



Mexican Economy UNDER REVIEW



March 2024

SIGNOS VITALES

EL PULSO DE MÉXICO

PEMEX

PEMEX

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One of the main objectives is the collection of reliable and independent information on the key variables of our economic, political and sociocultural context in order to diagnose, with a good degree of certainty, the state where the country is located.

Vital Signs intends to serve as a light to show the direction that Mexico is taking through the dissemination of quarterly reports, with a national and international scope, to alert society and the policy makers of the wide variety of problems that require special attention.



Weak or absent pulse can have many causes and represents a medical emergency.

The more frequent causes are the heart attack and the shock condition. Heart attack occurs when the heart stops beating. The shock condition occurs when the organism suffers a considerable deterioration, which causes a weak pulse, fast heartbeat, shallow, breathing and loss of consciousness. It can be caused by different factors.

Vital signs weaken and you have to be constantly taking the pulse.

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EXECUTIVE BRIEF

Image: <https://capitalismoconsciente.es/blog/tips-elaborar-resumen-ejecutivo-plan-negocios/>

EXECUTIVE BRIEF

The idea of an economic “optimism” has been recurring and has deeply caught our attention. Prestigious analysts reported by Bloomberg, El País and many of the media most supportive of the government have highlighted the “exceptional” economic growth of 2023, the export boom and the increase in the wage bill that have led to the rebound in consumption, the boom of investment, especially foreign investment. According to the, apparently everything is going very well.

In this report we look a much deeper and we can see that these “great advances” are, at best, from the last couple of years and that, in reality, there are ye-

llow spots that call into question their possible continuation in the future or the behavior of macroeconomic aggregates. Thus, if instead of looking at 2023 we analyze the figures of the last 5 years, those of this government, we find a very different story: several indicators are barely recovering to 2018 levels, others will remain below, and what is more worryingly, it is not at all clear why this “boom” would have to be sustained in the coming years.

As of November 2023, the economy's global activity index (the latest figure available) is just 3.9% above 2018: an average growth of 0.8% annually. This implies a decline in GDP per inhabitant of -1.6%

"Exceptional optimism" of analysts and government supporters is deeply questioned.

below that at the beginning of the government. On the other hand, the “rebound” in consumption has taken it to 9.3% above 2018 in November 2023 (annual growth of 1.9%), almost the same as the population has increased. It is argued that this is due to the increase in the wage bill, which in these 5 years has increased 29.6% in real terms. But what is not said is that the consumption of domestic goods barely increased 4.5% in the last 5 years, while the consumption of imported goods grew 52.6%. That is to say, consumption barely improved and we consumed more and more imported goods to the detriment of goods produced by us. Why is that? Largely due to the overvaluation of the peso, the super peso, which should at least be at 19–19.50 pesos per dollar.

Trade exchange with other countries in the world has not been limited to final consumer goods, but also to inputs and capital. In such a way that, to a large extent, the increase in commercial activity with the United States has led – theoretically – to the Mexican economy, and in particular the industry, to produce above its capacity (4.91%) (Banxico, 2023). What we are not told is that this abundant expansion has been accompanied by persistent and growing deficits with Asia and to a lesser extent with Europe and South America. As a consequence of the above, the inabi-

lity of the Mexican industry and the greater income of inputs from abroad, the national content of our exports is lower than in 2015 (historical maximum), 40.4% vs 44.1%, respectively. For its part, the complexity of our exports stopped in 2016 (when it became the 17th most complex economy), is declining (22nd place among 133 economies) and remains behind other industrialized economies in Asia.

And speaking of the Mexican Peso, where does its strength come from? It is recognized that it is due to the high interest rates in Mexico (11.25%) compared to those offered in the United States (5.25 – 5.50%) or Europe (4%), that it retains capital in the country instead of that savers look for options outside. But little is said that this also makes paying interest on the debt more expensive (VAT collection is barely enough for this) and that it inhibits investment. And of course,

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the inflow of remittances that continues to increase and reached the figure of 63 billion dollars in 2023. To give an idea, the international reserves of the Bank of Mexico reach almost 213.2 billion dollars, and it has taken us many years to accumulate them.

In this 2023, it is said, foreign direct investment (FDI) will be around \$36.1 billion, just over half of remittances. In the 5 years of government, the inflow of remittances has been 253.7 billion dollars, while FDI will approach 170 billion. Furthermore, the detail is that only 34.1% was new investment, the rest, reinvestment of profits and accounts between companies. It's not bad, but we are not attracting new investments. In fact, in all of 2023, only 11 companies with more than 500 employees were established, while 8 closed, so that we have only 3 additional companies with 500 employees or more in 2023; Therefore, opening a (formal) business is becoming more complicated than in the past. While in 2017 49.1% of attempts to open a business were successful, in 2023 this figure will have been only 33.8%.

In a second moment we address the main obstacles or restrictions to investment or production growth, such as energy, security and climate change, since we have frequently observed that in this boom na-

rrative there are not many words about the finances of Pemex and CFE, of the amount of money that the federal government is injecting. Between 2019 and 2023, the capital contributions, fiscal stimuli, other aid and discounts to the Right for Shared Profit will have totaled around 1.6 trillion pesos, and that despite this, the viability of Pemex is in question. Just a few days ago Moody's reduced its credit rating two notches, leaving the company on the brink of the abyss. Nor is the serious impact it already has on public finances and the environment recognized. Both Pemex and the CFE have been actors in extreme methane releases (variable rate of 260 to 550 metric tons of methane), only comparable to the rupture of the Nord Stream gas pipeline in 2022, however, Europe wages a war where natural gas it has been the cause of multiple disagreements and price increases.

The triumphalist narrative also fails to mention water crises and their potential impact on productivity. From 2018 to 2021, the GDP produced in municipalities with a water emergency has increased from 14.5% to 42.9%, and continues to worsen. Added to this are extortion and widespread payment of fees. In this context of climate change, the productivity of the primary sector continues to rise (with all its lags), contrary to the rest of the economy. Smu-

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gging and huachicol of gasoline and diesel is reaching unsuspected levels (Signos Vitales estimates that between 20 and 30% of the fuels consumed in the country come from the black market), in such a way that the information from the Ministry of Energy tells us a story different from that of the administrative records of foreign trade, while remittances have become a money laundering mechanism that can no longer be hidden and that serve to largely support the current account deficit.

This type of phenomena generates distortions in supply and demand indicators. For example, the oil market has an excess supply of 81%, while the fossil fuel market appears stagnant despite the fact that transportation activity is one of the most advanced since the entry into force of NAFTA (now TMEC). This type of crime shows that money launderers and smugglers have benefited from the rise in food prices resulting from international conflicts, which allows them to introduce a greater amount of resources while minimizing the cost (tax evasion). We found the largest distortions between 2021 and 2023. We estimate that between 2019 and 2022 the growth of these crimes was 124.2%. And up to this point it is clear that these crimes are committed across borders, through customs and the financial system.

All this is reflected in the cash economy, in the country of the King of Cash. Today, the cash and demand deposits in the hands of the public is enormous: each Mexican, including babies, children and the elderly, has 19,239 pesos in their possession on average. Or each member of the economically active population keeps 41,280 pesos in their possession on average (how many people do you know who are in that situation?). The number of thousand peso bills in circulation has increased 326.1% in the last three years, while those of medium denomination (up to 200 pesos) barely grew 24%. A very revealing fact is that 97% of the growth in thousand peso bills is observed from February 2021 (after confinement), when there were 85.3 million pieces in circulation (mdpc); By October 2023 there are already 311.6 million pesos (Banxico, sfe).

Why does the Bank of Mexico print so many high-denomination banknotes? To facilitate its movement, transactions and storage? It is difficult to explain it. It seems that it is facilitating the underground economy and money laundering (79% of transactions over 500 pesos were carried out in cash in 2021) (INEGI, sfp). If this excess of high and very high denomination bills (500 and 1,000 pesos) and dubious origin is introduced into the real economy, in 2023 it could well

The number of thousand peso bills in circulation has increased 326.1% in the last three years.

have generated 14.1% of GDP. And perhaps this has contributed to Mexico becoming, in 2023, the country with the most criminal markets in the world (GIATOC, 2023). Up to this point, the so-called relocation of investments has not appeared and its implementation will continue to be postponed according to various media and specialists. At SV we estimate that in 2023 this contributed, in the best of cases, a figure close to 0.3% of GDP and it is likely that there will be greater evidence at the local level, which seem to be isolated efforts, which can generate greater differences even within the interior. from the same regions.

It is not only a matter of drug trafficking (trade in heroin, cocaine, cannabis and synthetic drugs), but also human trafficking and smuggling, extortion and illegal protection charges, arms trafficking, trade in counterfeit products, smuggling, crimes against flora, fauna and non-renewable resources and financial crimes. The above also means that Mexican criminal organizations continue to diversify their portfolio of goods and services and expand their presence in the national, but also international, economy. And many of these cross-border exchanges happen through customs, which have serious implications for the administrative records of foreign trade, as confirmed by various international agencies and until recent-

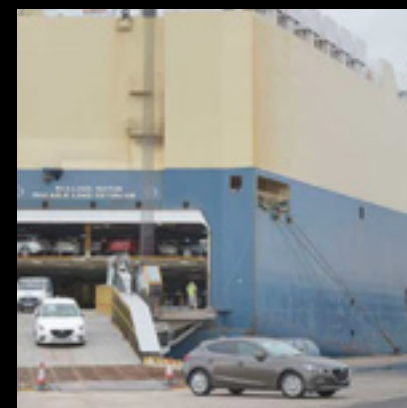
ly ANAM itself without giving figures in this regard (UIF, 2023); According to international experience, around 43% of money laundering through foreign trade operations comes from drug trafficking, another 18% from tax evasion or fraud, and other fraud, scams and corruption add up to 13%; In turn, erroneous billing was the most common methodology (63%) (GFI, 2023).

For all of the above, we conclude that Mexico has become the hub of illusion, evasion and transnational organized crime.

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GIATOC, 2023.



CONTEXT & ANALYSIS OF THE MEXICAN ECONOMY



CONTEXT & ANALYSIS OF THE MEXICAN ECONOMY



The world is going through a period of interwar. Although tensions began some time ago, here we refer to the period that started at the beginning of 2018 with the outbreak of the technological–trade conflict between the United States and China and the imposition of tariffs of more than 550 billion dollars (mmdd for its acronym in Spanish) on Chinese products and more than 185 mmdd on American goods. Thus, we are approaching six years of tensions between the two major economic powers of the modern world. Therefore, the baseline for this study is 2017.

The Covid–19 health crisis occurred amid this conflict, which had repercussions in various global value chains and seriously affected the services sector. The

health crisis paralyzed production and took countries and companies by surprise; following the great financial crisis of 2008–2009, central banks worldwide expanded their balance sheets, relaxed their monetary policy, and states and companies acquired considerable debt. In turn, the strong bailout of the U.S. economy caused it to suddenly return to pre–financial crisis levels, which was almost fleeting.

This spending expanded against the international energy crisis and rising global food prices, compounded by the cancellation of the Nord Stream 2 pipeline in Europe and the Russian invasion of Ukraine. The wave of trade and financial sanctions against Russia was not long in coming. By 2005, oil and gas ex-

- » 2018: technological–commercial conflict between the United States and China.
- » 2020: sanitary crisis by Covid–19.

traction activity in the United States had reached its minimum and, since then, experienced a significant boom that was only partially interrupted by the pandemic. Thus, between 2017 and 2023, the growth in activity will be approximately 40.5%. This expansion of the energy supply, which has flourished on the East Coast of the United States, has had Europe as its leading destination.

Faced with price pressures, central banks took appropriate measures to reduce inflation; Latin American countries, including Mexico, anticipated the US Federal Reserve's rate hikes, as they foresaw that inflation was not transitory. To date, inflation remains above the target in two-thirds of the countries that, like Mexico, apply inflation targets. It is, therefore, said that central banks will keep their rates at considerably elevated levels and are unlikely to lower them rapidly until inflation returns to target ranges.

The period alluded to has coincided with the nine warmest years on record (2015–2023). In 2023, the annual average global temperature exceeded pre-industrial levels by 1.45 ± 0.12 °C, bringing it closer than ever to the limits set in the Paris Agreement. In 2022, concentrations of the three most abundant greenhouse gases – carbon dioxide (CO₂), methane

(CH₄), and nitrous oxide (N₂O) – reached unprecedented levels. The combination of the El Niño episode and climate change caused heat levels to soar in the second half of 2023, and all indications are that 2024 will be even warmer.

Although extremely adverse, the conditions were propitious to capitalize on the part of the global readjustment, which in Mexico, companies, banks, and governments have not ceased to acclaim. The proximity to the United States, the renewal of the North American Trade Agreement (USMCA), the extensive network of gas pipelines in the country's north, relatively low debt levels, and advantages such as solar radiation make Mexico an ideal candidate to attract capital. Between 2017 and 2023, FDI flows in the world went from 1.64 trillion dollars (billion dollars for its acronym in Spanish) to 1.37 bdd. These flows are far from returning to pre-conflict levels. Between January and September 2023, Mexico has attracted 32.9 billion dollars in FDI. However, only 2.8 billion dollars are new investments distributed among a limited number of states (7 out of 32). The vast majority are reinvestments (companies already installed) (75.6% or 24.9 billion dollars) (SE, 2023), while China has had, for the first time since the beginning of the millennium, a net fall in FDI flows (SE, 2023).

- » Energetic international crisis and the increase of food prices.
- » Russian invasion of Ukraine, commercial and financial sanctions.
- » United States expansion of energy supply destined to Europe.
- » Inflation in Mexico and Latin America.
- » Nine years of global warming.
- » Mexico, ideal candidate to attract capitals.

In the face of meager investment in Mexico over the past two years, Mexico's GDP grew more than expected, mainly because the expected recession in the United States did not materialize. Such growth has been surprising and atypical, especially given the poverty observed in previous years. Growth in López Obrador's six-year term will end up being the lowest since the entry into force of NAFTA (now USM-CA), just 1.1% on average per year (assuming growth of 2.3% in 2024), but three features of this growth are of interest to us: the GDP trajectory, the potential output gap and the fundamental factors underlying this growth. In mid-2023, the Mexican economy is slightly above potential (between 0.8 and 0.88%) but stagnant in per capita terms compared to 2018 (Banxico, 2023).

The recent expansion of the economy is primarily due to strong demand growth, the drivers of which have been growth in government capital spending

(construction, other than housing) and imports of non-durable goods (food) and private capital goods. Between 2017 and 2023, aggregate demand will have grown by 3.08 trillion pesos (bdp for its acronym in Spanish), and two bdp of this growth is imported, 65%; for the same years, imports of machinery and equipment and goods for final household consumption represent 64.6 and 51.2% of the growth of gross fixed capital formation and private consumption (INEGI, n.d.l), respectively. Given this expansion and the inability of the aggregate supply to cope with it, internal imbalances have had to be compensated by intense and persistent external imbalances, mainly with Asia and, to a lesser extent, with Europe.

Imbalances in the current account balance (-13.9 billion dollars between the first and third quarters of 2023) are being offset by a surplus in the capital account (39 billion dollars) and a net indebtedness in Mexico's financial account with the rest of

- » Mexico captured 32.9 billion dls in Direct Foreign Investment, but only 2.8 billion dls in new investments.
- » GNP grew in Mexico because recession in the U.S.A. never arrived. This growth is atypical given the poverty observed.
- » Growth in this six-year term has been the lowest since NAFTA began.
- » Three characteristics studied: GNP trajectory, potential product gap and factors underneath growth.

the world of 8.9 billion dollars. As a result, the errors and omissions account showed an inflow of 4.9 billion dollars. This current account deficit was the result of the negative balance of the balance of oil goods (−16.6 billion dollars) and the surplus balance of non–oil goods (6.5 billion dollars), together with the negative balance of −14.7 billion dollars in the balance of services, in addition to a deficit of −35.7 billion dollars in the balance of primary income. On the other hand, the secondary income balance (inflows minus outflows of remittances) showed a surplus of 46.7 billion dollars due to the 9.5% annual growth of remittances¹.

The evidence shows that, to a large extent, imports of Asian and, to a lesser extent, European intermediate goods are facilitating the growth of Mexican exports. It is necessary to import. Therefore, such growth is not thoroughly stimulating the development of Mexican industry, as the domestic content of exports is relatively low. Mexican contributions to manufacturing value added are decreasing, the Mexican economy stopped advancing in complexity at some point in 2016, inventory levels are at historic

¹ The current account is composed of the balance of goods and services, the balance of primary income, and the balance of secondary income.

lows, and employment in the processing industry is growing below its potential, unlike Southeast Asian economies that are performing better. While some branches of the Mexican industry show a substantial deceleration in their production, their exports show considerable increases even with negative growth.

However, this –assumed– overstraining of the supply side (whoever produces it) has led to a divergence in the trajectory between Mexican and U.S. industrial activity. In other words, the level of industrial activity does not correspond to the level of exports since it should be higher than that observed. In this regard, Banxico estimates that the secondary sector is 4.91% above its potential (Banxico, 2023), even considering Pemex, which implies an underestimation of the potential gap from supply. Despite this, the industry produces above its capacity.

It should be remembered that the observed growth is taking place in the middle of the hottest year on record. On the supply side, primary activities continue to follow an upward trend. At the same time, water stress increases, and water supply reductions in the country’s north are constant. In the face of stagnation in the employed population, productivity per employ-

- » Exports growth is not is not thoroughly stimulating the development of Mexican industry, as the domestic content of exports is relatively low.
- » Water stress increases, and water supply reductions in the country’s north are constant.

ee continues to grow, contrary to what is happening in other activities.

The food deficit continues to grow despite the increase in productivity in primary activities, where social, economic, and technological lags are greater than in the rest of the economy. Between January and September 2023, private consumption of non-durable goods was 7.28 bpd, but domestic production covered 6.15 bpd (trillions of pesos for its acronym in Spanish); that is, the national demand for these goods exceeds by 18.3% the production of these goods which is covered by imports (1.12 bpd) (INEGI, n.d.). Between 2017 and 2023, the demand for non-durable consumer goods will have grown by approximately 642 billion pesos; of this growth, imports will have captured 59.4% (381.2 billion pesos) (INEGI, n.d.).

» **The food déficit continues to grow. Between January and September of 2023 private consumption of non-durable goods was of 7.28 billion pesos, but domestic production covered 6.15 billion pesos. Food imports covered this deficit by 1.12 billion pesos.**

In 2021, 54.4% of economic production was generated in some regions with drought, and at least a dozen entities were exposed to high water stress (Banxico, 2022). Within these entities, five have a high economic concentration in water-sensitive industries. In addition to potable water supply, the industry is exposed to scarce natural gas storage (only two days). The supply of clean and affordable energy remains limited despite isolated efforts at the local level and plodding progress in the growth of transmission and distribution networks (CFE monopoly).

Although there have been advances –by private companies– in distributed generation, these are insufficient to cover the demand for clean and affordable energy. It is estimated that the backlog inherited by López Obrador’s administration in terms of electricity transmission and distribution is 4,370 kilometers

» **The supply of clean and affordable energy remains limited despite isolated efforts at the local level and plodding progress in the growth of transmission and distribution networks (CFE monopoly).**

since for each percentage point of GDP growth, 800 kilometers per year in transmission lines should be installed (ICC Mexico, 2023). The difference between what should be and reality is enormous.

Since the entry into force of NAFTA and until 2018, the average growth of the electricity, gas, and water activity was higher than that of the economy (4.8% vs. 2%). The reason is that the electricity system was planned to meet maximum demand (a rate higher than GDP). An incorrect interpretation of the supposed excess production resulted in an erroneous reading of the current federal administration's energy policymakers. From 2017 to date, the growth of electricity, gas, and water activities is -26.3% (INEGI, n.d.b). Surprisingly, the Mexican industry grows (little) above its capacities and is supported without the minimum: water, gas, and electricity.

» From 2017 to date, the growth of electricity, gas, and water activities is -26.3%
INEGI, s.f.b.

» Between 20 and 30 of every 100 liters of gasoline and diesel consumed in the country comes from the black market.
SAT, s.f.

Likewise, service sector activities associated with industrial activity, such as transportation, show high growth rates. However, as is the case with the demand for industrial inputs, between 2012 and 2016, this activity stagnated the demand for hydrocarbons (diesel and gasoline). Mexico is a country on the move, but its energy consumption is far from telling us to what extent it is doing so. In this regard, based on official information, we know that between 20 and 30 of every 100 liters of gasoline and diesel consumed in the country comes from the black market, which includes huachicol (SAT, n.d.). The evidence tells us of imbalances in various markets, but these imbalances are also being corrected by growing illicit activities. In other words, it is about trade with Asia, Europe, and South America and disguised illicit activities.

» In February 2021, 85.3 million bills of 1000 pesos were in circulation. By October 2023, there were 311.6 million pieces
BANXICO, S.F.E.

There is more evidence of overheating of the Mexican economy and corruption in customs than any other phenomenon alluded to. The same evidence contrasts when looking at the growth in demand for cash. It supports the fact that illicit operations are carried out outside the financial system, which points to money laundering. This increase in cash is not generating pressure on prices to the extent it could have done five years ago. The change in the trend was observed in early 2021, after the long confinement; social programs and remittances explain this growth to some extent. This demand is driven by large quantities of the highest denomination banknotes (one thousand pesos) as the velocity of money decreases. In February 2021, 85.3 million pieces of this denomination were in circulation. By October 2023, there were already 311.6 million pieces (Banxico, n.d.e). The delicate thing is that money changes hands at a slower

rate, and the demand for bank accounts continues to grow, so we say that money is almost hoarded.

Despite the positive perception of macroeconomic stability, the business environment in Mexico, due to insecurity and extortion, is hostile and not conducive to carrying out large-scale projects. López Obrador's administration eliminated the sources of financing for local police, the so-called Fortaseg, to the detriment of police corporations and leaving public security in the municipalities where 90% of the country's high impact crimes are committed to their own devices (México Evalúa, 2022). In this sense, it is no coincidence that the "floor charge" extortion ("derecho de piso" in Spanish) permeates the daily life of companies in Mexico and affects the investment plans of firms established in the country.



I. MEXICAN ECONOMY & ITS INTERNATIONAL ENVIRONMENT



I. MEXICAN ECONOMY & ITS INTERNATIONAL ENVIRONMENT

Introduction

The performance of economic activity throughout the six-year period has been relatively low due to the impact of the Covid-19 pandemic, a weak governmental reaction that delayed recovery from 2018 levels until 2023, and a state of uncertainty that has slowed certain investments in the country. However, the lengthening of global value chains has been a stimulus factor to the economy's external sector, which a powerful peso has also impacted.

On the demand side, the relative expansion is explained by the growth of private consumption, espe-

cially that of imported goods (mainly non-durable), which has had exceptional growth and is above its long-term trajectory at 60.6%. Likewise, demand has expanded due to higher imports of fixed assets, which are 15.6% above their 2017 level. So far in 2023, construction has suffered one of the largest increases in modern history (19.2% annual rate and variation of 5.2% over 2017), which adds to capital imports. In contrast, housing is the fixed investment component with the largest lag. Meanwhile, the external sector remained buoyant until the end of 2022, and the slowdown in Mexican exports to countries other than the United States marks the recent weakness (in pesos).

The industrial sector stands out on the supply side, exceeding its potential level by 4.91% (this gap is more significant if Pemex is not considered). The manufacturing industry is growing, but even this growth is insufficient to satisfy internal and external demand. As a result, the industry requires more imported inputs, mainly from Asia, which has resulted in Mexican exports having a lower domestic content



Image: "Mortgage loans in Mexico dropped 15 per cent in the first semester of 2023" at <https://www.garmoclick.com/noticias/n/8536/colocacin-de-creditos-hipotecarios-en-mexico-cae-15-por-ciento-en-primer-semester->

and has shown signs of decoupling² from the U.S. manufacturing industry.

Between the first and third quarters of 2023, Mexico attracted \$32.9 billion in Foreign Direct Investment (IED). However, only 2.8 billion dollars (8.5%) resulted from new investments, and 24.9 billion dollars (75.6%) were reinvestments. New investments are barely equivalent to 6% of the remittances received by Mexico in the same period. At the same time, seven Mexican entities have captured 90 of every 100 dollars of these new investments, suggesting a greater concentration of capital. On the other hand, more than five years after the beginning of the technological-commercial conflict between the United States and China, the composition of the portfolio of new investments by country of origin has been loaded on the side of its main investors: 80.6% of new investments come from the United States, Canada, Japan, Germany, and the United Kingdom. In this sense, Mexico receives few investments from other countries. Despite the notable growth of investments from Australia and China in the last five years, they barely represent 0.4% of the capital stock.

² Decoupling refers to the divergence between Mexican export trends and U.S. economic activity.

Between January and September 2023, Mexico attracted 32.9 billion dollars in Foreign Direct Investment (IED).

Only 2.8 billion dollars (8.5%) resulted from new investments, and 24.9 billion dollars (75.6%) were reinvestments.

1.1 Mexico and the United States of America, symptoms of decoupling in the manufacturing sector

According to the trajectories of the last three decades, the country's industrial production should go hand in hand with Mexican exports, which are mainly directed to the United States (Heath, 2012) by up to 81.8% in 2022 (Banxico, n.d.). These exports affect some industrial activities in that country similarly since many of them are raw materials and intermediate goods. The statistics of industrial activity in the United States are generated one month in advance in such a way that it gives us a guideline of what may happen with Mexican exports, industrial activity in Mexico, and, to a great extent, the GDP. This close correlation appears to be shifting, so contrasting evidence that calls into question the long-run relationship is shown below.

The dynamism of industrial activity in the United States has been constrained for various reasons. Since the mid-1990s, the United States has experienced a decline in apparel and leather goods production of about 80% due to the exodus of factories abroad (FRED, 2018). The great financial crisis of 2008–2009 collapsed production in construction, and

recently (in the last two decades), the advancement of on-site electricity generation has kept production growth in electricity generation, transmission, and distribution down (FRED, 2020). After various efforts, especially the very active industrial policy of President Biden's administration, activity as a whole remains at levels similar to those of early 2008.

Beyond these events, which are shared to some extent by both the U.S. and Mexican economies, the cycles of U.S. industrial activity set the tone for Mexico's industrial performance. The communicating vessels are the goods exchanged for both industries. This occurs through international trade, first and foremost in manufacturing. As of December 2017, U.S. industrial activity explained approximately 45.4% of that variable in Mexico; by October 2023, it explains about 43.5%³. Such a (negative) difference may be the result of many factors, especially conjunctural ones, such that, in principle, they do not represent a danger in the long term for the region's economic integration. A clear example of this is the recent improvement in the performance of construction. Between December 2017 and October 2023, the expansion of construc-

³ Signos Vitales calculations with data from INEGI and Federal Reserve Bank of St. Louis.

tion activity explains 28.5% of the growth of industrial activity in Mexico (INEGI, n.d.) (Graph 1).

In a more detailed analysis, it is possible to observe that for each of the components of the indicator, there are significant differences in their behavior, mainly in mining, where oil and gas extraction is found, as well as in generation, transmission, distribution, and commercialization of electric energy. This is because the energy policy of both countries has taken different paths. Initially, both components have sunk in Mexico to the point of stagnation, while the United States is experiencing the greatest boom in oil and gas extraction in its modern history (36% growth between December 2017 and November 2023) (FRED, 2023c). Thus, it exhibits a lower utilization of installed capacity in electric power (73.7% in 2022) due to the expansion of on-site generation and other renewable energy sources, such as solar and wind (Mendez-Carbajo, 2020). In Mexico, these technologies are just advancing and growing. So far, management has made the difference and described much of the event, but it has little to do with the commercial exchange between the two nations.

When we focus on manufacturing activity, which is of greatest interest, we see that the two countries

have drifted apart in the last two years. Like many other phenomena analyzed here, this is not entirely new. The behavior of manufacturing activity in Mexico has been more dynamic than that of the United States since the great financial crisis of 2008–2009. In the United States, manufacturing activity has not recovered after the collapse caused by that crisis, to the point that at the end of November 2023, manufacturing activity was –4.2% below its historical maximum (December 2007) (FRED, 2023b), while the same activity in Mexico has grown 27.7% since then (INEGI, n.d.)⁴.

According to our estimates, at the end of 2017, US manufacturing activity accounted for 62.9% of the same activity in Mexico. To date, this share has fallen to 57%. This means that the Mexican manufacturing industry's dependence on US inputs or intermediate goods is probably lower than it was almost six years ago. Suppose the trajectory of manufacturing activity in Mexico continues as it has been. In that case, the gap between the two economies will become more evident over the years. At Signos Vitales, we believe this should continue to be the case in the near term for at least three reasons:

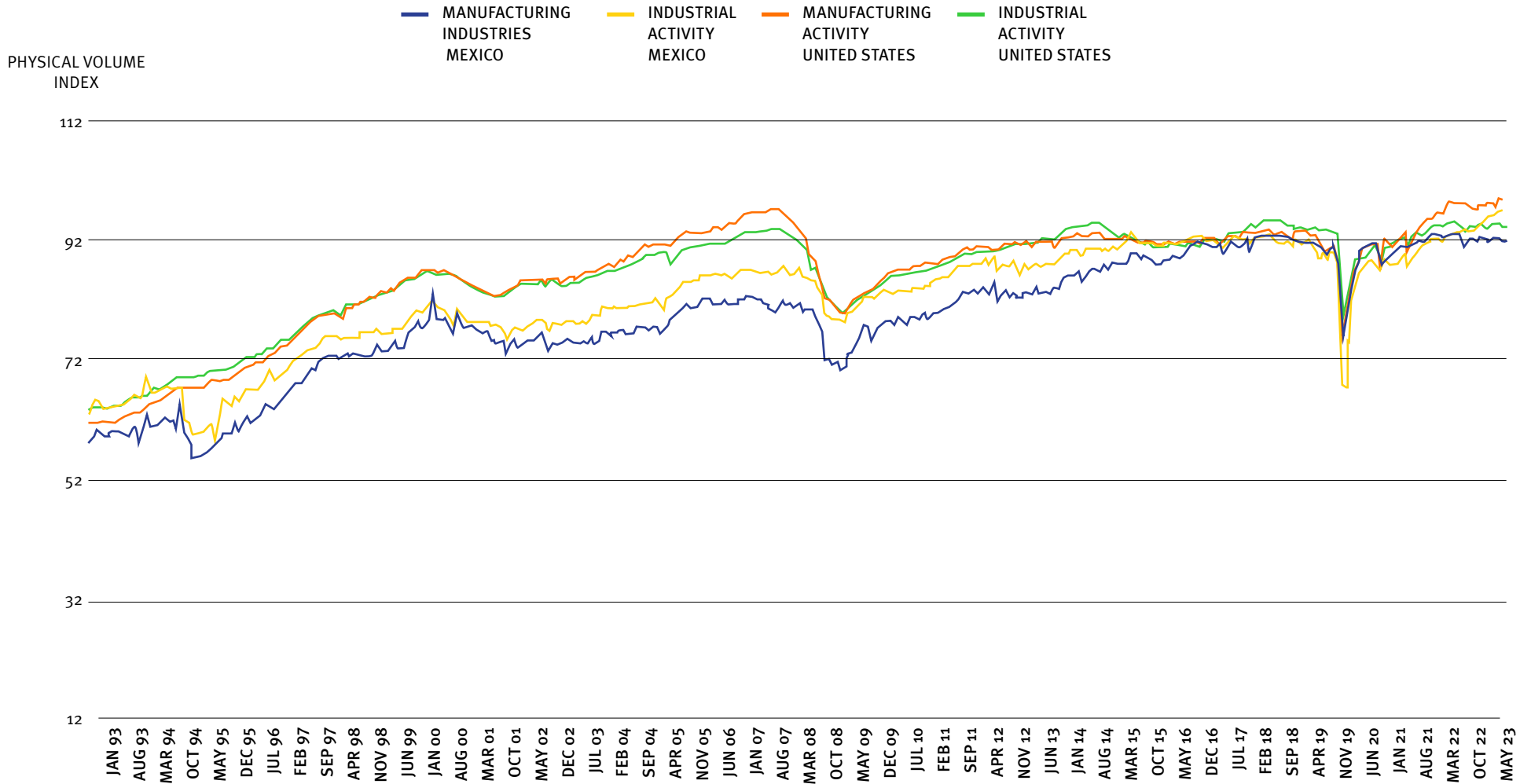
⁴ With data as of October 2023.

The energy policy of the US: is experiencing the greatest boom in oil and gas extraction (growth of 36% –December 2017 –November 2023).

*In Mexico: oil, gas and electric energy have been stagnated
FRED, 2023.*

GRAPH 1. INDUSTRIAL AND MANUFACTURING ACTIVITY IN MEXICO AND THE UNITED STATES

(JANUARY 1993 – NOVEMBER 2023) (SEASONALLY ADJUSTED SERIES)



Source: In-house elaboration with data from (INEGI, s.f.) and Board of Governors of the Federal Reserve System (US) (FRED, 2023a), (FRED, 2023b).

The auto strike recently paralyzed U.S. manufacturing activity, which slowed it down while the paralysis was active.

Mexican manufacturing exports continue their upward trend and are very close to exceeding their long-term trajectory, which, to some extent, exacerbates manufacturing activity in Mexico.

For political and electoral reasons, construction investment in Mexico will continue to accelerate due to the federal government's intervention for much of 2024.

The above is still insufficient to expose a break in the long-term relationship between the manufacturing activities of both nations since some factors are temporary. However, it can be said that the influence of both industries on the behavior of the other is decreasing. Although at first glance, this phenomenon seems favorable for the Mexican economy and is perceived as a gain due to the greater share of the U.S. market (from 13.4% of total imports in 2017 to 15.5% between January and October 2023) (U.S. Census Bureau, 2023) and less dependence on inputs and intermediate goods from that economy, it is evidence of the fragile manufacturing integration of the North American economic region.



Image: "Automobile union UAW in the USA on strike" at <https://www.latimes.com/espanol/eeuu/articulo/2023-10-23/sindicato-automotriz-de-eeuu-anade-otra-fabrica-a-su-huelga>

1.2 Industrial Activity in Mexico

Although not all sectors of the economy benefit from external demand, especially from the United States, this should be the case with the secondary sector (construction and transformation) and particularly with industrial activity (manufacturing). Between 1993 and 2023, industrial activity would have grown by a cumulative 59% (on average 1.6% per year). However, the manufacturing industry grew by 81.7% during this period and by an average of 2% annually (INEGI, n.d.b). So far, in the recent federal administration (December 2018 to October 2023), industrial



Image: Clothing manufacturing in Tehuacan, Pue. at <https://www.milenio.com/politica/comunidad/maquiladoras-de-tehuacan-comienzan-a-recuperar-empleos>

activity has only grown 7.3%, and manufacturing has grown 8.1% (INEGI, n.d.b)⁵.

Except for generating, transmitting, and commercializing electricity, water supply, and natural gas through pipelines to the final consumer (subsequently, electricity, water, and gas), construction and mining (the other components of industrial activity) maintain growth well below average. The cumulative growth between 1993 and 2023 is 45.1% for construction and a -2.7% decline for mining, 1.2%, and -0.1% in annual average, respectively (INEGI, n.d.b). The latter is mainly due to oil and gas extraction drop of -26.4% in the period above (-1% on average per year) (INEGI, s.f.b). The importance of this activity within the aggregate mining indicator (65.4% of production)⁶ overshadows the growth of the other two activities that make up the indicator: mining of metallic and non-metallic minerals (except oil and gas) and mining-related services, which have grown in the last three decades by 100% and 350.5% (INEGI, n.d.b), respectively.

The federal government's attempt to reverse the loss in extraction activity has been futile. Between 2018

⁵ Seasonally adjusted series.

⁶ Signos Vitales estimates with information from IMAI.

and 2023, its variation was only 1.4%. If this trajectory continues, the activity level will be only 2.1% higher in 2024 than the 2018 level and will be distanced by -40.7% from the historical maximum observed in 2004 (INEGI, n.d.b). The result reflects a failure of the López Obrador administration's energy policy without considering that the private sector has contributed more to this meager growth.

