



Regional Economic Report
October – December 2017



March 15, 2018

Outline

- I. Regional Economic Report**
- II. Results October – December 2017**
 - A. Economic Activity**
 - B. Inflation**
 - C. Economic Outlook**
- III. Final Remarks**

Regional Economic Report

- The Regional Economic Report is a quarterly publication on the recent trends in economic activity, inflation and business agents' expectations in the Mexican regions.¹
- This information is taken into account by Banco de México's Board of Governors when evaluating the economic situation and the forecast for the Mexican economy.
- The economic performance of the regions in Q4 2017 and the prospects for regional economic activity and inflation over the following 12 months are analyzed herein.

¹ For the purposes of this Report, the states of Mexico are grouped into the following four regions: Northern: Baja California, Chihuahua, Coahuila, Nuevo León, Sonora and Tamaulipas. North-Central: Aguascalientes, Baja California Sur, Colima, Durango, Jalisco, Michoacán, Nayarit, San Luis Potosí, Sinaloa and Zacatecas. Central: Ciudad de México, Estado de México, Guanajuato, Hidalgo, Morelos, Puebla, Querétaro and Tlaxcala. Southern: Campeche, Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Veracruz and Yucatán.

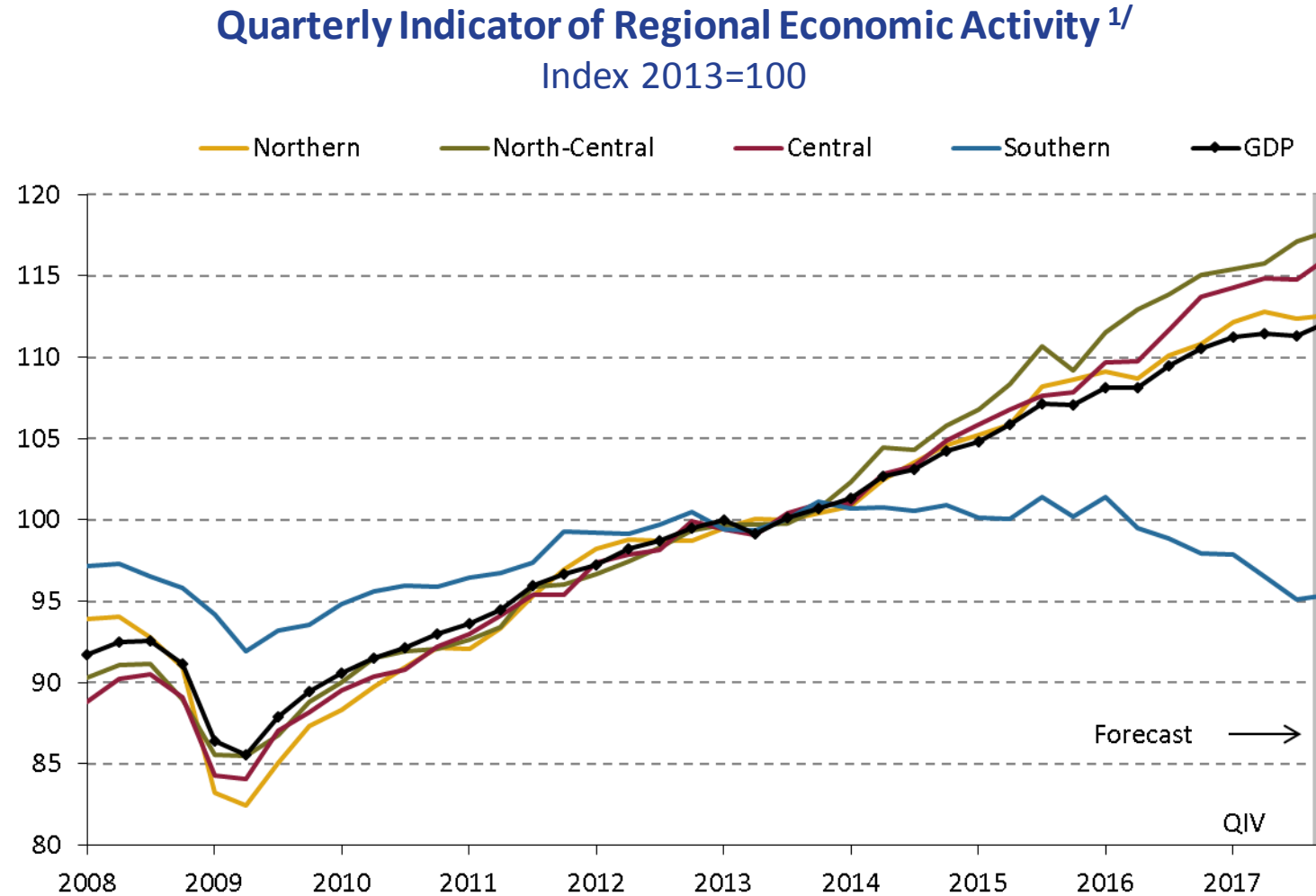
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Economic Activity

- In Q4 2017, the Mexican economy expanded significantly, which stands in contrast with the contraction in the previous one, in the wake of the September earthquakes and a major decline in the oil production platform during that month.
 - ✓ The recovery in economic activity in the fourth quarter mainly derived from the dynamism of services, despite the persistently weak performance of the industrial production.
 - This occurred in spite of a rebound in December, which was attributed to growth in the construction industry, in part, possibly associated with the reconstruction efforts following the September twin earthquakes.
- Indeed, the productive activity is estimated to have rebounded in the Central and Southern regions, in part reflecting the reestablished higher activity levels in the aftermath of the September earthquakes, and, in the South, the drop in crude oil production during that month.

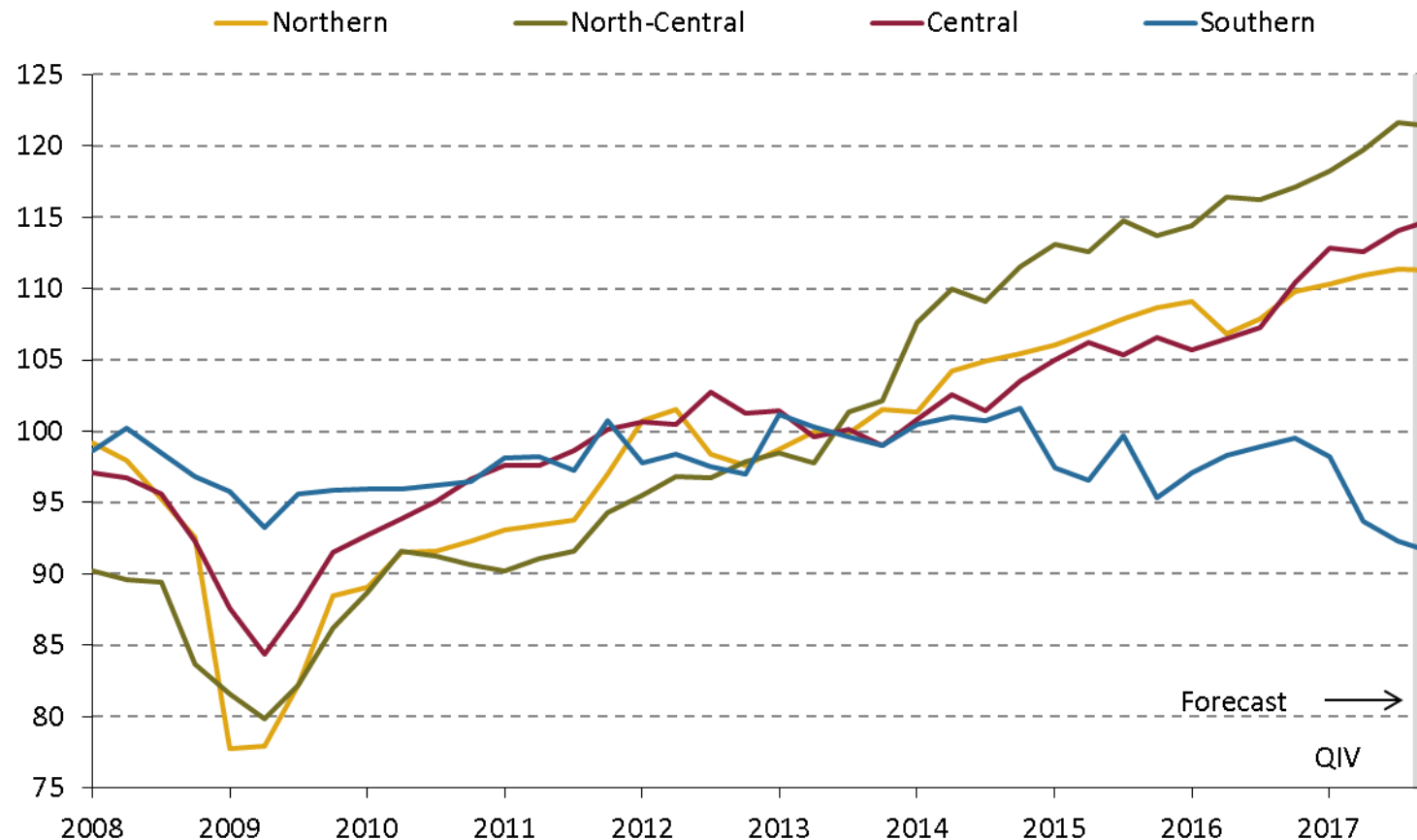
The recovery of Mexican economy in Q4 2017 in part reflected the rebound in the economic activity levels in the Central and Southern regions, as well as the expansion in the North-Central and Northern regions, following a decline in the latter region in Q3 2017.



^{1/} The value of Gross Domestic Product (GDP) for Q4 2017 corresponds to the observed data.
Source: Estimated by Banco de México with seasonally adjusted data from INEGI.

In Q4 2017, manufacturing activity showed a positive trajectory, albeit at a lower growth rate as compared to the second half of 2016. Manufacturing activity in the Central regions is estimated to have continued expanding, in the North it stagnated slightly, while in the North-Central and Southern regions it contracted.

