

## Retrospective analysis of the behaviour of the economic units of Guanajuato, Puebla and Querétaro, in order to determine their impact on the economic growth of each state

### Análisis retrospectivo del comportamiento de las unidades económicas de Guanajuato, Puebla y Querétaro, a fin de determinar su incidencia en el crecimiento económico de cada estado

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#### Abstract

This document contributes to the generation regarding the economic environment of the states of Guanajuato, Puebla and Queretaro specialized information in order to provide businessmen, entrepreneurs and institutions, relevant information to strengthen the situation assessment of each economic environment for decision of successful or to identify areas of opportunity to generate economic units making. Current transition research project and has impacted the behavior of economic units in the dynamics of growth of Gross Domestic Product (GDP) of the states of Guanajuato, Puebla and Queretaro, in the last ten years from 2003 to 2013. This, to fortalcer businesses, entrepreneurs and institutions in their decision-making to administrative and / or economic scenarios, financial aimed at generating micro, pequemas, medium and large companies, or in the detection of areas opportunity that will produce goods and services to meet needs. For this it is necessary to have references in economic easy to use but reliable and concise figures concerning the behavior of economic units and GDP, given that both are factors triggers of any economy.

**Economic Units, Gross Domestic Product, Economic Growth, Federal Entities**

#### Resumen

Este documento contribuye a la generación de información especializada referente al entorno económico de las entidades federativas de Guanajuato, Puebla y Querétaro, a fin de brindar a empresarios, emprendedores e Instituciones, información relevante que permita fortalecer el diagnóstico situacional de cada entorno económico para la toma de decisiones acertadas o bien para la identificación de áreas de oportunidad para la generación de unidades económicas. El proyecto de investigación muestra como ha impactado el comportamiento de la unidades económicas en la dinámica de crecimiento del Producto Interno Bruto (PIB), de los estados de Guanajuato, Puebla y Querétaro, en los últimos diez años de 2003 al 2013. Lo anterior, a fin de fortalcer a las empresas, emprendedores e Instituciones en su toma de decisión ante escenarios administrativos, financieros y/o económicos encaminados a la generación de micro, pequemas, medianas y grandes empresas, o bien, en la detección de áreas de oportunidad que permitan la obtención de bienes y servicios para satisfacer necesidades. Para lo cual es necesario poseer referencias bibliográficas en materia económica de fácil manejo pero con cifras confiables y concisas referentes al comportamiento de las unidades económicas y del PIB, dado que ambos son factores detonantes de toda economía.

**Unidades Económicas, Producto Interno Bruto, Crecimiento Económico, Entidades Federativas**

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## Introduction

This research paper aims to describe and specify the behaviour of economic units in the states of Guanajuato, Puebla and Querétaro. This is done through a series of indicators over the last ten years, in order to determine their influence on the economic growth dynamics of each state. To do so, we will use one of the most relevant macroeconomic indicators of any economy, the Gross Domestic Product (GDP), through which economic growth can be measured, which serves as one of the pillars to determine competitiveness and support nations.

Thus requiring to name the GDP as a global indicator of the economy, which measures the level of production of final goods and services at monetary value, in a given period, so that these levels of production have a direct impact on the growth and / or economic slowdown of countries, states, regions or municipalities.

This leads to the design of poles of economic attraction for new economic units, i.e. when certain Nations, States or Regions show an increase in production levels, derived from a growth and strengthening of their economic units previously, optimal economic scenarios are generated that make them attractive for investment and the creation of new productive agents, adding them as sources of employment and cash flow generators. The latter are vital for the growth dynamics of their economies, which has repercussions on the economic behaviour of each productive sector (primary, secondary and tertiary sectors).

Thus marking the relevance of the research topic, which seeks firstly to know the dynamics that have presented the economic units of each Federal Entity indicated above and thus diagnose the way in which their GDP from 2003 to 2013 has been favoured or affected and above all to identify whether these States are poles of economic attraction for companies, This is in addition to reviewing competitiveness in each productive sector through information generated by the National Institute of Statistics and Geography (INEGI), the Ministry of Economy (SE), the Ministry of Finance and Public Credit (SHCP) and the Mexican Institute for Competitiveness (Instituto Mexicano para la Competitividad A. C. (IMCO).

The above, in order to assess how this situation impacts on the generation of more economic units.