In the last five years, construction activity has barely grown 2.2% due to the lag in housing construction⁷ The construction of mega-construction and infrastructure and specialized construction work has a higher average growth rate than industrial activity as a whole, 3.2% and 1.8%, respectively (INEGI, n.d.b).

The growth of electricity, water, and gas has averaged 2.9% annually over the last three decades (cumulative growth of 136.2%). This is higher than the rest of the industry because the electricity system in Mexico was planned (at least until before 2019) based on peak electricity demand. Therefore, it is congruent that the growth rate of the electricity sec-

⁷ Not to be confused with the measurement of the National Survey of Construction Companies (ENEC). The construction activity reported in the Monthly Industrial Activity Indicator (IMAI) includes related services. The value of production reported by the ENEC is the main input to measure the behavior of the activity in both the IMAI and the Gross Fixed Capital Formation.

tor is higher than that of the Mexican economy and industrial activity. However, in the last five years, electricity generation activity has contracted -26.3% (INEGI, s.f.b), which is worrisome.

1.2.1 MANUFACTURING ACTIVITY

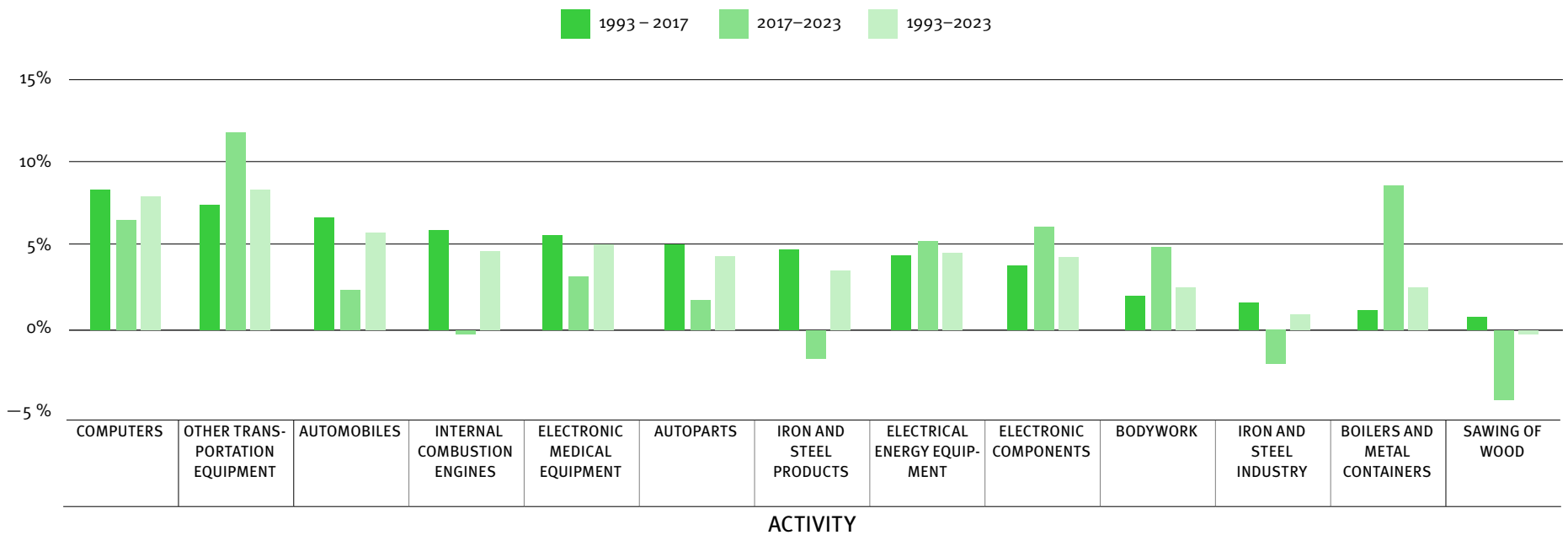
Although long-term growth has been positive, all industries and manufacturing are advancing slowly, similar to the growth of the economy as a whole. Between 1993 and 2023, only a few manufacturing activities stand out for their average annual growth: the food industry (2.1%), beverage and tobacco industry (2.8%), paper industry (2.8%), plastic and rubber industry (2.3%), manufacture of metal products (2%), manufacture of transportation equipment (5.1%) and other manufacturing industries (3.7%) (INEGI, n.d.b). On the other hand, the activities that far from growing are in decline are the manufacture of textile inputs and textile finishing (-0.84%), manufacture of clothing (-0.3%), Tanning and finishing of leather and leather⁸ (-1.39%), wood industry (-0.5%) and manufacture of petroleum and coal products (-0.68%) (INEGI, n.d.b). The result of the positives minus the negatives is the weak growth that we observe.

⁸ Tanning and finishing of leather and fur and manufacture of leather, fur, and leather substitute products.

The federal government's attempt to reverse the loss in extraction activity has been futile. Between 2018 and 2023, its variation was only 1.4%. If this trajectory continues, the activity level will be only 2.1% higher in 2024.

GRAPH 2. MANUFACTURING PRODUCTION (SELECTED ACTIVITIES WITH HIGHEST AND LOWEST GROWTH)

AVERAGE ANNUAL GROWTH RATED 1993–2017 VS 2017–2023 AND CUMULATIVE 1993–2023



Source: In-house elaboration with information from (INEGI, s.f.).

Considering the positives, industrial activity would grow by 84.6% in the analyzed period (INEGI, n.d.). In other words, the “booming” industrial sector (without the negatives) barely grows at the level of the Mexican economy as a whole. The negative component (mainly oil and gas extraction) had an influence of 20.2% in industrial activity three decades ago; in 2023, this component will have an approxi-

mate weight of 9.6%⁹, less than half of what it was before NAFTA came into effect, and it does not stop subtracting either. The variation of the industrial activities that grow the least is –25% in the same years (Graph 2).

Nevertheless, some activities will stand out more within the same industries. Still, in the aggregate,

The “booming” industrial sector (without the negatives) barely grows at the level of the Mexican economy as a whole.

⁹ Signos Vitales calculations with information from IMAI.

the effect of such growth is diffused. In a more detailed analysis, it is possible to observe activities that show growth rates to be considered and others that indicate that some activities tend almost to disappear. Among those that maintain the highest average growth rates are manufacture of other transportation equipment (8.4%), manufacture of computers and peripheral equipment (8.1%), metal coating and finishing (7.4%), manufacture of aerospace equipment (6.1%), manufacture of air conditioning, heating, and industrial and commercial refrigeration equipment (5.8%), manufacture of automobiles and trucks (5.9%), manufacture of household electrical appliances (5.4%), manufacture of measuring instruments, navigation, and electronic medical equipment (5.2%), and manufacture of railway equipment (5.1%) (INEGI, n.d.).

In general, the growth of industrial activity has been weak and mediocre, barely close to the average GDP rate since NAFTA came into effect. The hydrocarbon sector (oil and natural gas), in which Pemex plays a preponderant role, and housing policy bear some responsibility. However, it is impossible to attribute the slow progress to the vast majority of activities, especially those in which they have little or no influence. Likewise, the manufacturing activities with

the highest growth rates show little or no interrelation between them, reflecting isolated efforts. In addition, the latter's expansion is threatened by the inability of the electricity, water, and gas industries to meet the growing demand for resources (energy and inputs).

Just to match the 2017 level of activity, the latter industry would have to grow 33.1%. In 2023, annual growth will be approximately 4.5%, which is encouraging in the short term if the country's growth is somewhat lower than this rate. Nevertheless, suppose the level of growth remains constant. In that case, it will take almost seven years to return to the level observed in 2017. As with electricity, water, and gas, in the last year, at least 15 manufacturing activities showed considerable changes in their trajectories. However, if their growth remains constant, it will take several years to return to 2017 levels. There are also activities, such as manufacturing boilers, tanks, and metal containers, that will grow annually at around 63.7% in 2023. It will be necessary to follow this up to determine if this aggressive growth responds to structural changes or if it will result from merely atypical behavior.

In general, the growth of industrial activity has been weak and mediocre, barely close to the average GDP rate since NAFTA came into effect.

The public administration in Mexico, especially at the federal level, has had two direct channels to boost the country's industrial activity:

1. Through energy policy, the extraction of oil and gas and related services, as well as electricity, water, and gas, in turn, this policy indirectly impacts the manufacture of electric power generation and distribution equipment, petroleum and coal products, fertilizers, pesticides, and other agrochemicals (chemical industry).
2. Capital spending in emblematic works and absent housing policy is expanded in construction. At best, the federal government encourages increased activity in civil engineering works. In addition, the momentum of specific works, such as the Tren Maya, motivates the manufacture of railroad equipment (manufacturing of transportation equipment).

The more significant interference of the public sector in industrial activity could lead to these activities growing by about 10% (1.6% on average) between 2017 and 2023. Before the intervention, their average growth had been -1% (1993-2017). It should be noted here that economic indicators, such as industrial activity, do not necessarily distinguish (ex-ante) between socially profitable investments and those not.

1.2.2 INDUSTRIAL ACTIVITY, EXPORT SECTOR, AND THE MEXICAN SILK ROUTE

Between 2017 and 2022, the equivalent of 82.2% of export growth (variation of 138.3 mmdd) was concentrated in only thirteen of the 97 product categories, in order of importance: mechanical appliances, boilers and parts (37.1 mmdd), land vehicles, and their parts (34.3 mmdd) (vehicles and their parts), electrical machinery and equipment (15.7 mmdd), mineral fuels and their products (15 mmdd), beverages and vinegar (6 mmdd), optical and medical instruments and apparatus (5.4 mmdd), cast iron and steel (4.4 mmdd), articles of cast iron or steel (4.2 mmdd), plastic and its manufactures (4.2 mmdd), unclassified products (3.7 mmdd), metalliferous minerals, slag (3.6 mmdd), vegetables, plants, roots and tubers (2.5 mmdd) (vegetables) and fruits and edible fruits (2.3 mmdd) (fruits) (Banxico, n.d.b). Until 2022, these categories weighed 82.1% in the value of exports, and their growth was 41.2%, similar to the growth of all exports (41.1%) (Banxico, n.d.b). The growth of exports does not cause surprise by itself in most of the mentioned goods; in many of them, the upward trend continues, and Mexico has reached a high degree of specialization in producing these goods.

The economic literature assumes that the Mexican economy has undergone a long transformation period over the last three decades. However, recent export growth has been of such a magnitude that it casts doubt on the ability of the Mexican economy to cope with abrupt increases in demand that do not lead it to overheat. To a large extent, the observed growth in exports is indeed due to the variation in current international prices. However, evidence shows that the volume of exported goods grew 7.7% between the end of 2017 and the last quarter of 2022 (Banxico, n.d.c)¹⁰ (Graph 3).

As of the third quarter of 2023, the exported volume of all goods continues to grow, and the variation is 14.8% compared to the last quarter of 2017 (Banxico, n.d.c). This bonanza is not true for oil exports. Between the last quarter of 2017 and the same quarter of 2022, the volume of such exports contracted -25.4% and -15% at the close of the third quarter of 2023. Higher oil prices offset the total value of oil exports during much of 2021 and 2022.

In contrast to the latter, non-oil exports have shown a more solid growth (11.4%), and within these, agricul-

¹⁰ The volume figures expressed in this section have been seasonally adjusted using econometric methods.



Images:

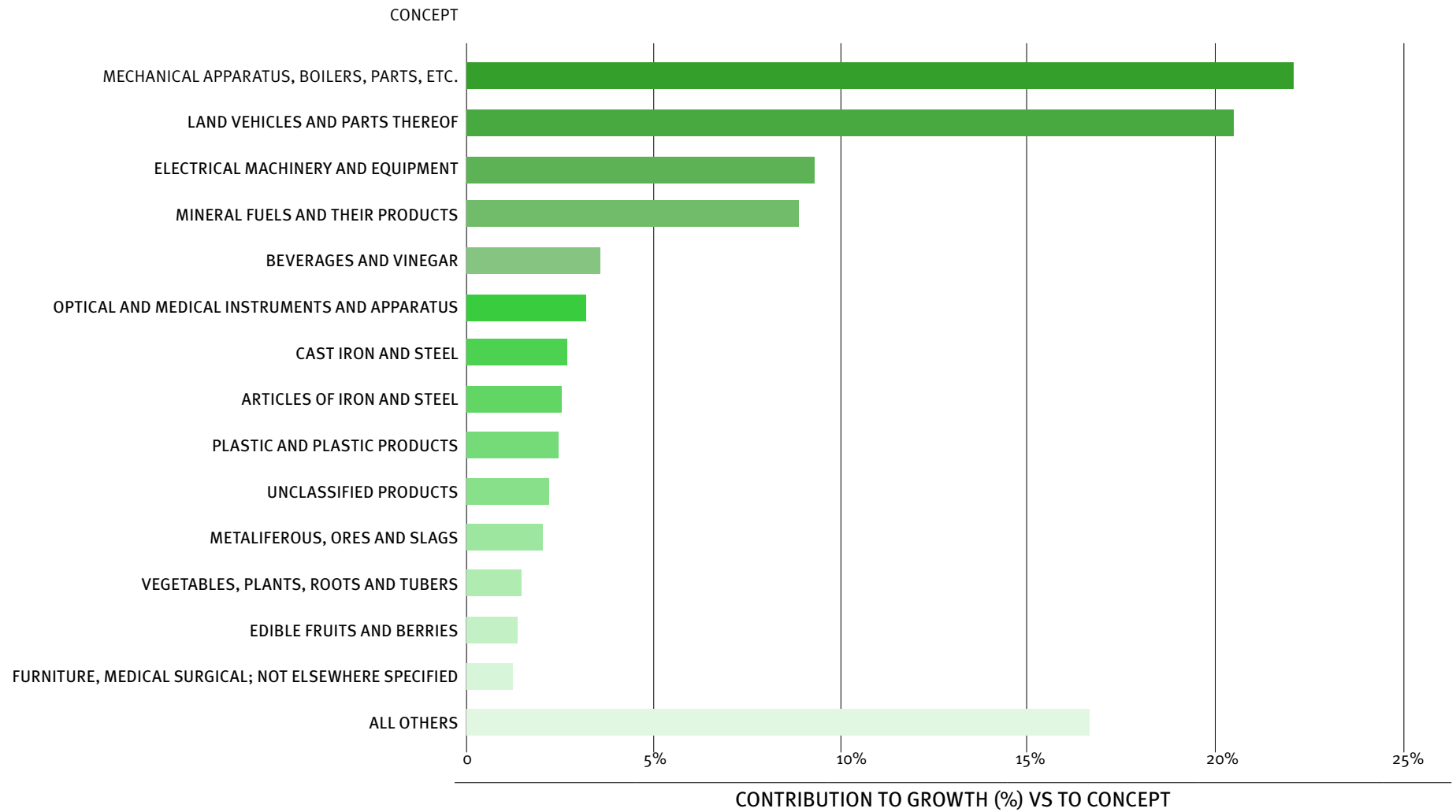
Dina factory of buses at <https://www.tyt.com.mx/nota/armadora-mexicana-dina-celebra-70-aniversario/>.

Mexico exports medical equipment at <https://www.medi.travel/2022/01/04/mexico-entre-los-10-exportadores-de-dispositivos-medicos-a-nivel-mundial/>

Water heater factory at <http://multiserviciolaunion.com/portfolio/calderas/>.

GRAPH 3. SHARE IN MEXICAN EXPORT VALUE GROWTH

(2017 – 2022) (%)



Source: In-house elaboration with information from (Banxico, s.f.b).

tural and manufacturing exports grew almost equally until the end of 2022 (11.4% and 11.8%, respectively). Although both types of goods remain buoyant, the evidence indicates that the volume of manufactured goods exports significantly impacts the performance of the Mexican economy's external sector (Graph 4).

Likewise, the volume of agricultural exports maintained its growth trend until the first quarter of 2021, when the volume exported reached its highest level on record. One year later, the volume of agricultural exports fell back to the level of the last quarter of 2017. To date, agrarian exports remain -1.3 % below the historical maximum of 2021 but maintain an accumulated growth of 16.6% compared to the end of 2017 (Banxico, n.d.c).

The data also show that the leading destination of Mexico's manufactured goods exports continues to be the United States. In contrast, exports to the rest of the world fell back to the levels seen in February 2022. Thus, the decline in foreign demand from the rest of the world largely explains the slowdown in foreign trade observed in recent times.

Mexico's links with the world are much more extensive than what has been analyzed here. As a result of various supply and demand shocks, global trade

relations have modified their course and, in other cases, have intensified their trend. As Mexico accelerated its exports to the United States –and, at some point, to the rest of the world– in a given set of goods, imports (mainly Asian) also increased their presence in Mexico. In 2017, the share of imports from Asia was 34.9% of the total (146.9 billion dollars); by 2022, these already accounted for 37.9% (161 billion dollars). In 2023, imports from Asia and Latin America will reach 41.7% of the total. They will be close to those from North America (45.2%) (Banxico, n.d.d).

Unlike North America, our exports to the rest of the world remain limited, such that the trade balance (exports minus imports) with the rest of the world has been negative for decades. However, the conduct of the trade policy implemented in the Lopez Obrador administration will lead to a reversal of the trade balance with Latin America, and this will weaken the terms of trade (increase the trade deficit), with almost all economic regions except North America, as already happened in 2023 (Graph 5).

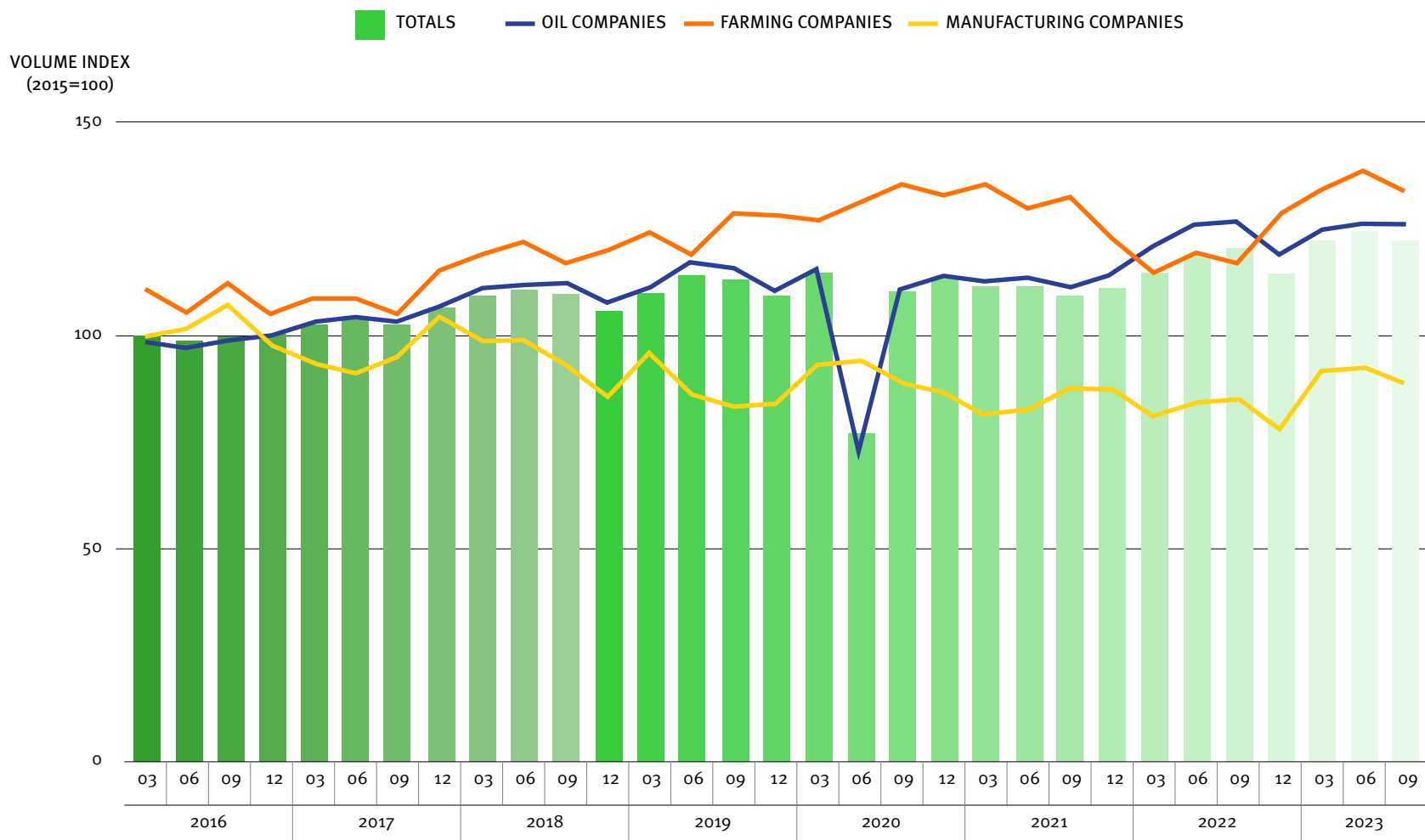
Trade relations with the rest of the world continue to grow, but there are marked differences in product type¹¹. Between January and October 2023, for exam-

¹¹ Dependence is defined as the trade deficit growth by product and region.

In 2023 imports from Asia and Latin America will reach 41.7% of the total and will be close to those from North America (45.2%)

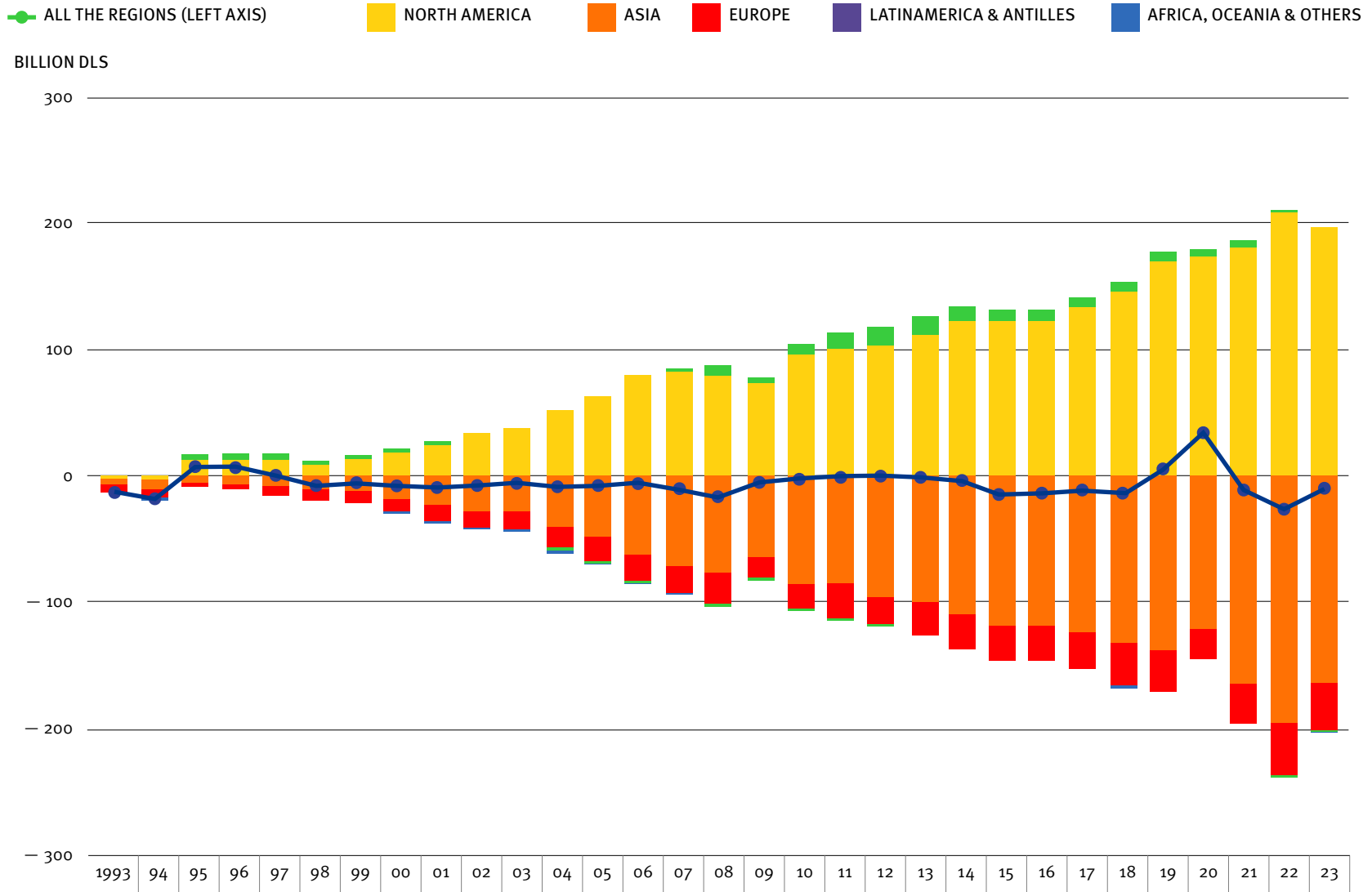
Banxico, s.f.d.

GRAPH 4. MEXICAN EXPORT VOLUME INDEX
 (FIRST QUARTER OF 2016 – THIRD QUARTER OF 2023), SEASONALLY ADJUSTED SERIES (2015=100)



Source: In-house calculation from Signos Vitales with data from Banxico (s.f.c).

GRAPH 5. MERCHANDISE TRADE BALANCE WITH ALL REGIONS AND BY REGION OF THE WORLD
(1993–2023*) (BILLION DLS)



Source: In-house elaboration with data from Banxico (n.d.d). * Cumulative January to October 2023. Negatives indicate deficits, and positives indicate surpluses.

ple, the trade deficit of intermediate goods, mainly technological goods, and metals, is greater with Asia, such as and in order of importance:

1. machinery and electrical equipment (–65.2 million dollars)
2. mechanical appliances, boilers, parts (–32.4 billion dollars)
3. cast iron and steel¹² (–5.7 billion dollars)¹³
4. optical and medical instruments and apparatus (–4 billion dollars) (medical apparatus,
5. articles of cast iron or steel (–3.4 billion dollars) and
6. Aluminum and articles thereof (–3.5 billion dollars)

The flourishing of the petrochemical industry in Asia, which added to the installed capacity in Europe, expanded the supply of plastic and its manufacturers. The deficit with these regions has reached –7.8 mmdd (billions of dollars for its acronym in Spanish) (Banxi-

¹² This amount is an estimate, as there is no information available on exports of this product from Mexico to Asia for the month of July 2023.

¹³ Mexico has a deficit of interest with North America in this area (–\$3.6 billion dollars), however, it also exports to the United States, so the deficit is smaller than with Asia. The latter region displaced the United States as Mexico's main supplier.

co, n.d.d). If the trend continues, in the coming years, the influence of these two regions will be greater than that of North America, with which the deficit is –8.8 mmdd. This phenomenon occurred with rubber and its manufacturers a little over a decade ago, where Asia and Europe now dominate Mexico's imports (–\$3.6 mmdd between both regions) while the balance with North America was reversed (\$176.7 mmdd) (Banxico, n.d.d). Of the products mentioned in the previous paragraph, Mexico only shows a trade surplus in medical devices (\$8.7 mmdd), as it maintains a surplus balance with North America (\$14.4 mmdd) (Banxico, n.d.d).

It can be seen by observing the various deficits in by-products that are directly related to those goods that have determined the growth of Mexican exports, especially in the United States. In other words, the growth of Mexican exports to the United States is accompanied by persistent and growing trade deficits with Asia and, to a lesser extent, with other world regions. Between January and October 2023, the trade deficit with Asia and Europe amounted to –162.8 mmdd and –38.7 mmdd, respectively. In the opposite direction, the trade surplus with North America was 194.8 mmdd (Banxico, n.d.d). For example, land vehicles and their parts do not

The growth of Mexican exports to the United States is accompanied by persistent and growing trade deficits with Asia (–162.8 billion dls) and, to a lesser extent, with Europe (–38.7 billion dls), between January and October 2023

Banxico, s.f.d.

show an exposed dependence on Asia. However, the observed growth of Asian vehicle imports between 2017 and 2022 of 29.8% (variation of 3.8 mddd) vs. North American ones of 8% (variation of 1.7 mddd) should be highlighted. With data as of October 2023, it is feasible to know that this gap will continue to widen. The growth of imports from Asia and Europe between 2017 and 2023 will end up being 72.3% and 56%, respectively, while imports from North America will have grown 31.3% in the same period (Banxico, n.d.d).

This process is also happening in other countries of the world. These economies have very recently been called “connector” economies (Gopinath, 2023). From the reading of the last speech of the First Deputy Managing Director of the International Monetary Fund, Gita Gopinath, it can be interpreted –from the statistical analysis– those countries such as India, the United Arab Emirates, Vietnam, and Mexico can take advantage of geoeconomic fragmentation. However, even within this group, Mexico and Vietnam stand out because they have a combination of relative (positive) variations in FDI from China and, at the same time, are recipients of a greater number of Chinese inputs, intermediate and final goods, whose final destination is the United States.

A few weeks before Gopinath’s speech, the Bloomberg agency also provided information on the so-called connector economies (with some variations), highlighting five economies: Vietnam, Poland, Mexico, Morocco, and Indonesia (Curran *et al.*, 2023). Everything indicates that it will be more and more frequent, and it seems more appropriate to hear and speak of connector economies and the lengthening of global value chains than of investment relocation.

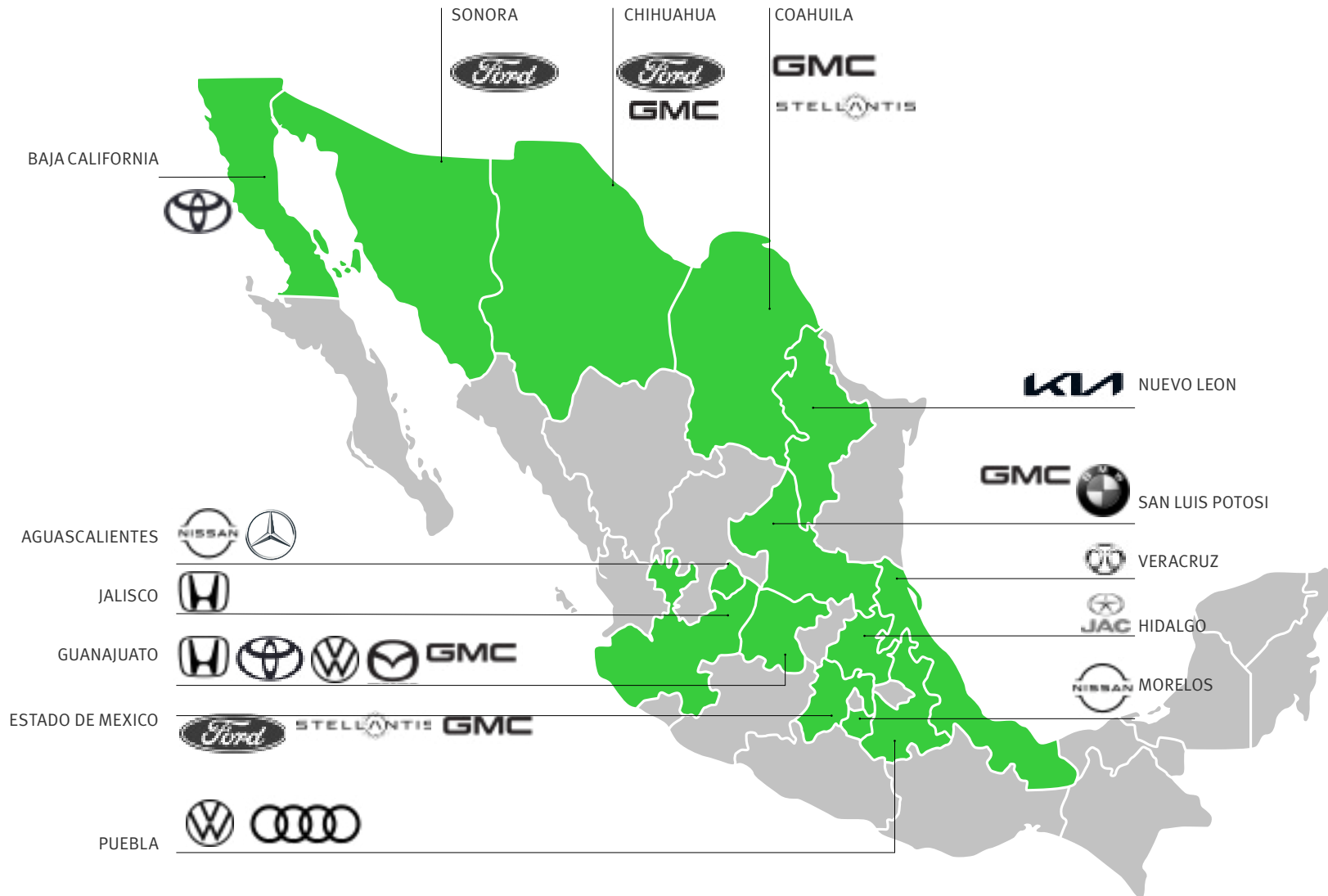
1.2.3 AUTOMOTIVE SECTOR

It is worth considering whether one of the variables with the greatest impact on trade with the United States and the Mexican manufacturing sector in the long term, exports of vehicles and their parts, are being driven by new investments. From January to November 2023, 77.3% of vehicle and light truck exports were destined for the United States, another 7.9% to Canada, and in Europe, the largest importer was Germany (5.1%). Between 2005 and 2017 and with information from the Administrative Registry of the Automotive Industry of Light Vehicles (RAIAVL for its acronym in Spanish)¹⁴, only a select group of car

¹⁴ This register reports production figures, sales to the national market and exports of the 23 enterprises (37 brands) affiliated to the Mexican Automotive Industry Association (AMIA), Autos Orientales Picacho, Promotora de Inversion

CAR ASSEMBLY INDUSTRY IN MEXICO

ASOCIACIÓN MEXICANA DE LA INDUSTRIA AUTOMOTRIZ AND INDUSTRIA NACIONAL DE AUTOPARTES



Source: AMIA, INA, 2022 at <https://mexicoindustry.com/noticia/-cuantas-armadoras-de-autos-hay-en-mexico>.

and light truck manufacturers (12 out of a total of 23 companies) located in Mexico have made—at least in some year and in any segment—sales abroad¹⁵. After 2017, only two companies were added to this remarkable group: BMW and Mercedes Benz. From 2005 until 2017, the latter two assemblers had no export records in any segment.

In 2017, the assemblers installed in Mexico exported 3.25 million cars and light trucks; by 2018, these exports reached their historical maximum (3.45 million); in 2019, there was a slight drop (variation of –1.8% annual variation or –62.9 thousand cars and light trucks) and has been followed by a period of slow post–pandemic recovery with a loss of –388.2 thousand cars and light trucks (INEGI, n.d.c). To a large extent, this recovery is due to the re–composition (i.e., preferences) of exports (foreign demand). A substantial change in the structure has been that exports are primarily of light trucks, driven by the sales of SUVs.

In 2022, SUVs exports integrated 53.1% of all exports; in 2017, they were only 30.3%. They also ex-

and Giant Motors Latinoamerica, results in a crucial administrative register.

¹⁵ These companies are: Chrysler, Fiat, Ford Motor, General Motors, Honda, KIA, Mazda, Nissan, Audi, Mercedes Benz, Toyota and Volkswagen.

plain 91.4% (535.3 thousand SUVs) of the growth of this segment (light trucks) between 2017 and 2022 (INEGI, n.d.c). Of these total exports, 85.4% refer to companies that had already exported any type of vehicle from 2005 to date, such as Mercedes Benz. Also, the vast majority of light truck exports go to the North American market, the United States (79.2%) and Canada (10.3%) (INEGI, n.d.c) (Graph 6).