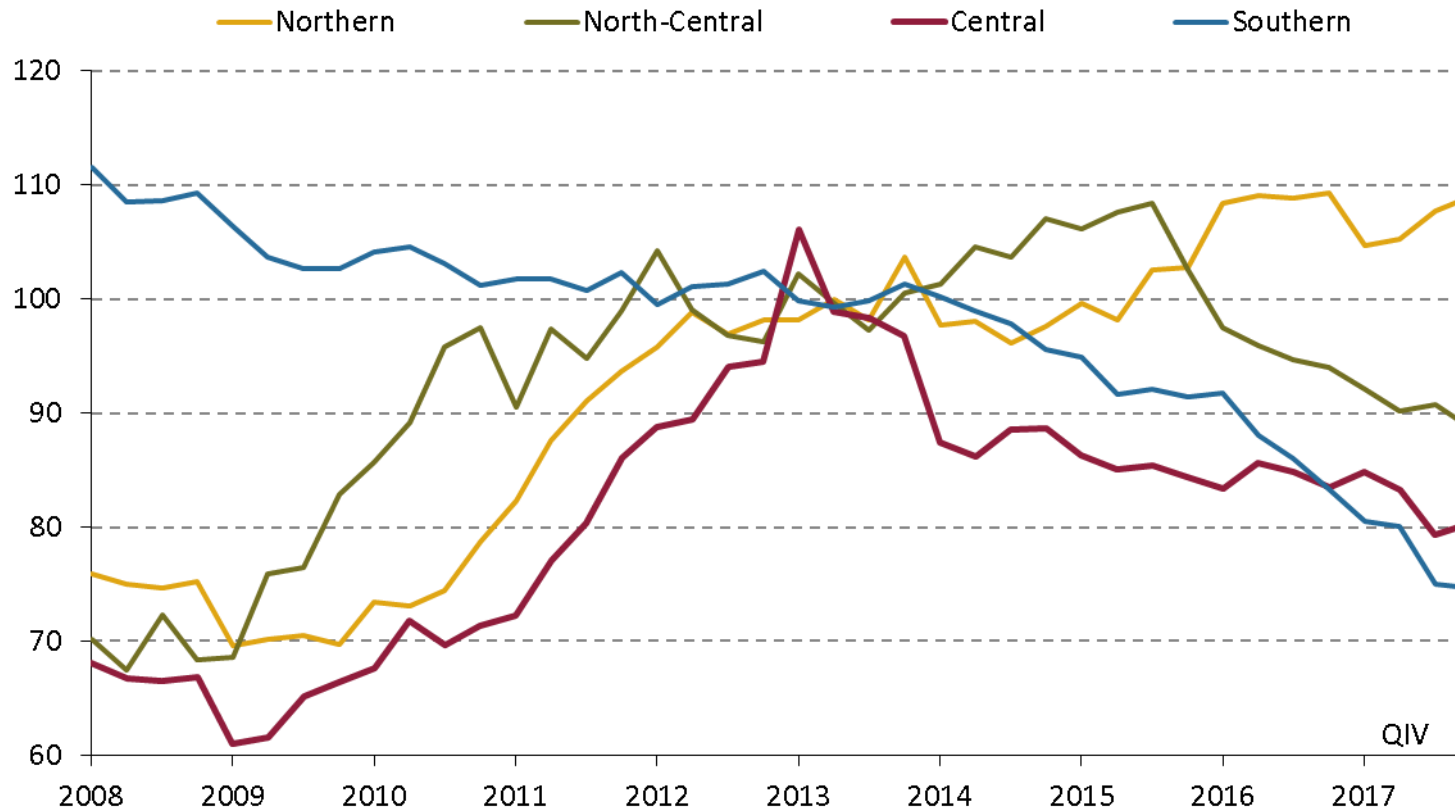
Regional Manufacturing Indicator Index 2013=100, quarterly average



Source: Estimated by Banco de México with seasonally adjusted data from INEGI.

In Q4 2017, Mexico's mining activity maintained a negative trend it had exhibited over the last few years. This sector continued to contract in the South, although at a more moderate rate than in Q3 2017. In the North-Central region, this sector resumed its downside trajectory, while in the Center it improved slightly and in the North it maintained a positive trend.

Regional Indicator of Mining Activity ^{1/} Index 2013=100, quarterly average



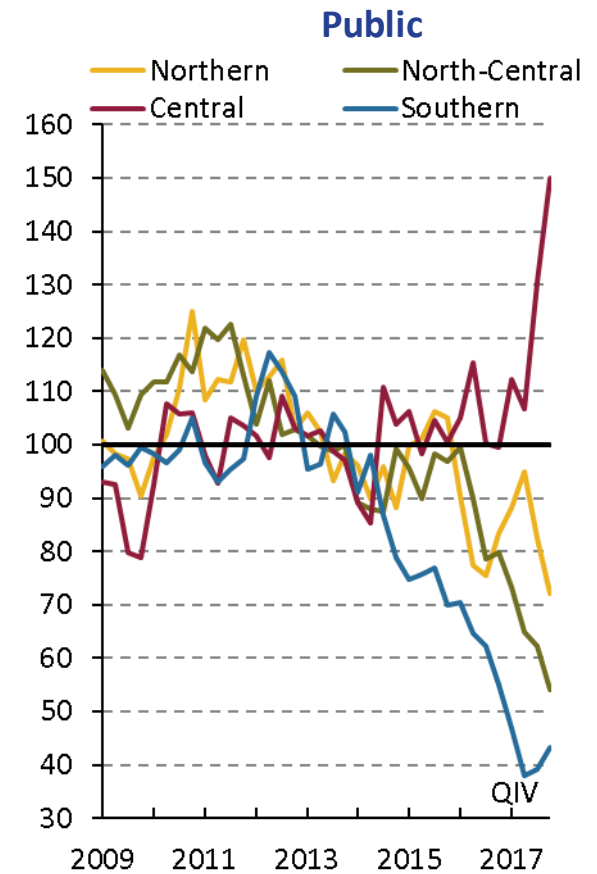
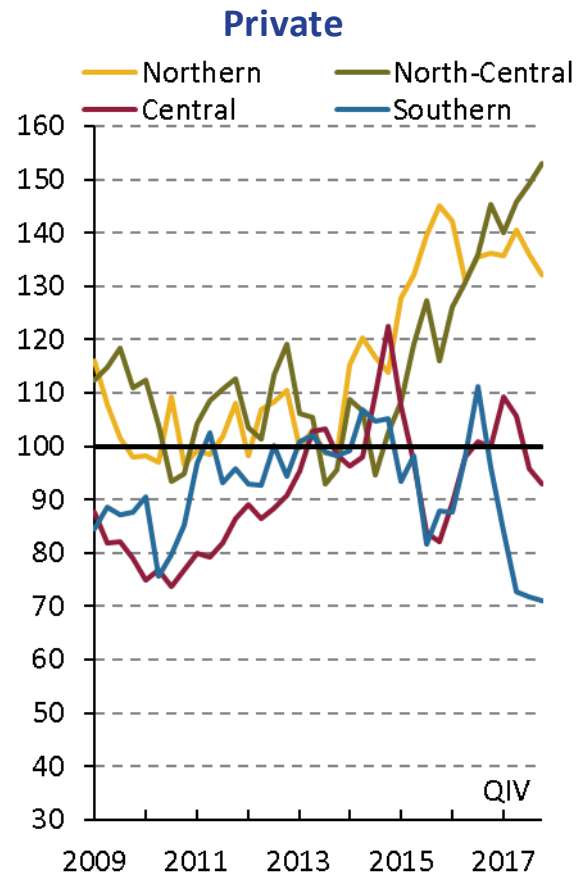
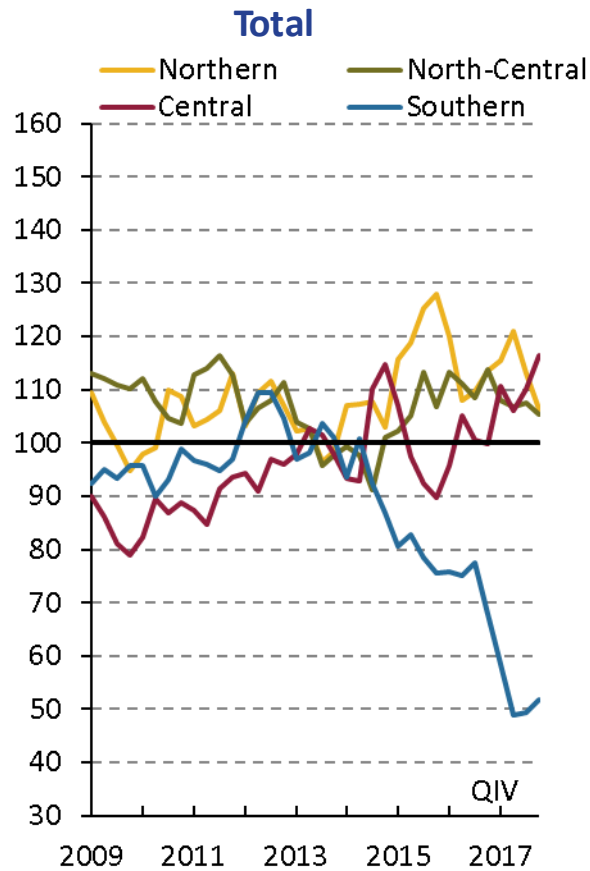
^{1/} Values in Q4 2017 are preliminary.

Source: Prepared by Banco de México with seasonally adjusted data from INEGI.

During Q4 2017, the construction industry expanded after the drop in the previous quarter. This growth is, in part, possibly associated with the reconstruction efforts following the September twin earthquakes. Therefore, it could be appreciated in the Central and Southern regions above all, where public construction works surged. In contrast, in the Northern and North-Central regions construction kept contracting, despite a rebound in private construction in the latter region.

Real Value of Production in the Construction Industry by Region

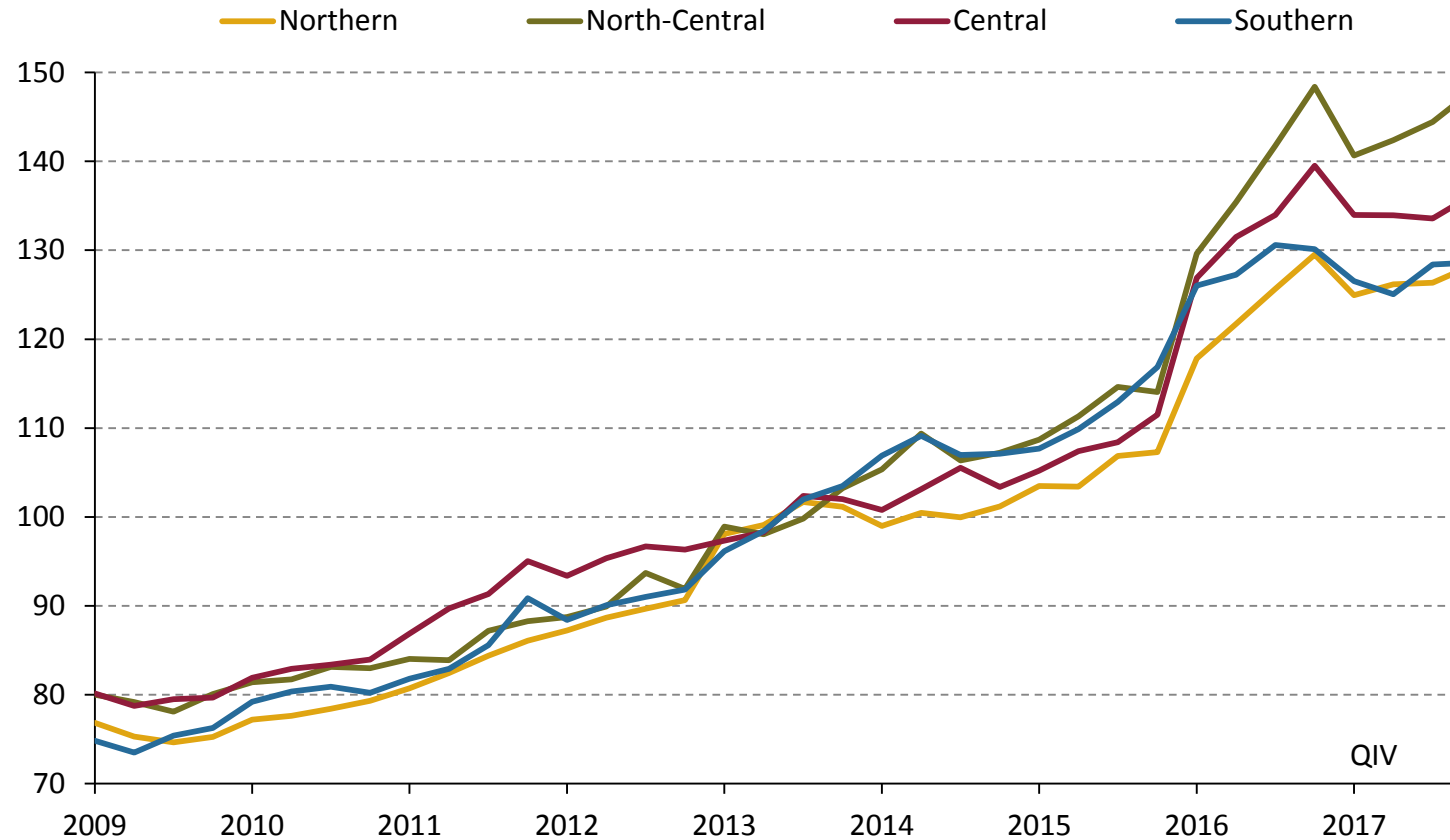
Index 2013=100, quarterly average



Source: Estimated by Banco de México with seasonally adjusted data from INEGI.