The research topic proposed seeks the relationship between the following two variables:

The generation of Economic Units, has an impact on:

### Gross Domestic Product (GDP)

For this purpose, annual and average annual growth rates were used to evaluate their growth dynamics and to justify that these states have become poles of economic attraction for micro, small, medium and large companies. This has allowed it to underpin its economy at the national level, placing it in the ranking of the ten states with the best economic performance.

In order to provide knowledge, it was necessary to reproduce the information presented by the various sources mentioned above.

### Research Approach

The research process frames a qualitative and quantitative approach, which explores the behaviour of two fundamental variables: the Economic Units and the Gross Domestic Product of the states of Guanajuato, Puebla and Querétaro. The aim is to recognise, through descriptive data, whether the creation of economic units has an impact on the generation of Gross Domestic Product (GDP), and thus affirm that the phenomenon of economic growth in these states has led them to become poles of economic attraction.

### General Objective

To diagnose the behaviour of economic units in the states of Guanajuato, Puebla and Querétaro, in order to determine their impact on the Gross Domestic Product.

### Specific Objectives

- To formulate an economic diagnosis of the aforementioned states.
- Select the variables and/or economic factors for the research project.

- To design an economic impact matrix for the states.
- Apply and analyse the dynamics and growth rates of the economic factors.
- Carry out a correlation analysis of economic units and GDP as well as the correlation between GDP and employed personnel in each State.

### Hypothesis

There is a relationship between the Economic Units and the generation of the Gross Domestic Product of the states of Guanajuato, Puebla and Querétaro.

H<sub>0</sub>: The higher the correlation between GDP and the growth of economic units, the less attractive the state is as a pole of economic attraction.

H<sub>1</sub>: The higher the correlation between GDP and the growth of economic units, the more attractive the state is as a pole of economic attraction.

### Justification

It is imperative to highlight that the success of any economy lies to a great extent in the composition of its added value, which is generated through the different economic sectors, which must respond to the needs dictated by society.

This gives rise to self-sufficient economies, where the creation of economic units is to a large extent the detonating force of these federative entities.

In which economic information is fundamental for every economic entity (family, company, government and external sector), who, in order to make decisions, must recognise the behaviour of the macro-environment, in this case the behaviour of production levels.

Although several articles and/or publications have been written about the states mentioned above, the subject of this line of research is focused on describing and categorising the growth dynamics of each of the states.

The main objective is to diagnose the economic context in which they find themselves and thus determine whether there is a feasible environment for the generation of economic units, which will enable them to trigger economic growth.

We know beforehand that there can be no economic growth without the prior generation of the so-called productive units or economic units, which underpin and strengthen the whole nation.

But for this to happen, there must be a viable environment that allows good economic performance with social responsibility to trigger growth in each federal entity, which is why this study aims to recognise how the main variables such as GDP and economic units have been behaving, together with the four main pillars of economic growth: human resources, natural resources, capital and technology.

The aim is to provide municipalities, businessmen, entrepreneurs and the interested public with a reliable source of information on the dynamics of growth and, above all, on the identification of business opportunities.

In other words, from the perspective of financial management, planning is a fundamental element for the achievement of objectives and goals.

This is subject to the information generated in a situational diagnosis, which makes it necessary to carry out a research exercise focused on diagnosing the economic environment of the aforementioned states, in order to identify their competitive advantages and provide guidelines for the generation of strategies.

Therefore, there is an urgent need to provide a wealth of qualitative and quantitative information that can be consulted by the different economic entities in order to give confidence and strengthen the creation of new economic units.

### Methodology

The research process used for this topic revolved around a descriptive approach with a quantitative and correlational design, evidently comparative of various economic factors.

This was based on the central objective, so that secondary information was collected for the period from 2003 to 2013 in terms of: Economic Units (EU), Gross Domestic Product (GDP), Economic Activities, Employed Personnel and Productivity and Competitiveness Indicators.

The processing of the information was aimed at determining the behaviour of the economic units and recognising their impact on GDP, for which data was collected from the three states of Guanajuato, Puebla and Querétaro. The compilation mechanism was carried out based on the information presented in the official websites of institutions such as: the National Institute of Statistics and Geography (INEGI), the Ministry of Economy (SE), the Ministry of Finance and Public Credit (SHCP).

The National Institute for Federalism and Municipal Development (INAFED), and the web portal of each Federal State; as well as unofficial sources at the federal level, but with recognition and prestige given their content framed in a socially responsible scheme.

Thus, the information platforms on which this research project was built are as follows at the end of the first phase, the collection of data through secondary sources, we proceeded to design an arrangement of hard data by federal entity, variables or characteristics and time period.