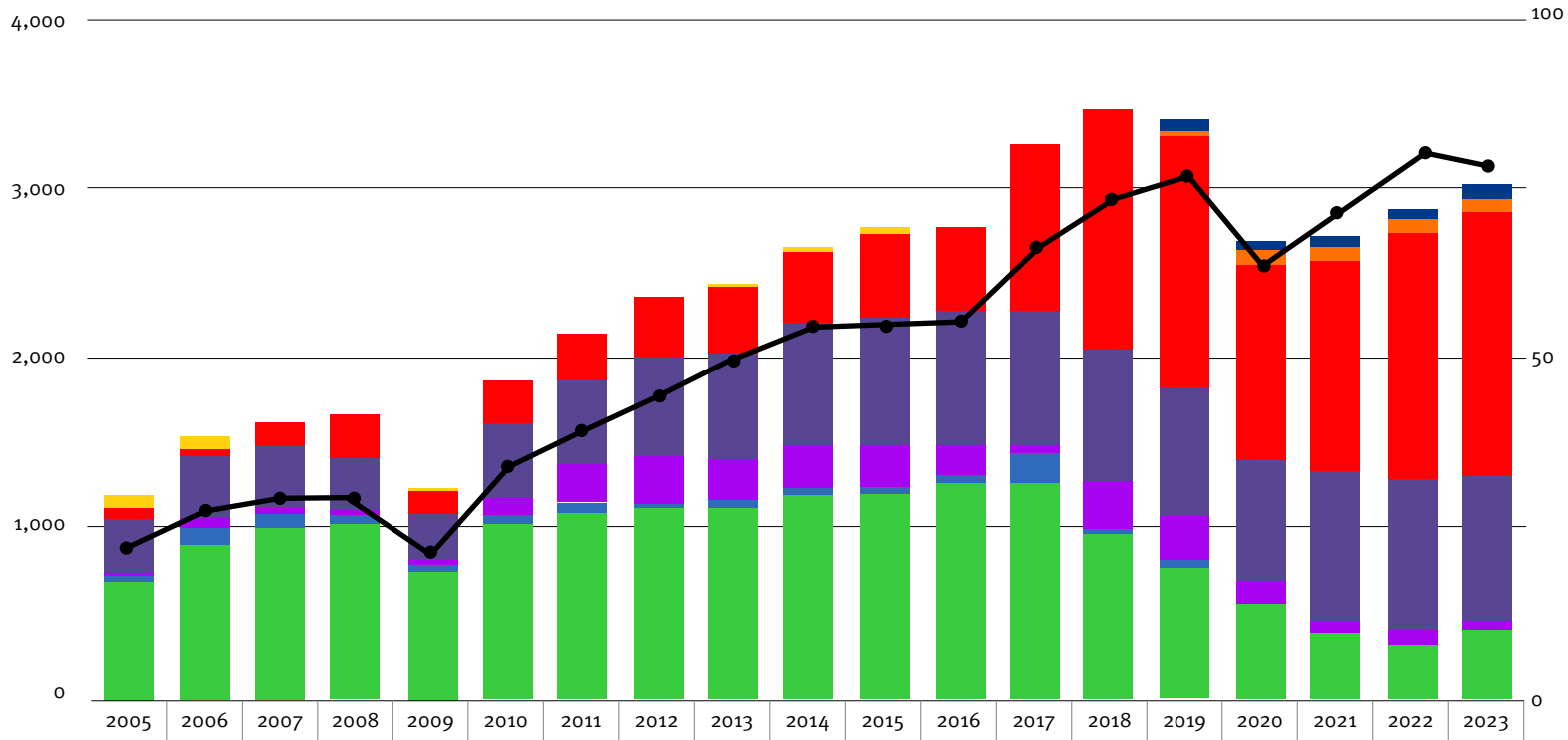
Unlike light trucks, especially SUVs, between 2017 and 2022, the loss in exports originated from the variation of –814.2 thousand compact cars and –182.8 thousand subcompacts. The total loss of exports is –974.2 thousand automobiles. Meanwhile, Mercedes–Benz and BMW have exported 63.2 thousand luxury vehicles, adding 22.8 thousand vehicles from this segment to those exported in 2017 (variation of 56.4%) (INEGI, n.d.c). The above suggests that the change in the supply composition or preference structure (SUVs for cars), probably exacerbated by the shortage of semiconductors (assemblers assemble higher value–added vehicles), increases the value (in dollars) of the sector’s exports, allowing them to compensate for losses in volume. In other words, the growth in the value of exports is due to the change in relative prices.

GRAPH 6. AUTOMOBILE EXPORTS BY SEGMENT AND NEW INVESTMENTS IN THE SECTOR
 (THOUSANDS OF VEHICLES AND BILLION DOLLARS) (2005 – 2023)*



EXPORTS OF AUTOMOBILES
 & LIGHT TRUCKS (THOUSANDS)

BILLION DLS



Source: In-house elaboration with data from INEGI (n.d.c) and Banxico (n.d.b). *Accrued January–November 2023. New investments refer to BMW and Mercedes Benz exports from 2018 to 2023.

The 2018 Administrative Registry of the Automotive Industry for Heavy Vehicles (RAIAVP for its acronym in Spanish)¹⁶, shows that up to that year, five of the eight companies exporting cargo and passenger vehicles had already exported at least once (Dina, Freightliner, International, Kenworth, and Volvo). These companies have since exported 99.98% of the total number of these vehicles (904.6 thousand cargo and passenger vehicles) (INEGI, n.d.c).

1.2.4 VALUE-ADDED MANUFACTURING: MADE IN ...ASIA AND SOME IN EUROPE

The Mexican economy is complex¹⁷ from an export perspective, number 22 out of 133 economies (Harvard Growth Lab., n.d.). It ranks above developed and developing economies such as Thailand (23rd), Denmark (24th), Poland (25th), the Netherlands (26th), Spain (34th), Canada (41st), and India (42nd), just to mention some of the most complex. Despite the increase in exports, they have stagnated in terms of complexity. In 2016, it became the 17th most complex

¹⁶ This registry has the statistics of freight vehicles and passengers.

¹⁷ A measure of a society's knowledge expressed in the products it produces. The economic complexity of a country is calculated in terms of the diversity of exports a country produces.

economy. Since then, we have regressed and moved further and further away from Asian economies such as Japan (1), South Korea (3), Singapore (5), and China (18) (Harvard Growth Lab., n.d.)¹⁸.

Moreover, this economic complexity is overshadowed by the low value-added to Mexican manufacturing exports. According to INEGI, until 2022, the share of domestic content in global exports was only 40.4%. That share peaked at 44.1% in 2015 (INEGI, n.d.d) and has also declined. This figure should alert the next federal administration. It should be remembered that the USMCA requires greater regional content, which puts the treaty itself at risk. However, in principle, manufacturing exports may be subject to tariff burdens that cause a loss of competitiveness¹⁹.

More than half (63.1%) of the contribution in global manufacturing export value added (VAEMG) comes from just eight branches of economic activity: au-

¹⁸ All of the above economies are in the highest complexity ranking.

¹⁹ It is necessary to stress the importance of this indicator because it not only considers the value added by manufacturing but also the intermediate consumption of national origin, that is, the generation of value caused by the production of these goods within the economy. Global Manufacturing Export Value Added equals Global Manufacturing Value Added plus Intermediate Consumption of Domestic Origin.

In 2016, Mexico became the 17th most complex economy. Since then, we have regressed and moved further and further away from Asian economies such as Japan (1), South Korea (3), Singapore (5), and China (18)

Harvard Growth Lab., s.f.

Until 2022, the share of domestic content in global exports was only 40.4%. That share peaked at 44.1% in 2015

INEGI, s.f.d.

tomobile and truck manufacturing (24.8%), motor vehicle parts manufacturing (18.2%), computer and peripheral equipment manufacturing (3.6%), manufacture of non–electronic equipment and disposable material for medical use²⁰ (3.6%), manufacture of audio and video equipment (3.5%), non–ferrous metal industries, except aluminum (3.5%), manufacture of electronic components (3.3%) and beverage industry (2.6%) (INEGI, s.f.d).

Despite the contribution of these branches, the national content within these branches leaves the evolution of the Mexican economy in question. Of those that contribute most to the VAEMG, the beverages and non–ferrous metals, except aluminum, branches stand out with 85.2% and 77.2% of national content, respectively, while the national content in the manufacture of automobiles and trucks and parts for motor vehicles, those with the greatest weight, are 47.4% and 38.7%, respectively (INEGI, n.d.d). The conditions of other economic branches are not different from those of the latter; the national content is lower, and the products are more complex. A clear example of this is that only 11.8%, 19.3%, and 20.9% of the manufacture of iron and steel products, computers and

²⁰ Manufacture of non–electronic equipment and disposable medical, dental, laboratory and ophthalmic supplies.

peripheral equipment, and electronic components, respectively, is of national content (INEGI, s.f.d).

This means that most of the value of the finished products of these industries comes from abroad, and in many cases, their components reach around 80%. Therefore, many products counted as Mexican exports are practically re–exported, with very low domestic content. In the three cases mentioned, their consumption of intermediate goods of national origin barely reaches 3%, 3.2%, and 2.9% of the total (INEGI, s.f.e). On average, this consumption is 14.6% for the entire global manufacturing industry (INEGI, s.f.f). In this sense and the context of global value chains, the manufacturing sector of the Mexican economy is highly dependent on imports of intermediate products. It has not sufficiently stimulated the development of domestic industry, with some exceptions.

In 2021, these global value chains (“CGVs” for its acronym in Spanish) generated 2.22 million jobs, 9.5% more than in 2017. In the same period, the growth rate of the labor market in Mexico turned out to be lower (variation of 6.7%) (INEGI, s.f.g), and formal employment in the processing industry increased by 9.3%. This figure represented only 4% of the people employed in the country. This proportion contrasts

Many products counted as Mexican exports are practically re-exported, with very low domestic content.

INEGI, s.f.d.

with the situation in Southeast Asia²¹. Mexico is just one-seventh of the workers employed in CGV in that region, where one in four are employed in CGV, 75 million workers (Viegelehn *et al.*, 2023). More than 60% of manufacturing employment in Southeast Asia is related to these global value chains (Viegelehn *et al.*, 2023), while in Mexico, it is only 24.4% (INEGI, s.f.g).

Between 2017 and 2021, the value of domestic content barely grew 1.7% in real terms (38.8 mmdp) (INEGI, s.f.f), with a higher growth rate in jobs, which may indicate a lower level of productivity.

By 2022, trade and transportation margins and VAE-MG will have grown with respect to 2017, 12.2% (variation of 26.2 mmdp) and 12.6% (variation of 267.5 mmdp), respectively. Although between 2021 and 2022, there was a substantial increase (in constant pesos) in VAEMG of 10.1% (including trade and transportation margins), the growth of imported goods was 75.6% higher (182.2 mmdp) (INEGI, s.f.h) so the contribution of Mexican industry continued to drop.

Between 2017 and 2022, for every peso that the Mexican industry added to its export products (intermediate goods plus gross value added), it had to add

1.47 pesos in imported inputs. Between 2021 and 2022, that ratio deteriorated even further: for every peso of Mexican value-added, there were 1.76 pesos of imported inputs (INEGI, n.d.h). It is evident that Mexico's processing industry cannot generate greater value than its manufacturing industry's installed capacity.

Adding to the above, according to the Enaproce (National Survey on Productivity and Competitiveness of Micro, Small and Medium Enterprises, its acronym in Spanish) in 2018, 95.4% of small and medium enterprises in Mexico had no relationship with CGVs (INEGI, n.d.i). Thus, the global labor market will hardly accelerate its growth since it cannot accommodate a larger number of people to add the same value. To avoid a loss of competitiveness, the global manufacturing industry would have to expand its presence in Mexico, but there is still no or almost none.

In 2018, 95.4% of small and medium enterprises in Mexico had no relationship with global value chains (CGVs).

INEGI, s.f.i.

Between 2021 and 2022, the ratio deteriorated even further: for every peso of Mexican value-added, there were 1.76 pesos of imported inputs

INEGI, n.d.h.

²¹ Brunei, Camboya, Laos, Filipinas, Tailandia, Vietnam, Singapur, Indonesia y Malasia.

1.2.5 LABOR PRODUCTIVITY: PEMEX SUBTRACTS AND, DOES AGRICULTURE ADD?

Another phenomenon observed in recent years at the global level is the loss of productivity, which largely resulted from the health crisis. In Mexico, the loss of labor productivity has been observed for a long time. In the third quarter of 2015, labor productivity per employed person reached its historical maximum, which was followed by a long period of no progress. From 2015 to the third quarter of 2023, the economy's productivity loss, based on the employed population, was -8.4% . Considering the hours worked, the loss is -7.4% in the same period (INEGI, n.d.)^{22, 23}.

The growth of the Mexican economy has been extremely slow (a variation of 9.2% between the third quarter of 2015 and the same quarter of 2023), and the growth rate of employed persons is also higher (a variation of 18.7% in the same period). However, the phenomenon is not reproduced equally at the sectoral level. As of the third quarter of 2023, productivity growth rates in the secondary and tertiary

²² The figures and variations presented in this section are Signos Vitales calculations after seasonal adjustment of the original INEGI figures using econometric methods.

²³ Considering hours worked, the historical maximum was observed in the second quarter of 2020.

sectors have been -11.8% and -9.3% concerning the third quarter of 2015, respectively. The growth of the employed population in the former was 19.4% , and in the tertiary, it grew 22.5% . Consequently, the large number of people added to already crowded labor markets accelerates the fall in productivity.

Manufacturing workers are more productive than before confinement (10.8%) but remain less productive compared to the third quarter of 2015 (-5.3%) (INEGI,



Image: "We visited the biggest computer factory in the Continent" in Monterrey, N.L., Mexico at <https://www.lanacion.com.ar/tecnologia/visitamos-fabrica-computadoras-mas-grande-del-continente-nid2302471/>

n.d.k)²⁴. However, in manufacturing, the results are heterogeneous, with four subsectors showing productivity increases (compared to the third quarter of 2015): printing and related industries (32.2%), manufacture of computer equipment (21.8%), manufacture of power generation equipment (17.9%), manufacture of machinery and equipment (12.1%), and manufacture of transport equipment (6%).

This data leads us to conclude that most of the loss of productivity in the secondary sector is due to the fall



Image: "Human capital in the border region is getting stronger due to educational exchange between the United States and Mexico" at <https://www.co-production.net/mexico-manufacturing-news/border-competitiveness-tijuana-san-diego.html>

²⁴ The highest productivity level on record in manufacturing occurred in the first quarter of 2006, concerning which there is still a considerable loss (-8.6%).

in production in the electricity and mining sectors, where CFE and Pemex are located, respectively²⁵. Both actors are critical in oil production (the most important is mining production), which is at extremely low levels and with stagnant production, and electricity generation and transmission, where CFE has the natural monopoly. In the case of Pemex, on the one hand, there is an increase in productivity in the derivatives subsector (refining). On the other hand, it tends to decline with the stagnation of oil production. The balance is negative.

As for tertiary activities, wholesale trade has contributed to the fall in productivity; the variation is -8.8% concerning the third quarter of 2015 and 5.7% concerning the pre-pandemic level, unlike service companies that increase productivity, same that has varied by 18.7% concerning the third quarter of 2015 and 20% concerning the pre-confinement level (INEGI, n.d.k). As a result of this growth, productivity in these sectors is at historical highs²⁶.

²⁵ INEGI publishes the original figures for manufacturing and construction but not for the other sectors: mining and generation, electricity transmission, water, and natural gas supply through pipelines to the final consumer.

²⁶ INEGI's figures are available since the first quarter of 2008.



Images: "Slim and CFE analyze investing in 450 km of natural gas ducts" at <https://editorial.aristeguinoticias.com/wp-content/uploads/2021/02/Gas-Natural-ductos-petr%C3%B3leo-Abasto-M%C3%A9xico-190221--scaled.jpg>. / "Production of crude oil in Mexico accumulates three-months standstill" at <https://www.bloomberglinea.com/latinoamerica/mexico/produccion-de-petroleo-crudo-en-mexico-acumula-tres-meses-de-estancamiento/>

It can also be concluded from the above that, on average, the upward variation in service productivity has been more vigorous than in the past after the great confinement²⁷. In general, all the subsectors that make up this indicator have shown considerable increases since then, although business support services (55.6%), real estate services (53.2%), mass media information (75.8%), and, to a lesser extent, temporary accommodation services (5.1%)²⁸ stand

out (INEGI, n.d.k). Also, post-confinement, labor productivity in retail trade (another sector that is part of tertiary activities) has improved considerably (a variation of 15.1% between the last quarter of 2019 and the third quarter of 2023) (INEGI, n.d.k).

Similarly, the increase in productivity in services is being driven to some extent by the labor outsourcing reform (the fall in employment is greater than the fall

²⁷ Between the third quarter of 2015 and the last quarter of 2019, the service productivity change was negative (-2.3%).

²⁸ Business support services and waste management and re-

mediation services; real estate and rental services of movable and intangible property; mass media information; temporary accommodation and food and beverage preparation services.

in sector output, -64.8%), which is why labor productivity in business support services shot up 18.5% in a single quarter (July–September 2021), and although it did not stop growing the effect of it began to dissipate in mid-2022 (INEGI, n.d.k) (Graph 7).

Unlike the economy's secondary and tertiary activity groups, primary activities considerably increase productivity based on the employed population. Between September 2015 and September 2023, the variation is 20.5%. The growth rate of the primary sector was 11% between the third quarter of 2015 and the same quarter of 2023, while the growth rate of the employed population only grew 0.9% in the period analyzed.

This last result needs to be carefully considered. It turns out that, as of the third quarter of 2023, 91.6% of the country's employed population in the primary sector (6.15 million employed) does not have access to health services; 21.3% of this population is engaged in subsistence agriculture; 21.4% of this population is 60 years of age or older, while the average for the economy is 10.9%; also, only 12.7% have completed high school or higher education, while this percentage is 43.8% for the entire employed population. As if all of the above were not enough, a

large part of these workers are located in the south of the country (43.9% of the total in the sector). The geographic characteristics are of interest since the technification of the field is not homogeneous in the country.

Paradoxically, the activities that concentrate a greater proportion of employed people with social, economic, and technological lags are some of the most productive in the economy and the country, all this without considering the effects of climate change on the Mexican countryside. Here, the economic explanation of the phenomenon lacks all logic and contrasts with the experience and knowledge accumulated over many years. There is only one explanation left: the northern and western regions drive the increase in production (32.8% of the population employed in the sector)²⁹, so much so that they boost the rise in productivity in this region even more. However, the north has been affected by the consequences of climate change, where water shortages have become a constant, and the prices of inputs, such as fertilizers, have risen due to the energy crisis.

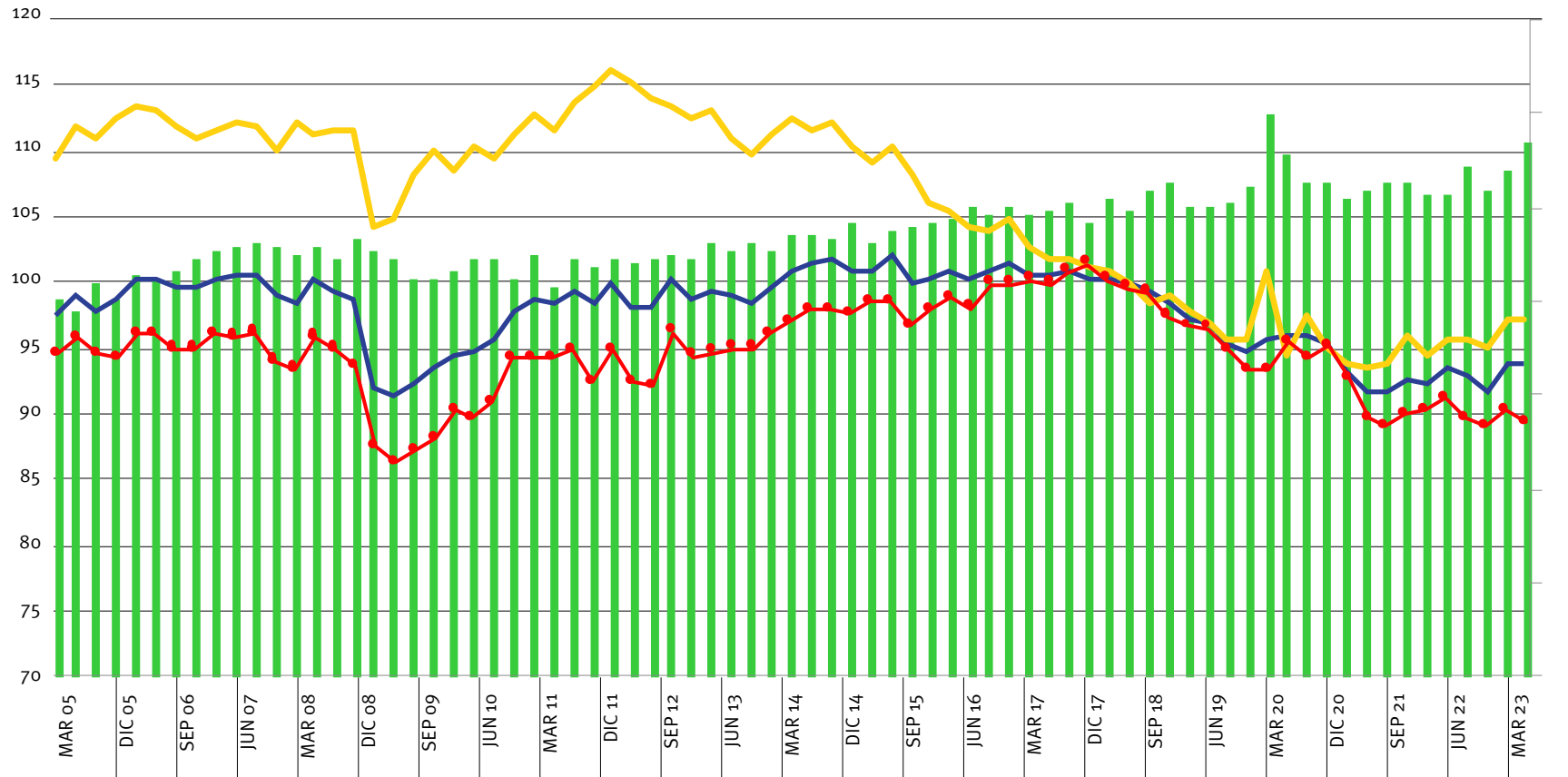
²⁹ Without considering the south and center of the country, according to Banxico's regional classification.

The northern and western regions drive the increase in production (32.8% of the population employed in the sector), so much so that they boost the rise in productivity in this region even more.

GRAPH 7. LABOR PRODUCTIVITY BY ECONOMY SECTOR BASED ON EMPLOYED POPULATION
 (2005–2023) (2018=100) SEASONALLY ADJUSTED SERIES

■ PRIMARY ACTIVITIES
 — GLOBAL ECONOMY
 — SECONDARY ACTIVITIES
 — TERCIARY ACTIVITIES

LABORAL PRODUCTIVITY
 2018=100



Source: In-house elaboration with calculations from Signos Vitales and data from INEGI (s.f.j).

1.3 Gross fixed capital formation

The recent growth of the Mexican economy is contrary to all forecasts dating back to the end of 2022, and above all, it is higher than that predicted by various international organizations and financial institutions since 2021 (after the great confinement), which have been revised upwards on several occasions. One of the indicators that should draw the most attention is Gross Fixed Capital Formation (GFCF), which can be summarized as installed (non-financial) capital. Still, up to the third quarter of 2022, the variation was -1.3% concerning the last quarter of 2018 (INEGI, n.d.l.).

The recovery in the last year is remarkable. Growth in the last year is 25.5% , and the variation between the second and third quarters of 2023 is 4.4% (INEGI, n.d.l.). In a conservative scenario (zero growth in the last quarter of 2023), at the end of 2023, the annual growth of this variable will end up being 17% . This trend has been observed since the third quarter of 2022 when the FBKF began to accelerate its growth, and the change in the trajectory was abrupt.

Given these growth rates, the level of investment observed as of the third quarter of 2023 is already high-

er than the last quarter of 2017 and the same quarter of 2018, 15.8% and 18.2% , respectively. Coupled with the growth observed in the last five years, the FBKF has once again surpassed 25 points of GDP (25.6% as of the same quarter and 24.6% between January and September 2023) and is approaching the historical maximum observed in the last quarter of 2011 of 27.3% of output. Also, the evidence indicates that the recovery has been mostly private, as has been the case since the great financial crisis of 2008–2009; as of the third quarter of 2023, participation has therefore been recharged to private investment, which contributes 88.7% (5.7 trillion pesos)³⁰ of the total FBKF (INEGI, n.d.l.). As a result, the government—at all levels—continues to lag despite the substantial capital expenditure oriented to López Obrador's emblematic works and projects.

This trajectory has closed the long-term gap rapidly, at least in recent quarters, to -0.5% in Q3 2023, following the negative streak that began in Q1 2018 (-2.3%). Prior to the pandemic (last quarter of 2019), this gap was already -13.5% and became sharper with the great confinement (-40.5%) (the most profound gap on record). Here, it should be distinguished that the private component yields a positive

³⁰ Original figures at 2018 prices.

gap (9.2%). Moreover, although public FBKF exceeded for the first time the level observed at the close of 2018 (variation of 6 mmdp or 0.9%), the lag of that sector (around -10.6%) explains the negative long-term differential. Thus, public capital expenditures could quickly return the FBKF to its long-term path.

Acquiring machinery and equipment, especially imported ones. This is not surprising since it is not recent and has been documented in *Signos Vitales*. This process has strengthened over the last three decades, at least after NAFTA and the 1994-1995 crisis, and was even more noticeable after the great financial crisis. Simultaneously, but in the opposite direction, private construction has behaved since construction has gone from 74.4% in the last quarter of 1995 (maximum historical participation) to 50.7% at the end of the third quarter of 2023. In other words, acquiring machinery and equipment constitutes 49.3% of the country's FBKF, most of which is imported.

The growth rate of both variables has been decisive in modifying the composition of the FBKF. Between 1995 and 2023, the FBKF will have grown 161.1%. Within its components, construction will have grown by approximately 81.5%, a much poorer growth than

that of the Mexican economy itself and far behind the acquisition of machinery and equipment (375.8%). Nevertheless, imported machinery and equipment will grow by 754.7% (INEGI, n.d.l).

It is estimated that the growth in the FBKF of the manufacturing sector can largely explain this trajectory. For the same years (1995-2023), the FBKF growth of manufacturing industries will be approximately 363.5% (INEGI, n.d.l). Likewise, according to *Signos Vitales* estimates, by the third quarter of 2023, the manufacturing sector made around 90.9% of machinery and equipment purchases, which also has a high incidence in capital imports (approximately 71.7% of total imports)³¹.

The Mexican economy is more dependent on manufacturing than it was three decades ago. However, in recent economic history, the capital contribution of this sector to the Mexican economy has been through imports, not through the expansion of capital through domestic goods (such as those that generate linkages within the economy) or construction, where its incidence is lower. Its contribution is nil when it comes to carrying out infrastructure works on its own. In this case, the construction sector has

³¹ In-house estimations with data from INEGI.

the most significant impact on the behavior of the FBKF in construction (Graph 8).

Despite the very abrupt drop generated by the pandemic, the disruption of different supply chains, mainly those related to semiconductors, and the subsequent energy crisis, capital imports not only quickly surpassed the pre-pandemic level at the close of 2021 but also moved above their long-term path in the first quarter of 2023. The gap concerning the pre-pandemic level was -4.4% as of the first quarter of 2019 and reached -40.4% in the second quarter of 2020³². Finally, the recovery came in the third quarter of 2023, with a positive gap of 2.1% , thanks to imports of machinery and equipment from the private sector, representing 96.7% from January to September 2023.

1.3.1 CONSTRUCTION

Unlike imported machinery and equipment, until not so long ago, the outlook and prospects for construction activity (the other component of the FBKF) were bleak. Very few economic activities did not give at least some glimpse of post-pandemic recovery, and this was the best example: at the close of 2022, the

³² In-house estimations with data from INEGI.

variation was -2.9% compared to the last quarter of 2018³³. The behavior of construction investment was very close to what analysts call an “L” pattern (a sharp drop-in activity followed by a long period of stagnation). However, as Signos Vitales has also pointed out, the fall and the punishment for the activity started before. They ended up collapsing with the great confinement (variation of -29.4% compared to the last quarter of 2018). The recovery came until the beginning of 2023, with a variation between the first and second quarters of 51.6% (INEGI, n.d.)³⁴. The expansion of both public and private sector spending explains this. The former contributed 18.2% between the first and third quarters of 2023 (114.3 billion pesos), while the private sector accounted for 81.8% of the variation, 514.9 billion pesos³⁵.

³³ Seasonally adjusted series.

³⁴ The closest precedent to this historical maximum was observed between the last quarter of 1993 and the first quarter of 1994 (quarterly variation of 34.1%).

³⁵ According to the System of National Accounts of Mexico, sources and methodologies base year 2018: for the measurement of the value of construction of the private and public sectors, information generated by the National Survey of Construction Companies (ENEC) is used, referring to the value of the production of construction companies by destination of work, identifying that of the public sector by institutional level, including that financed by state and municipal governments, thus allowing to know the total of public construction and calculate by difference the private construction.

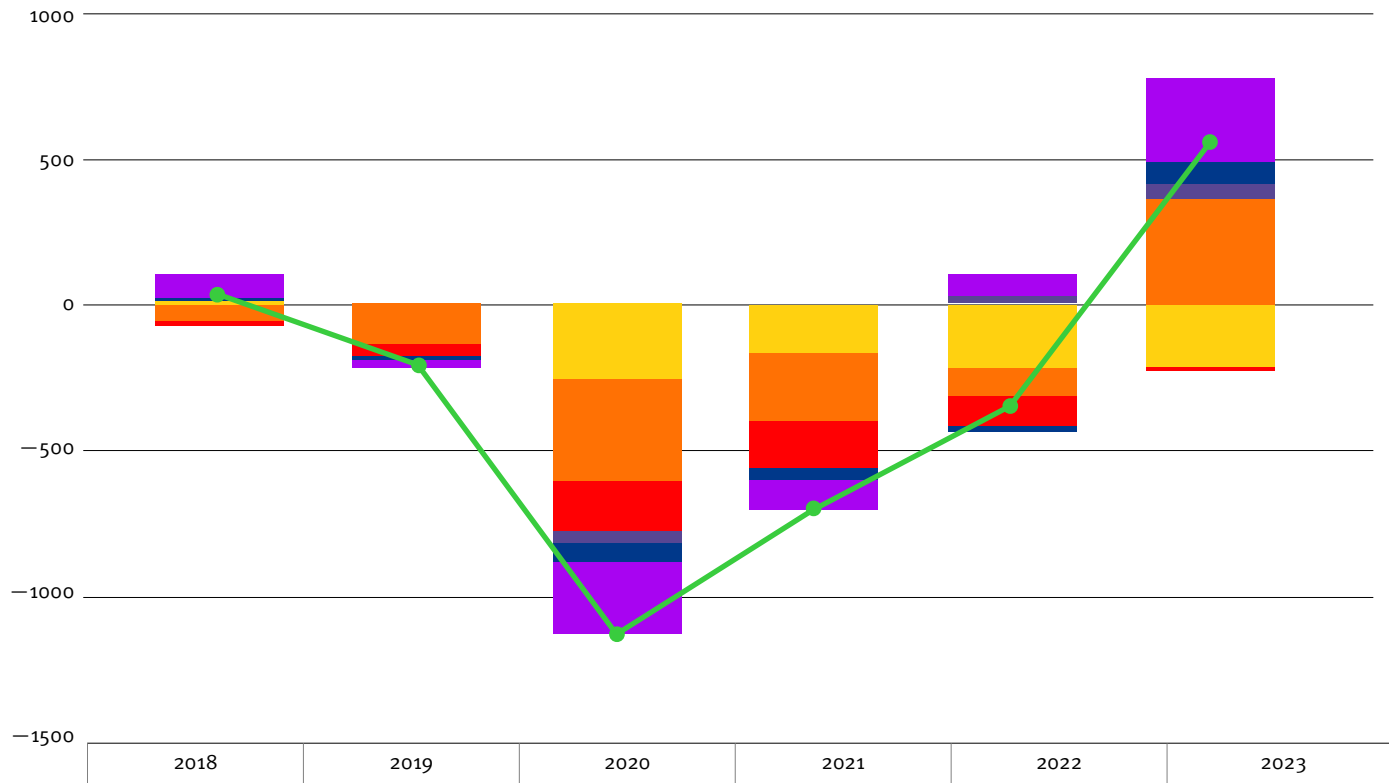
Despite the very abrupt drop generated by the pandemic, capital imports not only quickly surpassed the pre-pandemic level at the close of 2021 but also moved above their long-term path in the first quarter of 2023.

GRAPH 8. VARIATION AND CAPITAL STRUCTURE IN THE COUNTRY BY GOOD AND BUY

(CHANGE FROM 2017, BILLIONS OF PESOS OF 2018) (2018–2023*)



CHANGE COMPARED TO 2017
BILLIONS OF PESOS OF (2018)



Source: In-house elaboration with data from INEGI (s.f.c) and Banxico (s.f.b). *Accumulated January–November 2023. The new investments refer to exports of BMW and Mercedes Benz from 2018 to 2023.

This poor contribution of the public sector is explained in turn by the decline in its assets, in which Petr6leos Mexicanos (Pemex) plays a vital role since it is responsible for drilling oil and gas wells and disposing of assets. Thus, the stagnation of Pemex's exploratory activity obstructs value generation in the public sector's construction investment component. In all of 2022, the number of wells drilled in Mexico was 198, while in 2009, these wells reached 1,512 (the highest on record), a reduction of -86.9% (SIH, n.d.). Likewise, in 2022, there were 31 exploration wells, 26 of which belonged to Pemex Exploraci6n y Producci6n (PEP) (83.9% of the total). In 2004, the maximum historical number of exploration wells was observed (107), all belonging to PEP. (SIH, n.d.). It should be remembered that oil production reached its maximum in 2004 (3.38 million barrels per day) (SIH, n.d.); this was no coincidence; also, with the 2013 energy reform, private companies can participate in exploration to try to reverse the drop in production due to the reduction of large fields, which is why in 2021 private companies reached a maximum of 26 out of 63 wells explored (41.3% of the total) (SIH, n.d.). In fact, well productivity has been declining for years. In November 2023, 6,933 wells were operating, producing 1.64 million barrels of crude oil

per day (Mbd) (SIH, n.d.). In June 2009, the number of wells in operation was almost the same (6,909). However, they produced 2.52 Mbd (SIH, n.d.) (53.4% more than in 2023).

Likewise, for Pemex to operate and exploit its findings, it requires drilling equipment (capital). In March 2009, the average number of drilling rigs in operation reached a maximum of 152.1 (129.7 in development and 22.5 in exploration), and these were only 7 in September 2023 (reduction of -95.4%) (SIH, n.d.), of which 6.4 rigs belong to Pemex (the rest are privately owned)³⁶ (SIH, n.d.). In 2009, it can also be observed that the public FBKF also reached its historical maximum (1.12 billion pesos) when mining activity contributed 4.4% of the capital stock (200.1 billion pesos) (maximum historical contribution) (INEGI, n.d.n).

The Mexican state is not a large consumer of machinery and equipment. Still, its companies could make some difference when they optimize the use of their resources. With the depletion of operating wells, it is clear that it is unsustainable to maintain the same

³⁶ Total drilling rigs in development and exploration are considered; according to the National Hydrocarbons Commission (CNH), the monthly average corresponds to the number of days the rig was active divided by the number of days in the month.

The stagnation of Pemex's exploratory activity obstructs value generation in the public sector's construction investment component.

level of capital over the long term. The company's assets not only depreciate³⁷ but also add less value to the economy through their exploitation, decreased proven reserves, and made less use of their installed capacity (machinery).