In Q4 2017, trade, measured with the index of revenues from the supply of goods and services by retail business, expanded across all Mexican regions, thus maintaining a positive trend in the North-Central, Northern and Southern regions, despite a more moderate growth rate in the South with respect to the previous quarter. Similarly, the negative trajectory that had been observed in the Central regions was curbed.

Regional Indicator of Trade Index 2013=100, quarterly average

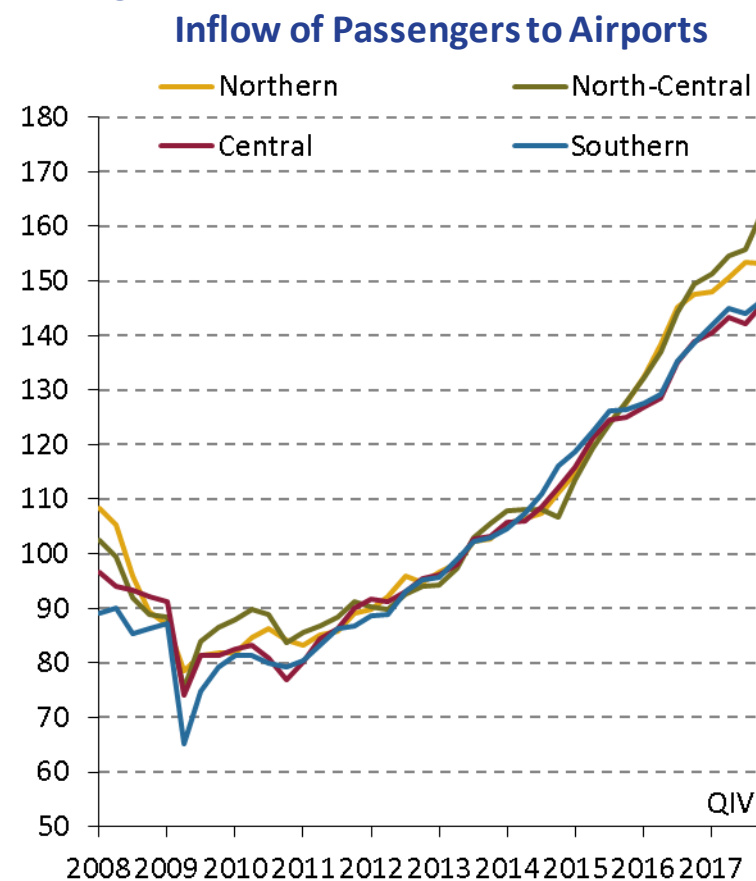
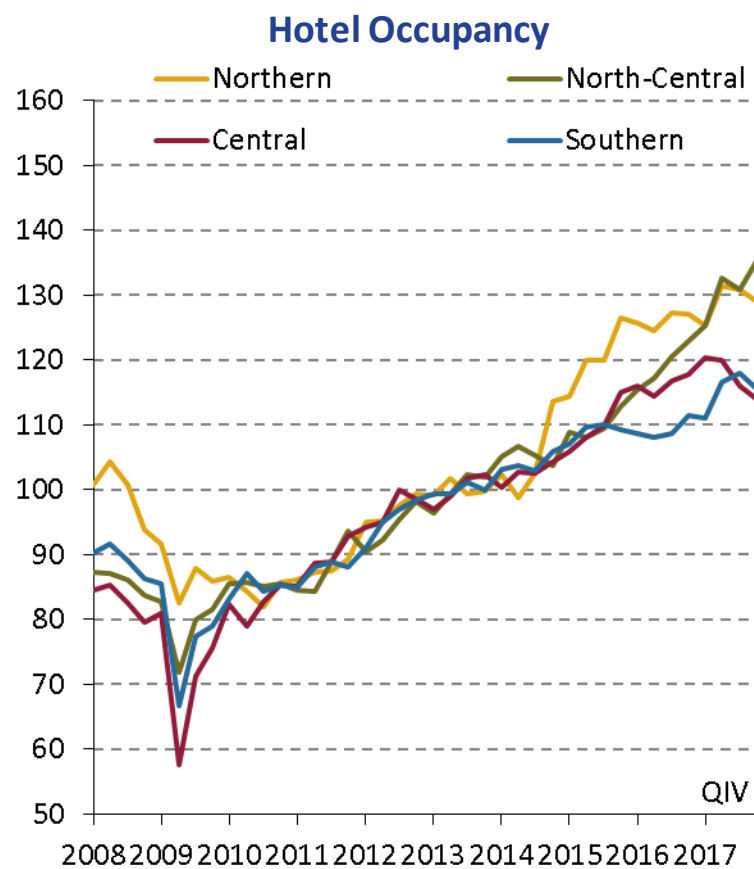


Source: Estimated by Banco de México with seasonally adjusted data from INEGI.

During Q4 2017, tourism, measured with hosting services and the inflow of passengers to airports, had a heterogeneous performance across the Mexican regions. In particular, hotel occupancy contracted in all regions, except for the North-Central one. The Inflow of passengers expanded in the Central and Southern regions, while in the North it stagnated.

Regional Indicators of Activity in Tourism

Index 2013=100, quarterly average

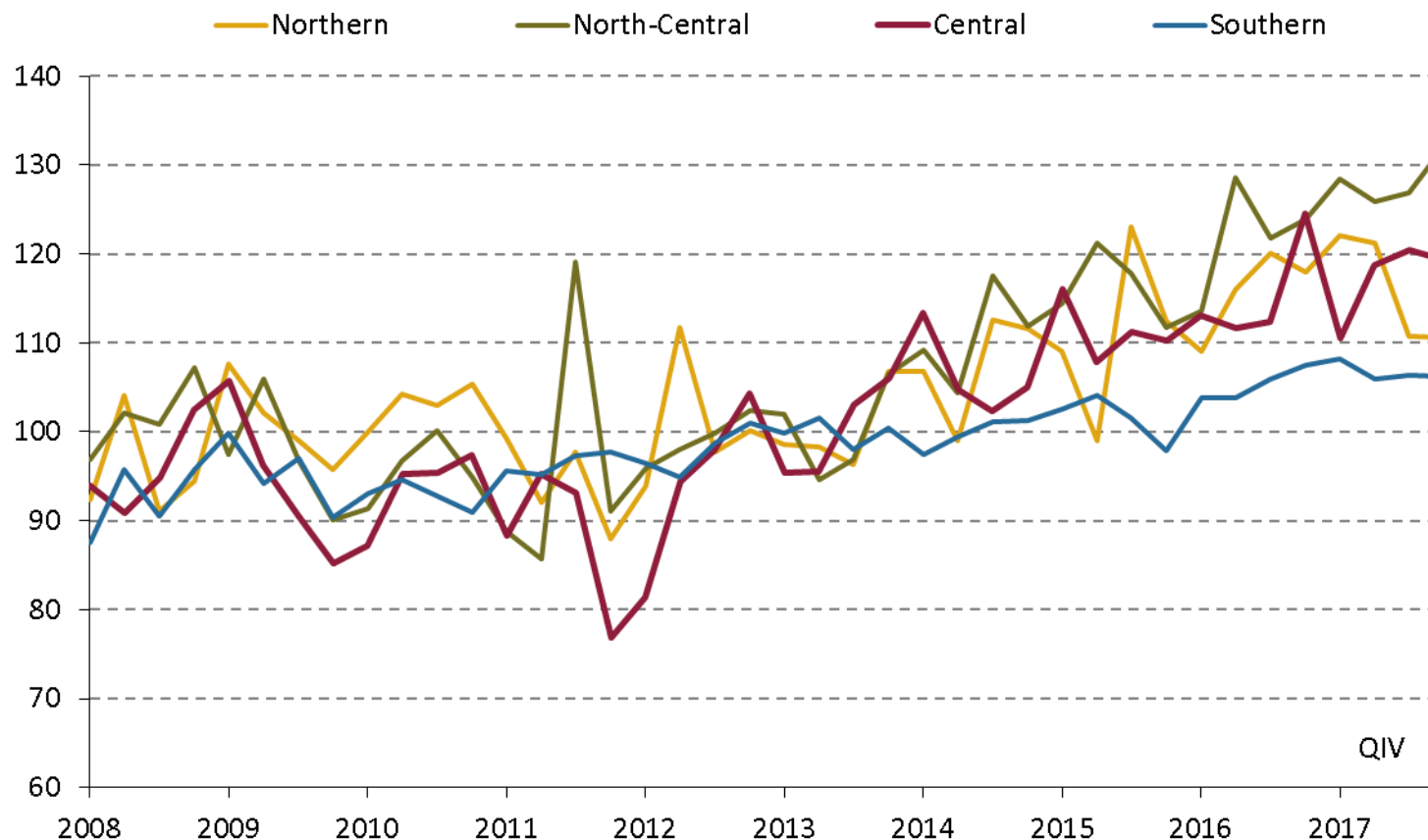


Source: Estimated and seasonally adjusted by Banco de México based on data from the Mexican Secretariat of Tourism and from Airport and Auxiliary Services (ASA).

In Q4 2017, agriculture and livestock production expanded, despite its heterogeneous performance at the regional level. Indeed, in the North-Central region this sector's production maintained an increasing trajectory, while in the North and the South the observed activity levels were similar to Q3 2017. In contrast, the agricultural activity in the Center contracted in the analyzed period.

Index of Regional Agriculture and Livestock Production

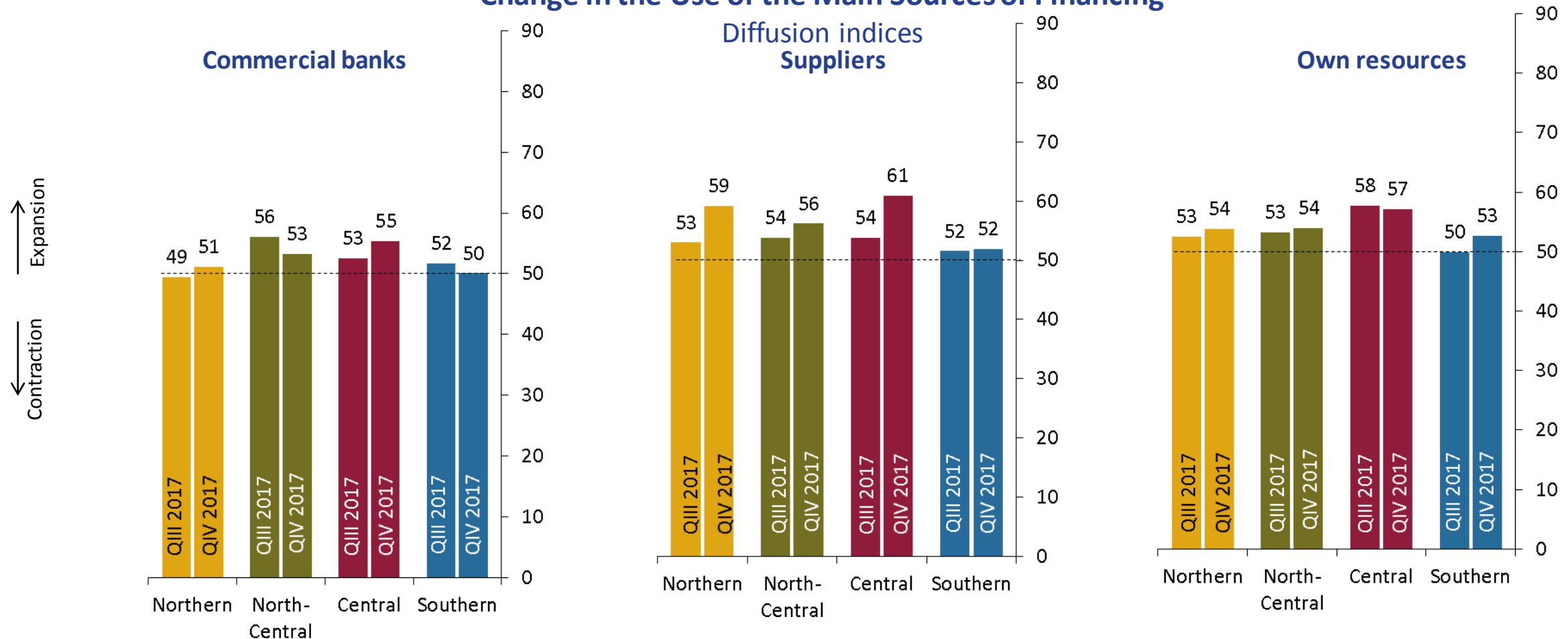
Index 2013=100, quarterly average



Source: Estimated and seasonally adjusted by Banco de México with data from SAGARPA. It should be noted that, unlike the GDP estimate, this indicator excludes information relative to the value generated by land cultivation and approximates a measurement of the gross production value, rather than that of value generated in the sector.