This led to the capture and processing of the information, for which horizontal analysis methods were implemented (annual and average annual growth rates), vertical analysis methods (percentage and/or participation structures), and the correlation method, which consisted of carrying out a statistical analysis to accept or reject the hypothesis.

This made it possible to obtain absolute and relative (percentage) statistics for each variable in order to generate a critical, comparative and correlational analysis, to reflect on each economic scenario and to have an impact matrix that would allow us to visualise the products, achievements and benefits of each state, in order to recognise not only the impact of economic units on GDP, but also to identify that these states have become poles of economic attraction for MSMEs and large companies in recent years.

For this purpose, it was necessary to apply the following statistical tools:

$$TCPA = \left[ \left( \left( \frac{AF}{A0} \right)^{\left( \frac{1}{t-1} \right)} - 1 \right) * 100 \right] \quad (1)$$

Donde:

TCPA: Tasa de Crecimiento Promedio Anual.

AF: Año Final

A0: Año Inicial

t: Período de Tiempo o Número de Años

Subsequently, once the methods of horizontal, vertical and correlational analysis had been applied to the arrangement of data, an impact matrix was created and statistical graphs were constructed, which made it possible to visualise the economic panorama of each federal state and to provide guidelines for the critical, comparative and correlational analysis of the different economic variables that make up this study.

Thematically, we show how, through the implementation of average annual growth rates, percentage structures or participations and the correlation method, we were able to diagnose the economic behaviour of each of the states.

The results have multiple uses in different projects and in different sectors, public, private and social. It serves as a reliable and practical source of information, denoting the retrospective behaviour of the main economic variables of the states of Guanajuato, Puebla and Querétaro.

Thus allowing weighty elements for decision making, which contribute to the creation of economic units, economic growth and also to the strengthening of the national economy, without leaving aside the promotion of economic attraction that is also a detonating factor to give guideline to competitiveness and productivity in each state.

Based on the above, we sought to identify how economic units in the last ten years, in each state, have been having an impact on economic performance, in such a way that their product has generated a growth in income (GDP), thus achieving a national ranking of the states with the greatest contribution to GDP, or with the greatest growth dynamics.

In this way, attention was focused on the economic behaviour of each state, identifying the progressive rhythm of these in the exercise of their economies.

Finally, it is important to highlight that through the correlation method, an analysis was carried out in which GDP was taken as the dependent variable and economic units as the independent variable, which led to the assertion that the greater the number of economic units, the greater the GDP, and therefore the correlation between both variables was high, which means that the greater the number of economic units, the greater the GDP, and the greater the GDP, the stronger the state as a pole of economic attraction.

## Results

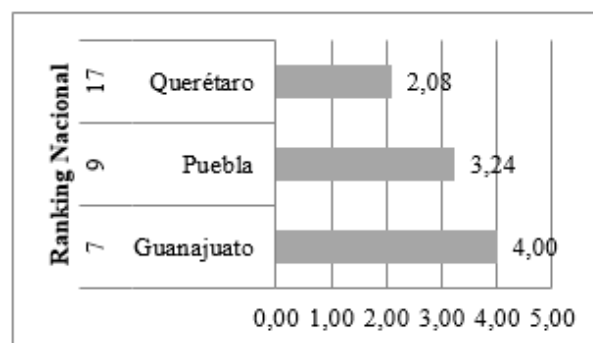
This line of research was centred on a qualitative-quantitative approach, in which the economic behaviour of the states of Guanajuato, Puebla and Querétaro was identified and diagnosed, in order to expose their growth dynamics over the last ten years from 2003 to 2013. This is based on the analysis of the economic units and the valuation of the Gross Domestic Product (GDP), given that both are main elements to detonate the economy, where the latter is part of the System of National Accounts of Mexico, so it is an indicator that allows measuring the productivity of the different factors of production involved in the economy.

In other words, let us remember that GDP is the sum of the market values of all the services and final goods produced by the resources (labour and capital) of the economy that reside in the country.

On the other hand, it is important to note that this item does not include the non-observed economy, which includes the informal and illegal economy.

Based on the information gathered, it was possible to identify that Guanajuato, Puebla and Querétaro ranked seventh, ninth and seventeenth, respectively, in relation to 2013 in a national comparison, thus ranking among the economies with the highest income (GDP).