On the other hand, the monopoly in oil exploitation hinders FBKF³⁸ when the State cannot invest in exploration or makes investments with a lower impact on the capital stock. Also, the company's financial problems may translate into a lack of services due to its inability to pay off its commercial debt.

When analyzing construction investment at the subsector level, it is easy to distinguish the growth of two subsectors: oil and petrochemicals and transportation and urbanization, 96.9% and 8.9% concerning the last quarter of 2018, respectively (INEGI, n.d.m). These investments have been concentrated in the first case in oil refining (reconfiguration of refineries and construction of the Dos Bocas refinery) and in the second case and in order in progress: Felipe An-

³⁷ The GDP calculation does not consider capital depreciation. However, it is crucial to consider that if this were done, the net capital of the public sector would be lower than that observed.

³⁸ With the opening of the oil sector, the difference lies, from a macroeconomic perspective, in who provides the fixed capital: the public or private sector.

geles International Airport (AIFA), Mexico–Toluca Interurban Train, Interoceanic Corridor (CI) and Mayan Train (TM). Timely data from construction companies anticipate that the inertia in public sector spending will continue until the end of 2023, and based on the 2024 Federal Expenditure Budget, it can be anticipated that it will continue for a good part of the following year.

Similarly, in 2023, after several years of neglect, two subsectors show a notorious improvement concerning the level observed at the close of 2018, as are the cases of electricity and telecommunications, and water, irrigation, and sanitation (variation of –6.8%)³⁹ but continue to lag behind (INEGI, n.d.m). Each subsector mentioned above has a local connotation, so performing a more specific analysis is appropriate.

1.3.2 STATE AND REGIONAL PERFORMANCE

On the one hand, in 2023, in the south of the country, there is still a concentration of works with a considerable budget allocation: Tulum International Airport, Tren Maya (TM), Dos Bocas Refinery (RDB), and Interoceanic Corridor (CI). Therefore, the value of construction in the entities that host these works

³⁹ Seasonally adjusted figures.

(Campeche, Chiapas, Oaxaca, Quintana Roo, Tabasco, Veracruz, and Yucatan) accumulates 60.2% of the total amount spent by the public sector (138.1 billion pesos). If Hidalgo and San Luis Potosí are added to the above seven entities, the concentration of resources reaches 68.4% (INEGI, n.d.m). The public sector has a 79.9% weight in the construction activity of these nine entities. Nationally, this percentage is 42.7% (229.3 billion pesos) (INEGI, n.d.m), reaching a maximum participation this year.

On the other hand, it should be noted that private investment in these nine entities continues to be poor (between January and October 2023, it barely contributes 20.1% on average), and indicates that, if at this time, public works were to stop completely, the investment aggregate would collapse. The private sector's contribution would return to its natural level, that is, a contribution close to the average (57.3%), so it should not be interpreted as attracting private investment (INEGI, n.d.m). The recent experience observed in Tabasco and the State of Mexico is a sample. Infrastructure investment remained on the rise only during the time that the RDB and AIFA were being implemented. For example, as of October 2023, the State of Mexico is already -66.6% below the level observed in April 2020, when it reached the highest activity level on

record. The same is happening in Tabasco. While the budget allocated to the RDB is decreasing, construction activity is declining, with a notable emphasis on the oil and petrochemical subsector.

There is also a concentration of private sector investment in construction from confinement. Only five entities account for close to 37% of the reactivation in overall construction activity from February 2020 to October 2023 (in order of importance): Baja California, Chihuahua, Jalisco, Sonora, and Querétaro⁴⁰. This is where the reactivation of construction is concentrated, where both housing and industrial buildings are located.

Contrary to what is happening in these entities, we observe that the fall in investment has been consistent or has not had a full recovery (by degree of loss) in the states of Mexico, Tamaulipas, Mexico City, Morelos, Guanajuato and Puebla (INEGI, n.d.m). Although it is impossible to anticipate that there will be a reallocation of capital to the interior of the country, we know that given these entities' contribution to economic activity, this lag will continue to harm the

⁴⁰ The recovery of these entities (with preponderantly private capital) and those where recovery depends on the public sector account for more than 85% of recent investment growth.

If at this time, public works were to stop completely, the investment aggregate would collapse. The private sector's contribution would return to its natural level.

performance of the entire economy. It is also possible to know that the growth of fixed capital, except for Querétaro, is not observed in the country's center.

The public sector is not the only actor in the economy that is mired in a crisis that has proven to be too prolonged. The only construction component that continues to lag behind the last quarter of 2018 is building (−4.9%) and has not yet recovered its pre-pandemic level (−0.8% compared to the last quarter of 2019) (INEGI, n.d.). This crisis resulted from the prolonged slump in housing construction at the national level (−16.1% concerning the historical maximum of the second quarter of 2018).

Despite this, in the first quarter of 2023, private construction investment vigorously began recovering. It increased by 8.4% over the last quarter of 2018 and, by the second quarter, reached 25.2% higher than in 2018 (INEGI, n.d.s). With this last record of 2023, and as with the imported machinery and equipment component, private construction is above the long-term trajectory by approximately 16.6%. However, the bias at the state level is very high, so it is not possible to generalize even at the regional level.

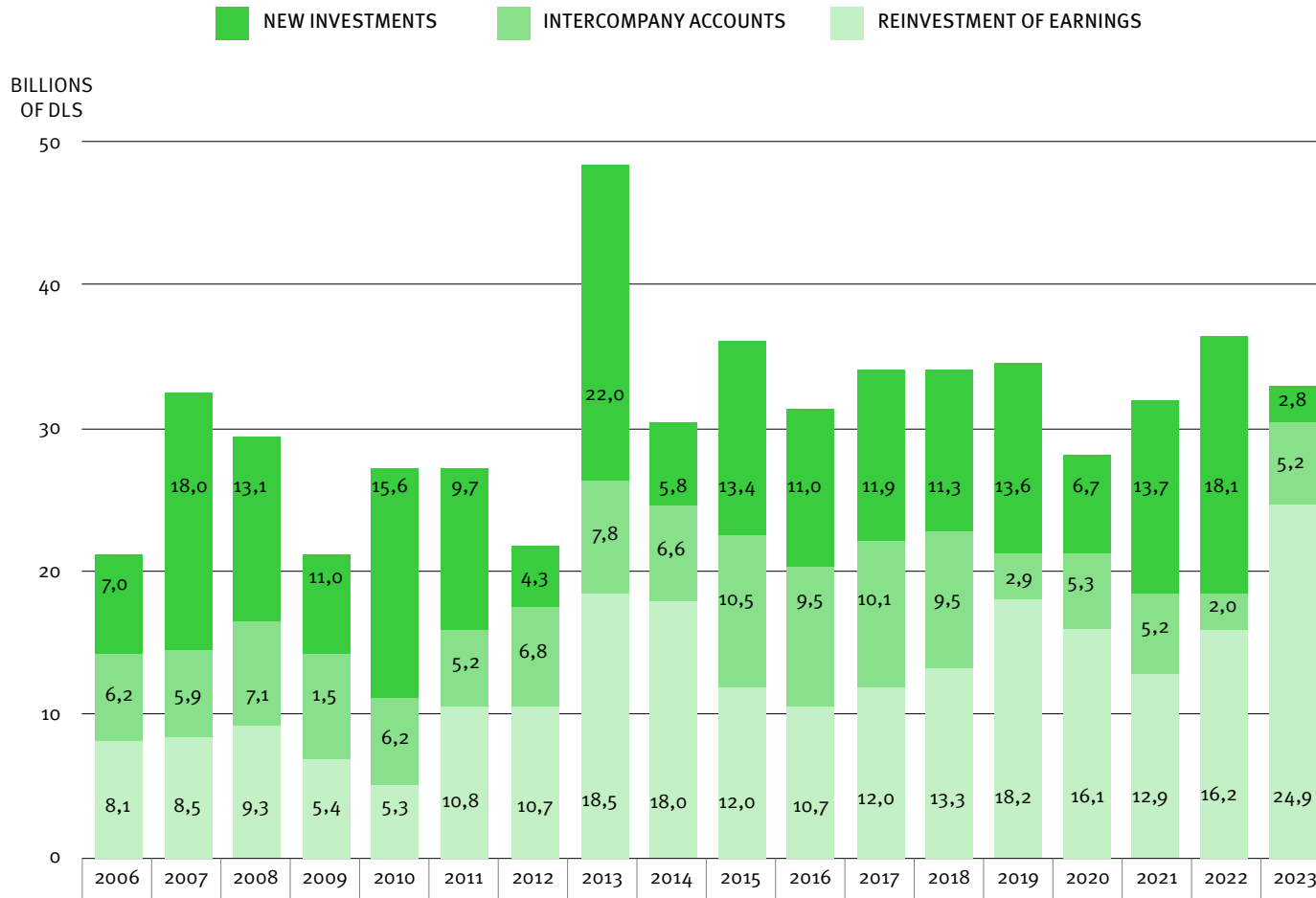
1.3.3 DIRECT FOREIGN INVESTMENT

In 2023, IED (Direct Foreign Investment for its acronym in Spanish) is going through a very good moment, at least apparently when looking at absolute values. Cumulative IED between the first quarter of 2019 and the third quarter of 2023 is 163.9 billion dollars, of which 88.3 billion dollars (53.9%) corresponds to reinvestment of profits. In 2023, 75.6% (24.9 billion dollars) of IED was essentially due to reinvestment of profits, the highest amount and proportion since records have been kept. This means that these are the same companies that have already been installed in Mexico, which shows positive prospects for the future, but not new companies wishing to set up in Mexico. For example, after the energy reform, 22 billion dollars of new investments were attracted in 2013, the highest on record (SE, 2023). On the other hand, between 2006 (the year since records began) and 2022, the average reinvestment was 39.6% of total IED (SE, 2023) (Graph 9).

Thus, only 8.5% (2.8 billion dollars) of the IED captured in 2023 corresponds to new investments (SE, 2023), which are concentrated in seven states (89.4% of the total): Baja California Sur (474.3 million dollars), Mexico City (548.5 million dollars), Coahuila

In 2023, 75.6% (24.9 billion dollars) of IED was essentially due to reinvestment of profits, the highest amount and proportion since records have been kept. This means that these are the same companies that have already been installed in Mexico.

GRAPH 9. DIRECT FOREIGN INVESTMENT (BILLIONS OF DOLLARS)



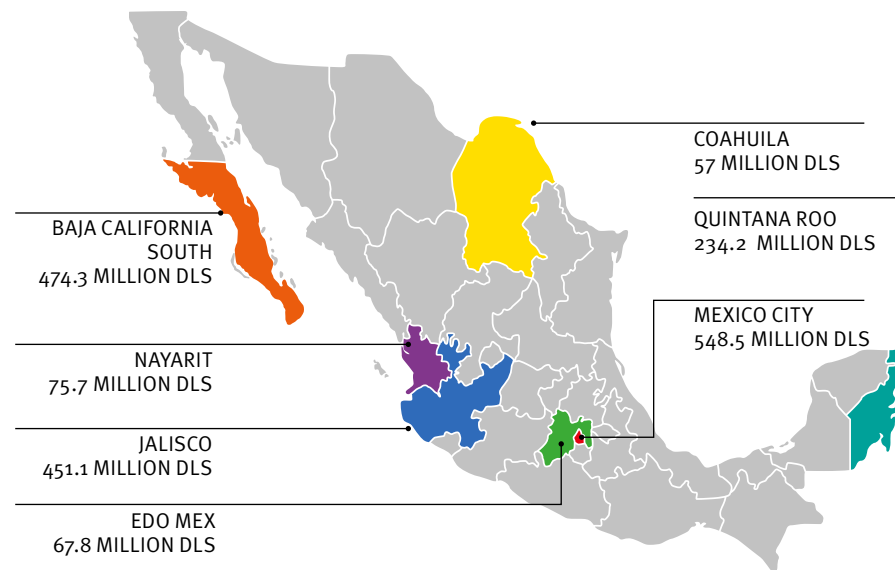
Source: In-house elaboration with information from INEGI (s.f.c) and Banxico (s.f.b). *Accumulated January–November 2023. New investments refer to exports of BMW and Mercedes Benz from 2018 to 2023.

(57 million dollars), Edo. Mex. (67.8 million dollars), Jalisco (451.1 million dollars), Nayarit (75.7 million dollars), and Quintana Roo (234.2 million dollars) (SE, 2023). Except for Nayarit, the rest of the states are part of a group of 11 states that accumulate 70.3% of the total stock of new investments registered over the years⁴¹ (SE, 2023).

IED in the south is advancing at a slow pace. In fact, the energy counter-reform hit this region by wasting its potential to generate clean energy and seeking greater participation from the Federal Electricity Commission (CFE) in electricity generation. Between 2006 and 2017, Oaxaca's share of total new investments was 1.4%; since 2017 and so far in 2023, this entity has only managed to capture 0.4% of these same investments (SE, 2023). The drop in foreign investment in said entity is due to the reduction of IED

⁴¹ Since the second quarter of 2023, Mexico has received a total of 208.5 billion dollars in new investments, and 11 entities account for 70.3% of the total: Baja California (7.5 billion dollars), Baja California Sur (8.1 billion dollars), Mexico City (45.5 billion dollars), Coahuila (8.3 billion dollars), Edo. 1 billion dollars), Mexico City (45.5 billion dollars), Coahuila (8.3 billion dollars), Mexico State (17.7 billion dollars), Guanajuato (10.1 billion dollars), Jalisco (11.9 billion dollars), Nuevo Leon (17.9 billion dollars), Quintana Roo (6.4 billion dollars), San Luis Potosi (6.5 billion dollars) and Veracruz (6.8 billion dollars).

ONLY 8.5% (2.8 BILLION DOLLARS) OF THE IED CAPTURED IN 2023 CORRESPONDS TO NEW INVESTMENTS, CONCENTRATED IN SEVEN STATES (89.4% OF THE TOTAL)



in electric power generation, which is zero dollars in 2023 (SE, 2023), despite its enormous wind potential.

The portfolio of our main investors has also changed after the technological trade war between the United States and China. Between 2006 and 2017, 11 countries in the world contributed close to 100% of the new investments captured by Mexico; between 2017 and mid-2023, five of these 11 countries have reduced

their share considerably: Argentina, Belgium, Israel, the Netherlands, and the Republic of Korea. Others occupied the position occupied by these countries in that decade between 2017 and 2023: Australia, Brazil, China, France, and Italy.

Together, the contribution of these last five countries was 12.3% of new investments since the beginning of the trade war, when before this war, they contributed 5% of the total (SE, 2023). This increase in participation is mainly due to the growth of new investments from Australia and China, 399.1% and 417.7% (SE, 2023), respectively. The first of these countries invested, on average, \$80.5 mdd in the pre-war period, and between 2017 and 2023, the average investment was \$401.6 mdd per year. China, on the other hand, has gone from investing an average of 31 million dollars per year (pre-war) to 160.5 million dollars (2017–2023) (growth of 417.7%) (SE, 2023).

The changes in the composition by country of origin of IED also involve modifying the participation of the six countries that have remained with high levels of investment in both periods. In order of importance, the United States, Spain, Canada, Japan, Germany, and the United Kingdom went from contributing 67.7% to 80.6% of new investments in the periods

mentioned above (SE, 2023). The above implies that, between 2017 and 2023, the 11 largest investors in our country contributed 92.9% of new investments. On the other hand, although the Chinese IED has grown considerably in the war years, its contribution is still very modest (0.4% of the stock and 5% only considering new investments) (SE, 2023).

At the sectoral level, no significant changes are observed. IEDs in manufacturing remain the most important (45.5% of total IEDs captured between 2017 and 2023). However, the contribution of manufacturing investment has decreased by 6.3% compared to the pre-war period, and financial and insurance



Image: Logistics and transportation at <https://paginaswebenguadalajaa.com.mx/mejores-centros-de-logistica-y-transporte-en-mexico/>

Although the Chinese IED has grown considerably in the war years, its contribution is still very modest (0.4% of the stock and 5% only considering new investments)

SE, 2023.

services have increased their share from 11.3% to 16.1% of total IED (SE, 2023). So, we have wholesale trade, transportation, post and storage, temporary accommodation, and food and beverage preparation services, but to a lesser extent. Their dynamic performance is due more to changing consumer behavior since the Covid-19 pandemic than to the effects of U.S.–China trade restrictions. The great confinement opened the way to the intensive use of technological platforms for digital services and the expansion of trade in goods or services, which require the use of other services, mainly logistics (transportation and storage) and digital means of payment.

The great confinement opened the way to the intensive use of technological platforms for digital services and the expansion of trade in goods or services

1.4 Private Consumption

As of the third quarter of 2023, private consumption has exceeded by 7.6% (1.24 bpd)⁴² (INEGI, n.d.s), the level observed in the last quarter of 2018. The figure may seem encouraging, but it still falls short of its long-term growth path. As of the same quarter of 2023, the gap of private consumption with its potential level ranges between -2.2% and -2.5% (between -394.4 billion pesos and -444.8 billion pesos annualized) (INEGI, n.d.s)⁴³. If this trend continues, consumption will likely touch its long-term path and may even be above it sometime in 2024⁴⁴. Given that the average observed consumption growth between 1993 and 2017 was just 2.6% (INEGI, n.d.s), reflecting the poor growth of the Mexican economy, reaching the long-term trend does not require consumption to have great dynamism.

The post-pandemic consumption recovery has not been homogeneous. Domestic goods have barely re-

⁴² Seasonally adjusted figures.

⁴³ This difference in estimates lies in the base year of comparison, either the last quarter of 2017 or the last quarter of 2018 (being a bit wider with respect to 2017).

⁴⁴ The long-term gap is likely to close in the first half of 2024 if consumption is boosted by the expansion of government spending (direct transfers), as happened in 1994, 2000 and 2006.

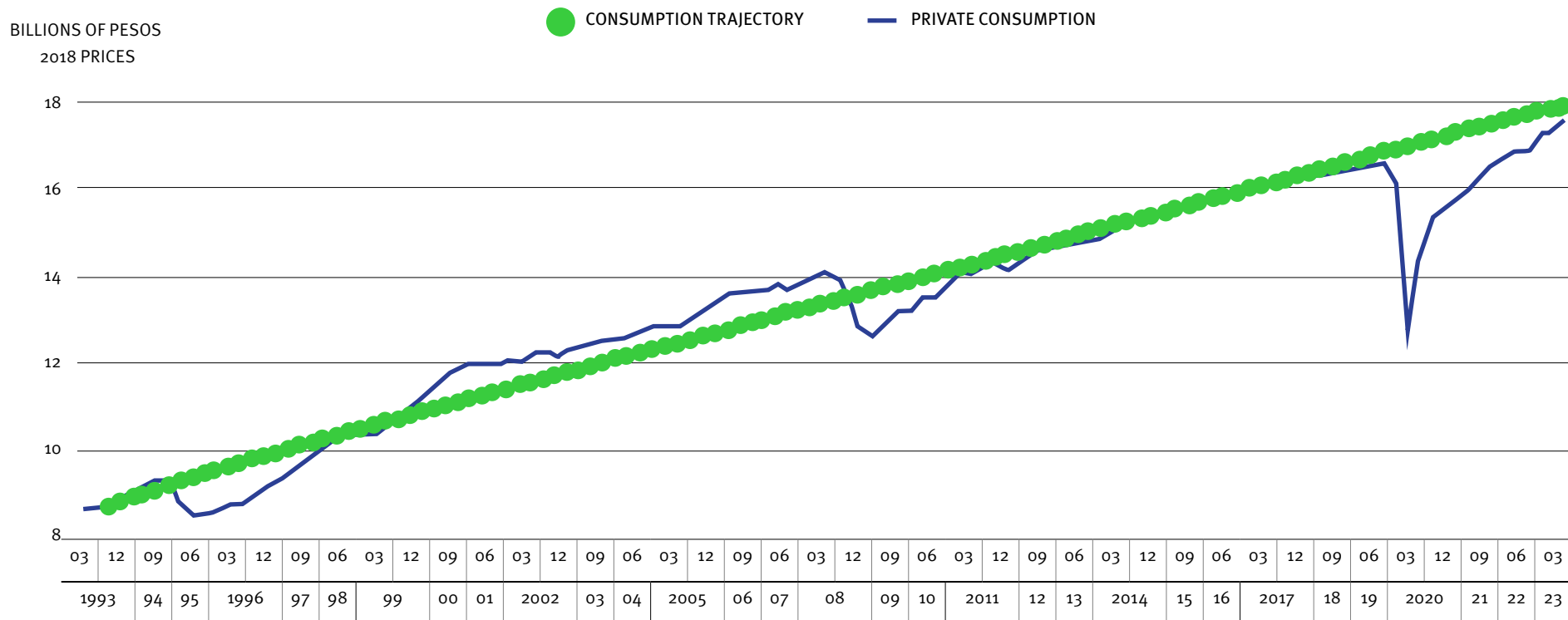
bounded (growth of 2.9% compared to the last quarter of 2017)⁴⁵, and even domestic semi-durable goods lagged behind in December of the same year (-0.1%). Furthermore, within domestic goods, both durable and non-durable goods show a slight improvement

⁴⁵ Seasonally adjusted figures.

(8.1% and 3.5% in the same period, respectively)⁴⁶. However, durables only represent 4.5% of private consumption. So far, we should not be surprised; most of the average expenditure of Mexican families goes to food, beverages, and tobacco (37.7% of total current monetary expenditure) (INEGI, 2023) (Graph 10).

⁴⁶ Seasonally adjusted figures.

GRAPH 10. PRIVATE CONSUMPTION CONCERNING ITS LONG-TERM TREND
(TRILLIONS OF PESOS)



Source: Calculations from Signos Vitales with information from INEGI (s.f.s).

Unlike goods, services have been a bit more dynamic. The great bull run collapsed the consumption of domestic services (–27% annual rate in the second quarter of 2020)⁴⁷ and is now better positioned (8.8% above the last quarter of 2017). However, they still present a gap of –1.7% concerning their long-term trajectory. This improvement in services accounts for 37.8% of the total recovery in private consumption over the last five years, but the gap with the long-term trajectory tells us that it could contribute something more. This recovery is of vital importance as it represents 41.2% of the total aggregate (7.26 trillion pesos) as of the second quarter of 2023⁴⁸ (INEGI, n.d.s). The other part of the consumption recovery and, therefore, the most robust (57.4% of total growth between December 2017 and June 2023) (729.1 billion pesos) is composed of imported consumer goods (growth of 719.1 billion pesos). In other words, the consumption of imported goods (durable, semi-durable, and non-durable) now plays a more relevant role in Mexico's consumption.

⁴⁷ Seasonally adjusted figures.

⁴⁸ As of the last quarter of 2017, it was equivalent to 41.1% of private consumption. Between 1993 and the second quarter of 2023, the share of services consumption has remained between 37.5% and 44.7% of the aggregate consumption.

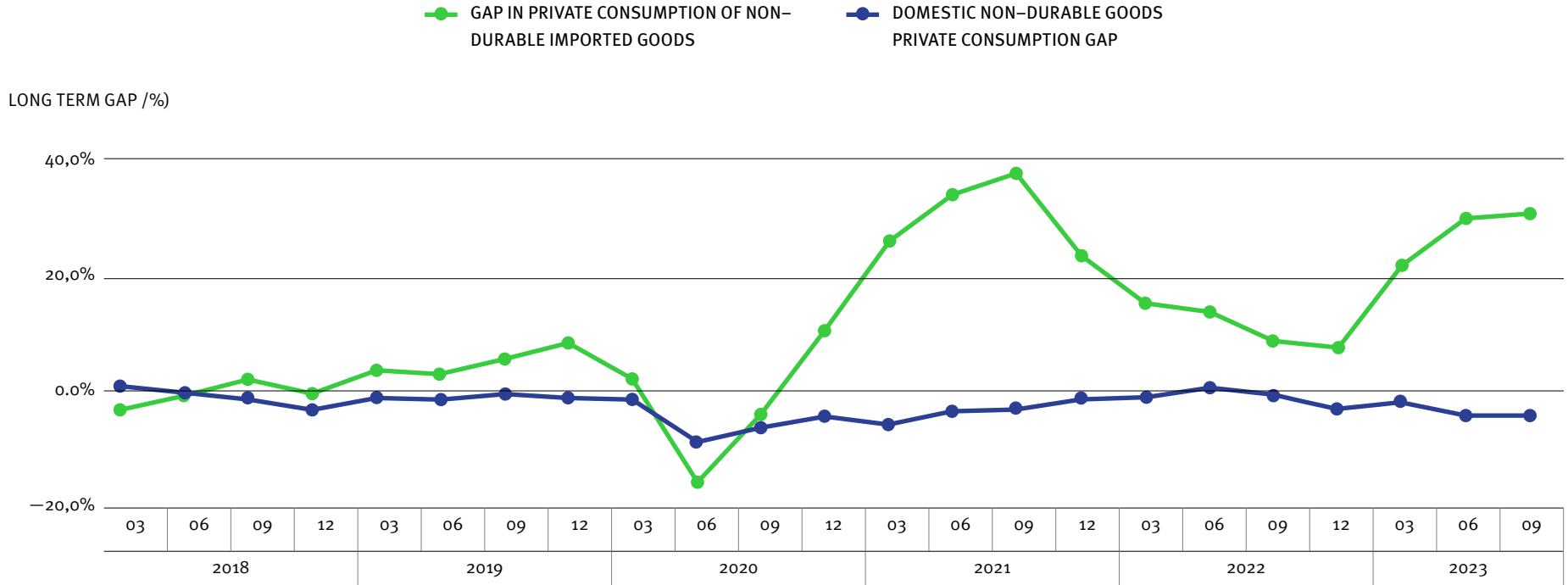
Until before the entry into force of NAFTA (North American Free Trade Agreement), now USMCA, these only accounted for 4.2% of total consumption; by the end of 2017, they represented 10.3%, and by the second quarter of 2023, their weight is already 14.1% of the goods consumed in Mexico. The variation between the last quarter of 2017 and the third quarter of 2023 is 59% for all imported goods and 87% for those imported non-durable goods. The difference in the growth of imported non-durable goods with the same type of domestic goods is abysmal (Graph 11).

If the trend observed up to the third quarter of 2023 continues, by the end of 2030, 24.7% of non-durable goods consumption will be imported (currently 18.5%) (INEGI, n.d.s). If this is the case, dependence on foreign food will continue to increase, given the inability of our economy to increase domestic production, even though the primary sector is apparently increasing its productivity.

The most dynamic sectors in 2018–2023 were the manufacturing industry (71.5%), mass media information (12.1%), and real estate and rental services of movable and intangible goods (10.4%) (INEGI, n.d.n). Of the above three, the mass media information sector will have the highest accumulated variation

The consumption of imported goods (durable, semi-durable, and non-durable) now plays a more relevant role in Mexico's consumption.

GRAPH 11. NON-DURABLE CONSUMER GOODS CONCERNING THEIR LONG-TERM TREND (%)



Source: Calculus from Signos Vitales with information from INEGI.

(30.9%) (INEGI, n.d.n) in these same years. The sectors that contributed to the losses in the last five years are other services except for governmental activities (15.7%), generation, transmission, distribution, and commercialization of electric energy (15.7%), generation, transmission, distribution and commercialization of electric energy (15.7%), and other services

(15.7%)⁴⁹ (14.7%) and business support services and waste management, and remediation services (10.8%) (INEGI, n.d.n). The latter includes statistics on companies engaged in labor subcontracting.

⁴⁹ Generation, transmission, distribution, and commercialization of electric power, water supply, and natural gas through pipelines to final consumers.

1.5 Comfort conditions in the Mexican Economy

Our estimates, like the conclusions presented in this section, are broadly in line with the results presented by the central bank (Banxico) in its latest quarterly report. As of the second quarter of 2023, the point estimate of the output gap remains at a level close to potential in either of its two measurements: at the end of June 2023, the quarterly GDP gap is 0.88% and 0.8% considering the IGAE (Indicador Global de la Actividad Económica for its acronym in Spanish) as of June 2023. Excluding business support services activities, the most affected by the labor outsourcing reform, the gap is 2.4% considering quarterly GDP and 2.5% based on the IGAE (Banxico, 2023).

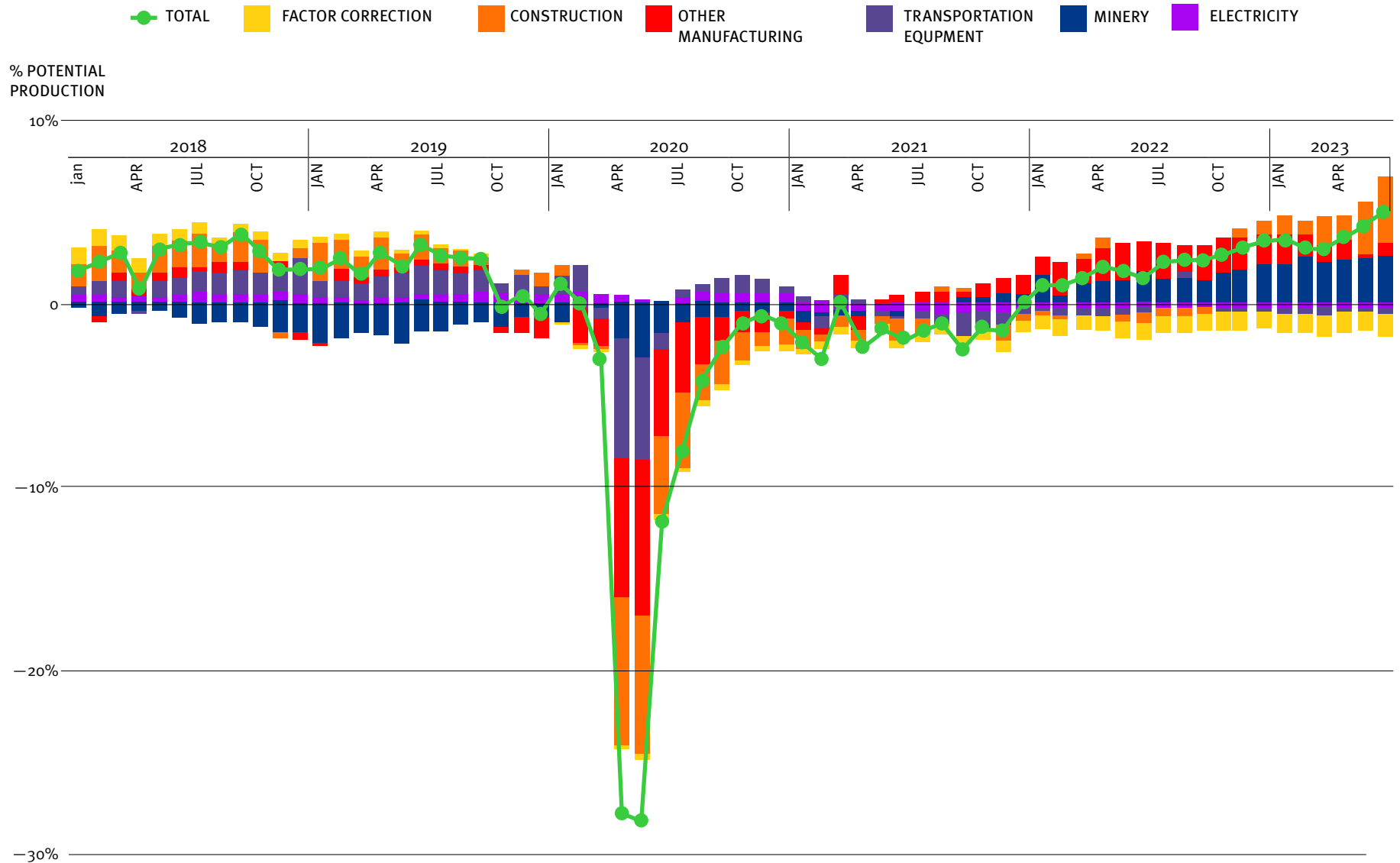
When disaggregated by major sectors of the economy, both the primary and tertiary sectors present a negative gap, although the former has behaved erratically and at levels close to zero. The tertiary sector remains slightly below its potential level (-0.64%), but to a large extent, this gap is explained by the -1.72% departure from the potential of professional and business support services. Excluding these services, tertiary activities are 1.54% above their potential level. As of June 2023, three activities are

inducing this behavior: leisure and accommodation (1.08%), transportation (0.41%), and trade (0.55%). For the three activities above, they have been (simultaneously) in positive territory since February 2022 (Banxico, 2023).

Unlike the previous sectors, by the second quarter of 2023, the secondary sector was 4.91% above its potential level (Banxico, 2023). This sector puts upward pressure on growth, so much so that GDP as a whole is above its potential level. From Banxico's estimates, it can also be concluded that, within secondary activities, manufacturing (other than transportation equipment), construction, and mining are pushing the sector above its potential level to levels not seen, at least since Banxico has made such information public. The first of these has moderated its expansion but has remained in positive territory since May 2021 (0.79% in June 2023); in construction, the aggressiveness of federal spending to conclude emblematic works (3.64% in the same month of 2023) has a lot to do with it. However, mining (which includes oil activities) has not been affected by Pemex's poor results and exceeds its potential level by 2.41% (Banxico, 2023) (Graph 12).

As in June 2023, the quarterly GDP gap is 0.88% and 0.8% considering the IGAE (Indicador Global de la Actividad Económica for its acronym in Spanish). When excluding business support, the most affected by the labor outsourcing reform, the gap is 2.4% considering quarterly GDP and 2.5% based on the IGAE Banxico, 2023.

GRAPH 12. CONTRIBUTION OF SECONDARY ACTIVITIES TO THE AGGREGATE SLACK
(SEASONALLY ADJUSTED FIGURES)



Source: Banxico (2023).

When reviewing previous Banxico reports⁵⁰, it used to exclude oil activities from its aggregate slack analysis (at least it did so until the first quarter of 2021) precisely because it biased downward the utilization of factors of production of the entire Mexican economy, giving an incorrect perception of the behavior of aggregate supply. We are certain that if Banxico were to replicate the same exercise, the hypothetical result for mining (without Pemex) would be higher than 2.41%. On the other hand, as of June 2023, other secondary activities such as transportation equipment and electricity remain below their potential level, at least since the beginning of 2021, -0.25% and -0.39% (Banxico, 2023), respectively.

Banxico argues in its latest report, and since the second quarter of 2022, that potential output is an unobservable variable, so its statistical estimate is subject to uncertainty, which has been exceptionally high after the pandemic shock (Banxico, 2023). This is true. However, it should be noted that the trajectory of secondary sector GDP may tend to overheat and generate inflationary pressures. Banxico appears to be cautious, and rightly so, but it is very likely that it is

not confident in the observed bonanza either. It does not seem feasible to maintain the level of spending of the Lopez Obrador administration at the same pace until after 2025 without solid fiscal adjustments.



Image: Bank of Mexico in Mexico City at <https://www.infobae.com/america/mexico/2021/02/02/reforma-a-banxico-no-dejara-beneficios-pero-si-un-alto-riesgo-camara-de-comercio-internacional/>

⁵⁰ For other reports see the following link: <https://www.banxico.org.mx/publicaciones-y-prensa/informes-trimestrales/informes-trimestrales-precios.html>

1.6 Labor market structure and business creation

Between December 2017 and October 2023, formal jobs have grown 13% (2.55 million), while in the processing industry, the increase has been 14.4% (759.3 thousand)⁵¹, which constitutes 29.8% of the formal jobs created in the country (IMSS, 2024). These jobs have grown considerably in those companies with more than one thousand workers (variation of 28.7% in the same years). In contrast, smaller companies participate to a lesser extent in this growth. This phenomenon is not new. At least since the recovery from the great financial crisis of 2008–2009, larger companies began to play a more prominent role in creating formal employment in the industry.