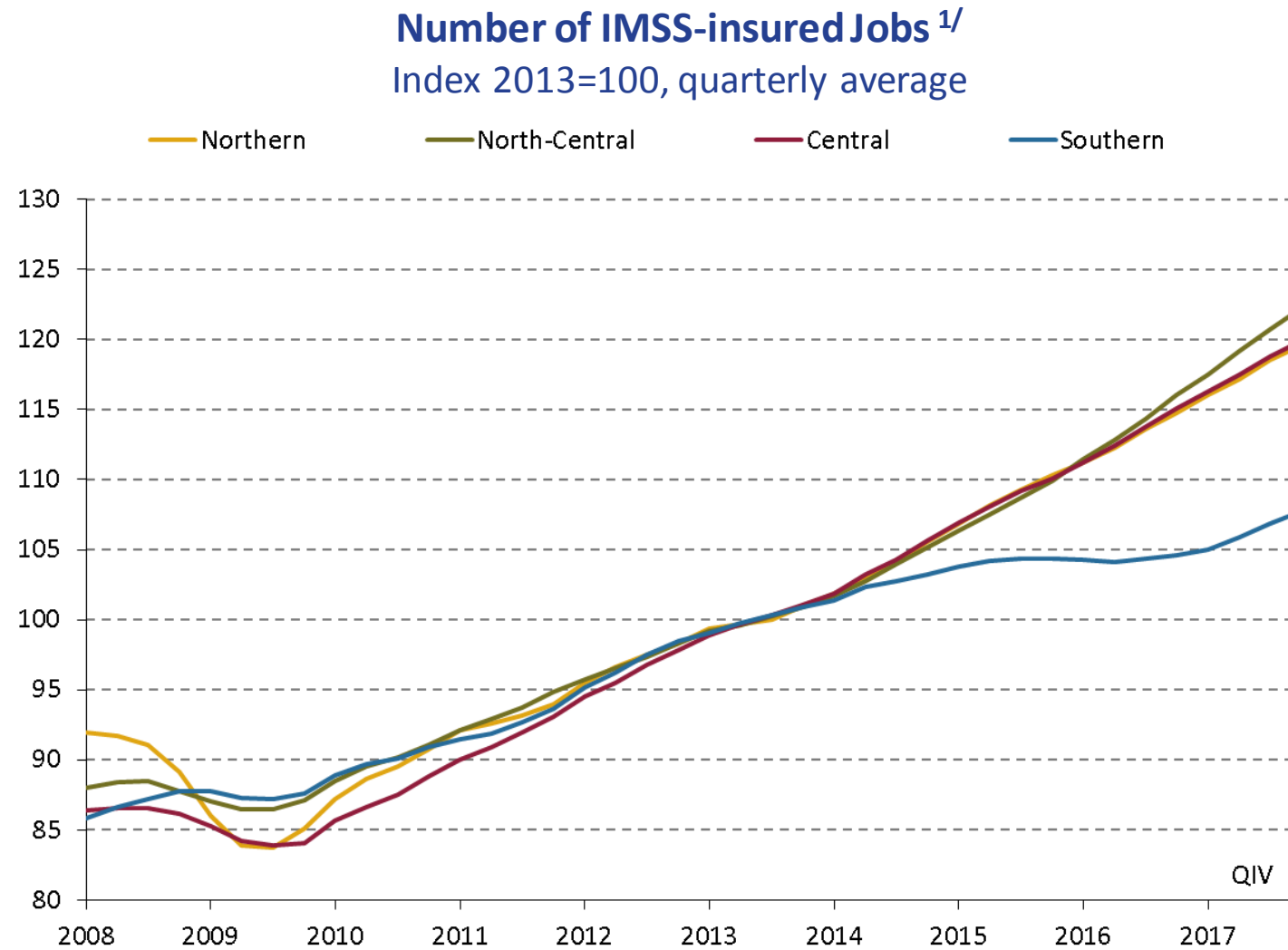
The sign of intensity in the use of different sources of financing to manage businesses was mixed across regions in Q4 2017. With respect to bank credit, this signal strengthened in the North and in the Center, and weakened in the North-Central and Southern regions. The intensity in the use of credit from suppliers increased across all regions, except for the Southern one, where it remained constant. Finally, the funding of business operations by own resources strengthened in all regions, except for the Central one, where it retreated slightly.

Change in the Use of the Main Sources of Financing



Source: Banco de México.

During Q4 2017, the number of IMSS-insured jobs continued increasing in all regions across Mexico.



1/ Permanent and temporary jobs in urban areas.

Source: Estimated and seasonally adjusted by Banco de México with data from IMSS.

Box:

Determinants of Remittances by State: 2004 - 2017

- The inflow of remittances to Mexico has been highly dynamic in recent years, particularly since 2013. At the end of 2017, the remittances reached a historic maximum of around USD 29 billion. These flows are key to the Mexican economy.
 - ✓ In line with the recent estimate of Banco de México during the period of 2015 – 2017, remittances contributed with approximately 0.3 percentage points, on average, to the annual GDP growth, although this contribution was observed above all in 2016.
- Given the relevance of remittances to the regional economic activity, this Box seeks to analyze the factors that contributed to the significant growth in these flows over the recent years.
 - ✓ In particular, it aims to explore the effect of the following factors on remittances: the U.S. economic activity, the real exchange rate, the Mexican economic activity, migration rates, and the uncertainty over the possible situation of Mexican immigrants in the U.S.

Box: Determinants of Remittances by State: 2004 - 2017

- Growth of the U.S. economic activity and the real exchange rate have a positive and statistically significant impact on the flows of remittances as a share of state GDP.
- Migration, immigrants' detention and uncertainty over the immigration policy also show a positive impact on remittances.
- In contrast, per capita GDP in Mexican states shows a negative association.

Estimated Determinants of Remittances as a Share of State GDP

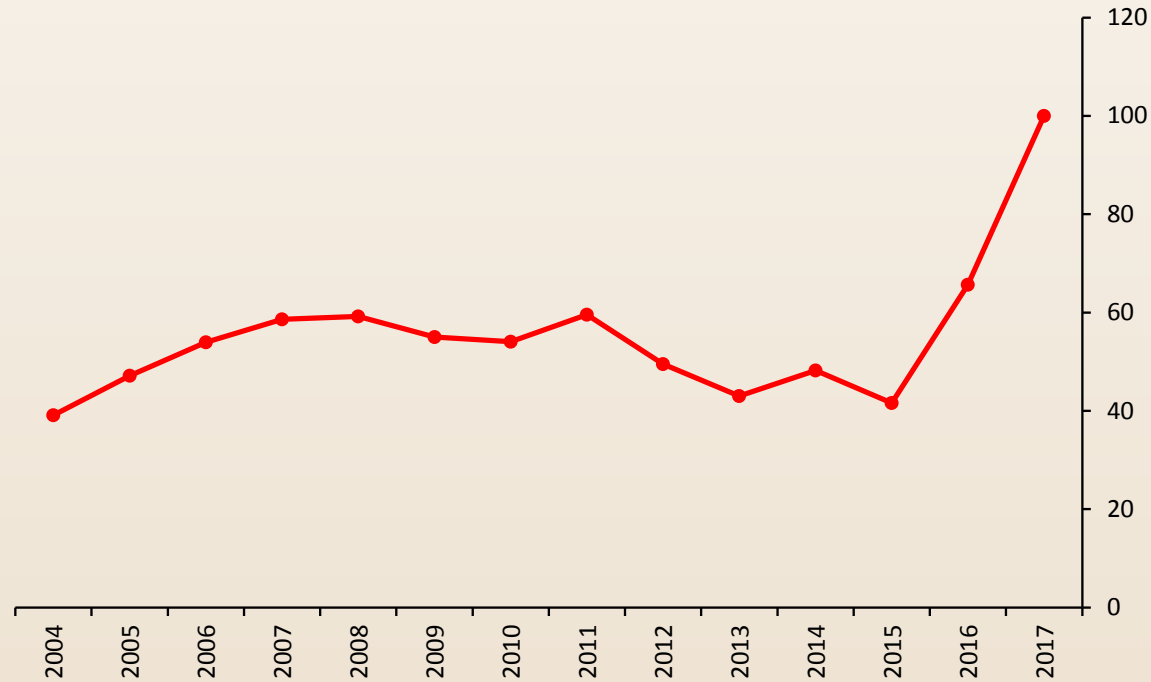
| Variables | Beta coefficient | |
|---|----------------------|-----------|
| Revenue by state | -1.630*** (0.250) | -0.602*** |
| Immigration to population ratio | 0.327*** (0.074) | 0.230*** |
| U.S. revenue | 3.720*** (0.278) | 0.321*** |
| Real exchange rate | 1.080*** (0.150) | 0.076*** |
| Dependency ratio | 4.471*** (0.532) | 0.461*** |
| Immigrants' detention | 0.120*** (0.046) | 0.051*** |
| Uncertainty index over the immigration policy | 0.135** (0.068) | 0.019** |
| Number of observations | 416 | 416 |
| R ² | 0.54 | |

Note: ***, **, * denote significance at 1, 5 and 10 percent, respectively.

Source: Estimated by Banco de México.

Box: Determinants of Remittances by State: 2004 - 2017

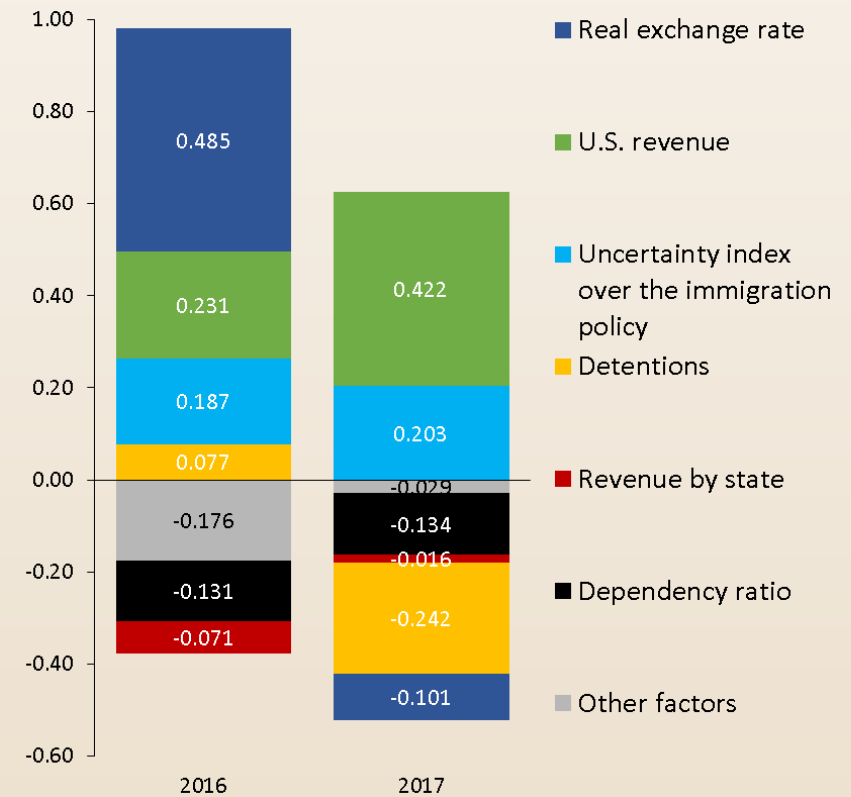
Immigration Policy Uncertainty Index (IPUC) Index 2017=100



Note: IPUC is built based on the search queries in Google Trends in the U.S. of such terms as: "deportation", "U.S. border patrol", "U.S. Immigration and Customs Enforcement", "Trump wall", "immigrants", "undocumented", "remittances", among others.