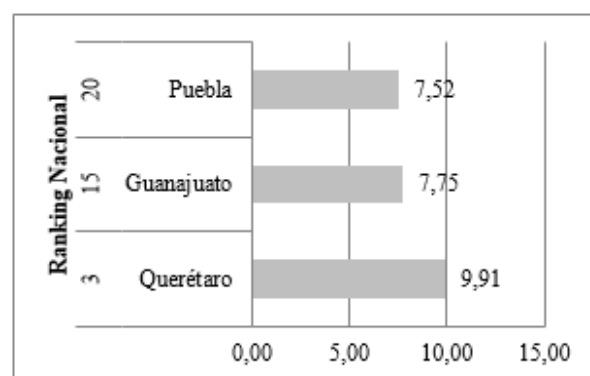
This allowed them to provide a significant contribution to GDP, with Guanajuato contributing 4%, Puebla 3.24% and Querétaro 2.08%, as shown in the following graph.



**Graph 1** Gross Domestic Product by State. Percentage Share in Current Values, 2013

In terms of GDP growth dynamics, Querétaro presented an average annual growth rate of 9.9 per cent from 2003 to 2013, placing it in third place at the national level.

Guanajuato was fifteenth with an average annual economic growth rate of 7.75 per cent and Puebla with 7.52 per cent, ranking twentieth.



**Graph 2** Gross Domestic Product by State. Average annual growth rate, 2003-2013

Recognising that Querétaro presented a significant economic expansion, given that its economic growth rate is above the national average of 8%, estimated based on the average annual growth rates of all the federal entities in the period from 2003 to 2013. In terms of GDP by major division of economic activities in 2013, Guanajuato contributed 4.57% to primary productive activities, ranking seventh in the national ranking, and in ninth place is Puebla with a share of 4.46%.

Querétaro contributed 1.57%, placing it in 22nd place. Other relevant results of this primary sector, focused on the average annual growth from 2003 to 2013 in these states, highlighting that Puebla was located in the twelfth place with a growth rate of 7.16%; Guanajuato in seventeenth with average growth rates per year of 6.56%; followed by Queretaro with a percentage of 6.51%, where the average annual growth rate at the national level averaged 6.46%.

Regarding secondary activities the figures are also encouraging, given that Guanajuato in 2013 contributed 4.53% to the nation, thus achieving ninth place, Puebla in eleventh place with a share of 3.14% and Querétaro in fifteenth place with 2.56%.

On the other hand, when comparing the average annual growth rates of this secondary sector in the period covered, Querétaro was observed in eighth place with a growth dynamic of 9.61%; in the case of Guanajuato, the evolution of its economic growth was 7.30%, placing it in fifteenth place. Puebla is in twenty-second place with a rate of 6.85%.

With respect to tertiary activities, which bring together activities related to commerce, services and large-scale transport, it was identified that the states of Guanajuato and Puebla in 2013 were in sixth and seventh place in this national ranking with the greatest contribution to the sector. Guanajuato participated with 2.28% and Puebla with 2.01%, while Querétaro in sixteenth place contributed 1.5% to these tertiary activities.

However, Querétaro, in its behavioural dynamics, was propped up in first place with an average annual growth rate of 10.33% from 2003 to 2013, thus recognising that the tertiarisation of the economy is predominant.

In the case of Guanajuato, its growth rate amounted to 8.15% annual average, taking it to the tenth place, and Puebla to the fifteenth with a growth dynamic of 7.92% annual average.

It is clear that all this derives from the generation of economic units year after year, which are a detonating factor and pillars in the increase of production levels.

This can be demonstrated through the correlation method implemented in this research, where the following results can be noted:

Guanajuato: Correlation analysis between the state GDP of Guanajuato and the growth of economic units.

Año	PIB	Unidades económicas
2003	326,882	150,800
2008	436,671	179,867
2013	617,325	272,635

**Table 1** Correlation Analysis Between Guanajuato's GDP and Economic Units

Observing that the correlation was 0.9882 in a general way, this indicates that the correlation between the variables is high. As for the analysis by economic sector we have:

Correlation analysis between the state GDP of Guanajuato and the growth of the economic units of the primary sector.

Año	PIB	Unidades Económicas Sector Primario
2003	326,882	46
2008	436,671	60
2013	617,325	164

**Table 2** Correlation analysis between GDP and economic units in the primary sector  
R= .9624

Correlation analysis between Guanajuato's state GDP and the growth of economic units in the secondary sector.