In December 2008, companies with between 51 and 250 jobs accounted for 22.6% of formal jobs in the industry; companies with more than 1,000 jobs accounted for 25.5% (IMSS, 2024). To date, the former reduced their share to 18.2%, and the latter created 40.5% of jobs. Between December 2017 and October 2023, both types of companies accumulate 79.5% of job creation in the industry (694.7 thousand) (IMSS, 2024). In turn, ten states account for 82.9% of this

⁵¹ Seasonally adjusted figures.

variation: Baja California (10.2%), Chihuahua (11.9%), Coahuila (9%), Guanajuato (6.9%), Jalisco (8.8%), Mexico State (7.7%), Nuevo León (15.3%), Querétaro (4.8%), San Luis Potosí (4.7%) and Yucatán (3.6%).

Despite the employment growth of larger firms, it is off its long-term growth path at –6.5% (–167.5 thousand jobs) as of October 2023 (IMSS, 2024). Since August 2019, the long-term gap has remained negative. Like many other economic variables, the decline came before the Covid–19 pandemic. The growth rate observed since June 2020, when the gap reached –11.6%, is not high enough to return to its long-term level. Discounting the inertia of employment growth, we know that the observed growth is lower than expected.

With the information analyzed, it is possible to know that we have not even reached the long-term trajectory. Nevertheless, if we were on the verge of an employment shock caused by an expansion of labor demand, employer registrations (without considering re-entries) would provide extremely valuable information. At Signos Vitales Mexico (SVM), we requested information from the Mexican Social Security Institute (IMSS) on the creation of companies by payroll size (employer registrations, without con-

sidering re-entries)^{52 53}, according to the economic sector and delegation of assignment. Although said institute denied the existence of such information⁵⁴, SVM filed a complaint before the National Institute of Access to Information (INAI) and obtained a favorable response for the first and only time (given that said institute does not periodically publish the requested information).

This indicator is extremely timely and accurate. It would be difficult for a company of this size to be overlooked by our country's tax and social security authorities, whether it is national or foreign capital. As of the third quarter of 2023, there were 58.5 million employed people, of which 22.67 million have access to health institutions (38.7%) (INEGI, n.d.g); as of the same quarter, in medium and large companies and government, there are 13.27 million employed people with a degree of access to health institutions that is much higher than the rest of the labor mar-

⁵² Disaggregating the information on employer registrations (new entries and re-entries) would also make it possible to know the impact of the labor subcontracting reform and not overestimate other phenomena or underestimate the effects of this reform.

⁵³ Request with folio number 330018023032381.

⁵⁴ The IMSS collects information on employer registrations, cancellations, and reinstatements, as well as employer registration by company size and delegation.

ket (91.9%) (INEGI, n.d.g)⁵⁵. If the -incomplete- expansion of labor demand is due to new companies (employers with new capital), the indicator would express it clearly and very precisely.

The data obtained through the RRA 15655/23 appeal to the IMSS are discouraging. At the end of 2023, there were 11 large employer registrations (greater than 500 workers) and eight cancellations. Hence, the net variation is of only three large companies at the end of 2023; two belong to the transformation industry. The state of Sonora benefited the most from three new additions of large companies. In other entities, mainly in the north, only one large company was opened (without observing any deregistrations): Baja California Sur, Coahuila, Guerrero, Jalisco, Nayarit, and Nuevo León. The most crucial entity in terms of economic activity, Mexico City, remained unchanged. Before the conflict, the highest aggregation on record can be observed with the installation of nine large companies at the end of 2014, a year in which the economy grew by 2.5%.

⁵⁵ This does not necessarily imply that the remaining 8.1% of workers work for an informal company; most likely they work under another flexible labor scheme, such as fees or subcontracting.

At the end of 2023, there were 11 large employer registrations, greater than 500 workers, and eight cancellations. Hence, the net variation is of only three large companies at the end of 2023; two belong to the transformation industry.

In addition to the IMSS, which has valuable information on labor–management relations, the Ministry of Economy (SE) also collects useful information related to the opening of companies. The first step to opening a company in Mexico, with the characteristics of the companies mentioned above, is the request for a company name or corporate name. Based on the response to the request for information 330025923001882 from the SE, we know that in 2017, 587.7 thousand requests for company name or corporate name were made, of which 178.9 thousand were authorized. In turn, of the latter, only 87.9 thousand gave notice of using the authorized names. That is to say, only 49.1% of the authorized ones.

We know then that opening a company in Mexico was already difficult, but in 2023, it was even more complicated, as the opening success rate decreased to 33.8%. Between January and November 2023, the second highest number of applications for company names (606.9 thousand applications) since the SE was registered (2012) was filed. However, 232.7 thousand have been authorized, and only 78.6 thousand have given notice of use. Even the number of successful applications was lower in absolute terms by –9.3 thousand companies.

Conclusions

The Mexican economy’s production exceeds its potential level by almost 0.9% and exceeds historical levels. This gap is even larger, excluding Pemex and the effects of the labor outsourcing reform. The evidence suggests that the economy may be overheated, even though private consumption is off its long–term trajectory between –2.5 and –2.2%. Several markets, such as food and industrial inputs, are subject to strong imbalances. However, these internal imbalances are being offset by growing and persistent external imbalances, mainly with Asia (cumulative balance between January and November 2023 of –179.9 billion dollars). By 2024, a budget deficit (revenues minus expenditures) of 4.9% of GDP is expected. Considering the debt of the entire State, it is estimated to reach 5.4% of GDP, an extremely high amount.

On the other hand, a market as sensitive as the food market is being covered with growing deficits in South America (–8.1 billion dollars for the same months) despite the very strong and unusual increase in labor productivity in the Mexican primary sector (variation of 20.5% between September 2015 and September 2023). Also, in the last five years, a reduction in in-

We know that opening a company in Mexico was already difficult, but in 2023, it was even more complicated, as the opening success rate decreased to 33.8%.

dustrial activity has been observed in a large number of branches of the economy, which the growth of exports has accompanied without an increase in the added value of such manufactures.

There is no evidence to suggest that a greater number of (new) companies are being added to the Mexican economy—quite the contrary. IMSS data corroborate the fact that the installation of large companies comes in trickles (just three by the end of 2023), mainly in the north of Mexico, while the probability of successfully opening a formal business has dropped considerably in the last five years.

Asian investments are so far negligible, and, unsurprisingly, they are on an upward trend. However, their presence is noticeable in the growth of Mexican exports, which depend more on imported inputs from this region. International experience suggests lengthening global value chains and using economies such as Mexico to connect Asia with other markets, mainly the US.



Image: "Tesla will build a new factory in Monterrey" at <https://expansion.mx/empresas/2023/02/28/planta-tesla-nuevo-leon-mexico>

II. OBSTACLES AND RESTRICTIONS FOR COMPANIES



II. OBSTACLES AND RESTRICTIONS FOR COMPANIES

Introduction

According to official statistics, the Mexican economy is growing fast. If it continues at this pace, it could overheat the economy as a whole. However, some specific industries must already be under great stress, and it would therefore be important to avoid the formation of bottlenecks that would hinder such growth. The economy has resorted to imports, mainly energy imports, where natural gas plays a fundamental role in alleviating the pressure. Our dependence on natural gas is enormous, given our weak domestic production and the concentration of our suppliers. The United States, our leading suppli-

er, has expanded its supply and is the cheapest supplier. With the war in Ukraine, its main destination is now Europe, the main consumer.

Given the growing risks in Mexico, with only two days of natural gas storage, nor having expanded the distribution network to facilitate the importation of gas from other suppliers, there is no policy in place to meet this urgent demand, exposing Mexico to the ups and downs of the international market and losing competitiveness. The issue is relevant for the electricity market since nearly 60% of electricity is generated from gas, and this dependence will likely grow to 70%. At the same time, the National

Interconnected System faces a deficit of transmission lines (where CFE has a natural monopoly). It is estimated that 800 kilometers per year in transmission lines should be installed for each percentage point of GDP growth, while the accumulated deficit between 2018 and 2022 is 4,370 kilometers (ICC Mexico, 2023). It is in this sense that energy security needs to be improved.

Also, more economic activity is taking place in less business-friendly conditions. Some risks have increased. According to Banxico, in May 2018, 61.4% of GDP was produced in some municipalities that were not compromised by drought, and by May 2021, the proportion of GDP not compromised decreased to 24.3%. Meanwhile, organized crime is permeating economic activity in more corners of the country with the disappearance of Fortaseg (Subsidy for the Strengthening of Public Security Performance), which served the 300 most violent municipalities in the country where 90% of high-impact crimes occurred, and the continued weakening of local police forces.

We have seen that Mexico is becoming a communication channel, and not because the Isthmus of Tehuantepec is as functional as the Panama Canal, but because the transit of goods exceeds domestic de-

mand and the excesses of foreign trade cover the inability of Mexican industry and the Mexican countryside, with due exceptions, to meet the opportunities. In addition to the above, Mexico has accumulated social, economic, energy, environmental, and public safety backlogs, where the federal government has been a critical factor. Its attention is essential to attract investment in the short and long term. In any case, and regardless of the media spectacle, the lengthening of global value chains will end at some point, and Mexico could capitalize on this situation in the best possible way.

Mexico is becoming a communication channel because the transit of goods exceeds domestic demand and the excesses of foreign trade cover the inability of Mexican industry and the Mexican countryside, with due exceptions, to meet the opportunities.

Natural gas storage a pending issue

Mexico is highly dependent on natural gas from the United States. In 2022, 68.6% of Mexico's natural gas supply was imported, 5,822.01 million cubic feet per day (MMcfd) (SIH, n.d.). Of this percentage, approximately 98% (5,705.37 MMcfd) came from the United States of America⁵⁶ (EIA, n.d.). Among the causes of this dependence are:

⁵⁶ Imports by pipelines and liquefied natural gas (GNL) are considered.

1. In 2023, 61.7% of natural gas extraction in Mexico depended on oil exploitation (natural gas associated with oil) (SIH, n.d.). From 2017 to date, non-associated gas has increased by 88.1% (from 20.3% to 38.3% of domestic production) (SIH, n.d.). Still, it is insufficient to meet the growth in demand.
2. There is low investment in exploration, given Pemex's limited resources and restricted private participation in the market.
3. Pemex has a quasi-monopsony in the consump-



Image: "Government forgets to store natural gas" at <https://diario.mx/nacional/olvida-el-gobierno-almacenar-gas-natural-20200114-1614835.html>

tion of domestic natural gas production. Of the 2,641.66 MMpcd produced in 2022, Pemex demanded 2,092.21 MMpcd, 79.2%. Pemex only contributed 21.8% of the domestic output to the domestic market. Still, this proportion only represents 8.6% of the available supply in Mexico (discounting Pemex). (SIH, n.d.).

In addition to the above, the growth in demand from the electricity sector generates a greater imbalance. Between 2017 and 2022, natural gas demand grew 6.3% (10.5% excluding Pemex) (SIH, n.d.) and 26.5% in the electricity sector (Sener, n.d.), driven in part by the energy reform, while domestic production fell -13.5% (SIH, n.d.). Added to the above is the drop in Pemex imports. In 2017, Pemex still accounted for 35.9% of imports; in 2022, the state-owned company reduced its share to only 6.8% (SIH, n.d.). In the last five years, Pemex imports dropped -67.2% (-1,187.57 MMcfd) (SIH, n.d.). This imbalance had to be compensated with the growth of imports by private companies (66% variation, 2,085.47 MMcfd) (SIH, n.d.). In sum, Pemex has lower participation in the natural gas market due to the fall in associated gas production and imports.

In 2022, almost all (99.8%) of the imported gas entered Mexico through pipelines (24 points of entry) from the northern border with the United States. The pipeline network, one of the most extensive in the world, is distributed mainly in the northern and north-central regions. However, even in these regions, the infrastructure is insufficient to make it possible to expand the energy supply to households (0.7% of natural gas demand in 2022) (Sener, n.d.). In this sense, Mexican households do not have substitute goods for liquefied petroleum gas (LP gas) as long as the necessary pipeline distribution systems do not exist, as concluded by the Federal Economic Competition Commission (Cofece, for its acronym in Spanish, 2018).

Only a minimal portion of imports (0.2%) arrive in Mexico in liquid form (liquefied natural gas)⁵⁷ in methane tankers to three Liquefied Natural Gas (GNL, for its acronym in Spanish) storage and regasification terminals (Ensenada, Manzanillo, and Altamira), unlike what happens in other countries due to geographical barriers with the world's largest producer, the United States. In this sense, the market price to which Mexico has access is highly competitive inter-

⁵⁷ Should not be confused with LP gas (a mixture of propane and butane).

nationally, representing an advantage, either as an input (in industrial processes) or as an energy source (mainly in the electricity industry).

Despite these conditions (physical and structural), such that they can be considered advantages, in 2021, for the first time in the last two decades, U.S. natural gas exports to the rest of the world surpassed exports to Mexico and Canada. Mexico ceased to be the largest consumer of natural gas in the U.S. in 2022, and Europe took its place. However, it remains the largest pipeline buyer (68.4% of U.S. pipeline exports). The pipeline network built in federal administrations before López Obrador's has supported Mexican industry and the economy in the country's most prosperous regions. Expansion in the recent administration has been extremely poor; only 1,224 km have been completed (South Texas – Tuxpan and La Laguna – Aguascalientes) as opposed to the expansion of 4,639 km between 2012 and 2018 (Signos Vitales, 2022b).

It is essential to mention here that one of the main consequences of the Russian invasion of Ukraine is the increase in the price of natural gas at a global level, especially in that continent. Although the energy crisis began before this conflict, it has ended up po-

larizing the world, where the regions are taking part in the conflict from their energy perspective. It is to be assumed that the fall in exports to Asia, Central and South America, and the Caribbean is being compensated to some extent by exports from other producing countries, such as Russia and Australia.

U.S. exports to Asia, Central and South America, and the Caribbean fell sharply last year (-49.1% annual rate). However, the United States more than compensates for this loss with the growth of gas exports to Europe. In 2023, exports to Mexico grew by about 8.7% annually (EIA, n.d.) and will most likely reach an all-time high. However, the variation is 4.3% concerning the 2021 peak, and the annual growth of European demand will result in 108.2% (EIA, n.d.). Demand from the rest of the world will be 86.7% higher than demand from Mexico. In a single year, the growth of European demand will have been equal to 68.1% of Mexican demand (EIA, n.d.).

A booming natural gas industry has accompanied this polarization on the United States East Coast. This expansion suggests that this will be a long-term process. Therefore, it is very likely that prices will tend to stabilize. In this seemingly bleak scenario, Mexico can capitalize on the situation if it understands the

Mexico ceased to be the largest consumer of natural gas in the U.S. in 2022, and Europe took its place.

international energy rearrangement. Mexico is not a big player, and it has to assume it; it is a price taker in most energy products, and it will hardly be able to reverse this trend (at least in the short term) in the case of hydrocarbons. Perhaps this is an excellent opportunity to advance in the energy transition. Mexico has the incentives and resources (Graph 13).

Since that dependence will not end but the opposite, it would be optimal to assume it by reducing the impact of climatic or geopolitical shocks, not strictly economic ones. In other words, what is relevant is energy security, which is defined as access to energy securely at the lowest possible cost. Its availability is protected in the event of regional or global energy crises due to conflicts of any kind; rather than trying to produce all energy internally (“energy sovereignty”), it is crucial to ensure its availability (Graph 14).

The flourishing of industries such as petrochemicals depends mainly on the availability of this gas. The electricity sector will continue to consume the most of this input (approximately 58.5% of demand in 2022) (Sener, n.d.), only followed by a declining oil sector (23% of demand in 2022). In this sense, the Mexican State’s acquisition of Iberdrola’s combined cycle power plants perpetuates such dependence.

It will modify the electricity matrix by subjecting it even more to fossil fuels. According to Rosanety Barrios, this dependence will increase from 60% to 70% (Ventura, 2023).

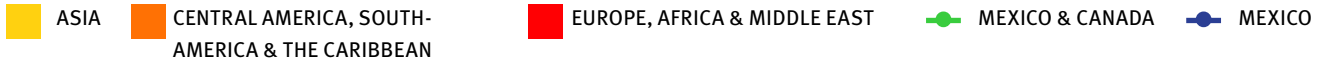
On the other hand, the energy crisis makes it seem that Mexico could have started the nearshoring phenomenon several years ago, but it did not. Mexico did not attract heavy industry, nor did it receive so many announcements related to the petrochemical industry. The opposite happened; between 2017 and 2022, the demand for natural gas in the petrochemical industry decreased -13.4% (-214.7 MMSCFD by its acronym in Spanish MMpcd) (Sener, n.d.) and fell back to 2015 levels. At the same time, Mexico will continue to have a considerable trade deficit in industrial plastics, as it has been doing so far.

It is worth noting the slight contraction in industrial gas demand observed since 2019 (-1.8% annual rate) (Sener, n.d.), even before the energy counter-reform of the recent federal administration and the long confinement. This situation coincides with the zero economic growth observed in the first year of López Obrador’s administration. In other words, gas consumption is expected to maintain a behavior similar to that of the economy and industrial activity,

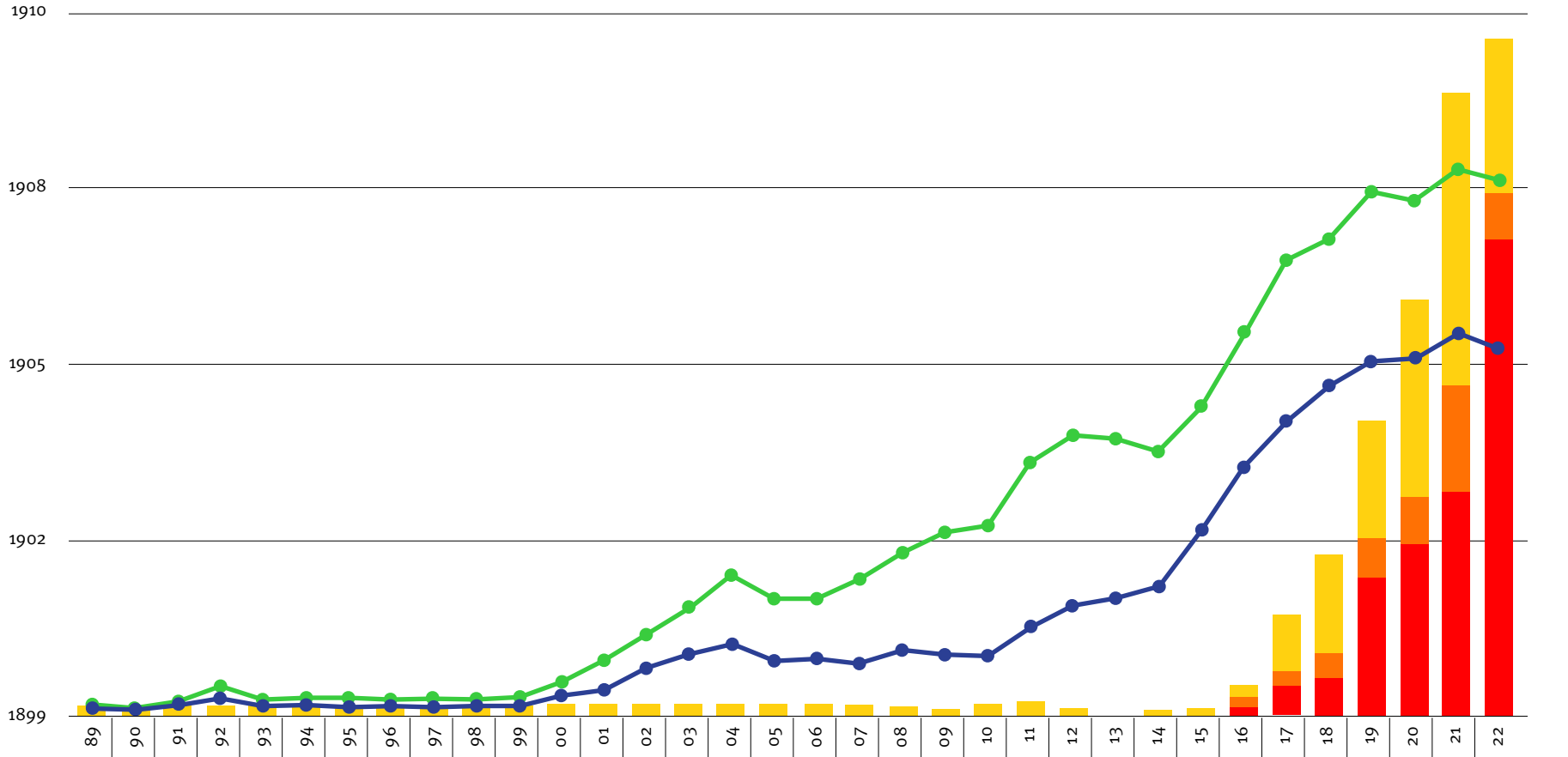
The Mexican State’s acquisition of Iberdrola’s combined cycle power plants perpetuates such dependence. It will modify the electricity matrix by subjecting it even more to fossil fuels. According to Rosanety Barrios, this dependence will increase from 60% to 70% Ventura, 2023.

GRAPH 13. AMERICAN NATURAL GAS EXPORTS BY DESTINATION

(1989–2022)



THOUSAND OF
MILLIONS OF CUBIC FEET



Source: In-house elaboration information from U.S. Energy Information Administration (EIA, s.f.).

given the dependence of the electricity sector on this energy source.

However, such demand continues to fall, and the Mexican economy has maintained a growth rate above the average in the last three decades. In other words, growth is contrary to expectations. Likewise, industrial growth has been fragile in the abovementioned period (0.6% between 2017⁵⁸ and 2022) (INEGI, n.d.b) and barely shows signs of greater dynamism. Therefore, the scope of the energy counter-reform should have affected the consumption of natural gas as an energy, not necessarily as an input, in the industrial sector for industrial plastics or fertilizers, just to mention some by-products⁵⁹.

Therefore, storage capacity is strategic for two reasons: it reduces uncertainty, i.e., price volatility, and increases competitiveness with other industrialized economies. Mexico barely enjoys 2.4 days of natural gas storage. It is extremely far from other economies and from the goal of reaching five days of inventory in national territory by 2026 (45 trillion cubic feet), as specified in the public policy on natural gas storage

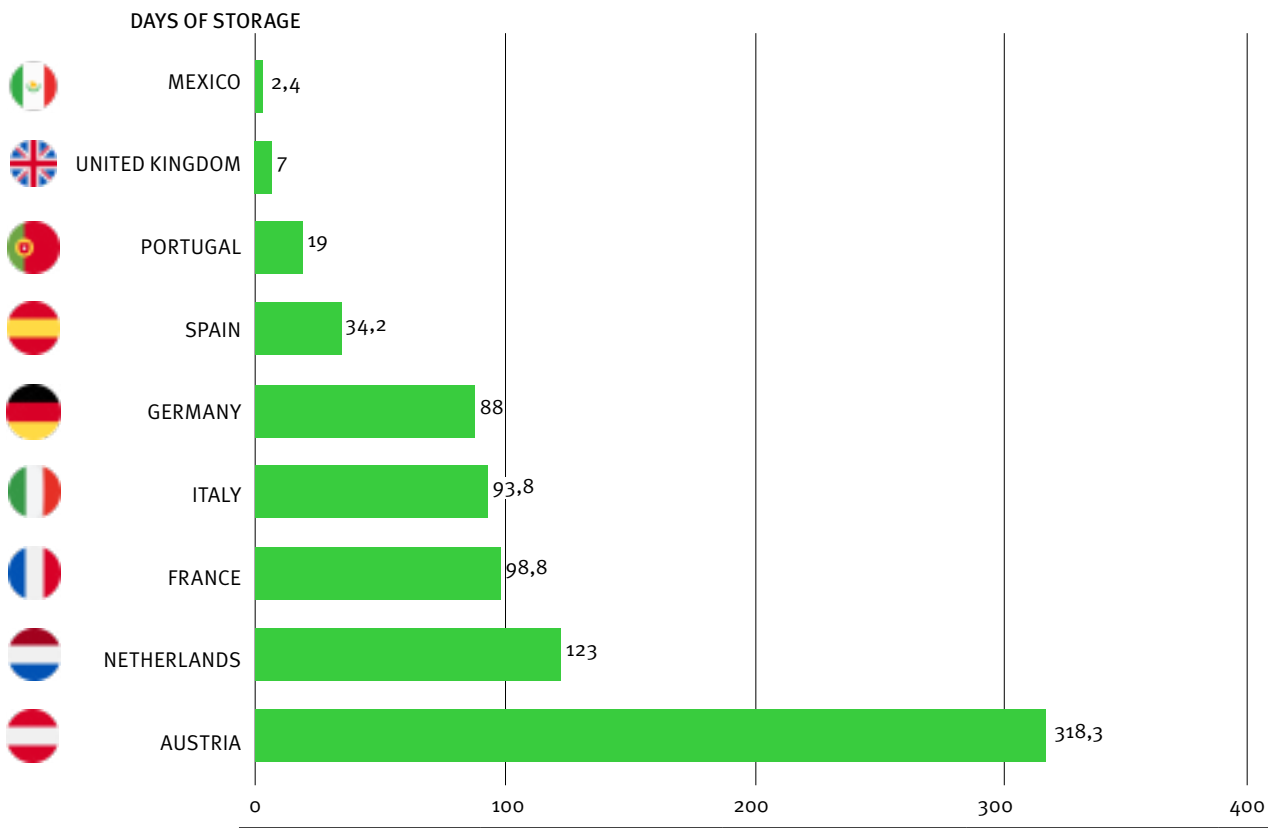
⁵⁸ Between 2017 and 2023, the growth of industrial and manufacturing activity was approximately 4.3% and 9.1%.

⁵⁹ Industry can produce electricity through cogeneration or self-supply processes.



Image: "Fertilizers raised even though the government's promise" at <https://www.cronica.com.mx/negocios/dispara-importacion-fertilizantes-mexico-pese-promesa-gubernamental.html>

GRAPH 14. NATURAL GAS STORAGE CAPACITY IN MEXICO AND OTHER INDUSTRIALIZED COUNTRIES
(DAYS OF STORAGE)



Mexico barely enjoys 2.4 days of natural gas storage. It is extremely far from other economies and from the goal of reaching five days of inventory in national territory by 2026.

Source: In-house elaboration with data from IMCO (2022).

(Sener, 2018), although this is not happening. According to IMCO estimates, this policy would cost between 428.3 and 2,594.9 million dollars (MDD), depending on the technology used⁶⁰ (Carrillo *et al.*, 2022).

The consequences of the lack of energy are evident. According to Banxico, during the first quarter of 2021, interruptions in the supply of natural gas and electricity could have subtracted 0.22% from the country's GDP growth rate concerning the previous quarter. By regions, the most significant estimated impact was obtained in the northern region, where an effect of 0.28% is estimated on its quarterly growth rate (Banxico, 2021).

⁶⁰ According to IMCO, in Mexico this molecule is only stored in its liquid form in the LNG tanks of the three storage and regasification terminals mentioned, which have limited capacity. To date, there is no infrastructure for the subway storage of natural gas (in gaseous form) in deposits that are unviable for hydrocarbon extraction, confined aquifers and salt caverns.

2.2 Energy at the end of the road, although clean and affordable, is not enough

The conflict with the private sector in energy matters, especially with foreign investment, worsened during the López Obrador administration. The cancellation of the long-term auctions and the 3.2 and 3.3 oil rounds were the guidelines that would set the tone for this administration. The federal government has started by making an inadequate diagnosis, which is convenient for its purposes. In electricity matters, it has concentrated all its efforts (at least in discourse) on electricity generation, where it has incurred losses and increased dependence on natural gas, leaving aside the tasks (transmission and distribution) conferred by the Constitution itself, where it has the natural monopoly and therefore is where the Federal Electricity Commission (CFE) obtains profits.

The problem with this neglect is that the infrastructure is insufficient, creating bottlenecks for the installation of companies, increasing their operating costs, and affecting the welfare of families. These problems are notorious in the peninsulas of Baja California and Yucatan. As of July 2023, Quintana Roo and Baja California Sur have prices of 5,932 and 5,220 pesos per Megawatt-hour (MXN/MWh), the highest in the

country, 6.6 and 5.8 times higher than in Mexico City (900 MXN/MWh) (IMCO, n.d.b), respectively (IMCO, n.d.b).

As in other areas, private initiatives and families have taken matters into their own hands, boosting electricity production through distributed generation (DG)⁶¹. The number of requests for interconnection of power plants with less than 0.5 MW capacity continues to increase. Between 2017 and the first half of 2023, such requests went from 59.2 thousand to 367.2 thousand (variation of 519.9%) (CRE, n.d.). In the same period, the installed capacity went from 459.25 MW to 2,954.65 MW (variation of 543.4%) (CRE, n.d.). The average installed capacity has also increased; requests this year are 41.5% higher in capacity than six years ago (10.1 vs. 7.2 kW).

Of the total installed capacity, 99.4% has solar energy as a source (337,438 requests out of 2,692 MW) (CRE, 2018). It can be assumed that families and companies seek to solve a cost problem or meet

⁶¹ According to the National Electricity System Development Program (Prodesen), distributed generation is the use of small-scale electricity generation technologies (less than 500 KW) –installed in a home, business, building, small or medium industry and agricultural sector– that can impact electricity consumption and the demand profile of a local electricity system.

environmental goal commitments rather than saturation. These permits also present concentration at the region, entity, and municipality levels, either by number of requests or power. 66.2% of the installed capacity is located in the north, center–north regions and the other third is distributed between the center (21.7%) and south (12.1%) (CRE, 2018); in 13 entities of the country, 74.9% of such capacity is concentrated, and only one of these entities is located in the south (Yucatan).

In particular, the 10% of the applications with the highest capacity (first decile) (33,765 applications) concentrate 53% of the total capacity (1,436 MW), and 63.7% of them are located in the north and



*Between 2017 and the first half of 2023, requests for interconnection for housing went from 59.2 thousand to 367.2 thousand (519.9%)
CRE, s.f.*

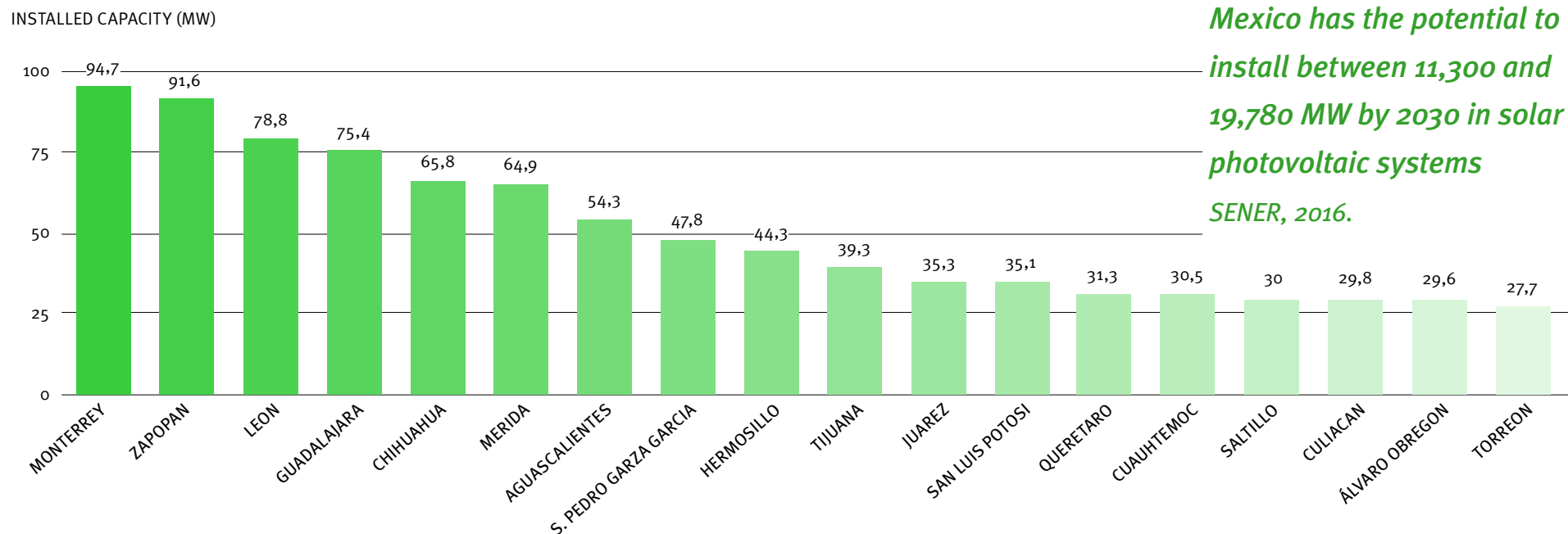
Image: Installation of solar panels in homes at [https:// fotos.habitissimo.com.mx/ foto/paneles-solares-casa-lm-parte-1_268272](https://fotos.habitissimo.com.mx/foto/paneles-solares-casa-lm-parte-1_268272)

north–central regions; in 106 municipalities of the country, there is 70.6% of the installed capacity of DG in Mexico. Only 42 of these municipalities concentrate 50.3% of the total capacity (1,436 MW). Only 42 of these municipalities account for 50.3% of the total capacity, of which only three belong to the south and seven to the center: Benito Juárez (Quintana Roo), Solidaridad (Quintana Roo), Merida (Yucatan), Alvaro

Obregon (CDMX), Miguel Hidalgo (CDMX), Irapuato (Guanajuato), Leon (Guanajuato), Cuernavaca (Morelos), Puebla (Puebla) and Queretaro (Queretaro) (CRE, 2018) (Graph 15).

Therefore, the use of solar energy on a small scale can be observed in the larger population centers in the north and central–north industrial zones and

GRAPH 15. MAIN MUNICIPALITIES WITH AN INSTALLED CAPACITY IN DISTRIBUTED GENERATION (MEGAWATTS) ACCUMULATED 2023



Mexico has the potential to install between 11,300 and 19,780 MW by 2030 in solar photovoltaic systems
SENER, 2016.

Source: In-house elaboration with information from the Energy Regulatory Commission (CRE).

some beach tourist destinations, such as Bahia de Banderas, Puerto Vallarta, and Mazatlan. Except for Guanajuato, thanks to a greater installed capacity in the cities of Leon and Irapuato (56.3% of the entity's capacity), and to a lesser extent, the CDMX and the State of Mexico, the rest of the center lags behind the center–north and north.

According to the Renewable Energy Outlook 2016–2030 and estimates made by the International Renewable Energy Agency (IRENA) and Bloomberg New Energy Finance, in conjunction with the Ministry of Energy and the CRE, Mexico has the potential to install between 11,300 and 19,780 MW by 2030 in solar photovoltaic systems in DG (Sener, 2016). The growth of DG is remarkable, and the trend remains upward. We estimate that it will continue, and by 2036, it will represent 8.6% of the total installed capacity (Sener, 2022). The current trajectory exceeds the conservative scenario; however, it is far from the most optimistic one since 2023, and the installed capacity should already exceed 5 thousand MW.

Although there is no defined installed capacity range in the world for DG systems, typically, such power plants have a capacity ranging from 0.1 to 20 MW (megawatt) (Gallegos *et al.*, 2015). In the case of

Mexico, the Electricity Industry Law (passed in the previous federal administration)⁶² facilitates electricity generation for power plants smaller than 500 kW and does not demand high requirements. For example, Germany, one of the countries with greater decentralization in its electricity sector, registered in 2013 an installed capacity in DG of 86 GW, equivalent to 48% of the total available (Gallegos *et al.*, 2015); other economies such as Spain, Denmark, and Chile also present progress in DG, 55%, 31% and 10% of the total installed capacity, respectively (Limón, 2017).

Mexico's potential may be enormous, especially because solar energy has been a critical element in the growth of DG. However, other countries with less solar potential and land area have taken more significant advantage of this energy. Although Mexico has a territory that is 5.5 times larger than Germany and has five times more radiation, the solar energy generated in the European country is 44.2 times higher. Concerning China, even though Mexico has a territory 4.9 times smaller and has an average solar radiation 1.2 times higher, the solar energy generated in Mexico is equivalent to 0.1% of China's (Limón, 2017).

