to save.

The results of the survey will also be used to answer the following questions: Have consumers of Magna, Premium and Diesel gasoline perceived any benefit from the implementation of the energy reform in Mexico, and do consumers of Magna, Premium and Diesel gasoline consider prices in Mexico to be high?

The hypothesis is that the increase in the prices of Magna and Premium petrol in Mexico has encouraged consumers to save, for this reason a survey will be conducted, the population or universe that was selected is the teaching staff of the Faculty of Engineering of the degree in civil engineering specifically, of the Coatzacoalcos - Minatitlán region of the Universidad Veracruzana. The teaching staff is composed of 35 academics in total, including full-time professors, part-time professors, academic technicians, and hourly or subject-based professors.

The sample population of civil engineering teaching staff for the survey to determine whether the increase in the price of Magna and Premium petrol in Mexico has encouraged consumers to save is 15 academics.

Using the procedure described above, in Know groups, teachers were asked where most of them had a car, checking with questions about whether they have a car, and others, to meet the criterion variable.

For construct validity, the hypothesis is considered: The increase in the prices of Magna and Premium petrol in Mexico has encouraged consumers to save, in order to correlate the savings variable with the variables: high prices of Magna and Premium petrol, increases in the prices of the basic food basket, increases in taxi fares and public transport.

Survey of civil engineering academic staff.

Male	14	93%
Female	1	7%

Table 1 What is your gender? *Source: Own elaboration* (2022)



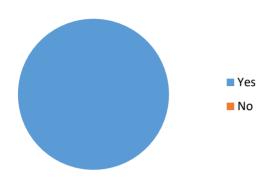
Graphic 1 What is your gender? *Source: Own elaboration (2022)*

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Yes	15	100%
No	0	0%

Table 2 In general terms, do you consider petrol and diesel prices to be high?

Source: Own elaboration (2022)

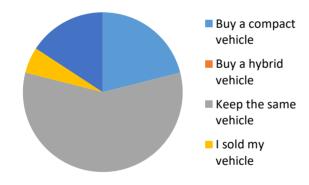


Graphic 2 In general terms, do you consider petrol and diesel prices to be high?

Source: Own elaboration (2022)

Buy a compact vehicle	4	21%
Buy a hybrid vehicle	0	0%
Keep the same vehicle	11	58%
I sold my vehicle	1	5%
I have no vehicle	3	16%

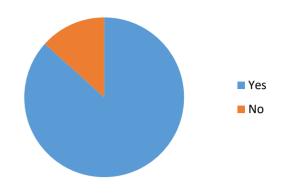
Table 3 In this question you can select more than one option. By increasing the price of gasoline Source: Own elaboration (2022)



Graphic 3 In this question you can select more than one option. By increasing the price of gasoline *Source: Own elaboration* (2022)

Yes	13	87%
No	2	13%

Table 4 With the increase in the price of gasoline, do you buy magna instead of premium? *Source: Own elaboration* (2022)

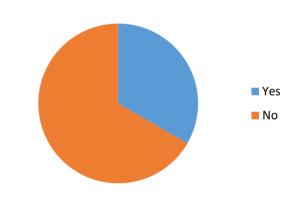


Graphic 4 With the increase in the price of gasoline, do you buy magna instead of premium? *Source: Own elaboration* (2022)

Yes	5	33%
No	10	67%

Table 5 Did the price of petrol cause you to use public transport?

Source: Own elaboration (2022)



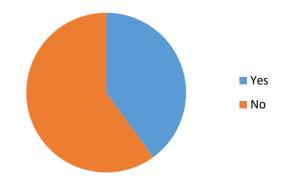
Graphic 5 Did the price of petrol cause you to use public transport?

Source: Own elaboration (2022)

Yes	6	40%
No	9	60%

Table 6 Do you use public transport more often with the rise in petrol prices?

Source: Own elaboration (2022)



Graphic 6 Do you use public transport more often with the rise in petrol prices?

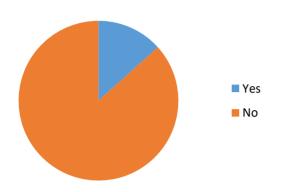
Source: Own elaboration (2022)

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Yes	2	13%
No	13	87%

Table 7 Did the price of petrol cause you to use a motorbike or a bicycle?

Source: Own elaboration (2022)



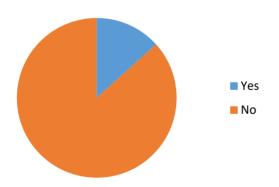
Graphic 7 Did the price of petrol cause you to use a motorbike or a bicycle?