Año	PIB	Unidades Económicas Sector Secundario
2003	326,882	18,666
2008	436,671	24,142
2013	617,325	28,494

**Table 3** Correlation analysis between GDP and economic units in the secondary sector  
R= .9788

Año	PIB	Unidades económicas Sector Terciario
2003	326,882	132,088
2008	436,671	155,665
2013	617,325	191,341

**Table 4** Correlation analysis between GDP and economic units in the tertiary sector  
R= .9997

### Querétaro

Correlation analysis between Querétaro's state GDP and the growth of economic units.

Año	PIB	Unidades Económicas
2003	143,405	42,524
2008	225,553	56,345
2013	321,858	68,783

**Table 5** Correlation analysis between GDP and business entities.  
R= .9971

Like Guanajuato, Querétaro also presents a high correlation index between the dependent and the independent variable. The correlation between GDP and economic units by economic sector is reviewed below.

Correlation analysis between Querétaro's state GDP and the growth of economic units in the primary sector.

Año	PIB	Unidades Económicas Sector Primario
2003	143,405	14
2008	225,553	23
2013	321,858	26

**Table 6** Correlation analysis between GDP and economic units in the primary sector  
R= .9470

Año	PIB	Unidades Económicas Sector Secundario
2003	143,405	4,639
2008	225,553	6,542
2013	321,858	7,340

**Table 7** Correlation analysis between GDP and economic units in the secondary sector  
R= .9616

Correlation analysis between Querétaro's state GDP and the growth of economic units in the tertiary sector.

Año	PIB	Unidades Económicas Sector Terciario
2004	143,405	37,871
2009	225,553	49,780
2014	321,858	61,417

**Table 8** Correlation analysis between GDP and economic units in the tertiary sector  
R= .9986

### Puebla

Correlation analysis between Puebla's state GDP and the growth of the economic units.

Año	PIB	Unidades Económicas
2004	263,525	165,237
2009	366,427	215,288
2014	499,753	250,622

**Table 9** Correlation analysis between GDP and economic units  
R= .9850

Puebla also presents a high correlation index as do Guanajuato and Querétaro. The correlation between the dependent and independent variable is analysed by economic sector.

Correlation analysis between Puebla's state GDP and the growth of economic units in the primary sector

Año	PIB	Unidades Económicas Sector Primario
2004	263,525	43
2009	366,427	196
2014	499,753	196

**Table 10** Correlation analysis between GDP and economic units in the primary sector  
R= .8265

Correlation analysis between Puebla's state GDP and the growth of economic units in the secondary sector

Año	PIB	Unidades Económicas Sector Secundario
2004	263,525	27,997
2009	366,427	38,606
2014	499,753	42,737

**Table 11** Correlation analysis between GDP and economic units in the secondary sector  
R= .9483

Correlation analysis between Puebla's state GDP and the growth of economic units in the tertiary sector.

Año	PIB	Unidades Económicas Sector Terciario
2004	263,525	137,197
2009	366,427	176,486
2014	499,753	207,689

**Table 12** Correlation analysis between GDP and tertiary sector economic units.  
R= .9901

## Conclusions

As we can observe in the following table, the correlations of the three states are high, therefore we can conclude that the increase in productive units increases the GDP, making them poles of economic attraction.

Entidad Federativa	Correlación global	Correlación sector primario	Correlación sector secundario	Correlación sector terciario
Guanajuato	0.9882	0.9624	0.9788	0.9997
Querétaro	0.9971	0.947	0.9616	0.9986
Puebla	0.985	0.8265	0.9483	0.9901

**Table 13** Concentrated correlations

In such a way that the creation of productive or economic units gives rise to the generation of sources of income in each economic entity, be it family (individuals), private and governmental companies, propitiating optimal scenarios for aggregate consumption, investment and the creation of new productive agents, adding up as sources of employment and generators of cash flow, thus once again becoming a cycle that detonates and favours the economy.

In addition to this, there are other factors that give a greater value to the above mentioned in economic matters, so if these elements are combined in such a way that they encourage MSMEs, large companies, the government or the external sector to invest or generate traditional or innovative projects, there will be a sum of efforts that give a guideline to economic growth..

Finally, it is important to recognise that productivity and competitiveness are important elements that act as underpinning forces for the propitious economic attraction or the formation of economic attraction poles, as in the case of the federal states under study.

Finally, it is important to recognise that in order to do so, it is essential to identify favourable socio-economic environments in order to take advantage of the competitive advantages they provide for the performance of the business opportunities demanded by society.