⁶² It has antecedents in the Energy Transition Law.

CFE OBSOLETE

Mexico has ample natural resources to meet its clean energy needs in strict compliance with the international treaties it has adhered to. Mexico's electricity sector is highly dependent on the performance of natural gas. And the increase in installed capacity is determined by the new CFE combined cycle plants. This addition is estimated to mean that demand for natural gas will continue to grow for at least the next decade. It should also be noted that this addition has a political strategy since its objective is to ensure a source of employment for the state-owned company's personnel.

According to México Evalúa, the CFE has been impoverished by two actions of the recent federal administration: the renegotiation of gas pipeline contracts in 2019 and the reversal of the changes made in 2016 to the Collective Labor Contract. The first action implied that CFE's total liabilities increased by 50% (690.2 billion pesos) (México Evalúa, 2023). The second change implied that by the end of 2020, the company's labor liabilities increased by 10% (48.5 billion pesos), while the cost of labor obligations increased by 236% (89.5 billion pesos) (México Evalúa, 2023).

the CFE has been impoverished by two actions of the recent federal administration:

- 1) the renegotiation of gas pipeline contracts in 2019, and*
- 2) the reversal of the changes made in 2016 to the Collective Labor Contract Mexico Evalúa.*



Image: "CFE will add 4.3 GW generation with six new thermoelectric plants at <https://energiahoy.com/2021/04/22/cfe-anadira-4-3-gw-en-generacion-con-seis-nuevas-termoelectricas/>

Fortunately for the CFE's finances, its directors have abandoned, for now, the discourse of increasing clean energy generation through hydroelectric plants. The loss in generation with this technology has been remarkable in the last year, given that generation is determined by seasonal factors (weather). Rainfall in 2023 was the lowest in the last seven years (SMN, n.d.). In October 2023, only 5.7% of the generation was produced with this technology, while in the same month of 2022, the share was 14% (IMCO, n.d.b). The annual drop in generation through this technology is -68.1% (IMCO, n.d.b). For the same year, the production of clean energies decreased by 44.5%, 78.7% of which is explained by the drop in hydroelectric generation (IMCO, n.d.b).

According to the Energy Commission of the International Chamber of Commerce (ICC) Mexico, to grow at the current rate of 2.4% per year in GDP, it is necessary to build at least 58,900 kilometers of transmission lines and develop infrastructure for 100,974 MW, taking into account plant factors and assuming generation with combined cycle, photovoltaic and wind processes. The total investment required would amount to 1 trillion 985 billion pesos, which would be equivalent to investing 132.3 billion pesos per year

for 15 years (ICC Mexico, 2023); of this total, 413.4 billion pesos correspond to transmission lines (ICC Mexico, 2023).

Estimates of the required investment in electricity generation and transmission infrastructure for the National Interconnected System (SIN) over the next fifteen years assume a constant increase in GDP. One of the main conclusions is that 800 kilometers per year in transmission lines must be installed for each percentage point of GDP growth. Likewise, an accumulated deficit of 4,370 kilometers in transmission is estimated for 2018 – 2022 (ICC Mexico, 2023).

To grow at the current rate of 2.4% per year in GDP, it is necessary to build at least 58,900 kilometers of transmission lines and develop infrastructure for 100,974 MW.

An accumulated deficit of 4,370 kilometers in transmission is estimated for 2018 – 2022

ICC México, 2023.

Water shortages and social and economic (in)stability

A recurring problem for Mexican businesses and households is the shortage of potable water. In 2021, Mexico faced the most severe drought episode since 2012. In recent years, the proportion of the national territory affected by drought has increased, with the northern and north-central regions being the most susceptible. In particular, in May 2018, 7% of the country's municipalities, distributed in 11 federal entities, presented drought levels in the emergency category. By September 2019, this number rose to 18%, distributed in 18 states, while by May 2021, this percentage was 35%, distributed in 23 states of the Republic. Likewise, by July 2022, 19 states had at least one municipality in a state of emergency, with Coahuila, Baja California, Chihuahua, Baja California Sur, and Sonora being the states most affected by extreme and exceptional droughts (ICC Mexico, 2023).

According to Banxico, the more significant geographic extension of droughts has implied that a greater percentage of economic activity is carried out in regions with more arid conditions and low water storage. Thus, in May 2018, it is estimated that 61.4% of GDP was produced in some municipalities not com-

promised by drought, while 22.1% was in a municipality with some degree of drought, and 14.5% was in an emergency. By May 2021, the proportion of GDP not compromised decreased to 24.3%, while the proportions that could be impacted by drought and state of emergency increased to 54.4% and 42.9% (Banxico, 2022).

Considering three hypothetical scenarios of extreme effects, such that all the municipalities in the north and center-north of the country (regions more



Image: "Water stress in the Metropolitan area in the Valley of Mexico" at <https://www.gaceta.unam.mx/mexico-experimenta-escasez-de-agua-y-falta-de-equidad-en-su-distribucion/>

prone to droughts) face severe, extreme, or exceptional drought during one month, the total effect on the variation of GDP would be -0.31% , -0.45% and -0.56% , respectively, where the most significant loss would be generated in manufacturing (-0.22% , -0.32% and -0.39%) (Banxico, 2022), followed by the agricultural sector with a little more than a quarter of the total loss.

According to S&P Global Ratings, 11 of Mexico's 32 states already face high water stress. Of these 11, the states with the highest exposure are Aguascalientes, Baja California, Baja California Sur, and CDMX. In 2050, under a moderate emissions climate scenario, the number of states exposed to high water stress will increase by nine if no adaptation measures are taken. These nine additional states are Nuevo León, Tamaulipas, Coahuila, San Luis Potosí, Querétaro, Tlaxcala, Hidalgo, Colima, and Jalisco (S&P Global Ratings, 2023) (Graph 16).

Also, five of the 11 states with the highest exposure to water stress have a high economic concentration in water-sensitive industries (above 40% and in order of importance): Aguascalientes, Chihuahua, Sonora, Zacatecas and Baja California (S&P Global Ratings, 2023). In contrast, the rating agency identi-

fied only six states with low exposure to water stress in this decade, and this is likely to remain the case until 2050, even if no adaptation measures are taken. These states are: Chiapas, Oaxaca, Guerrero, Campeche, Veracruz and Tabasco⁶³ (S&P Global Ratings, 2023).

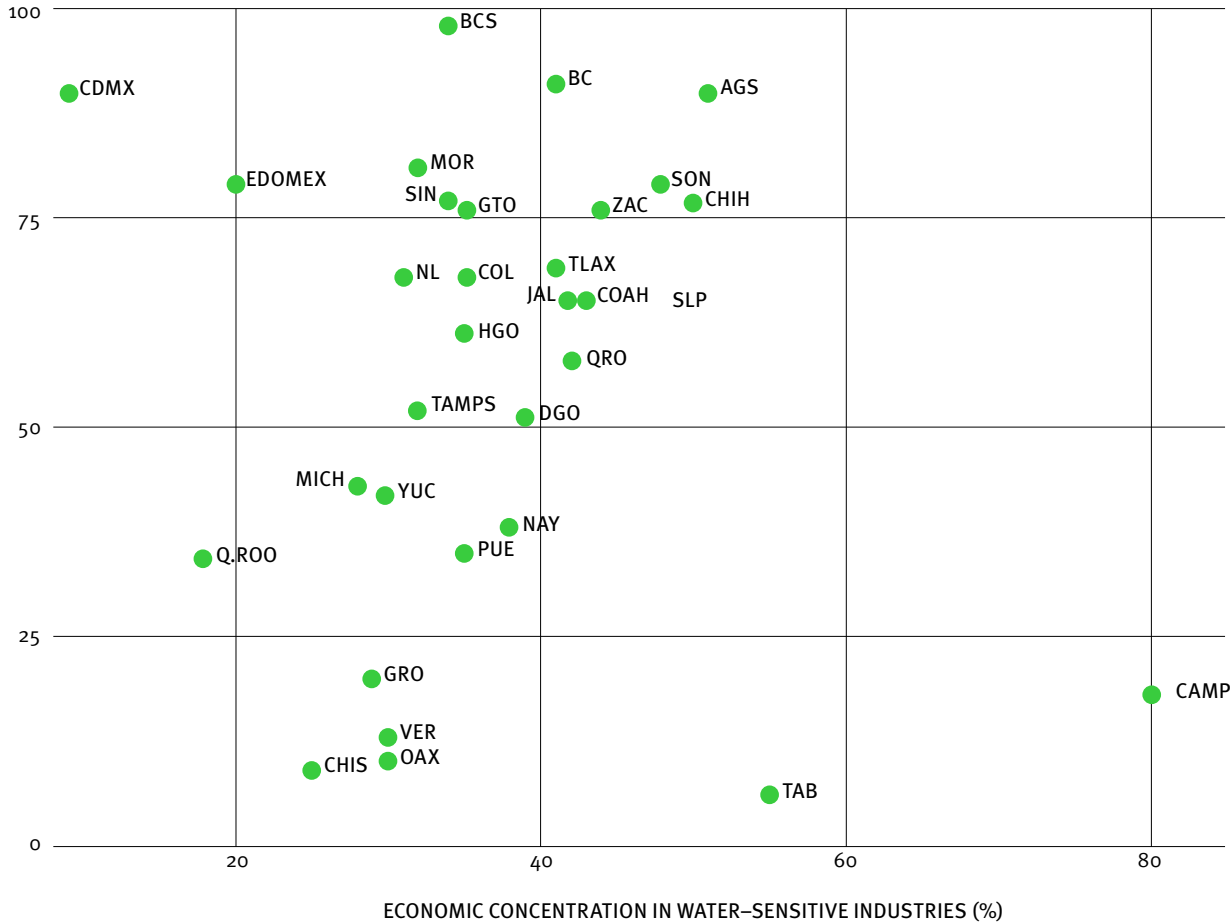
The study in question has four conclusions of great relevance:

1. An economy focused on water-sensitive sectors, particularly in arid regions, could face increased costs associated with ensuring the availability of water resources to support the growth of those sectors while at the same time coping with the potential weakening of economic activity (S&P Global Ratings, 2023).
2. As water is a critical input for specific manufacturing processes, frequent water supply disruptions may increasingly affect investment decisions and cause water-sensitive industries to relocate to less exposed states (S&P Global Ratings, 2023).
3. As tensions over water resources increase, risks to local and regional governments include a dete-

⁶³ The scenarios do not take into account possible changes in the social and economic structures of the six states, such as increased prosperity, which could increase water use.

**GRÁFICA 16. WATER STRESS VS ECONOMIC CONCENTRATION IN WATER SENSITIVE INDUSTRIES
BY STATE (%)**

CURRENT WATER STRESS
(AVERAGE 2020–2030)



Five of the 11 states with the highest exposure to water stress have a high economic concentration in water-sensitive industries (above 40% and in order of importance): Aguascalientes, Chihuahua, Sonora, Zacatecas and Baja California
S&P Global Ratings, 2023.

Source: S & P Global Ratings (2023).

Note: Water stress assigns scores from 1 (lowest risk) to 100 (highest risk). Scores above 70 indicate high exposure to climate risk.

rioration in economic growth and public finances, as well as disruptions in the water supply to the population that could lead to social unrest or emigration. These factors could pressure federal and local governments to implement costly emergency measures, weakening their financial performance (S&P Global Ratings, 2023).

4. As exposure to water stress increases, economic growth could be constrained among vulnerable states. At the same time, high exposure to water stress could intensify political and economic pressures to increase water-related expenditures (S & P Global Ratings, 2023).

It should be clarified that the cases of Baja California and Sonora have a different nuance from the rest of the entities above. To a large extent, the supply of drinking water in both entities depends on the inflow from the Colorado River basin (United States)⁶⁴, which has reduced its volume for various reasons,

⁶⁴ The distribution of water volumes between Mexico and the United States is regulated by the International Water Treaty, signed by both countries on February 3, 1944. This binational agreement guarantees Mexico the annual delivery of 1,850.23 hm³ of water, of which 1677.54 hm³/year (90.7%) is delivered in the North International Boundary (LIN), at Morelos Dam, and 172.69 hm³/year (9.3%) in the South International Boundary (LIS), through the Sanchez Mejorada Canal, in San Luis Rio Colorado, Sonora.

including over-concession of water, vulnerability to climate change, and anthropogenic alteration of the water cycle⁶⁵ (IMTA, 2020).

Over the past two years, the combined storage of Glen Canyon (Lake Powell) and Hoover (Lake Mead) reservoirs has been at historic lows “of less than 40%. In March 2023, they reached the lowest on record (24.6%) (15,295 Mm³), even lower than Lake Powell’s storage one year after its filling in 1964 (20,500 Mm³) (CILA, n.d.). The problem is not recent; in 1999, both dams reached 92% of the storage capacity (CILA, n.d.b), which has been reduced considerably since then.

According to specialists consulted by Signos Vitales, the reduction will be constant. It is estimated that river levels will fall between 19% and 31% by 2065, so a future with a high risk of water scarcity is anticipated (IMTA, 2020). This has resulted in savings and reductions for the United States (US) and Mexico. In 2023 alone, these will be approximately 761 million cubic meters (Mm³) (514 Mm³ in reductions to the

⁶⁵ The river’s hydrology is controlled by a series of dams (48 large dams) and reservoirs that harness water for economic development of cities within and outside the basin.

⁶⁶ These lakes are the two most important reservoirs in terms of capacity and operation in the Colorado River Basin.

lower basin states in the USA and 247 Mm³ in savings) and 128 Mm³ (86 Mm³ of reductions and 42 Mm³ in savings), respectively (CILA, n.d.b).

In 2024, Mexico's allocation will be reduced by 62 Mm³. Mexico will contribute 37 Mm³ of recoverable water savings, resulting in a total decrease of 99 Mm³ in deliveries to Mexico in 2024. Also, deliveries to Lower Basin users in the U.S. will decrease by a total of 658 Mm³. As a result of these reductions, Colorado River water deliveries will be reduced by 6.8% of the average total allocation to Lower Basin users in both countries (CILA, 2023). Of the total annual volume received by Mexico, 88.31% is for agricultural use, for crop irrigation in Irrigation District 014 (DR 014)⁶⁷, another 3.53% is for industrial use, and 0.87% is for urban public use (IMTA, 2020).

Although DR 014 has significantly increased its productivity since the beginning of the last decade (between 2011 and 2018, the yield per hectare increased

⁶⁷ According to the Mexican Institute of Water Technology (IMTA), this district is perhaps the only one nationwide that has an assured water supply regardless of the climatic or drought conditions prevailing in the region. This district comprises a physical irrigable area of 204 thousand hectares (ha), where an average of 190 thousand ha are irrigated, of which approximately 66% is irrigated with surface water and the remaining 34% with groundwater.

by 12.8%), resulting from the production growth (variation of 6.2%), both the area planted and harvested maintain a downward trend (-5.8% in the same years) (IMTA, 2020), so it would have to be evident, given the urgency and the quasi-monopsony of demand, investment in water infrastructure in the region, mainly technology that increases efficiency in the agricultural sector.



Image: "Canyon Glen dam and the artificial lake Powell" at <https://blog.structuralia.com/la-presa-del-canon-glen-y-el-lago-artificial-powell>

2.4 Rising insecurity

The increase in insecurity, especially related to property damage, has become part of the daily life of businesspeople, their companies, and collaborators. As reported by SVM, extortion, and robbery are two crimes that have increased in the last five years. The accumulated from January to October 2023 is 58.8% higher than in the same months of 2018 (8,809 extortions) (Sesnsp, 2023); dispossession has increased by 19.5% for the same period (26,263 dispossessions so far in 2023) (Sesnsp, 2023).

As is the case with economic and social phenomena, this type of crime has a higher incidence in certain regions, entities, and even municipalities. Extortions have been more prevalent in the center of the country. Despite the media exposure –with clear political connotation– around dispossessions in the CDMX, these have not diminished. On the contrary, they have increased by 10.2% (3,333 dispossessions so far in 2023) and continue to show the same pattern: seasonality in December and January, where a decrease of close to 17% is observed (Signos Vitales, 2022). Dispossession is a crime that can be very complex in its architecture and logistics. As documented, dispossession requires a framework involving civil

registries, public notaries, public property registries, and fraudsters. Seasonality is not casual but causal since crime decreases during the holiday season.

Likewise, as documented by other organizations specialized in the matter, the criminal statistics leave much room for doubt since there is a clear exercise of concealment and manipulation of certain crimes (Causa en Común, 2022; 2023). An example of the above is that between 2018 and 2023, the number of threats grew by 58.5% (Sesnsp, 2023) nationwide. By definition, threats⁶⁸ have similarities with extortion⁶⁹. However, unlike the latter, in the former, there is no profit for oneself or another. The growth in threats and the low presence of extortion occur in the CDMX. The accumulated threats between January and October 2023 are 81.6% higher than the 2018 record (Sesnsp, 2023); in contrast, extortions have decreased by 3.5% in the same period.

This (disguised) concealment is already occurring in other more serious crimes related to personal liberty

⁶⁸ Manifestation of causing damage to another's person, property, honor or rights, whether or not a personal bond is involved.

⁶⁹ Action that forces another to give, do, stop doing or tolerate something, obtaining a profit for oneself or for another, causing someone a patrimonial damage, by means of physical or moral violence.

and life, as happened recently with the registration of missing persons. In the five years of López Obrador's administration, the most significant number of missing and unaccounted-for persons in the last four federal administrations has been documented: 47,300 (Delgadillo *et al.*, 2023). While there have been advances in accounting for disappearances in past administrations, the actual number of missing persons could be as high as 500 or 600,000 (Delgadillo *et al.*, 2023). Still, the current federal administration tries to make the seriousness of the problem invisible.

These criminal events have naturally had considerable costs and severe economic consequences. The economic impact of insecurity has also been documented. According to Banxico, in 2019, insecurity resulted in 5.5% of Economic Units in the country canceling investments (273.9 thousand UE). The cancellation of investments resulted in higher numbers in the country's center than in any other region (7.7% of UE vs. 2.9% in the north). Protection expenditures and losses associated with crime accounted for 0.92% of GDP (225.9 billion 2019 pesos), equivalent to the beverage industry's production value in the same year (222.3 billion pesos). The worst affectation, equivalent to 1.67% of GDP, occurred in the center. At the same time, in other regions, expenses and



Image: "Statistics of stolen merchandise" at <https://www.mascontainer.com/mexico-estadisticas-de-robo-de-carga-durante-2022/>

losses were lower: North (0.37%) and South (0.43%) (Signos Vitales, 2022).

The country's south has the lowest percentage of victimized businesses (25%). According to estimates by the same central bank, if the rate of victimized businesses were reduced in the rest of the regions to the same level as in the south, private spending on security would decrease to a quarter of what it represents today, going from 0.54% to 0.16% of GDP.

The decrease would occur in all regions. In the north, it would go from 0.25% to 0.13%, in the center–north from 0.27% to 0.08%, and in the center from 1.01% to 0.11%. In this same case, if the percentage of victimized businesses were reduced to the level of the South, the loss associated with crime would decrease from 0.38% to 0.08% of the country’s GDP. In the northern region, it would decrease from 0.12% to 0.06%, in the central north from 0.34% to 0.06%, and in the country’s center from 0.66% to 0.04% (Signos Vitales, 2022).

In addition, less insecurity would also affect business profits, wages, investment, and output. Average profits would increase as the burden of insecurity on businesses would decrease by 3.5% at the national level, by 1.8% in the north of the country, by 2.7% in the center–north, and by 7.4% in central Mexico. On the other hand, salaries showed increases of 1.5% at the national level and, on average, would increase by 3.2% in the center, 1.3% in the center–north, and 0.3% in the north. In the center, an increase of 13.4% in investment and 3.5% in production would be observed; in the north, the region less distant from the victimization levels of the south, the effects would be minor but still relevant, with increases of 1.3% in investment and 0.4% in production (Signos Vitales, 2022).

Although López Obrador took office under the banner of transparency and the fight against corruption, complaints against public servants and clear evidence of acts of corruption have marked his administration. The growth of complaints against crimes committed by public servants has increased by 14.9% so far in the recent federal administration (Sesnsp, 2023). Collusion between criminals and public servants is increasingly evident.



Image: "'Cobro de piso'. Charging for the floor business. It says –Closed for insecurity: father and son shot victims" at <https://www.reddit.com/media?url=https%3A%2F%2Fi.redd.it%2Fel-cobro-de-piso-es-uno-de-los-deltos-que-est%25C3%25A1n-golpeando-vo-9eh6005pvedc1.jpeg%3Fs%3Db6286bb388c7c-482docb8ca9c5d6b3do8eccdc3c>

2.4.1 WE ARE RUNNING OUT OF LOCAL POLICE OFFICERS

Noted research centers in Mexico, such as México Evalúa, CIEP (Centro de Investigación Económica y Presupuestaria), and Observatorio Nacional Ciudadano, have studied the impact of the reduction in the amounts of federal transfers to finance local public security. These research centers have concluded that federalized spending continues to lose ground to federal spending on public safety; this was 12.5% in 2012, and by 2023 will be approximately 8.9% of federal spending in this area (Graph 17).

Also, since 2021, with the disappearance of Fortaseg (Subsidy for the Strengthening of Public Security Performance), the State has not complied with Article 21, paragraph e of the Constitution. Thus, federal aid for public security will no longer be granted to states and municipalities to be used exclusively to finance public security programs. At the time, López Obrador categorically denied the disappearance of Fortaseg, but this was later rejected (Aguirre *et al.*, 2022). Fortaseg was the only fund directed to municipal governments, and its objective was to strengthen, train, and standardize municipal police forces (ONC and CIEP, 2021). With the elimination of this fund, the nearly 300 most

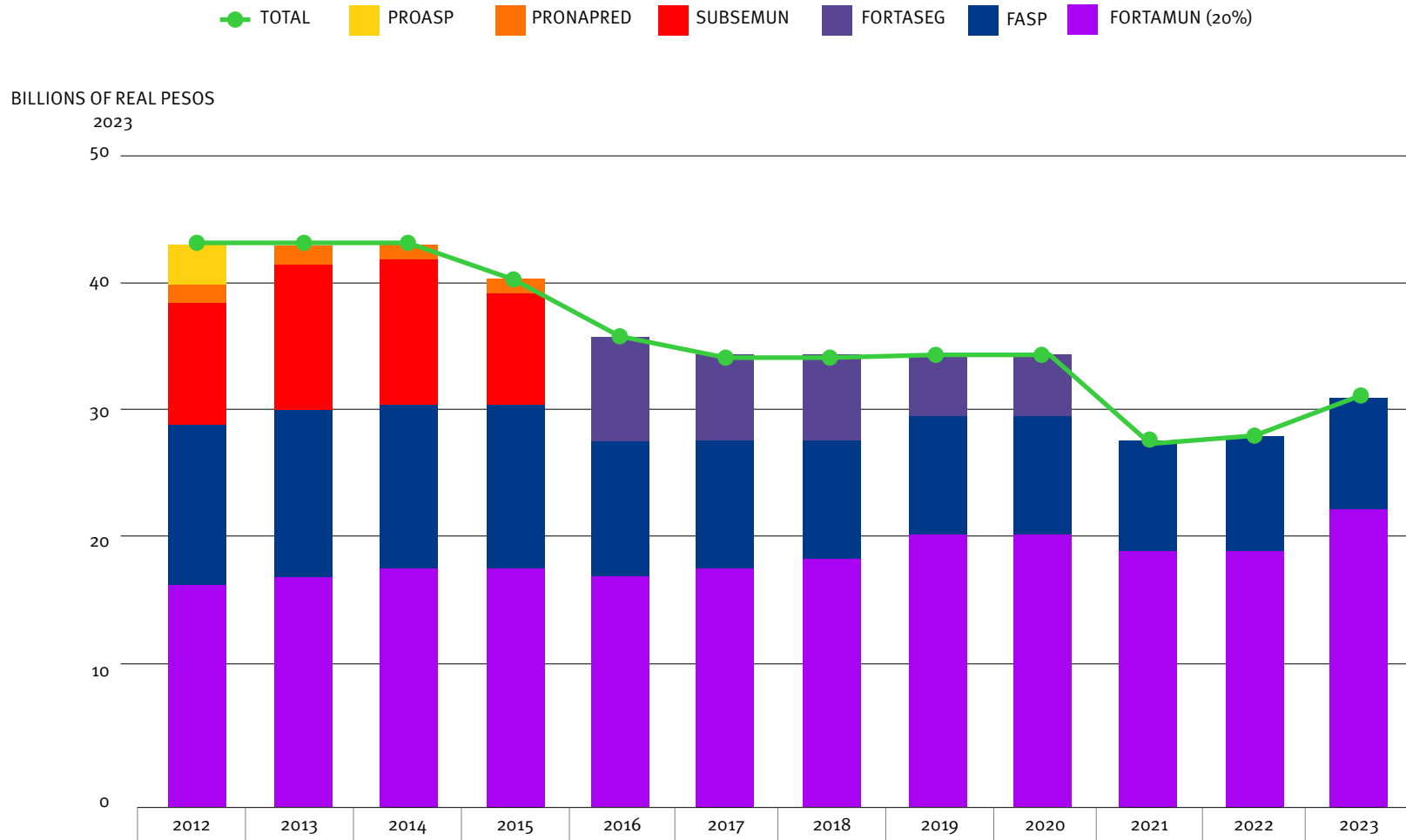


violent municipalities in the country were no longer protected, as 90% of high-impact crimes took place in their territories (Mexico Evalua, 2022).

In addition to the above, the labor precariousness of local police continues to increase. In 2021, 60.05 billion pesos were allocated to public security institutions at the municipal level. This amount represents an annual per capita expenditure of 22.5 dollars per year, a figure representing 6% of what is spent in countries such as the United States, where 388 dollars per person per year are spent (Mexico Evalua, 2022).

Image: "The elimination of Fortaseg is catastrophic for municipalities" at <https://www.alcaldesdemexico.com/notas-principales/catastrofi-co-para-municipios-la-eliminacion-del-fortaseg-co-parmex/>

GRAPH 17. EVOLUTION OF FEDERALIZED SPENDING 2012–2023
(REAL 2023 MDP)



Note: Subsidies of Supports for Federal States in Public Security (PROASP); National Program for Crime Prevention (PRONAPRED); Subsidies for Public Municipal Security (SUBSEMUN); Fund for Strengthening Public Security Institutions (FORTASEG); Fund for Assistance for Public Security (FASP); and Fund of Assistanes for Municipal and Territorial Security Areas of the Federal District (Fortamun).

Source: Mexico Evalua (2022).

Conclusions



Mexico faces a wide range of problems, many of which must be solved immediately and comprehensively in the short and medium term. Some of them are real-time bombs⁷⁰. In particular, we focus here on those that, if left unresolved, will drive away investments or generate an economic paralysis of regional magnitude. Assuming that the Mexican economy maintains a growth rate close to the historical average (since NAFTA entry) or somewhat above it (2.5%), and in the global context and the limitations of such growth, many of these problems cannot be postponed.

According to the evidence provided by various studies on the subject and supported by recent experience, it is predictable that these phenomena have the capacity to paralyze entire economic regions. We have plenty of examples: we should remember the recent shortage of natural gas and drinking water in the most prosperous area of the country and the impact of the increased presence of organized crime in various parts of the country, where entire localities have had to partially close their businesses or increase the price of their products.

⁷⁰ For further details see: <https://signosvitalismexico.org.mx/rb/wp-content/uploads/2022/11/Reporte-3-2022.pdf>

In light of this, it is essential to emphasize that the industrial activity of electricity, water, and gas has declined by —26.3 % so far during the recent federal administration despite exhibiting an apparent higher demand. The lag of such activity concerning the growth of the Mexican economy should not be overlooked. However, maintaining these growth rates and not meeting the minimum requirements will generate more doubts about the performance of the Mexican economy and the origin of inputs (mainly energy) as long as price pressures do not manifest themselves.



III. ENVIRONMENTAL, ENERGY AND MONEY LAUNDERING ALERTS



III. ENVIRONMENTAL, ENERGY AND MONEY LAUNDERING ALERTS

Introduction

Up to this point, external imbalances explain many of the Mexican economy's internal imbalances. What is not made in Mexico and is consumed domestically or exported to the United States is still very much Asian. But even if only part of the growth is purely Mexican (which does not depend on Asia), it still demands services, such as transportation. This activity is intensive in hydrocarbons, such as diesel and gasoline. And despite the growth observed in the vehicle fleet (between 2018 and 2022, registered motor vehicles in circulation grew 15.5%), the demand for diesel and gasoline peaked in 2012 and 2016, respectively.

According to SAT, between 2018 and 2021, estimated fuel smuggling increased by 122.7%, going from 45.8 to 102 million barrels per year. This problem has not subsided; it is estimated that 2023 may aspire to be the second-highest smuggling year in the last three decades. The evidence presented in the previous sections supports knowing which branches of the economy are most affected by production and their relationship with foreign trade. This does not mean that only Asia affects or generates distortions in the growth of these activities but that the black market of goods can take various forms. That is, the items declared are different from those actually traded. Pemex has played a crucial role in hydrocarbons by not making the necessary investments in technology.

The lack of technological and institutional capabilities is allowing companies such as Pemex and CFE to be major sources of pollution and a project such as the Tren Maya or projects such as Sembrando Vida to continue destroying forests while our exports of timber products are increasing at an all-time high.



Image: "Gasoline smuggling becomes a crisis in Mexico" at <https://www.nytimes.com/es/2017/04/27/espanol/america-latina/huachicol-gasolina-robo-de-combustible.html>

3.1 Oil black market: huachicol, under-registration and more

One of the objectives of this federal administration in energy matters was to bring gasoline imports to zero, so it was considered urgent to address the low production of refined products by Pemex and the theft of hydrocarbons, known as *huachicol*. Ending dependence on imports will not happen for multiple reasons, as stated by various social organizations specializing in the matter, including Signos Vitales and many specialists. It is worth noting that under this premise, the Dos Bocas Refinery (RDB) project began in Tabasco in 2019 started with a shortage of gasoline in a good part of the country due to the failed and nonsurgical strategy of the federal government to combat huachicol, and subsequently various permits for the importation of gasoline were terminated.

Although the demand for diesel and gasoline grew during a good part of the beginning of the millennium, around 2012 and 2016, they reached their historical maximums, 420.3 and 823.9 mbd (Sener, n.d.), respectively, and then fell notably. In 2019, as happens with most petroleum products and hydrocarbons, gasoline demand fell -2.1 %, then col-

lapsed in 2020 due to the long confinement (annual variation of -14.8%). In 2021, the recovery was modest (7.1% annual rate) and less than the economy's growth. Although 2022 demand approached 2018 levels (-0.9% concerning 2018), this has not had a stable behavior. In fact, with preliminary data, we know that in 2023, gasoline demand will fall again (-4.1% annual rate) (Sener, n.d.) and will be at levels close to those of 2014.

Given the reactivation of the economy after the great confinement, mobility in large cities, and the continuous advance in the vehicle fleet (between 2018 and 2022, registered motor vehicles in circulation grew 15.5% , 7.4 million vehicles) (INEGI, n.d.ñ), it was to be expected that the demand for fossil fuels would continue to grow. To the above, it will be necessary to add public transportation deficiencies in large cities, mainly in the CDMX. Between 2018 and 2022, passengers transported in the Metro Collective Transportation System have decreased $-by\ 35.3\%$ ⁷¹ (INEGI, n.d.o), so it is tough to argue that families and companies make their transfers using another type of transportation, other than vehicles, which is more

⁷¹ It is very likely that the drop in the number of users is due to the collapse of the so-called Línea Dorada. Another possibility is under-registration.



Image: "Huachicoleros in Mexico: the new and violent face of organized crime that challenges AMLO and his security plan" Photo: AFP at <https://www.bbc.com/mundo/noticias-america-latina-45351125>

efficient or uses another energy source, such as electricity. It should be added that since NAFTA came into force, the transportation sector has been one of the most dynamic sectors, whose activity has an exhaustive use of diesel (in 2022, it demanded 338.4 mbd, 82.1% of the country's supply) ⁷² (Sener, n.d.).

The behavior of oil consumption simply does not seem to respond to economic cycles or vice versa. Although this relationship is not strictly necessary since technological progress could affect the behavior of both variables, neither is a structural change in energy or economic matters in sight. The evidence points to the fact that several markets are dissatisfied with the known supply of fuels. In this regard, the SAT (Tax Administration Service) has acknowledged that, between 2018 and 2021, estimated fuel smuggling increased by 122.7%, going from 45.8 million barrels (Mdb) to 102 per year. In 2021, 21 out of every 100 liters of combustibles consumed in the country came from smuggling. This figure equals 79.4% of Pemex's supply (127.9 Mdb), 27% of legitimate fuel sales, and 41% of legitimate fuel imports (SAT, n.d.).

⁷² Considering only autotransportation. When considering maritime and rail transportation (the entire transportation sector), consumption amounts to 87% of the total.

The same agency estimates that in 2022, fuel smuggling represented 13.6% of the total supply and argues that the reduction in these last two years is because it coincides with the increase of the complementary incentives of the IEPS (Special Tax on Production and Service) on fuels, since by not requiring the payment of the IEPS on the importation, in addition to the refund of the complementary incentive per liter in first-hand sales, the incentives against smuggling activity are eliminated (SAT, n.d.b). Between 2021 and 2022, the average incentive (for gasoline under 91 octane) went from around 40% to more than 110% (SAT, n.d.b). The above dramatically measures the magnitude of huachicol, which is also far from being solved, as stated by Pemex executives and López Obrador himself.

The SAT adds that, as an example of the decrease in technical smuggling in 2022, there is a reduction in the importation of lubricants of 62% compared to what was observed in 2021. Lubricant imports ⁷³ went from 26.26 Mdb to only 9.96 Mdb (SAT, n.d.b). It is worth mentioning that these products are not subject to payment of IEPS, so they are used as a means of evasion for the introduction of fuels (SAT, n.d.b).

⁷³ Sum of base oils and finished oils.

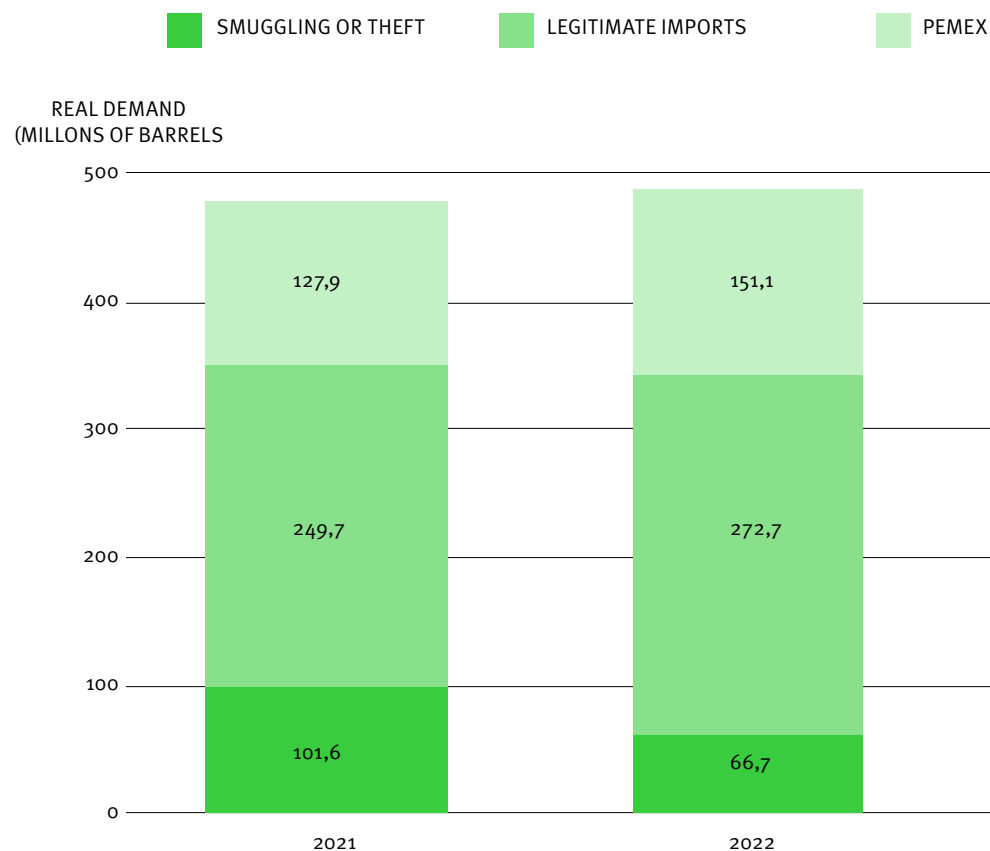
SAT has recognized that, between 2018 y 2021 estimated fuel smuggling increased by 122.7%. In 2021, 21 out of every 100 liters of fuels consumed in the country came from smuggling
SAT, n.d.