Source: Own elaboration (2022)

Yes	2	13%
No	13	87%

Table 8 Do you use your motorbike or bicycle more often with the rise in petrol prices?

Source: Own elaboration (2022)



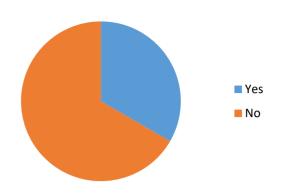
Graphic 8 Do you use your motorbike or bicycle more often with the rise in petrol prices?

Source: Own elaboration (2022)

Yes	5	33%
No	10	67%

Table 9 Do you share the use of your car because of the petrol hike?

Source: Own elaboration (2022)



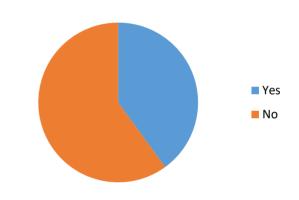
Graphic 9 Do you share the use of your car because of the petrol hike?

Source: Own elaboration (2022)

Yes	6	40%
No	9	60%

Table 10 Did the price of petrol cause you to use taxis more often?

Source: Own elaboration (2022)



Graphic 10 Did the price of petrol cause you to use taxis more often?

Source: Own elaboration (2022)

Yes	14	93%
No	1	7%

Table 11 Due to rising petrol prices, have taxi fares increased?

Source: Own elaboration (2022)



Graphic 11 Due to rising petrol prices, have taxi fares increased?

Source: Own elaboration (2022)

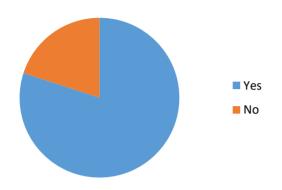
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Yes	12	80%
No	3	20%

Table 12 Due to rising petrol and diesel prices, have public transport fares increased?

Source: Own elaboration (2022)



Graphic 12 Due to rising petrol and diesel prices, have public transport fares increased? Source: Own elaboration (2022)

Yes	3	20%
No	12	80%

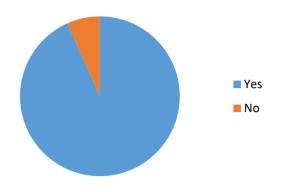
Table 13 Did you move to a house that is closer to your job as the price of petrol increased? Source: Own elaboration (2022)

Yes No

Graphic 13 Did you move to a house that is closer to your job as the price of petrol increased? Source: Own elaboration (2022)

Yes	14	93%
No	1	7%

Table 14 With the increase in gasoline prices, have you noticed increases in the prices of basic food baskets? Source: Own elaboration (2022)

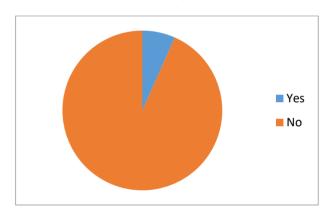


Graphic 14 With the increase in gasoline prices, have you noticed increases in the prices of basic food baskets? Source: Own elaboration (2022)

Yes	1	7%
No	14	93%

Table 15 Is the minimum wage increase enough to cope with rising petrol prices?

Source: Own elaboration (2022)



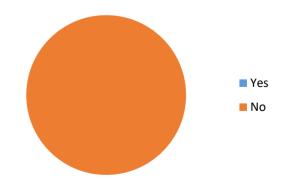
Graphic 15 Is the minimum wage increase enough to cope with rising petrol prices?

Source: Own elaboration (2022)

Yes	0	0%
No	15	100%

Table 16 To date, have you noticed any benefits from the implementation of the energy reform in Mexico in relation to gasoline and diesel prices?

Source: Own elaboration (2022)



Graphic 16 To date, have you noticed any benefits from the implementation of the energy reform in Mexico in relation to gasoline and diesel prices?

Source: Own elaboration (2022)

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Results

From the survey applied to the civil engineering teachers, the following analyses are obtained.

Question 1 shows that of the 15 teachers who answered the survey, 14 are men and 1 is a woman.

In question 2, 100% of the teachers (15) answered that they consider the prices of petrol and diesel to be high.

In question 3, when petrol prices increased, 2 teachers bought a compact car, 2 teachers kept the same car and bought a compact car, 1 teacher sold it, 8 teachers kept the same car and 2 teachers said they did not have a car. If we discard the 2 teachers who do not have a vehicle, of the remaining 13, 30.77% of them bought another vehicle that consumed less fuel and 7.69% had to sell it, which means that 38.46% of them had to save on their fuel consumption.