Source: Prepared by Banco de México with data from Google Trends.

Contribution of the Growth in Remittance' Quotient to GDP in 2016 and 2017 Percentage points



Source: Prepared by Banco de México.

Box:

Determinants of Remittances by State: 2004 - 2017

- Evidence presented in this Box suggests that fluctuations in the flows of remittances during the period of 2004 – 2017 arise from the structural factors, such as the performance of the U.S. economy and the exchange rate. However, a number of other factors, such as the uncertainty faced by immigrants, also seem to contribute to the recent increase.
- Indeed, a significant growth of remittances in 2016 is largely attributed to the depreciation of the real exchange rate, as well as improved labor conditions among immigrants, in light of the dynamism of the U.S. economy. However, in an order of a similar magnitude to that of the latter factor, uncertainty over the U.S. immigration policy also affected the evolution of remittances that year, just like in 2017.

Box

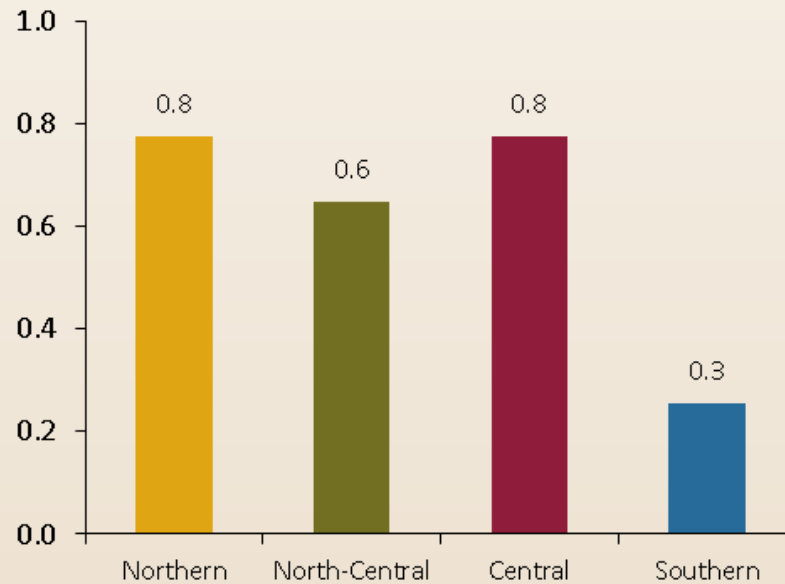
Synchronization of Manufacturing Activity between Mexican regions and the U.S.

- With the entry into force of NAFTA in 1994, economic links between Mexico and the U.S. have become tighter, while the admission of China to the WTO in 2001 may have weakened this synchronization in the manufacturing sector.
- However, over the next few years the Mexican manufacturing sector reassigned resources to the sectors characterized by the comparative advantage, and thus managed to maintain the synchronization in the respective sector in the U.S.
 - ✓ Recent evidence indicates that long-term relations between Mexican and U.S. manufactures remain in force and that the economic cycles of the two countries tend to be synchronized.
- Considering this, the Box seeks to estimate the degree of synchronization of the manufacturing production at the regional level with that of the U.S., by analyzing the cyclical correlation and their long-term relation during the period 2003 – 2017.

Box

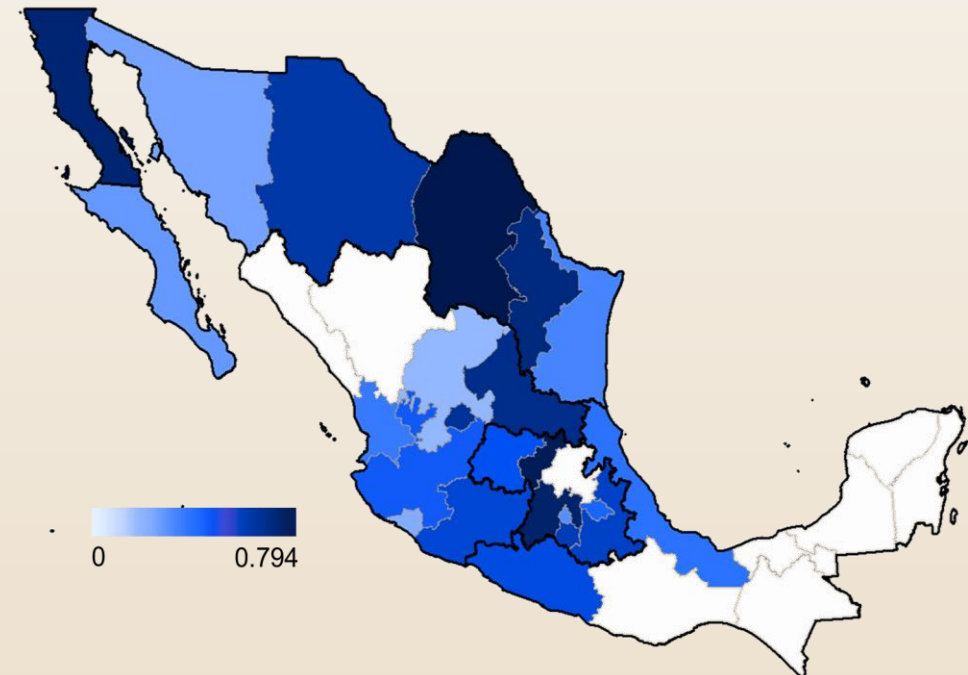
Synchronization of Manufacturing Activity between Mexican regions and the U.S.

Synchronization of Manufacturing Production between Mexican Regions and the U.S., 2003 – 2017
Correlations



Source: Estimated by Banco de México with data from INEGI and the Federal Reserve Bank of St. Luis.

Synchronization of Manufacturing Production Cycles of the U.S. and Mexican States, 2003 – 2017
Correlations



Source: Estimated by Banco de México with data from INEGI and the Federal Reserve Bank of St. Luis.

Box

Synchronization of Manufacturing Activity between Mexican regions and the U.S.

- As regards the analysis of cointegration among regional manufacturing series of Mexico and the U.S., the results suggest that the manufacturing production in the Northern, North-Central and Central regions has a long-term relation with the U.S. manufacturing activity.
- There is no evidence that the Southern region shares a long-term trend with the U.S. manufacturing production.

Analysis of Cointegration among Mexican and U.S. Manufacturing Production Indices

| Region | There is a cointegration relation* | Long-term elasticity |
|---------------|------------------------------------|----------------------|
| National | Yes | 0.97 (0.09) |
| Northern | Yes | 1.10 (0.07) |
| North-Central | Yes | 1.81 (0.27) |
| Central | Yes | 0.82 (0.11) |
| Southern | No | --- |

*/ Based on the Johansen trace test with a significance of at least 15%.

Source: Prepared by Banco de México with data from INEGI and the Federal Reserve Bank of St. Luis.

Box

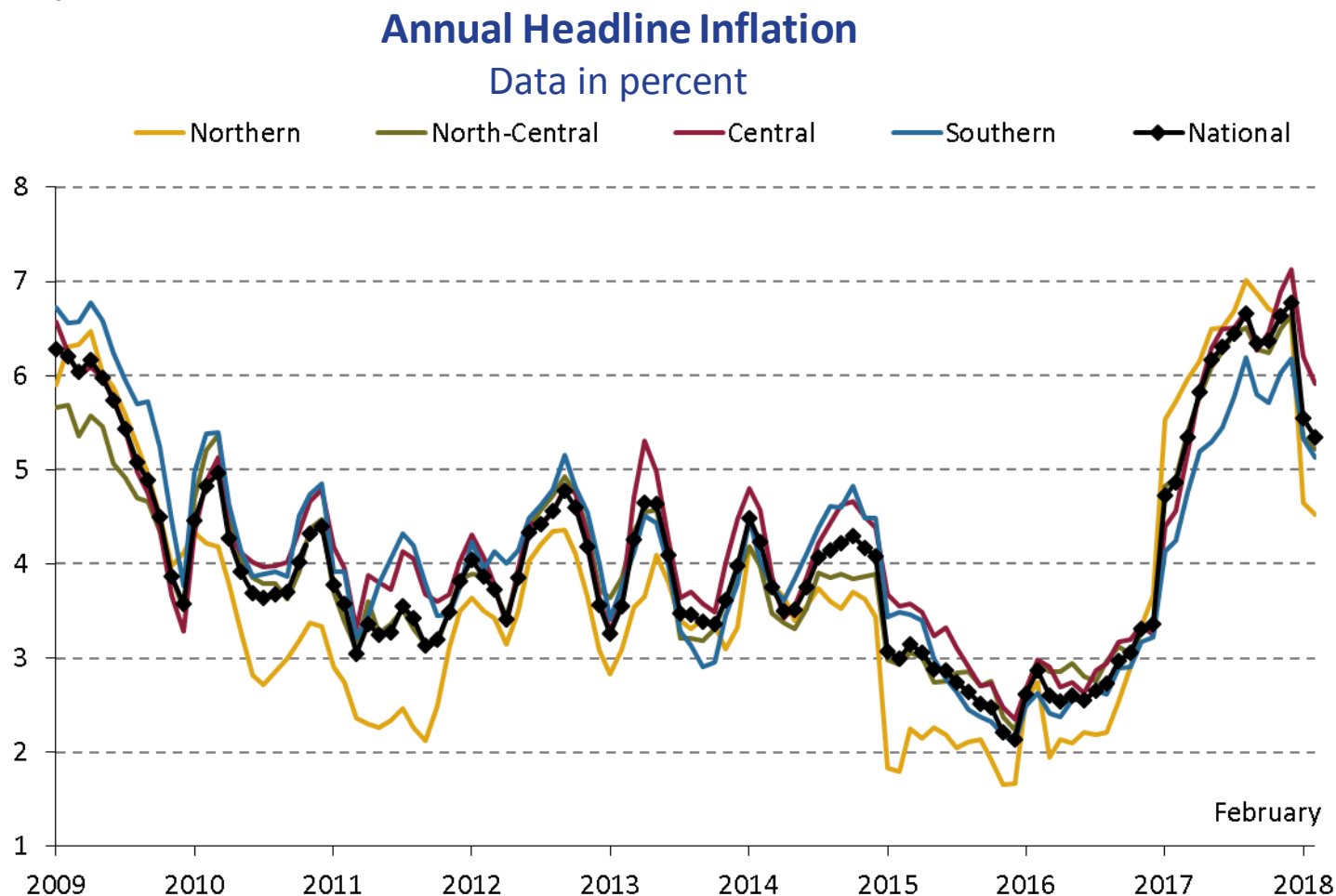
Synchronization of Manufacturing Activity between Mexican regions and the U.S.