In this sense, the SAT notes another revealing fact: in 2022, the demand for lubricants was 5.5 Mdb, so the supply –despite the incentives– exceeded the demand for lubricants by 81.1% (SAT, n.d.b). In other words, we continue to observe imbalances in lubricant and fuel markets.

Although it enjoys a valid fiscal basis and is convincing to a large extent, the official explanation leaves room for doubt when economic agents (private, Pemex, and smugglers) analyze the variations in supply. It should be noted that the loss in fuel smuggling and theft (–34.9 Mdb) is not offset by the growth in legitimate imports (23 Mdb). As seen in Figure 16, both private and Pemex gained market share in 2022, almost to the same extent (Pemex absorbed 50.2% of the supply growth) (SAT, n.d.b) (Graph 18).

Since October 2019, the CEO of Pemex acknowledged in Congress that the company did not have effective control mechanisms to ensure no differences between production and balances in refineries and distribution terminals, making it vulnerable to the illicit fuel market. This lack of capacity is made evident in the reports filed by Pemex with the U.S. SEC. In these documents, Pemex admitted not having –until at least 2018– adequate internal controls to limit losses due

**GRAPH 18. REAL FUEL DEMAND AND SUPPLY
(PEMEX, LEGITIMATE IMPORTS AND SMUGGLING OR THEFT)
(MILLIONS OF BARRELS), 2021 & 2022**



Source: In-house elaboration with information from tax and management reports of the Tax Administration System (SAT) (SAT, s.f.; s.f.b).

to the illegal theft of derivatives (León, 2022). This implies that the information on hydrocarbon theft (in volume) ends up being imprecise (incomplete), and the calculations are mere guesstimates.

The company's technical limitations and weak internal controls facilitate the so-called huachicol and fuel smuggling. This was already warned by the Superior Audit Office of the Federation (ASF) in February 2019 (ASF, 2020), when it found that Pemex Logística presented a 36.2% decrease regarding measuring stations that monitor pipeline pressures and flows, looking for anomalies that could indicate that there is a loss of containment, going from 47 stations in 2017 to 20 stations in 2018 (ASF, 2020). At the beginning of the same year, 170 out of 379 SCADA (Supervisory Control and Data Acquisition) system monitoring sites (ASF, 2020) (45 %) were out of operation due to vandalism or lack of repairs (40 were sabotaged between 2015 and 2018), while 98 were never installed (among these cases were strategic facilities such as the Salamanca Refinery) (León, 2022).

The oil market has caught the attention of the López Obrador administration and transnational organized crime, not only gasoline and diesel. The public sector has taken over the Jet Fuel market –fuel for the avi-

ation industry ATF or avtur– (Turbosina in Spanish), where competition was already weak, almost at the time of announcing the entry into operation of an airline managed by the armed forces. At the beginning of 2023, Cofece determined the existence of barriers to competition in the relevant markets of the ATF⁷⁴ value chain and concluded the following:

- » The barriers to competition identified generate restrictions to the efficient functioning of the markets for the commercialization, storage, and dispensing of jet fuel, the primary input for air transportation (Cofece, 2023).
- » ATF represents between 25% and 30% of airlines' operating costs. Hence, the existence of barriers to competition in the markets of its value chain impacts airlines and could indirectly impact consumers in the prices of air transportation services (Cofece, 2023).

The ATF market's monopoly is again in the hands of Pemex, and it has not recovered pre-pandemic levels. The trajectory in consumption was severely affected by the pandemic. As of today, the number of flights (domestic and international) has not re-

⁷⁴ The agency had been warning about this since March 2022 in a preliminary opinion.

Pemex Logistics presented a 36.2% decrease regarding measuring stations that monitor pipeline pressures and flows, looking for anomalies that could indicate that there is a loss of containment.

covered (-4.4% concerning the accumulated from January to October 2018) (AFAC, 2022). Another fact that has deteriorated the market's performance was the downgrading, for just over two years of Air Safety Category 1, the same that Mexico recovered only in September 2023. Between January and November 2023, 96% of ATF imports were made by Pemex and only 4% by private companies (Sener, n.d.). In the same months, Pemex participates with 97.6% of this fuel supply (domestic production plus imports) (Sener, n.d.). In 2021, the market was barely shared between private and Pemex, 10.5% and 89.5% (Sener, n.d.), respectively (Sener, n.d.).

In this context, the behavior of the supply of LPG (another petroleum gas) should not be strange. In 2000, the supply of this gas reached its historical maximum (349.2 mbd); by 2023, it will be -18.1% lower than that year's supply. Although consumption has remained close to the historical average in recent years, in 2020, it was also affected by the pandemic, even though confinement required families to spend more time at home. The annual growth in such consumption was -2.6% for all sectors of the economy and was even higher in families (-3%) (Sener, n.d.). It should be remembered that most Mexican house-

holds depend on LP gas (for heating food), and most do not have substitutes. Despite this, consumption has remained almost flat over the last two decades.

In this sense, during the confinement, ozone levels did not decrease; on the contrary, despite the decrease in mobility in the country's large cities, the ozone concentration increased by 17% during the second quarter of 2020 (Espinosa, 2022). Ozone concentration increased by 17% during the second quarter of 2020 (Espinosa, 2022), a phenomenon also reproduced in many countries. According to specialists consulted by Signos Vitales, the behavior is not unusual but results from higher energy consumption, particularly of LP gas in Mexican homes. This suggests that the consumption of this gas increased during the confinement, but official statistics barely indicate it. In other words, as with gasoline, the supply of LPG must be underestimated, and the 2020 crisis has exposed the imbalance.

Unlike diesel or gasoline, This oil appeared less attractive to criminal groups. Apparently, the loss due to clandestine pipelines was much lower than other petroleum products. The upward trend became noticeable in 2019 when the number of illegal pipeline extraction points increased by 497% (León, 2022).

The upward trend became noticeable in 2019 when the number of illegal pipeline extraction points increased by 497% 497% León, 2022.

According to Pemex, clandestine LP gas tapping has continued to grow since then. In the first half of 2023, there were 1,924 clandestine pipeline tappings, representing a 65% variation compared to the same period in 2022 (Rojas, 2023).

With the energy crisis at its peak and the increase in the price of LPG, the federal government intervened in the price mechanism, showing a complete lack of understanding of the phenomenon. Mexico is a price taker, and price volatility may be constant as long as Asia continues to increase the demand for these gases⁷⁵ to produce industrial plastics. This lack of knowledge and the excessive concentration of powers in the federal executive branch (displacing Cofece in its attributions) may motivate the black market for this fuel. The cost structure of small companies likely makes them less competitive with dominant companies, which ultimately generates serious competition problems.

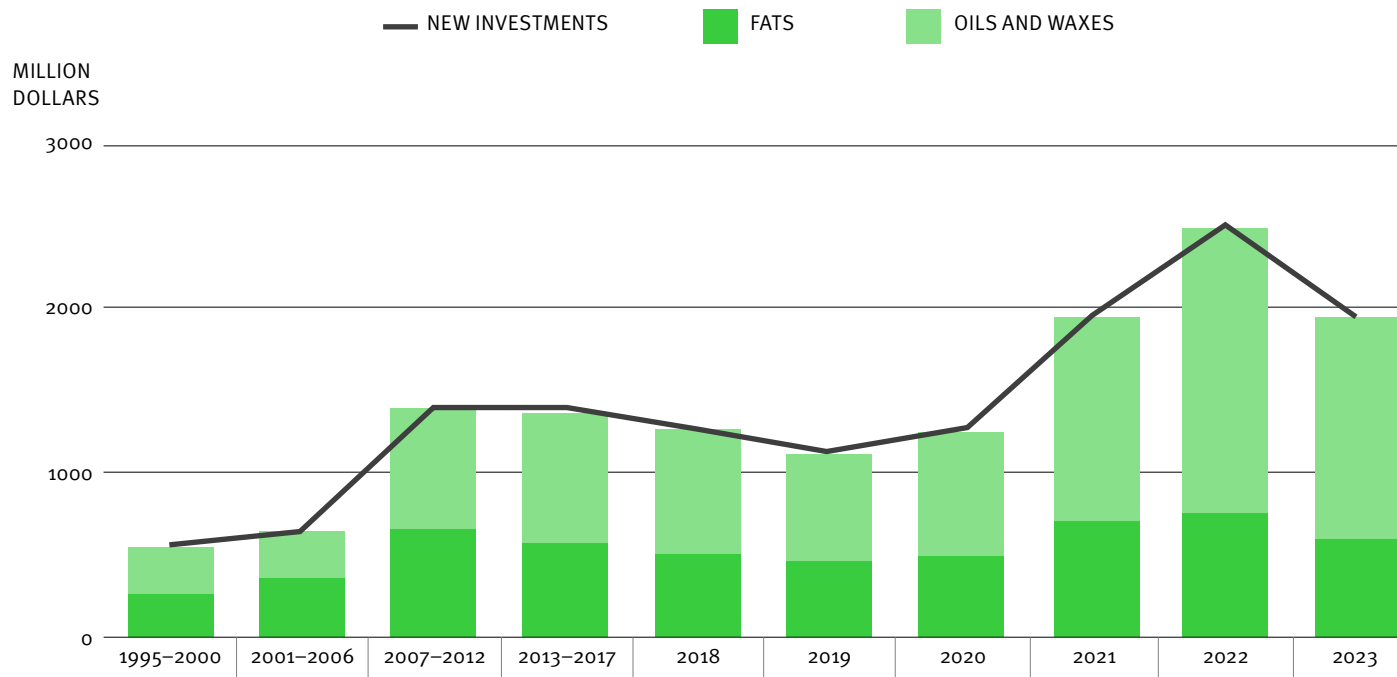
Finally, the statistical and economic evidence and the contributions of information from the SAT (published a year late) corroborate the *modus operandi*

⁷⁵ The Mexican official standard establishes that LP gas has a composition of propane and butane. Propane must be equal to or greater than 60% and less than 96% and butane equal to or less than 40%.

di of the so-called King of Huachicol. According to Héctor De Mauleón, [Sergio] Carmona [Angulo] and his brother Julio César, in 2019 administrator of the Reynosa, Tamaulipas customs, were accused of controlling the state's border crossings to traffic hydrocarbons "under the guise of vegetable oil," as well as medicines, medical equipment and bales of used clothing (De Mauleón, 2022). In November 2021, the King of Huachicol, according to various sources linked to Morena (Movimiento de Regeneración Nacional) for financing political campaigns (El Norte, 2021), was murdered in one of the safest municipalities in the country, San Pedro Garza García, Nuevo Leon (Graph 19).

Sergio Carmona's death may have ended with documentary evidence or his own testimony. Still, it did not end the imports of animal or vegetable fats and oils. The increase in the prices of edible oils, the product of the energy crisis and Russia's invasion of Ukraine was the prelude for fuel smuggling to be hidden under that veil of dollars. Between 2019 and 2022, the growth of imports was 124.2% (variation of 1,389.8 million dollars) (Banxico, n.d). With preliminary figures for 2023, we know that the problem is still there (1,799.7 million dollars in imports) (Banxico, n.d.e), even after reducing the prices of certain oils and that

**GRAPH 19. IMPORTS OF ANIMAL OR VEGETABLE FATS
(MILLION DOLLARS)**



Source: In-house elaboration with information from (Banxico, n.d.e). *Figures for 2023 are preliminary and correspond to the accumulated figures from January to November of the same year. For the six-year period, it is the annual average.

The increase in the prices of edible oils, the product of the energy crisis and Russia's invasion of Ukraine was the prelude for fuel smuggling to be hidden under that veil of dollars. Between 2019 and 2022, the growth of imports was 124.2% (variation of 1,389.8 million dollars) Banxico, n.d.

2023 will undoubtedly be the second with the highest imports since records have been kept.

3.2 Pemex's numbers

In Mexico, the insufficiency of domestic production of petroleum products to supply the aggregate demand for these products is evident. The participation of imports is essential in all markets: as of November 2023, 70.2%, 62.6%, 64.3%, and 64.5% of the known supply of gasoline, diesel, LP gas, and jet fuel are imported (Sener, n.d.). Pemex's results indicate that this dependence will continue, even with the operation of the Dos Bocas Refinery (RDB for its acronym), which will expand the installed refining capacity by 350 mbd (in the best case scenario) (when its total capacity is used), and the acquisition of the Deer Park Refinery (RDP) in the United States (adding another 350 mbd)⁷⁶.

The objective of producing the gasoline that the country needs is clearly unattainable with Pemex's installed capacity (refining capacity of 1.64 Mbd), added to the deterioration of the National Refining System (SNR)⁷⁷: the configuration of the refineries

(three of the six SNR refineries require reconfiguration), the predominance of heavy crude oil extraction (in October 2023, 62.8% of total extraction is heavy crude) (Sener, n.d.) which is incompatible with these facilities, low oil production anchored to other variables and oil theft.

Despite the data-based criticisms, the Ministry of Energy (Sener) and Pemex were faithful to the President's discourse. Even after the energy crisis began, Pemex continued with the same strategy and accelerated the refining volume. In 2021, Pemex sent 16.3% more oil to refineries than in 2018 (Sener, n.d.). The above may have been a watershed in the company's management because oil prices remained historically high. The result is widely known: Pemex increased refining volume, and waste (fuel oil) grew to a greater extent (40.6% variation between 2018 and November 2023), while the company's accumulated losses were concentrated in Pemex Transformación Industrial (PTI) (80% of the total, 790 billion pesos) (Barnés, 2023). In 2023, 29.2% of refined products are waste (260.3 mbd). The window of opportunity for high prices was missed.

At Signos Vitales, we have observed that if this process continues, our dependence on oil will accelerate

Pemex increased refining volume, and waste (fuel oil) grew to a greater extent (40.6% variation between 2018 and November 2023), while the company's accumulated losses were concentrated in Pemex Transformación Industrial (PTI) (80% of the total, 790 billion pesos) Barnés, 2023.

⁷⁶ These refineries have similar technical characteristics in terms of refining capacity and configuration.

⁷⁷ The SNR consists of six refineries: Salamanca, Minatitlán, Tula, Madero, Salina Cruz and Cadereyta.

(most likely slightly). Mexico will go from being a net oil exporter to a net oil importer and will also continue to import gasoline. On the other hand, Signos Vitales estimates are based on gasoline sales statistics reported by Sener. Considering the black hydrocarbons market, more than 2.1 Mbd of oil is required to produce the necessary gasoline and diesel, which Mexico does not produce. The goal becomes more distant and will end up affecting Pemex's current account and delicate financial position.

In addition to the disaster that this administration will inherit in energy matters, the financial and social costs will be extremely high. The federal government has transferred the company's financial debt to the Mexican State in such a way that between 2019 and 2023, the federal government has transferred to Pemex 992.8 billion pesos in direct support (capital contributions, fiscal stimuli and other aid) in addition to other discounts to the DUC (Derecho por la Utilidad Compartida) for 457.1 billion pesos (what Pemex has stopped paying to the State). The DUC rate went from 65% in 2019 to 40% in 2022 (IMCO, 2023).

All of the above adds up to 1 trillion 450 billion pesos. This sum does not consider that in October 2023, Pemex received 55.9 billion pesos (IMCO, 2023). Of the total, 175.8 billion pesos (12.1%) were allocated

to the RDB (IMCO, 2023). As warned by the Ley de Ingresos de la Federación (–Federal Revenue Law– LIF for its acronym in Spanish) and the Proyecto de Presupuesto de Egresos de la Federación 2024 (–Federal Expenditure Budget Project– PPEF for its acronym in Spanish), support will continue in the last year of López Obrador's administration. According to the LIF 2024, Pemex's tax burden will be reduced to 30%. According to the Federal Expenditure Budget for the same fiscal year, another 170.9 billion pesos will be allocated in equity contribution (SHCP, 2023). The initially proposed reduction of five percentage points in the DUC would generate savings of 4 billion dollars in the year (Moody's Investors Service, 2023). The mix of these elements will end up supporting the financial surplus of 145 billion pesos foreseen in the PPEF 2024 (SHCP, 2023b). Otherwise, the balance would be in deficit.

Rating agencies do not favor direct intervention by the federal government. At the same time, Pemex is unable to cover its financial obligations. The company is expected to record a negative cash flow of –\$4.4 billion in 2024 (Moody's, 2023). Other surprising decisions are the decrease in capital expenditures (–49% annually, –12.2 billion dollars) and operating expenses (–4.3%, –400 million dollars) (Moody's,

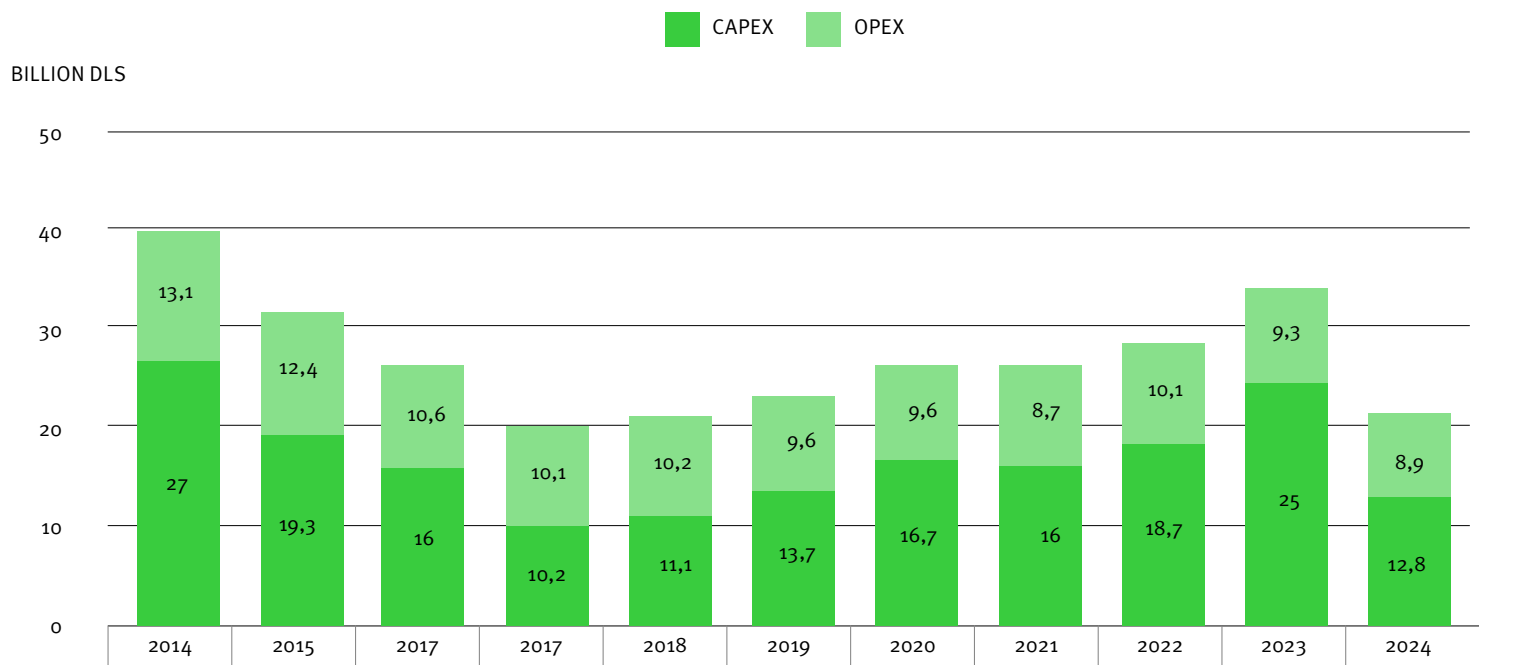
According to the Federal Expenditure Budget for the same fiscal year, another 170.9 billion pesos will be allocated in equity contribution SHCP, 2023.

2023). The dramatic reduction in capital investment erodes the company's future revenues. Lower investment in exploration decreases the probability of new discoveries and consequently depletes proven reserves. The reduction in current spending calls into question the operation of the RDB for the following year, as Pemex faces pressures to cover additional expenses (Graph 20).

The ratio of short-term assets to short-term liabilities is 0.45. In other words, the value of its most liquid assets is not even half what it owes in the short term. Pemex is unable to cover its expenses. In addition to the above, Pemex is also overexposed to exchange rate depreciation; as of September 30, 2023, only 17% of the financial debt is contracted in

GRAPH 20. INVESTMENT AND OPERATING EXPENSES

(CAPEX AND OPEX) 2014 – 2024* (BILLION DLS)



Source: In-house elaboration with information from Pemex (2023) and Moody's (2023). *2024 is the proposed budget.

Mexican pesos (357 billion pesos or 20.3 billion dollars). The remaining 83% is in foreign currency (85.6 billion dollars), mainly dollars and euros (79.2% of the total) (Pemex, 2022). The pandemic crisis highlighted this fact. Then, to avoid acquiring debt, and as a supposed show of strength, between December 31, 2018, and the close of the third quarter of 2023, the company has increased its commercial debt (suppliers) by 122.4%, from 7.6 (Pemex, 2022b) to 16.9 billion dollars (Pemex, 2022c). Neither the federal government's direct and indirect support nor the suppliers' account increase have been sufficient. Pemex must amortize 50.1% (934.1 billion pesos or 53 billion dollars) of its total debt balance in the next four years (October 2023 to September 2027) (Pemex, 2022).

In the face of its insolvency, Pemex has had to refinance its debt repeatedly. The cost is higher than if the Mexican State carried out this refinancing. On January 31, 2023, Pemex announced its "successful" return to the international capital markets. This operation, with which Pemex obtained 2 billion dollars at a ten-year term and a rate of 10.4%, only represents a success for the investors who bought this bond since they obtained almost double the return they would have had if they had purchased a federal government bond at the same term. Every year, we Mexicans will

be paying 100 million dollars more than we should for this decision, reaching a waste of one billion dollars, 18 billion pesos, over the life of these bonds (Werner *et al.*, 2023). While the cost of Petrobras' debt is only 0.5 percentage points higher than Brazil's sovereign debt, Pemex's debt costs are between 4 and 6 percentage points higher than Mexico's sovereign debt (Barnés, 2023).

This has resulted in Pemex's rating being downgraded, making credit more expensive in international markets. Pemex has entered into a vicious cycle of downgrades, increased credit, and government intervention (due to Pemex's inability to meet its obligations). According to Banxico, downward adjustments in the sovereign and Pemex credit ratings are among the five main macro-financial risks, which, if they materialize, could affect financial stability (Banxico, 2023b). In addition, the international financial environment (rising interest rates) has contributed to the increase in the financial cost of debt.

Another alarming figure is the company's reported net cash income of 36.2 billion dollars. According to CIEP, future revenues represent 23.7% of Pemex's total debt. The result shows the risk that Pemex faces in meeting its payment obligations in the future, as

Pemex must amortize 50.1% (934.1 billion pesos or 53 billion dollars) of its total debt balance in the next four years (October 2023 to September 2027) (Pemex, 2022).

Downward adjustments in the sovereign and Pemex credit ratings are among the five main macro-financial risks, which, if they materialize, could affect financial stability (Banxico, 2023).

future revenues expected until 2047 would not be enough to cover the current debt (CIEP, 2023).

For the company to float during 2024 and for the next federal administration not to face very short-term liquidity problems, without considering the operational issues that will not have a quick and painless solution, it is highly probable (based on the budget expansions of previous years, at least since 2019) that López Obrador's administration will end up transferring in its last year of government a figure close to 250 billion pesos. Even though the federal government has brought Pemex so many resources, close to those disbursed in 2014 (40.1 billion dollars), many of which are capital expenditures (around 64.7% between 2019 and 2024), these have not been enough to cover the company's capital requirements.

According to the National Hydrocarbons Commission (CNH for its acronym in Spanish), to increase production from 1.67 to 2.35 Mbd during López Obrador's administration (2019–2024), an average of 26.6 billion dollars per year should have been invested, of which Pemex should have contributed 19.1 billion dollars of the total and the rest by the private sector (7.5 billion dollars) (Signos Vitales, 2022b). In 2022, the investment was approximately 18.7 billion dol-

lars. Of this investment, 17.3 billion dollars (90.7% of the capital requirements) will have been allocated to exploration and production (Pemex, 2023b).

Pemex's contribution is decreasing. Duties and taxes paid by Pemex between 2007 and 2012 represented 35.1% of federal government revenues (4 trillion 427 billion pesos); in the Peña Nieto administration, Pemex contributed 15.2% of such revenues (3 trillion 2 billion pesos) (Barnés, 2023). In the López Obrador administration, Pemex has contributed the equivalent of 5.9% of federal government revenues; however, when discounting the capital contributions made by the same government to Pemex (798 billion pesos), the company's net contribution to public finances between 2019 and 2023 is only equivalent to 2.3% of the federal government's total revenues (575 billion pesos) (Barnés, 2023). Pemex has a lower participation in the country's public life, both in absolute and relative terms.

Pemex's net contribution to public finances between 2019 and 2023 is only equivalent to 2.3% of the federal government's total revenues (575 billion pesos)

Barnés, 2023.

3.3 Energy policy and the environment: Pemex and CFE role

State-owned productive enterprises, Pemex and CFE, play a decisive role in the deterioration of the environment. Air and water pollution have been of no concern to the directors of these companies. On the one hand, both companies will consume most of the demand for natural gas in Mexico, modifying the energy matrix in the long term (at least for the next 10 years). Oil extraction, increased oil production, and electricity generation in combined cycle plants will demand more significant quantities of natural gas every year. The danger of this policy is that natural gas will leave its place as a transitional energy source.

In 2022, PTI presented the highest natural gas consumption levels in the last seven years (349.6 MMSCFD) and only below the consumption of 2014 and 2015 (historical maximum of 385.3 MMSCFD). The variation in consumption concerning 2018 is 40.1% (100 MMSCFD). Still, refined products have grown by 23.5% (Sener, n.d.) in the same four years (Sener, n.d.). Although the consumption level is comparable to the consumption in 2013 (348.7 MMSCFD), the production of gasoline, diesel, kerosene and LPG is lower by -38% (-166.3 mbd), -53.3% (-167.1 mbd), -45.6%



Image: Pemex Tower in Mexico City at <https://www.dondeir.com/ciudad/estos-son-los-edificios-mas-impresionantes-de-la-cdmx-conocelos/2023/05/>

(-27.7 mbd) and -55.3% (-113.9 mbd), respectively (Sener, n.d.). The only oil product that maintains a level close to that of that year is fuel oil (-3.9% or -10.5 mbd) (Sener, n.d.). To a large extent, the company's inefficiencies explain the growth in demand since Pemex now requires more energy than in the past to produce the same unit of petroleum products.

There are at least two factors that explain these inefficiencies: flaring and venting of natural gas (natural gas utilization) and the increase in oil extraction through artificial techniques (pneumatic pumping) (477 MMSCFD or 7.9% in 2022) (CNH, 2023). In September 2021, natural gas utilization reached its lowest level on record (85.2%). In all of 2021, unutilized natural gas was 13.1% (493 MMpcd) (CNH, 2023). This means that a large part of the volume of natural gas is wasted.

Despite the improvement in utilization in the last months of 2022, the volume of untapped natural gas during the year is 137% higher than in 2018 (variation of 226 MMSCFD. According to information from the CNH, Pemex is still far from its utilization goal (98%). This case is worrying because of its environmental effects. Although natural gas is less harmful to the environment than other fossil fuels, such as fuel oil,

it is 80 times more potent than CO₂ in heating the atmosphere. It can remain there for around ten years.

This gas leak coincides with the gas leak recorded between December 8 and 27 of the same year (excluding the 16th and 17th and the nights of the 17th, 24th, and 26th) in the Gulf of Mexico, near the coast of Campeche in one of the largest producing fields in Mexico. Recent research shows that during 17 days of

In 2022, Mexico ranked as the world's seventh-largest gas-flaring country

IBRD, 2023.



Image: Burning natural gas in Mexico at <https://es-us.noticias.yahoo.com/quema-gas-m%C3%A9xico-alcanza-r%C3%A9cord-131545433.html>

2021, an ultra-emission (venting) event of methane (3.36 million tons of CO₂) occurred, which is equivalent to approximately 3% of Mexico's oil and gas emissions (Irakulis–Loitxate *et al.*, 2022) (Graph 21).

Among the commitments acquired by Mexico in the framework of COP 27 is to mitigate flaring and venting in oil and gas operations. This commitment was reaffirmed at COP 28. Now, it has a stronger and more precise tone, recognizing that the world must accelerate and substantially reduce emissions other than carbon dioxide, particularly methane emissions, by 2030 (FCCC, 2023). In 2022, Mexico ranked as the world's seventh-largest gas-flaring country (IBRD, 2023). However, Mexico does not produce anywhere near the same amount of oil and associated gas as several countries ahead of it: Russia, Iraq, Iran, Algeria, Venezuela, and the United States. Consistent with previous years, flaring during 2022 was dominated by a relatively small number of countries, with nine responsible for 74% of flaring volumes and 45% of global oil production⁷⁸ (IBRD, 2023).

The CFE is also a participant in these methane leaks. Recent studies show that on May 12, 2019, there was

⁷⁸ In addition to the seven countries mentioned in the same paragraph, Libya and Nigeria should be added.

an extreme release of this gas at El Encino–La Laguna (EELL) in Durango⁷⁹. The release, to get a clear idea of the instantaneous magnitude of this leak, lasted 3 hours at a variable rate of 260 to 550 metric tons of methane per hour, totaling 1,130 to 1,380 metric tons (Watine–Guiu *et al.*, 2023). International experience indicates that this type of release ranges from 10 to 100 tons per hour (Watine–Guiu *et al.*, 2023). The event is comparable to the Nord Stream pipeline rupture in 2022 (Watine–Guiu *et al.*, 2023). According to the same research, assuming that natural gas from the Permian region has a methane content of 80%, it can power between 3,600 and 4,400 Mexican urban homes for one year (Watine–Guiu *et al.*, 2023).

Although researchers selected May 12 to produce the most prominent methane plume, satellite data show this is not an isolated event. Large methane plumes are also observed from three block valve stations along the EELL pipeline on 11 days between April 7 and May 24, 2019 (Watine–Guiu *et al.*, 2023). These types of extreme releases are extremely difficult to detect and quantify because evidence shows that they can last less than an hour due to deliberate venting.

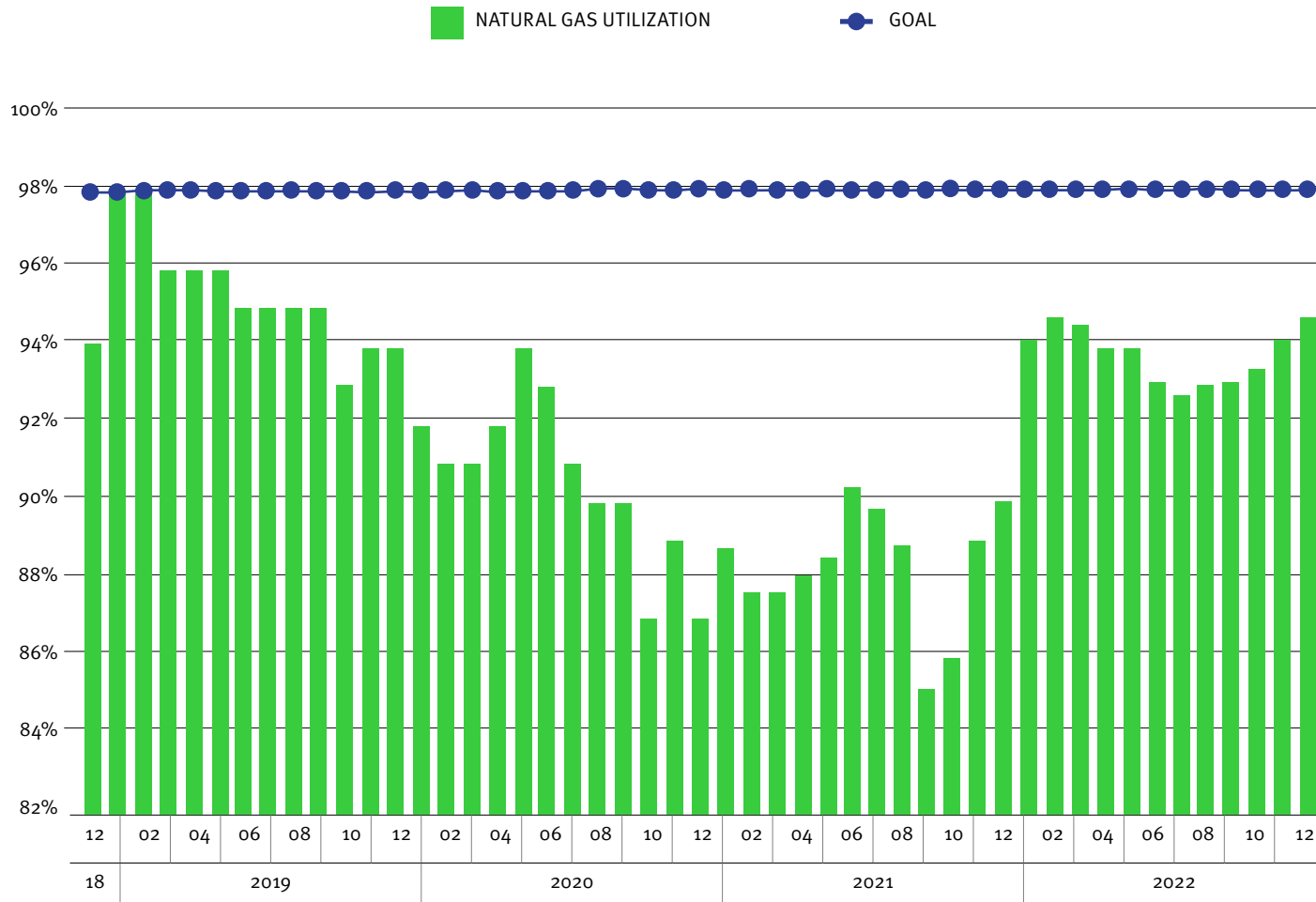
⁷⁹ The El Encino–La Laguna pipeline is part of the Wahalajara pipeline system that supplies Mexico with natural gas from the Permian Basin in the United States. It transports 1.5 Mmpcd of natural gas from Chihuahua to Durango.

During 17 days of 2021 an ultra-emission (venting) event of methane (3.36 million tons of CO₂) occurred, which is equivalent to approximately 3% of Mexico's oil and gas emissions

Irakulis–Loitxate et al., 2022.

The CFE is also a participant in these methane leaks. Recent studies show that on May 12, 2019, there was an extreme release of this gas at El Encino–La Laguna (EELL) in Durango.

GRAPH 21. NATURAL GAS UTILIZATION
(DECEMBER 2018 – DECEMBER 2022) (%)



Source: In-house elaboration with information from (Banxico, s.f.c).

International organizations such as the World Bank consider that oil-importing countries have much to do with this problem, as they acquire oil or gas from the countries most responsible for the phenomenon. However, the Mexican government continues to make commitments, as it did at COP 28, without the slightest concern about receiving any type of sanction or trade restriction in the future. The underlying reason lies in the focus of its energy policy. When Pemex has to send more heavy oil to its refineries, it will reduce its foreign sales, as it has recently acknowledged.