With question 4 it was found that 13 teachers buy Magna petrol instead of Premium, which represents 87%, this is another important action where teachers seek to save.

In question 5, a third of the teachers (5) had to use public transport, due to the price of petrol, a response that indicates high fuel prices and another alternative to save money.

Question 6 complements the previous one, because it indicates that 6 teachers (40%) use public transport more frequently, another cost-saving measure.

Two teachers (13%) use motorbikes or bicycles because of the price of petrol, in response to question 7.

The same percentage (13%) said that due to the increase in petrol prices they had to use motorbikes or bicycles more frequently, question 8.

For question 9, 33.34% of teachers answered that due to the increase in petrol prices they share the use of their vehicle, another way to save money.

In question 10, 40% of teachers use taxis more frequently because of the price of petrol.

In question 11, 93% of teachers responded that taxi fares have increased due to the increase in petrol prices, which accentuates the perception of the economic repercussions.

On question 12, 80% of teachers responded that public transport fares have increased due to the increase in fuel prices.

The answer to question 13 is somewhat interesting, because 20% of the teachers opted to move to a house closer to their work due to the increase in petrol prices, which is not so easy to imagine that this could happen in order to save money on their commute to work.

In the answer to question 14, 93% of the teachers consider that with the increases in petrol prices, the prices of the basic food basket have also increased. Strong impact on the family economy.

Only 7% of teachers responded to question 15 that the increase in the minimum wage is sufficient to cope with the increase in petrol prices. This percentage is practically insignificant compared to the 93% who consider the opposite to be true.

And finally, 100% of teachers responded to question 16 that they have not noticed any benefit from the implementation of the energy reform in Mexico, in relation to gasoline and diesel prices.

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Annexes

		-
No.	Question	Scale
1	What is your gender?	Male, Female
2	In general terms, do you	Yes; No
	consider petrol and diesel	
	prices to be high?	
3	In this question you can select	Buy a
	more than one option. With	compact
	the increase in the price of	vehicle; Buy a
	gasoline	hybrid
		vehicle; Keep
		the same
		vehicle; Sell
4	XX7'.1 .1 · · .1 ·	my vehicle;
4	With the increase in the price	I do not have a
	of gasoline, do you buy	vehicle
	magna instead of premium?	XZNI.
5	Did the price of gasoline	Yes; No
	cause you to use public	
	transport? With the increase in the price	Vos. No
6		Yes; No
	of gasoline, do you use public transport more frequently?	
7	Did the price of gasoline	Yes; No
,	cause you to use a motorbike	105, 110
	or bicycle?	
8	With the increase in petrol	Yes; No
	prices, did you use a	105,110
	motorbike or bicycle more	
	often?	
9	Do you share the use of your	Yes; No
	car because of the increase in	
	petrol?	
10	Did the price of petrol cause	Yes; No
	you to use taxis more often?	
11	Due to the increase in petrol	Yes; No
	prices, have taxi fares	
	increased?	
12	Due to the increase in petrol	Yes; No
	and diesel prices, have public	
	transport fares increased?	**
13	With the increase in petrol	Yes; No
	prices, did you move to a	
	house that is closer to your	
1.4	work?	V.s. N.
14	With the increase in gasoline	Yes; No
	prices, have you noticed	
	increases in the prices of the basic food basket?	
15	Is the increase in the	Yes; No
13	minimum wage sufficient to	105, 110
	cope with the increase in	
	gasoline prices?	
16	To date, have you noticed any	Yes; No
10	benefits from the	100,110
	implementation of the energy	
	reform in Mexico in relation	
	to gasoline and diesel prices?	
	to gasonne and dieser prices!	İ

Table 17 Survey of civil engineering academic staff. *Source: Own elaboration (2022)*

Acknowledgement

Special thanks to the academic staff of Civil Engineering, Facultad de Ingenieria Región Coatzacoalcos, Universidad Veracruzana, for answering the survey.

Conclusions

The civil engineering academics of the Faculty of Engineering, due to the impact of petrol prices on their economy, have had to resort to actions that lead to savings, which are as follows:

- 33.33% buying compact cars.
- 7.69% had to sell their vehicle.
- 83.33% of the 12 teachers who own a vehicle buy Magna petrol instead of Premium petrol.
- 40%, use public transport more frequently.
- 33.33% share the use of their car.
- 20% moved to a house closer to their work.

Regarding the impact of petrol prices, 93% of academics consider that the increase in the minimum wage is not enough to cope with these prices.

And 100% of academics have not noticed any benefit from the Energy Reform for petrol and diesel prices.

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