- As a result of a higher level of competition in foreign markets after the admission of China to the WTO, the degree of synchronization between Mexico and the U.S. has weakened temporarily.
 - ✓ However, the Mexican economy redirected resources to the sectors that had a comparative advantage, reason why the degree of synchronization with the U.S. manufactures persisted.
- However, this process is no longer homogeneous across regions. Indeed, the entities that are closer to the U.S. and that have a greater infrastructure provision and a high degree of integration in GVC, were particularly favored during this process, which has been reflected in greater FDI flows and in the strengthening of its vocation for exports, as well as productivity gains.
- In the future, it is necessary to move forward with the actions to improve infrastructure, human capital, public safety conditions and the institutional framework prevailing across different regions of Mexico, particularly in the south. The goal is to fully benefit from the comparative advantages and to boost competitiveness and the degree of integration in the world economy, along with the dynamism of the domestic market.

Outline

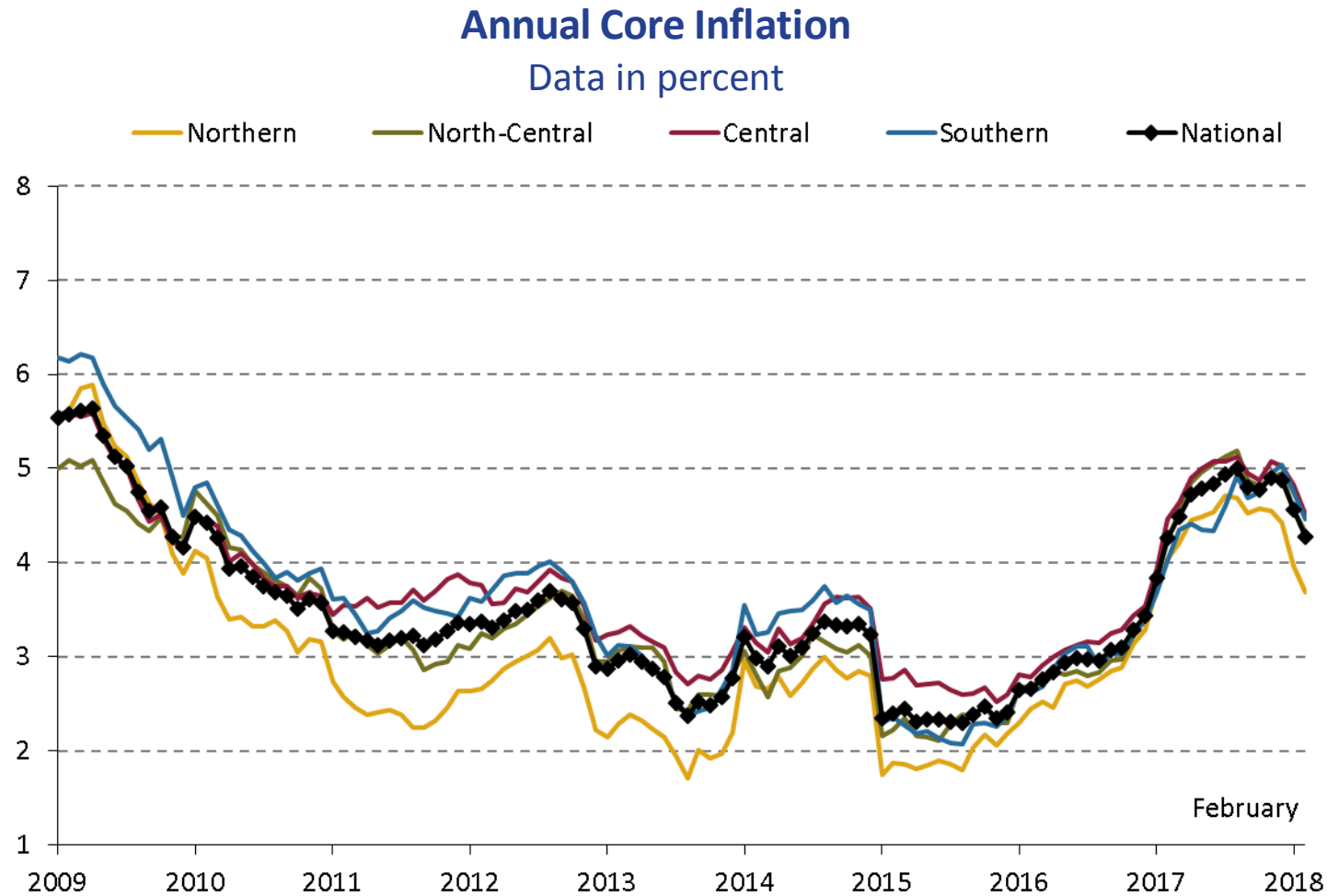
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Between Q3 and Q4 2017, average annual headline inflation increased from 6.48 to 6.59 percent and closed the year at 6.77 percent. In January 2018, as previously anticipated, annual headline inflation decreased, marked 5.55 percent and subsequently 5.34 percent in February. It should be noted that the evolution of regional inflation has generally followed a similar trajectory, although the Northern region stood in contrast with the other regions, as it presented an inflation decline in Q4 2017, as compared to Q3 2017.



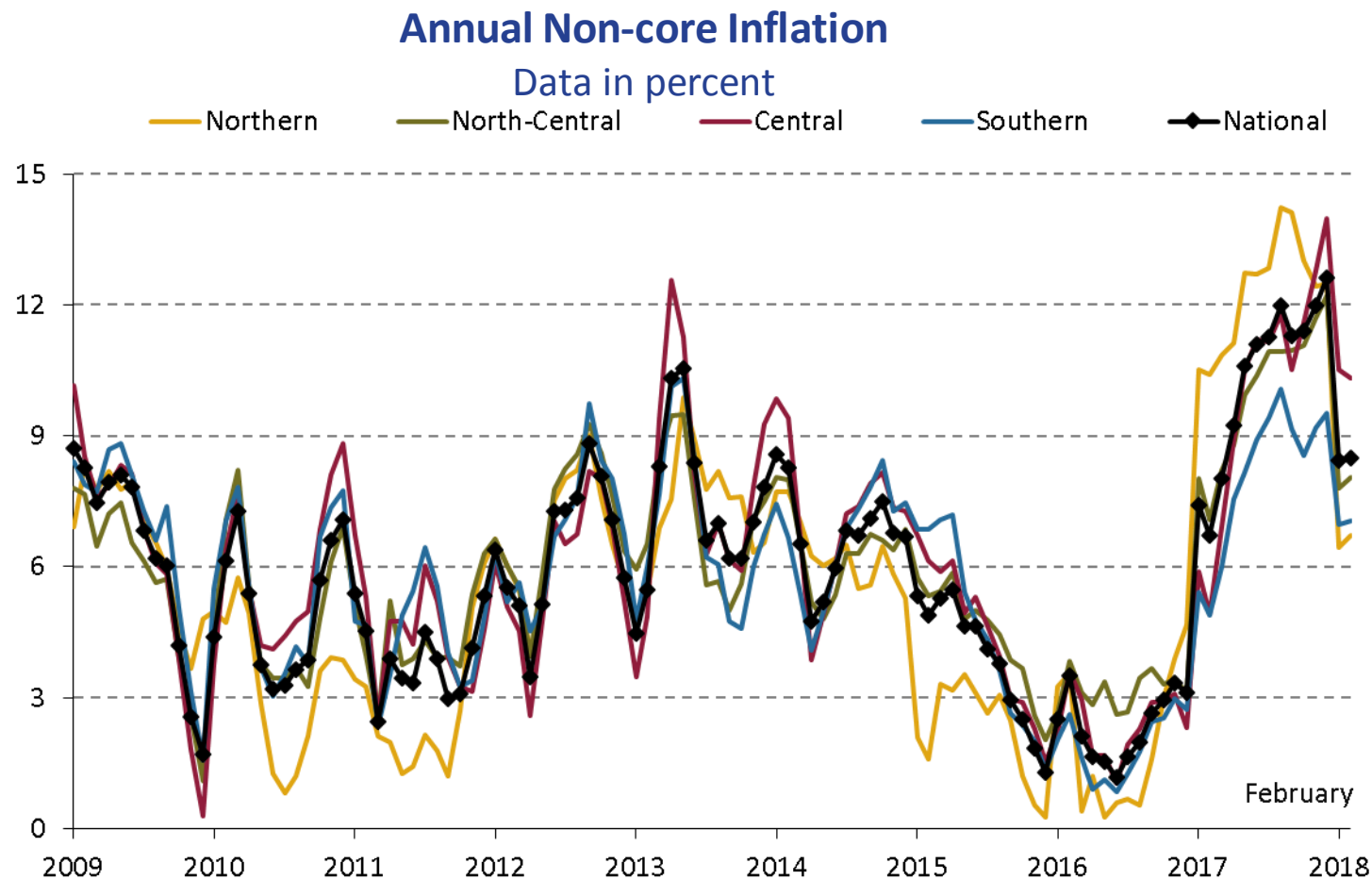
Source: Prepared by Banco de México based on data from INEGI and own data.

Since late 2017, annual core inflation has shown a slight downward trend in all regions, which reflects the dissipation of the indirect effects of energy price increases on merchandise and services, as well as the impacts of the implemented monetary policy. Nonetheless, the pace of its decline could be affected by the cyclical position of the economy.



Source: Prepared by Banco de México with data from INEGI and own data.

Non-core inflation observed an increasing trajectory during Q4 2017 in almost all regions. This resulted from the unforeseeable shocks on some energy prices, principally LP gas, and on the prices of certain fruits and vegetables with a high weight in the CPI. Starting from January, non-core inflation strongly declined in all regions.



Source: Estimated by Banco de México with data from INEGI and own data.

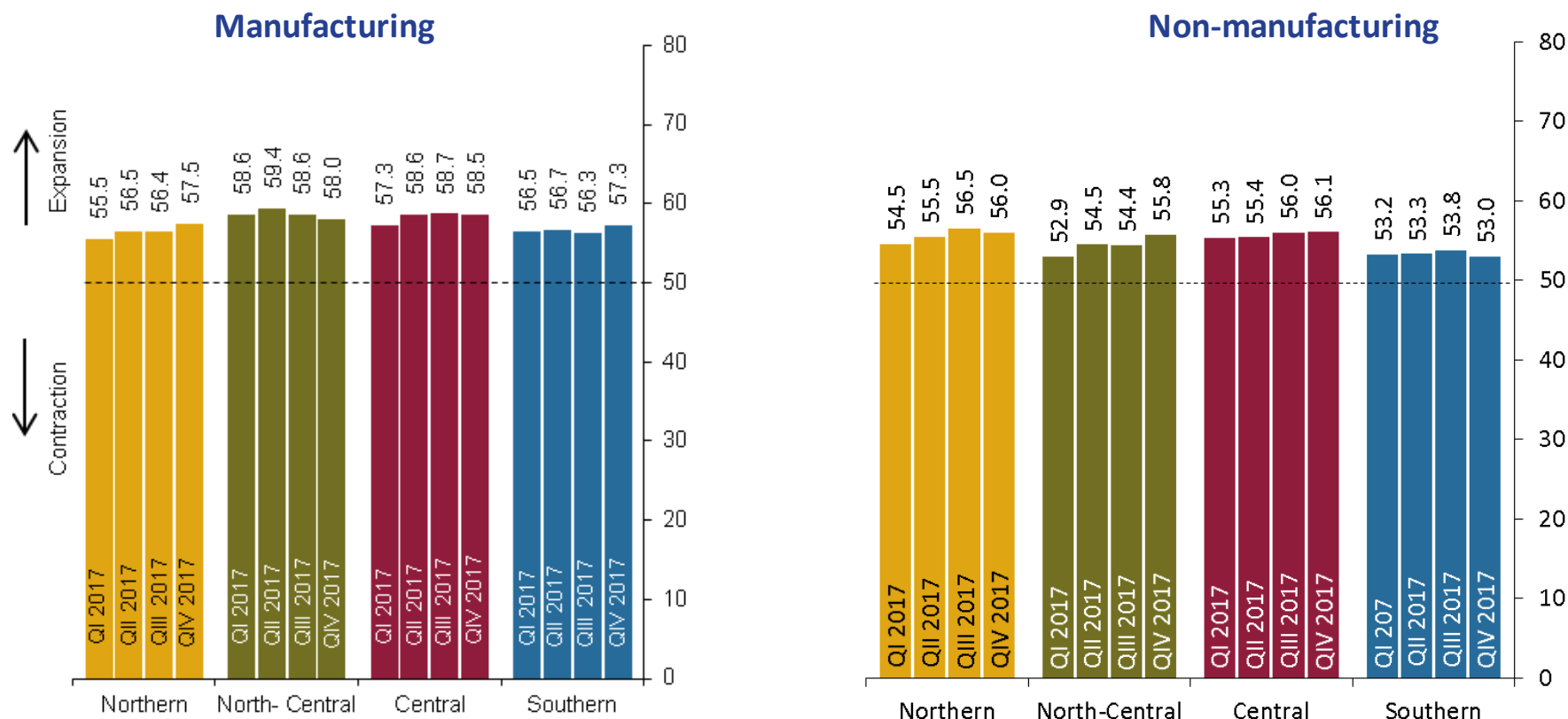
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Regional indices of manufacturing and non-manufacturing orders indicate that both manufacturing and non-manufacturing activity will continue to expand during the next three months in all regions of Mexico.