The obstinate policy of increasing the supply of petroleum products has resulted in the continued growth in fuel oil production, a petroleum by-product. Due to its high sulfur content, this petroleum product has fallen into disuse, especially in the maritime and electricity industries (except for Mexico). Given the low demand and the multiple restrictions on consumption, this by-product has a lower price than crude oil itself (export price of 38.4 dollars per barrel between January and November 2023) (on average -46% lower than crude oil during 2023) (Sener, n.d.) In other words, oil is more valuable as primary energy (for export) than a processed product in Mexico.

In addition to the increase in waste production and natural gas waste, Pemex is the protagonist of oil

spills. The last two, which occurred in July 2023, had an extension of 467 square kilometers, equivalent to twice the size of Guadalajara. The accident occurred off the coast of Campeche, 80 kilometers from Ciudad del Carmen, on the Ek Balam Tango Alpha platform (owned by Pemex), part of the Cantarell Complex. Given the direction of the slick, it is expected to land on the coasts of the Gulf of Veracruz, Tamaulipas, or the United States (UNAM, 2023). In this regard, the information was made known by researchers and various media but not promptly by the company itself.

Pemex reluctantly acknowledged, and after being exposed with satellite images, not without first minimizing the facts, that the spill began between July 3 and 4 and was contained until July 22. On July 18, Pemex estimated that it was 58 m³ (365 barrels of oil), which affected an estimated area of 0.06 km², where the thickness of the oil film is estimated at one millimeter (Pemex, 2023c). According to the head of the Specialized Prosecutor for Crimes against Animals, the Environment and Ecosystems of the Campeche State Attorney General's Office, the most significant concern is that the oil will reach the ten mangrove zones identified by Conabio (National Commission for the Knowledge and Use of Biodiversity) in the coastal zone of Campeche (Arellano, 2023). The offi-

In Mexico oil is more valuable as primary energy (for export) than a processed product.

cial assures that this is an ecocide that must be dealt with as soon as possible.

Since 2021, a group of 40 scientists attached to the Colegio de la Frontera Sur, the Instituto Superior de Centla, UNAM, the Universidad Autónoma de Baja California, and the Universidad Autónoma del Carmen have analyzed more than 1,500 satellite images with which they have issued 36 reports of suspected spills in the Campeche Sound (Gulf of Mexico) that have been brought to the attention of the Secretary of the Navy, the Agency of Security, Energy, and Environment (Asea for its acronym in Spanish) and the National Commission of Natural Protected Areas (Conanp for its acronym in Spanish) (Arellano, 2023).

Pemex has become a focus of global attention not only for its outrageous level of financial debt but also for its operational inefficiencies that result in negative externalities and environmental and public health impacts. CFE has been contaminated by many of these bad decisions, as it is part of the fuel oil value chain, but the bad practices in the management of natural gas are also replicated by the latter.

Mexico is shaping up to be a country highly dependent on hydrocarbons. Along the way, it does so with deficiencies and generates more negative externali-



ties than its counterparts worldwide. Between January 2020 and December 2021, the investment packages of 38 countries and international organizations had a mix of fossil fuel and clean energy-intensive sectors, 41% (515 billion dollars) and 38%, respectively. In Mexico, investment was almost entirely focused on fossil fuels; about 82% of the investment (\$8.7 billion dollars) in Mexico was only in fossil fuels in the same years, which is double the world average. Turkey, Indonesia, and Russia were other countries with characteristics similar to the Mexican economy that followed the same practices (amounts close to 100% of investment destined for fossil fuels) (Welker, n.d.).

Image: "ASEA should act upon hydrocarbon spill in Campeche". Photo: Lino Zentella at <https://www.elheraldo-detabasco.com.mx/local/asea-debe-actuar-por-derrame-de-hidrocarburo-en-la-sonda-de-campeche-analista-10438808.html>

3.4 Social and economic policy as a means of environmental destruction

Economic activity has negatively impacted the environment, including tree cover loss. Only six states accounted for 76.7% of all tree cover loss in Mexico between 2001 and 2022: Campeche (842 kha), Chiapas (748 kha), Quintana Roo (581 kha), Yucatán (506 kha), Veracruz (480 kha) and Oaxaca (415 kha). The most significant loss occurred in the south of the country. This region far exceeded Mexico's average tree cover loss (146 kha). Infrastructure projects and monocultures are likely the leading causes of a large part of tree cover loss. In 2021, an area of forest equal to 1.25 times the area of Mexico City disappeared in Mexico, releasing 85 megatons of CO₂ equivalent into the atmosphere.

The loss of tree cover is no coincidence. The weakening of law enforcement institutions (federal and state) and budget reductions have had their consequences. Between 2015 and 2022, Profepa carried out 5,551 administrative procedures nationwide for alleged illegal changes in forest land use. According to recent research, Profepa's information does not allow us to know how many of these procedures are exclusive of changes from forest land to agricultural land.

Profepa has only executed 1,915 sanctions (fines) for illegal forest land changes in these same years. In 2,168 procedures, it was decided not to impose any type of sanction after reaching an agreement. In 1,468 cases, there is no public information available to inform us of what happened. The impunity rate continues to rise in such a way that until 2021, only 17 crimes were sanctioned for every 100 when such a rate was 44 out of every 100 in 2017 (a reduction of -61.4%).

Six states accounted for 76.7% of all tree cover loss in Mexico between 2001 and 2022.



Image: "Deforestation and corruption, results of Sembrando Vida in the south" at <https://avispa.org/deforestacion-y-corrupcion-resultados-de-sembrando-vida-en-el-sur-de-mexico/>

3.5 Money under the mattress. Excess cash

The monetary base understood as the demand for money by economic agents, used to be a good indicator for measuring the economy's health since most transactions are settled in cash in Mexico. Despite the diversification in the use of means of payment due to the pandemic, cash continues to be the means of payment par excellence. According to the ENIF (National Financial Inclusion Survey) 2021, in Mexico, 90.1% of payments for up to 500 pesos and 78.7% of transactions for higher amounts were made in cash (INEGI, n.d). In 2018, 94.5% of purchases of 500 pesos or less and 84.9% of purchases greater than this amount were settled in cash (INEGI, n.d.q). The progress in recent years is marginal for an economy the size of the Mexican economy.

In the midst of the confinement, demand for cash jumped as never seen before. This phenomenon was replicated in other emerging economies, such as Brazil and Poland (Banxico, 2021b). It may also indicate that these were precautionary motives, as argued by Banxico (Banxico, 2021b). However, to date (September 2023), the money demand trajectory is 13.5% above the long-term trajectory (around 296.4 billion

pesos)⁸⁰. This means that after more than three years of prolonged confinement, this demand has neither stabilized nor returned to its long-term path.

This phenomenon has slowed since April 2022, after the gap peaked at 15.8% in March of that year (a gap of 309.5 billion pesos)⁸¹. However, it has remained at similar levels since then. The excess continues to be evident. As a result of this expansion, the velocity of money continues its downward trend, i.e., money changes hands at a slower rate than in the past (Graph 22).

This excess has resulted from a greater demand for higher denomination banknotes (500 and 1,000 pesos). From December 2018 to September 2023, the growth in demand for the former (with seasonally adjusted figures) has been 73% and 326.1% for the latter. In the latter, 97% of such growth occurred as of February 2021. In February 2021, there were 85.3 million pieces in circulation; by October 2023, there were already 311.6 million pieces (Banxico, n.d.e). Therefore, the hypothesis of the precautionary motive is much weaker for the highest denomination banknotes, which already total 311.6 billion pesos

⁸⁰ Signos Vitales estimates with information from Banxico.

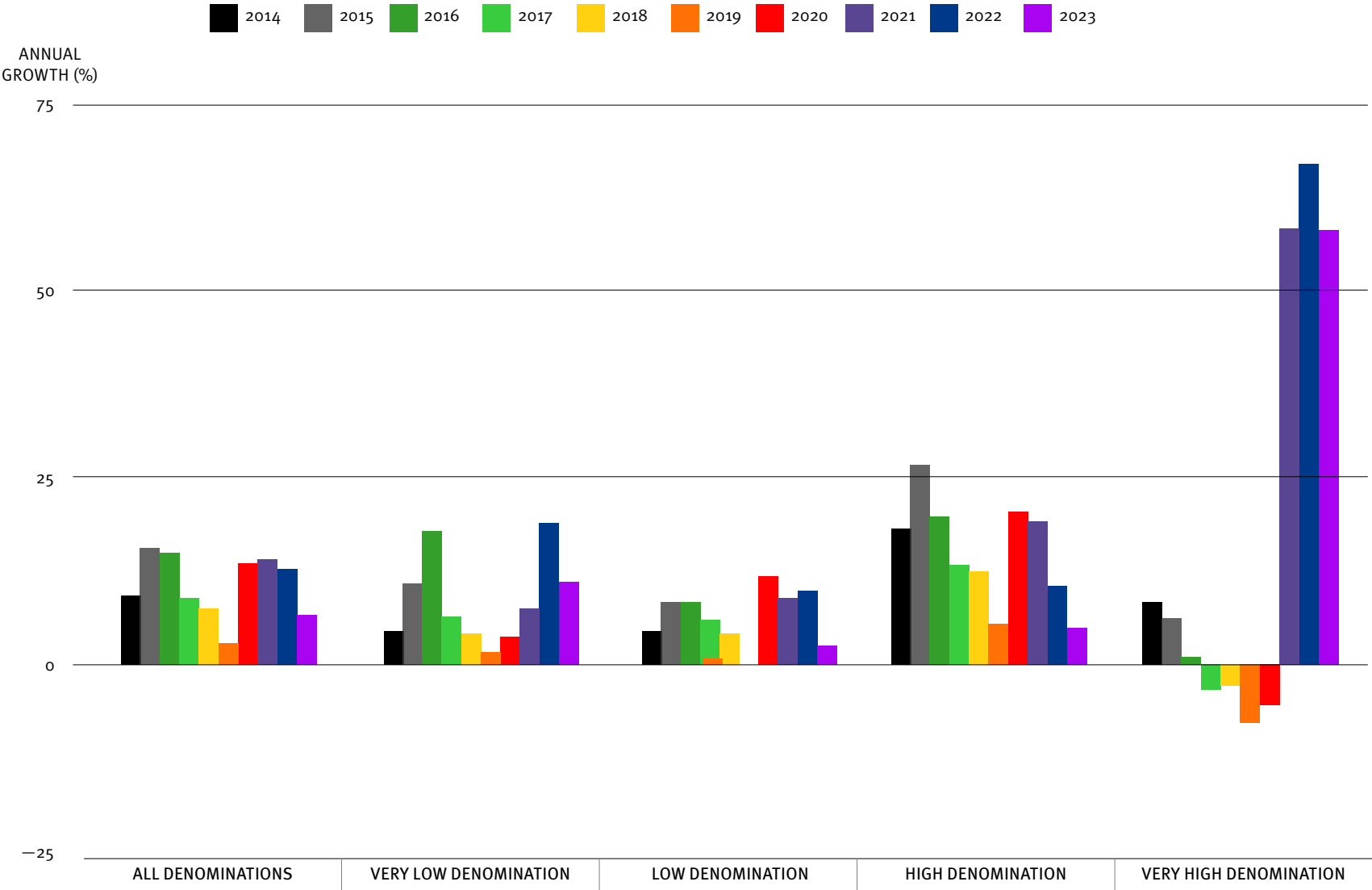
⁸¹ Signos Vitales estimates with information from Banxico.

In Mexico (2021), 90.1% of payments for up to 500 pesos and 78.7% of transactions for higher amounts were made in cash

ENIF, 2021 INEGI, s.f.p..

GRAPH 22. ANNUAL GROWTH IN DEMAND FOR BANKNOTES BY DENOMINATION

(%) (2014–2023) *



Source: In-house elaboration with information from Banxico. *Very low denomination: 10, 20 and 50 pesos bills; low denomination: 100 and 200 pesos bills; high denomination: 500 pesos bills; very high denomination: 1,000 pesos bills.

(Banxico, n.d.e), continue to increase their volume; to date, this balance represents about 12% of the monetary mass. Since February 2023, they have been the second most demanded banknote in the economy (Banxico, n.d.e), only after the 500 peso banknotes that total 1.94 billion⁸² (Banxico, n.d.e).

In the period above (December 2018 to September 2023), the Mexican economy grew in real terms by 4.2%. Until the third quarter of 2022, growth barely overcame its negative streak (0.8%) (INEGI, n.d.s). Private consumption grew by 7.6%, and despite being at the highest levels on record, it bears no relation to the variation in the demand for money⁸³. The increase in the demand for high-denomination banknotes is directly related to the increase in government money transfers and the rise in remittances. Still, even these increases are insufficient to explain the phenomenon as a whole.

To measure the magnitude of the issue, suffice it to say that if the coins and bills in circulation were distributed equally for each Mexican in the country, it would mean that as of September 2023, each Mexican would have 19,239 pesos in cash (INEGI, n.d.g).

⁸² All banknotes of the different families are considered.

⁸³ When we refer to money we are talking about the monetary base (banknotes and coins).



Image: <https://www.infobae.com/mexico/2023/10/04/ tienes-alguno-en-la-cartera-estos-son-los-billetes-en-circulacion-mas-buscados-por-los-coleccionistas-en-mexico/>

The amount of liquidity per average Mexican would mean that the availability of this liquidity is greater than that of current income (mainly wages). However, if this monetary base is only distributed among the economically active population (employed plus unemployed) (60.2 million people), the average would amount to 41,279.9 pesos in cash (INEGI, n.d). This figure is even much higher (155%) than the average base contribution salary of the insured (formal) population (532.2 pesos per day) (IMSS, 2023) (16,187.8 pesos per month on average).

Like the monetary base, the M1 aggregate (the most liquid) has grown, totaling 6.85 bdp as of Septem-

ber 2023. This includes, in addition to banknotes and coins held by the public, demand deposits (4.36 bp) (in local or foreign currency)⁸⁴. The increase of said monetary aggregate between December 2018 and September 2023 is 61.6%, and in particular, that of deposits is 53.2%; in turn, within these deposits, the assets with the lowest growth were foreign currency deposits (20.5% in the same period)^{85,86}, which is why the growth of deposits (in domestic or foreign currency) is lower than that of the entire M1.

Suppose it is estimated that at some point, there was a transfer of resources from savings to current income, that is, that families withdrew resources from their bank accounts (with immediate maturity) to dispose of them. In that case, it is impossible to prove it at the individual level with the publicly available information. Financial assets in bank accounts continued to increase before, during, and after the great confinement. In one way or another, the financial system, through banking, has not stopped capitalizing. On average, the owners of such accounts have more

⁸⁴ Includes checking accounts and current account deposits in banks and popular savings and loan institutions (savings and loan societies, popular financial societies and savings and loan cooperative societies).

⁸⁵ Seasonally adjusted figures.

⁸⁶ Deposits in local currency grew 60.7% in the same period.

liquidity than in the past despite inflation increasing by 26.3% in the same period (INEGI, n.d.).

From this, we can conclude that the average monthly rate of return on demand deposits could have been 106% higher than the average monthly inflation rate (0.41%) during the period above, which is not the case. This is not true because such a rate would have to be, on average, higher than the reference interest rate, such as the Cetes rate. Based on the previous, it can be stated that such deposits had net increases in financial capital (other than interest) from December 2018 to date. In other words, on average, account holders increased the actual balance of their accounts instead of reducing it. At the same time, the general public increased their disposition of money (many of these double)⁸⁷ with high denomination bills. Where is the cash? Why such a high denomination?

If the coins and bills in circulation were distributed equally for each Mexican in the country, it would mean that as of September 2023, each Mexican would have 19,239 pesos in cash

INEGI, S.F.G.

⁸⁷ According to the ENIF 2021, 49.1% of the population between 18 and 70 years of age (41.1 million) has some kind of formal savings instrument.

3.6 Money laundering is seen from the outside

Since the end of 2022 and throughout 2023, notable studies on money laundering and its link to transnational organized crime through foreign trade operations have been published. These studies put Mexico at the center of the discussion. We refer to five documents (in order of publication): Money Laundering from Fentanyl and Synthetic Opioids by FATF (GAFI), Trade-Based Money Laundering: A Global Challenge by Global Financial Integrity (GFI), Annual Threat Assessment of the U.S. Intelligence Community (ATAIC) by the Office of the Director of National Intelligence of the U.S. Government, The Global Organized Crime Index 2023 (GOCI 23) and Basel AML Index 2023.

Early last year, Signos Vitales reported on the well-founded possibility of money laundering operations through personal transfers (remittances), as well as other related phenomena, which was followed by a prominent journalistic investigation that López Obrador disqualified despite the evidence presented (Ore, 2023). Subsequently, in December of last year, the Financial Intelligence Unit (UIF for its acronym in Spanish) in Mexico published its National Money Laundering and Terrorist Financing Risk Assessment

2023. The results and findings of the previous publications are mentioned below.

According to FATF (Financial Action Task Force), *Organized crime groups trafficking synthetic opioids [such as the Mexicans] use a variety of methods to transfer illicit proceeds across borders. Such methods include the smuggling of large sums of cash, using cash couriers, trade-based money laundering schemes, unauthorized money and value transfer services or the banking system, and money brokers...Traffickers use front companies and shell companies to launder profits, but also to acquire drugs, precursor chemicals, and production equipment through those profits* (FATF, 2022, p. 3).

U.S. law enforcement authorities have documented numerous ways in which Mexican cartels seek to increase their ability to supply drugs to the U.S. market. These include smuggling chemicals in legitimate commercial shipments, mislabeling shipments to avoid law enforcement scrutiny, and diverting supplies from illicit purchases to the chemical or pharmaceutical sectors (FATF, 2022). Overall, the methods suggest that such drugs pass across the U.S. and Mexican borders through customs.

Traffickers use front companies and shell companies to launder profits, but also to acquire drugs, precursor chemicals, and production equipment through those profits

FATF, 2022, p.3.

Organized crime groups use professional money laundering networks to launder the proceeds of their illicit activities. Since the primary objective of professional money launderers is to facilitate the transfer of value to their clients, they rarely engage in illegal revenue-generating activities. Instead, they bring their expertise to disguise the nature, source, location, ownership, source control, and, or destination of funds in order to avoid detection. Professional money launderers often do not differentiate between drug traffickers, fraudsters, human traffickers, or other criminals needing to transfer or conceal ill-gotten gains
(FATF, 2022, p.16).

Sophisticated multinational criminal networks [say Sinaloa Cartel and Jalisco Cartel New Generation] wishing to repatriate illicit proceeds have turned to Asian money laundering organizations, a type of professional money laundering network that coordinates value transfers, often using methods that do not require the money to move across international borders
(FATF, 2022, p. 18).

Criminal organizations use front companies to import pharmaceuticals and precursor chemicals, as

well as to receive shipments of production equipment and related payments. In the case of cross-border transfers of value, they use legal entities and arrangements to transfer proceeds, using trade-based money laundering schemes and other transfers and exchanges of value
(FATF, 2022, p. 27).

According to FATF, while there are various estimates that place global trade-based money laundering (TBML) activity in the hundreds of billions, or even trillions of dollars annually, from a mapping of known TBML (court) cases worldwide from 2011 and through 2021, it identified the counted amount of TBML globally to be \$60 billion dollars (GFI, 2023).

Geographically, LTBI affected or occurred in 77 jurisdictions around the world. By prevalence, jurisdictions with the highest number of MLTB cases include the United States (16% of all cases), Mexico (10%), Colombia (6%), China (6%), and Hong Kong (3%). However, the prevalence of cases may also speak to the institutional capacity to detect and investigate such cases. On average, cases involved three jurisdictions
(GFI, 2023, p. 7).

According to the agency, MLCT, and money laundering generally, is used to launder resources generated by criminal activities.

In terms of predicate offenses, the most common include drug trafficking (43% of all predicate offenses mentioned), tax evasion or fraud (18%), other frauds or scams (7%), and corruption (6%) (GFI, 2023, p. 7).

Almost any commodity can be used in TBML schemes. The most common types of commodities used include automobiles/transportation (24% of all commodity types mentioned), metals and minerals (17%), agricultural products (13%), and textiles (11%). In total, 68 specific products were identified” (GFI, 2023, p. 8), and the most common specific product was automobiles (GFI, 2023).

The data also shed light on which methodologies are being used. Misinvoicing was the most common methodology (representing 63% of all available methodologies analyzed), followed by IVTS (informal value transfer system) (23%))⁸⁸, and combined and other methodologies (12%). Among the

⁸⁸ A payment is made to a local representative who then arranges with a counterparty in another jurisdiction to make a payment of the same amount to a specific individual.

cases of misinvoicing, the methods were very diverse and include falsification of product, country of origin, value, ownership, and even the existence of a product (phantom shipments) (GFI, 2023, p. 8).

For its part, ATAIC added in early 2023 that, *Transnational Criminal Organizations (TCOs) threaten the integrity of the United States and the international financial system by laundering billions of dollars of illicit proceeds through the United States and other financial institutions. Such organizations often use shell companies to disguise their identity. They may rely on professional money launderers or gatekeepers, such as accountants, lawyers, notaries, and real estate brokers, to access legitimate financial systems. TCOs move and launder illicit proceeds through bulk cash smuggling, exploitation of legitimate remittance channels, purchase of U.S. real estate, structured deposits, trade-based money laundering, and wire transfers (OODONI, 2023, p. 31).*

As we noted at the time, remittances were being recognized as a source of money laundering, and as we highlight here, because of their importance to the Mexican economy, our close relationship with the

Money laundering, generally is used to launder resources generated by criminal activities.

United States, and the growing trade relationship with China, so are trade-based operations.

The level of crime in Mexico for the latest edition of GOCI 23 places it without progress for two years. It is second with the highest crime rate in the continent, only after Colombia. The level of crime in Mexico exceeds the average of the African continent, and unlike what happens in the American continent, resilience in Mexico decreases, reaching levels similar to those of Honduras, Guatemala, or Guyana. As a result, by 2023, Mexico was on a list of 63 countries with high crime levels and low resilience (position 123). This group includes Afghanistan, Brazil, Ecuador, Iran, Pakistan, Russia, Ukraine, and Venezuela, just to mention a few (GIATOC, 2023).

The report mentions that *it is evident that the Americas have emerged as a hub for global illicit markets, as its regions consistently rank among the top three in the world for 11 of the 15 markets* (p. 100).

Unfortunately, Mexico stands out as the world's top country in criminal markets⁸⁹, followed only dis-

⁸⁹ These criminal markets refer to human trafficking, human smuggling, extortion and illegal protection charges, arms

tantly by Myanmar, Iran, Nigeria, and Colombia (GIATOC, 2023). Mexico is the third country in the world with the highest criminality (among 193 countries). According to the evidence, it does not rank above Myanmar or Colombia, first and second, respectively, because Mexico has no foreign actors and a lower presence of private sector actors. Although within criminal actors, a more significant presence of state-integrated actors can be observed at the same level as in Colombia.

One of the most relevant conclusions of GOCI 23, and in the tone of this report, is that in 2022, *organized crime took advantage of the discrepancies and fissures between countries and the global illicit economy posed a collective challenge* (GIATOC, 2023, p. 16).

The index results also show that financial crimes predominate in 17 of the 20 largest economies in the world, including Mexico⁹⁰. According to the GIATOC

trafficking, trade in counterfeit products, illicit trade in excisable consumer goods, crimes against flora, fauna, non-renewable resources, trade in heroin, cocaine, cannabis, synthetic drugs, cybercrime and financial crime.

⁹⁰ In addition to Mexico, the following economies are included: the United States of America, China, Japan, Germany, India, the United Kingdom, France, Italy, Russia, Brazil, Australia, Spain, Indonesia, Switzerland, Saudi Arabia and Turkey.

The Americas have emerged as a hub for global illicit markets, as its regions consistently rank among the top three in the world for 11 of the 15 markets

GIATOC, 2023.

Mexico stands out as the world's top country in criminal markets, followed only distantly by Myanmar, Iran, Nigeria, and Colombia

GIATOC, 2023.

report, this also shows that rich countries are not immune to organized crime.

Lastly, Mexico has not progressed in other essential measurements, such as the Basel AML Index 2023, which measures exposure to the risk of money laundering and terrorist financing. This index places Mexico in the 73rd position out of 152 countries analyzed. However, it should be noted that the vast majority of the economies ahead of Mexico in this ranking are much smaller, except for China (27th place). For example, Haiti, which ranks first in the Basel AML Index 2023, has a GDP of 20.25 billion dollars (The World Bank, n.d.), Myanmar, which also seems to be an international hotspot (third place in this ranking) whose economy has a size of 62.26 billion dollars (The World Bank, n.d.). Even if organized crime organizations generated their entire GDP, they represent only 1.4% and 4.2% of Mexico's GDP, respectively.

Conclusions

Transnational organized crime is taking advantage of the international situation, even more so than the very nations with the greatest potential to capitalize on the lengthening of global value chains, such as Mexico. These groups are taking advantage of the abrupt increases in food and oil prices due to the Russian invasion of Ukraine and the energy crisis. They are also capitalizing on the institutional weakness to which the Mexican state has been subjected with the loss of capacity to care for and protect the environment.



IV. CONCLUSIONS:
WHO IS IN CHARGE HERE?



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Mexico's economic growth over the last five years has been extremely poor and will average around 1% per year during the Lopez Obrador administration. However, in the last biennium, the trajectory of GDP (cumulative growth of 6.4%) and various macroeconomic variables are far from the trajectory observed in the last three decades. This behavior has led the industrial sector to be theoretically overshoot (4.91% above its potential) and the economy as a whole to exceed its potential by close to 0.9% (Banxico, 2023). And even if it returns to its long-term path, this episode should not be overlooked.

This overheating is largely explained by the explosive growth of construction activity (annual variation of 24.1% or 309.5 billion pesos) (other than housing),

whose only precedent is that of the third quarter of 1996 (26.5% annual rate), and the growing wave of Mexican exports to the United States, which reached a relative maximum of 10.7 billion pesos in the third quarter of 2022. But even the number of exports is such that industrial activity should have increased more than was observed. In other words, the level of manufacturing activity does not correspond to the amount invoiced in exports, even in 2023, when its growth rate slowed down.

Supply shortages are indeed being made up for with persistent and growing deficits with Asia and, to a lesser extent, Europe. This tells us that many shipments from Mexico are practically re-exported with very low domestic content. The IMF and other inter-

The level of manufacturing activity does not correspond to the amount invoiced in exports, even in 2023, when its growth rate slowed down.

national agencies have termed these types of economies as connector economies and describe the event as a process of lengthening global value chains (not relocation). However, even with these anomalies, the industry continues to produce above its potential, even considering Pemex (which almost always subtracts), the collapse in electricity transmission and distribution, and the change in the composition of automotive production in Mexico.

It has been very comfortable for various actors in the Mexican economy to attribute this expansion to the so-called relocation of investments. However, after analyzing 91 branches of industry, as well as the effects of the labor subcontracting reform, we estimate that its impact is highly modest since in 2023, it will have contributed barely 0.26% to GDP, mainly through four activities: manufacturing of agricultural machinery and equipment, for construction and the extractive industry, electronic components, bodywork and trailers, and other transportation equipment. The vast majority of industrial activities (65 branches) have been seriously affected in their production, and their growth has slowed down concerning the levels before the interwar period.

There is no way to expand supply without new investments that have not arrived. Between the first and third quarters of 2023, new investments are only 2.8 billion dollars (8.5% of total FDI). These data are in line with the information provided by the INAI through a review appeal (RRA 15655/23) to the IMSS so that at the end of 2023, the net variation of employers (new and reinstated employees, minus departures) with a workforce equal to or greater than 500 jobs (large companies) is only three (two in the transformation industry). With information from the same resource, we know that at the end of 2014, the growth of companies with the same characteristics was nine, the same year in which new investments amounted to 5.8 billion dollars.

In addition, investment decisions are being altered by the local government's weakness of public security institutions and the lack of clean and affordable electric power despite isolated efforts in distributed generation. In 2019, insecurity motivated 5.5% of economic units in the country to cancel investments (273.9 thousand units). Protection expenses and losses associated with crimes accounted for 0.92% of GDP (Signos Vitales, 2022).

In addition, climate change and the *El Niño* phenomenon seriously threaten production, given the limited availability of potable water. Also, the path to opening a formal business in Mexico is proving to be more cumbersome than six years ago. In 2023, only 33.8% of attempts to open a business were successful, compared to 49.1% in 2017. Nevertheless, efforts are notable in some entities in the north and center-north of the country. There is very little evidence of the arrival of private capital (other than López Obrador's emblematic works) in the south of the country, despite the opportunities opening up for the Yucatán peninsula in energy matters and to some extent for the Isthmus of Tehuantepec. Without the constant flow of resources to López Obrador's emblematic works, the collapse of the secondary sector in the south is imminent.

In a manner of speaking, the high amount of reported exports is too large for Mexico in view of the inability of the aggregate supply to expand. At the same time, its modest expansion does not correspond to the needs of the industry. On the other hand, the excess of imported inputs (other than capital) (235.3 billion pesos between 2017 and 2023) tells us about the other side of the coin: various final consumer goods, disguised as inputs, pass through Mexico's borders

daily. The most exemplary case is that of fossil fuels, such as gasoline and diesel, which are registered as oils. In this case, Pemex is negligent by allowing the loss of technological capabilities despite the supposed control of the Ministry of Energy and the SAT in an attempt to reduce smuggling.

We also note that, as with fossil fuels (in disguise), transnational smugglers have taken advantage of the rise in prices (mainly commodities) due to the Russian invasion of Ukraine and the tensions between China and the United States. In other words, professional launderers and smugglers capitalize on abrupt price increases to hide profits from other activities, concealing the actual volume and product imported or exported (even if the volume is nearly zero). This brings to light two of the severe problems of foreign trade accounting (not only in Mexico):

1. Volumes traded, both exports and imports. In Mexico, the amounts are treated statistically, not the quantities (volume). The personnel processing this information is highly experienced and capable but extremely limited in number. This experience is similar to what we observed with money laundering through remittances. Almost no attention is paid to the volume of operations.

The path to opening a formal business in Mexico is proving to be more cumbersome than six years ago. In 2023, only 33.8% of attempts to open a business were successful, compared to 49.1% in 2017.

2. The fragility of the administrative records of foreign trade.

According to the National Risk Assessment 2023, ANAM (Mexico's National Customs Agency) recognized in a straightforward way, after several international organizations pointed out to Mexico at the end of last year, that money laundering in foreign trade occurs mainly around invoice fraud and modification of supporting documents. In other words, there are false prices in some foreign trade operations (UIF, 2023).

It should be noted that these supporting documents (–custom declaration– pedimentos in Spanish) feed the balance of payments statistics and, consequently, the GDP. These operations have severe implications on the composition of aggregate demand, i.e., they distort macroeconomic indicators such as fixed capital, private consumption, and intermediate goods and send false signals at the microeconomic level (markets) (deficits or surpluses). The doubt then lies in the information sent to INEGI through administrative records, i.e., it is not produced by INEGI (INEGI only processes it and makes the relevant estimates). This report addresses four areas of great relevance: Pemex operating information, construction companies, the automotive industry, and foreign trade.

By far, the most important administrative records (in value) are those related to foreign trade, so our analysis was more in–depth. Still, we should not lose sight of other records, such as those associated with the primary sector of the economy. The primary sector has increased its productivity per employed person unusually, despite all the shortcomings exposed. Between September 2015 and September 2023, productivity in the primary sector grew by 20.5%, in contrast to the notable drop of –8.4% in the total economy (INEGI, n.d.j).

As a result of these weaknesses and the evidence presented above, it can be affirmed that the measurement of the GDP is being contaminated by the (direct) manipulation of administrative records, with particular emphasis on foreign trade, due to institutional, technological, and capacity weaknesses, or the omission, and, or direct collaboration of the competent authorities, where the role of ANAM is paramount and whose head is General André Georges Foullon. Thus, in Mexico, professional launderers, tax evaders, and smugglers seem to coexist under the alleged shelter of a military authority.

It should be remembered that since its inception, the economy was conceived as a system of checks and

Several international organizations pointed out Mexico as money laundering in foreign trade, and it occurs mainly around invoice fraud and modification of supporting documents. In other words, there are false prices in some foreign trade operations UIF, 2023.

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balances; strictly speaking, it is necessary for the actors involved to act in a coordinated manner so as not to produce imbalances that generate doubts in the eyes of an outside observer. In other words, chaos can't prevail among large launderers, so a large-scale operation, such as the one occurring in Mexico, requires management. This operation would not be possible without the customs authorities' alleged omission or direct participation.

We also emphasize the moment when the phenomena summarized here converged either by chance or causality. Around that time, ANAM was created, and its first general director until October 2022 was the current Secretary General of the Government of the State of Mexico, Horacio Duarte Olivares. Like Duarte, a clique of local politicians stationed in the entities with the most outstanding commercial flow (mainly on the borders) have had ties with known smugglers. The most exemplary case is that of Tamaulipas, where the case of the Federal Deputy and President of the Budget and Public Account Commission, Erasmo González Robledo, stands out (Carbaljal, 2024). This type of organization is not strange, given that the legislation to combat money laundering prosecutes this crime at the federal level with serious deficiencies at the subnational level.

We highlight four major risks and implications resulting from the increased penetration of money laundering resources into Mexico's economy and social fabric:

1. Among the most serious implications is that of greater social acceptance, as an increasing number of people (jobs) and businesses (profits), some probably hard hit by the pandemic, may depend on the fresh resources generated by transnational organized crime.
2. The effects of this type of operation on the stability of the political system in Mexico through the financing of political campaigns, especially in the context of the 2024 electoral process.
3. Increased interference of the armed forces in civilian tasks and closer ties with transnational organized crime groups. As of the third quarter of 2023, the value of foreign trade (imports and exports) is 20.7 billion pesos, equivalent to 56.9% of global demand. Although we only analyze the flow of goods here, their work transcends the flow of people and the goods they transport.
4. Serious tax loss. It is estimated that between January 2019 and August 2023, tax evasion meant

a loss of 418.1 billion pesos for the importation of 94,391 million liters of gasoline (Carbajal, 2024).

Introducing these resources is affecting the real economy and is not only a matter of distortions or atypical data. The growing inflow of dollars via foreign trade and remittances is driving the demand for pesos, which is related to the abrupt increase, in the same years, of the highest denomination banknotes (500 and 1,000 pesos), showing that a (relatively) small number of transactions, but of high value, are carried out outside the financial system.

Based on GDP growth, the amount of high and very high denomination banknotes in circulation should be 1.88 bpd instead of 2.23 bpd, so there is a surplus of 348.6 bp as of the third quarter of 2023. According to our estimates, the surplus grew moderately since mid-2020 and gained more momentum between 2021 and 2022. Although its growth slowed by the end of 2023, it exceeded historical data (400.3 billion pesos or 23.3 billion dollars). Then, suppose this excess money supply is introduced into the real economy, as we have argued, and the velocity of money is kept constant (as of the third quarter). In that case, its value is 4.5 bpd current (annualized). From the above, we estimate that by the third quarter of 2023,

the value of bad money in the Mexican economy will be close to 14.1% of GDP⁹¹. All this only considers the most liquid and highest-value assets.

It is necessary for the Mexican State to create a façade, such as the arrival of a high flow of capital or to create a bubble in some sectors of the economy, to conceal or hide the inflow of capital of dubious origin. As we have seen, part of these resources may cover the political-electoral financing needs of the government in office. Consequently, it could be an operation of the federal government.

The value of bad money in the Mexican economy will be close to 14.1% of GDP.



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⁹¹ After calculating the velocity of money based on the identity of the quantity theory of money, and knowing the excess of money in high and very high denomination bills (differential between the long-term trajectory and the bills in circulation), we estimate the output generated by introducing that amount of money into the Mexican economy (keeping velocity constant).

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