Indicador	2003	2013	TCPA 2003-2013 (%)	Ranking	Participación %	Ranking
PIB (Millones de Pesos)	125,148	321,858	9.91	3	2.1	17
Actividades Primarias (S1)	4,241	7,970	6.51	18	1.57	22
Actividades Secundarias (S2)	54,474	136,352	9.61	8	2.56	15
Actividades Terciarias (S3)	66,433	177,537	10.33	1	1.5	16
Unidades Económicas S1	14	26	6.39			
Unidades Económicas S2	4,639	7,340	4.70			
Unidades Económicas S3	37,871	61,417	4.95			
Personal ocupado. Universo total	374,470	601,554	4.85			
Personal ocupado total	277,336	459,265	5.17	2	2.10	
Personal Ocupado S1	394	168	-8.17			
Personal Ocupado S2	110,896	314,535	10.99			
Personal Ocupado S3	166,046	144,562	-1.38			

**Table 15** Queretaro Impact Matrix, 2003-2013



## Conclusions

Based on the information gathered, it was possible to identify that the states of Guanajuato, Puebla and Querétaro have shown outstanding economic performance over the last ten years, from 2003 to 2013, and have therefore become centres of economic attraction.

Guanajuato: In 2013, 5.2% of economic units nationwide were concentrated in this state, which increased its economic units by 145.89% from 2003 to 2013, going from 150.8 million to 219 million 999 million. million 800 thousand to 219 million 999 thousand economic units, thus achieving an average annual increase of 3.85% of economic units, so that these were triggers for the generation of a significant Gross Domestic Product (GDP), thus achieving a participation in 2013 of 4% of the National GDP, ranking in the ranking with the highest contribution in position seven. Its annual average growth dynamic was 7.75%, placing it in the ranking in fifteenth place, indicating that in recent years its growth rate has not been as strong, however, it has presented a good economic performance.

In which secondary activities have been favoured with an average annual growth of 7.30%, so that its participation in the GDP by large division of activities allowed it to contribute 4.53%, this being a key factor to be placed on the ninth step, however, the sector with the highest growth is the tertiary sector, in which in terms of percentage participation allowed it to be in the sixth place, highlighting that the dynamic growth of economic units was of 3.85%, with a nationally employed personnel uptake of 4.9% in 2013, which meant that it is one of the economies with the highest uptake of human resources, given its place in fifth position in this ranking.

This means that Guanajuato can be framed as an entity with higher employment generation and diversification, given that most of it is working in non-governmental private productive sectors.

However, in terms of labour productivity, it is below the national average of 662 pesos, a figure in which Guanajuato reported in 2012-2013 an amount of 588 pesos, an element that points to the concept of wage poverty. 588 pesos, an element that points to the concept of wage poverty.

But not everything is grey, given that this entity supports the promotion of exports and labour diversification as mentioned above, indicating that it has a percentage of 2.7% of the population employed in government, so the rest of this population is located in various private productive activities.

Based on the above, it can be corroborated that derived from its favourable growth in the economic units, it has been able to support in the participation of economic income to the Nation, where its three economic sectors are highly dynamic.

Puebla: One of the most relevant aspects is that in terms of contribution to the National GDP, it occupies the ninth place with a dynamic of annual average growth of 6.61% from 2003 to 2013. However, its average annual growth rate regarding the generation of economic units in the primary sector is significant, given that it rose to 16.38% annual average for the same period, so that the number of people employed in this sector also increased, reaching an average annual growth rate of 15.85%.

On the other hand, its tertiary activities marked a favourable growth rhythm with an average annual growth rate of 7.92%, which placed it at number seven at the national level, thus highlighting its participation in Mexico's economy.

In terms of the behaviour of its economic units in the last decade, it generated an average annual growth rate of 4.25%, belonging to the ranking of entities with a growth rate in production units; however, in terms of employed personnel, it ranked nineteenth, which is worrying, because it denotes a low uptake of human capital.

Querétaro: Although this state ranked seventeenth in terms of contribution and/or participation in GDP, it can be seen as a promising economy, given its accelerated growth rate, since in the period from 2003 to 2013, its economic units increased by an average of 4.93% per year, placing it in tenth place in the national ranking in terms of the generation of economic units.

This had an impact on its GDP growth dynamics, achieving an average annual growth rate of 9.91%, and thus ranking third at the national level with the highest growth rate in income.

This in turn had a favourable impact on the attraction of employed personnel at the national level, as its growth in labour demand managed considerable and dynamic figures.

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