Regional Index of Manufacturing and Non-manufacturing Orders: Activity Outlook, Next 3 Months ^{1/}

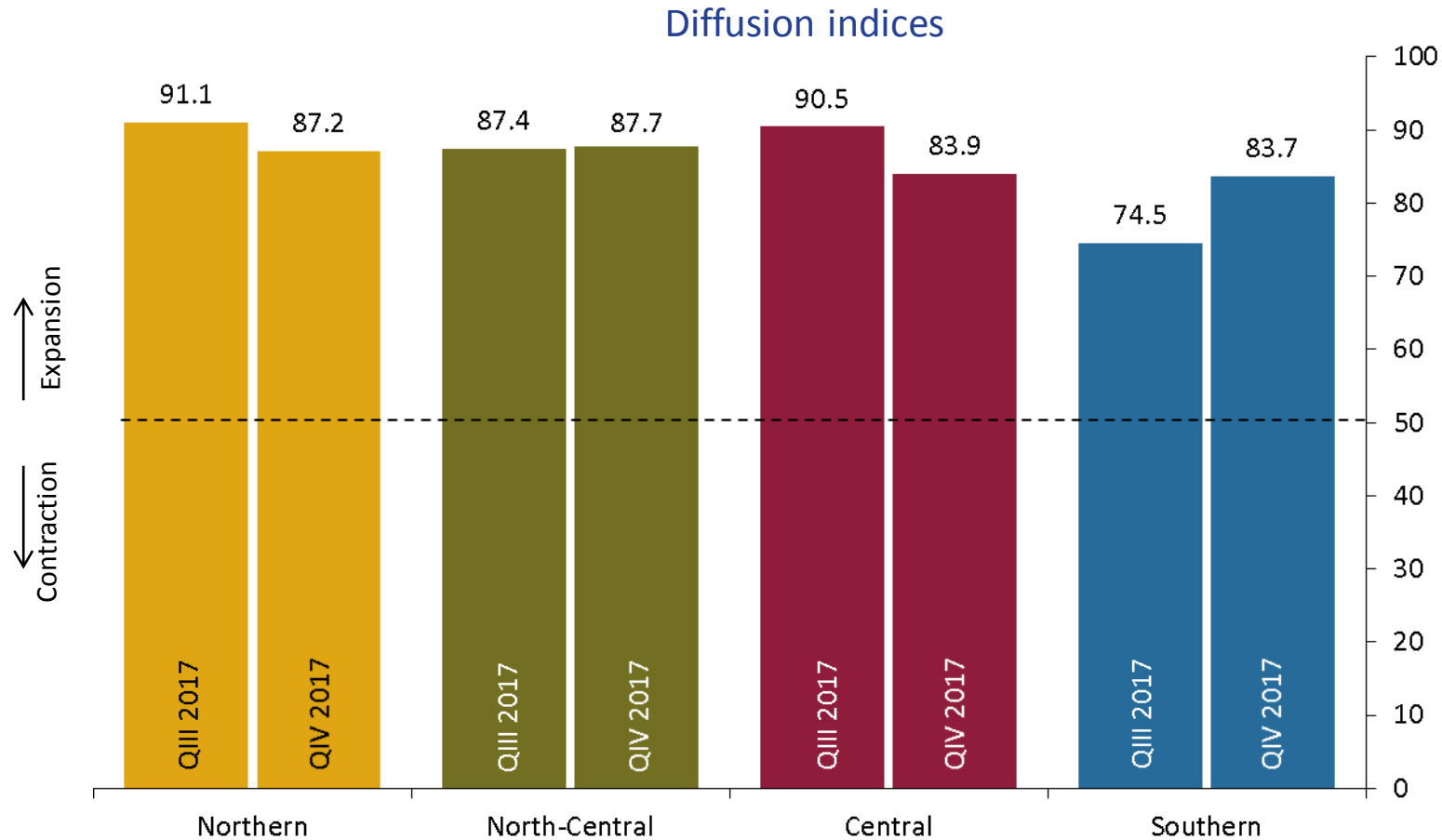
Diffusion indices



^{1/} Seasonally adjusted data.
Source: Banco de México.

For the next 12 months, business agents interviewed in all Mexican regions anticipate a higher demand for own goods and services, even though the signal has weakened in the Northern and Central regions relative to Q3, while in the North-Central one it remained at a similar level and in the South it intensified.

Business Agents' Expectations: Demand over the Next 12 Months ^{1/}

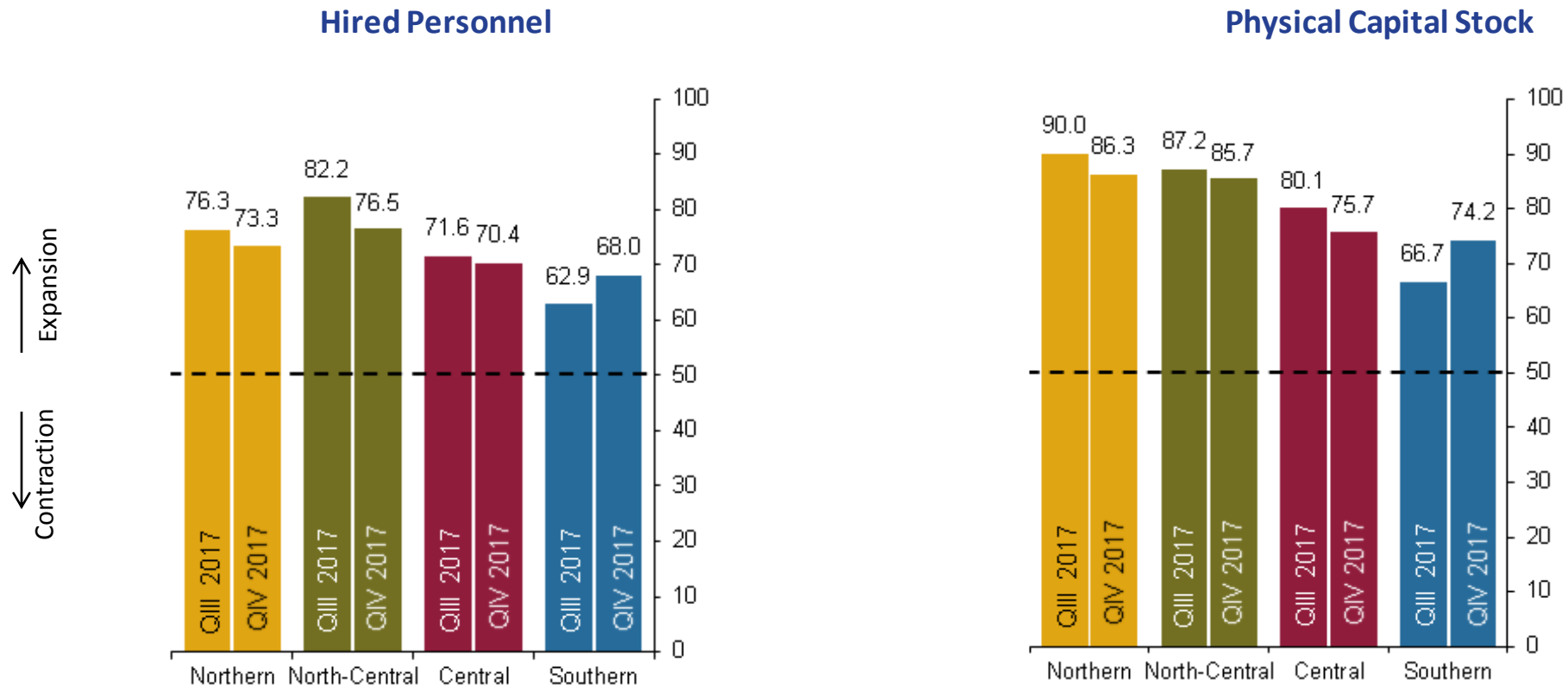


^{1/} Results obtained from responses to the question: "With respect to the volume of sales of own goods and services over the previous 12 months, how do you expect the volume of sales to modify in the next 12 months?", from interviews conducted by Banco de México.

Consistent with the expected growth in demand for own goods and services, business agents generally anticipate an expansion of hired personnel and physical capital stock in different regions. However, these signals have weakened with respect to Q3 across all regional economies, except for the Southern one.

Business Agents' Expectations: Hired Personnel and Physical Capital Stock, Next 12 Months ^{1/}

Diffusion indices



^{1/}Results obtained from responses to the questions: “With respect to the previous 12 months, how do you expect the total number of workers in your firm to modify for the next 12 months?”, and “With respect to your firm’s investment in fixed assets during the previous 12 months, how do you expect the investment level to change for the following 12 months?”, from interviews conducted by Banco de México.

Business Agents' Opinion on Risks to Regional Economic Activity

Upward risks



✓ A favorable outcome in NAFTA negotiations.

✓ A greater-than-expected increase in private investment levels (both domestic and foreign), especially in the energy and automotive sectors.

✓ Business contacts in the Central regions stressed a possible recovery in the construction sector, while in the South they noted that an improvement in the perceived public safety could foment economic activity levels, especially in tourism.

Downward risks

✓ A possible deterioration in public safety.

✓ The uncertainty related to the 2018 electoral process could detonate volatility episodes in financial markets, which could curb private spending on investment.

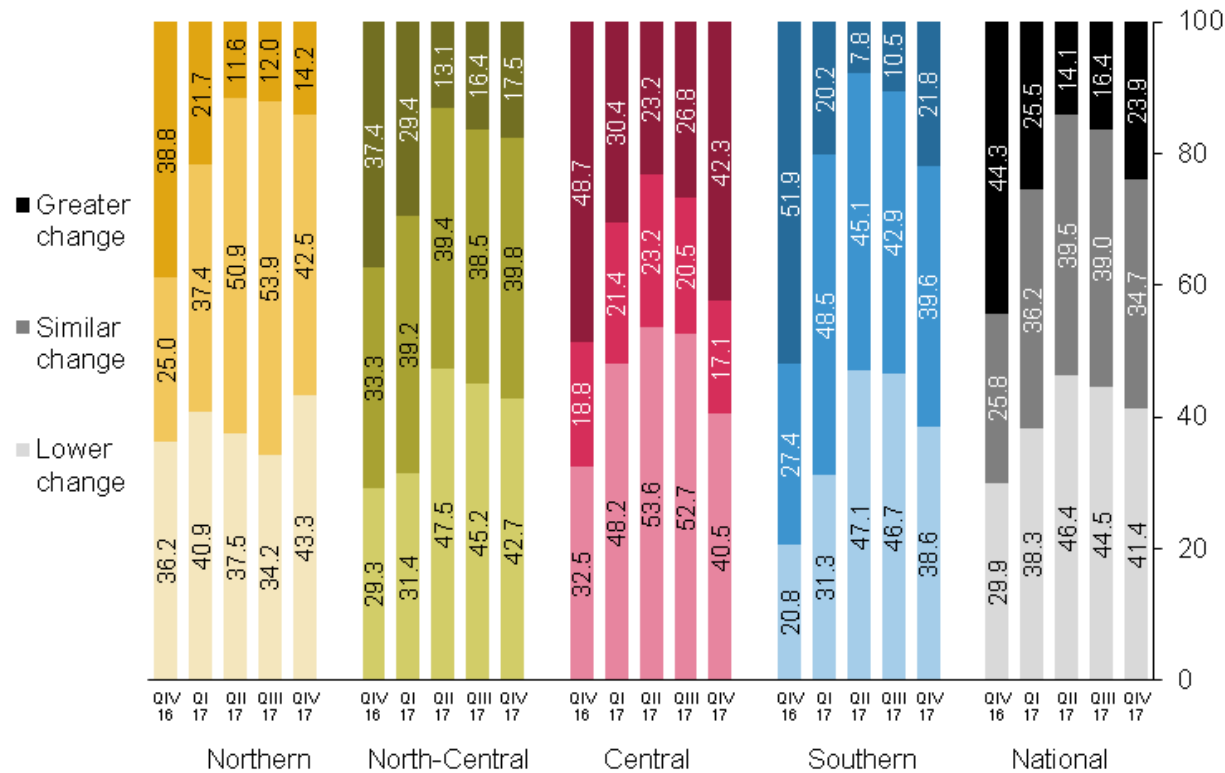
✓ A possible unfavorable outcome of the NAFTA renegotiations for Mexico.

✓ Additionally, some business agents in the North and in the Center noted that the U.S. fiscal reform can affect competitiveness of the Mexican economy.

Regarding the sales' prices of own goods and services, most business agents interviewed in all Mexican regions anticipated lower or equal annual changes as compared to those observed over the previous 12 months. However, a larger share of the consulted business agents currently expects a greater growth rate across different regions of Mexico, particularly in the center.

Business Contacts' Expectations: Annual Change of Sales' Prices, Next 12 Months ^{1/}

Percentage of responses

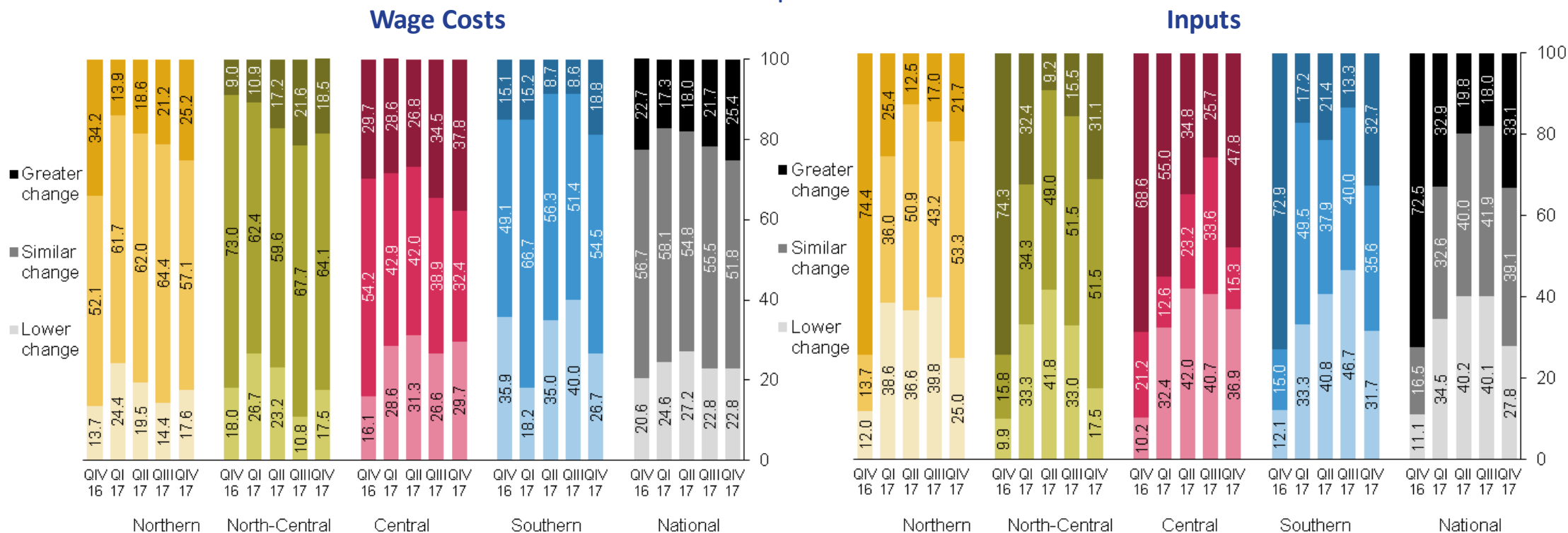


^{1/} Results obtained from responses to the question: "With respect to the previous 12 months, how do you anticipate the sales' prices in your sector to change over the next 12 months?", from interviews conducted by Banco de México.

Most business contacts interviewed in four Mexican regions estimate the annual growth rate of wage costs and input prices to be lower or equal to those observed over the previous 12 months. It should be noted that the share of business agents who anticipated a greater growth rate continued to rise across all regions, except for the North-Central one in the case of wage costs.

Business Contacts' Expectations: Annual Change of Wage Costs and Input Prices, Next 12 Months^{1/}

Response rate



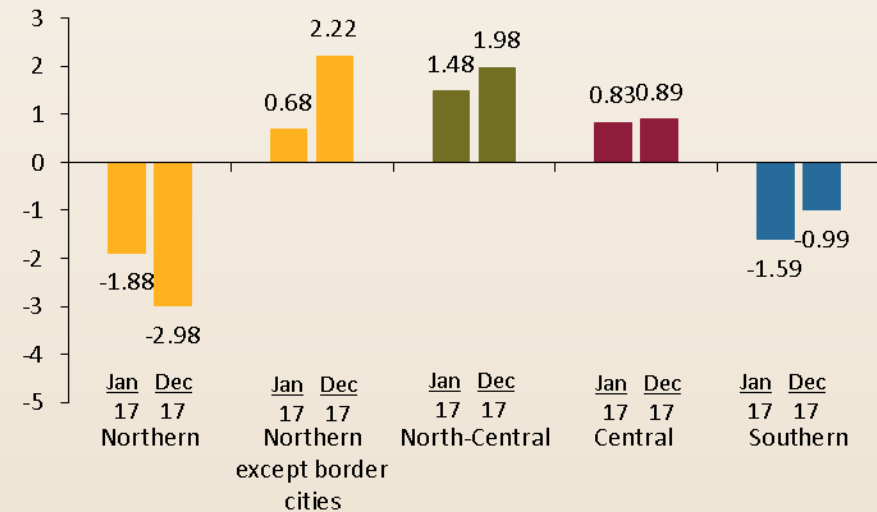
1/ Results obtained from responses to the questions: "With respect to the previous 12 months, how do you expect the wages of your sector's workers to change in the next 12 months?", and "With respect to the previous 12 months, how do you anticipate input prices (goods and services) used in your sector to change over the following 12 months?", from interviews conducted by Banco de México.

Box:

Considerations on the Determinants of Regional Gasoline Prices in Mexico

- The recent energy reform sought to encourage an environment of greater competition in the gasoline market.
 - ✓ One of the most relevant statutes was the determination of gasoline retail prices by the market starting from December 1, 2017 throughout the country.
- One month after the conclusion of the liberalization process, the average price of 1 liter of low octane gasoline with respect to the national average varied notably across regions.
- This Box gives an analysis of the impact of logistics costs and a number of variables associated with the market concentration on the regional price of low octane gasoline.

Regional Differences of Low Octane Gasoline Prices ^{1/}
Percent with respect to the average national price



^{1/}The average of regional and national prices were estimated using the volume of sales by municipality as a weight.

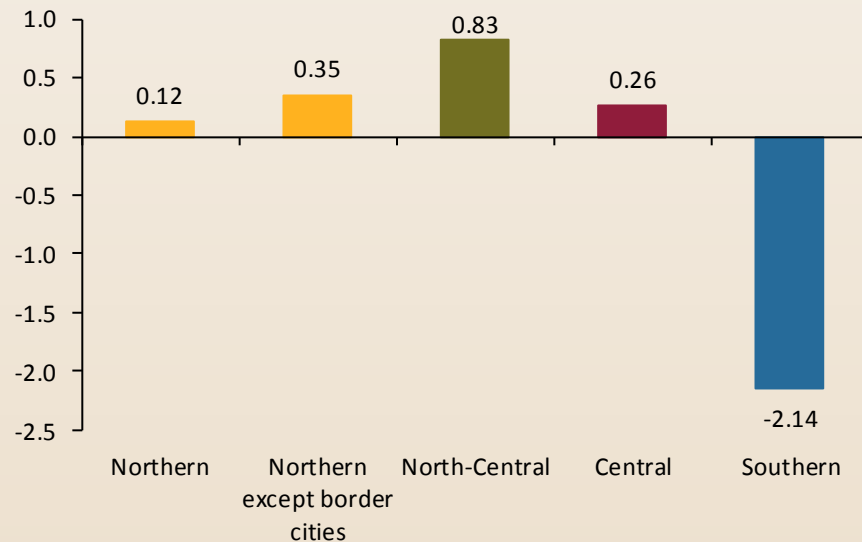
Source: Prepared by Banco de México with data from CRE.

Box:

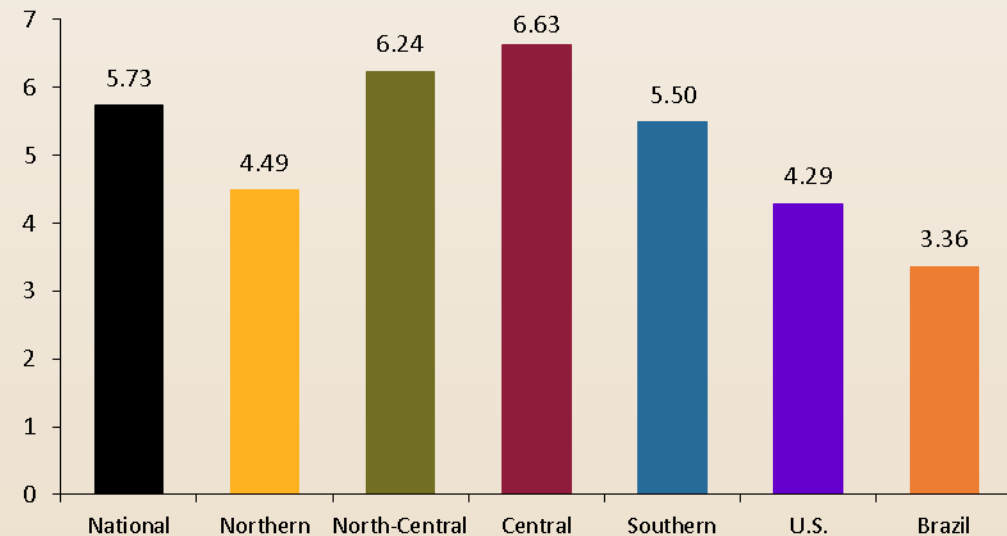
Considerations on the Determinants of Regional Gasoline Prices in Mexico

- Differences in regional prices can be due to an array of factors, such as the logistics costs at gasoline stations to resupply fuel and the environment of local competition prevailing in the said market.

Differences in Logistics Costs by Region ^{1/}
Percent with respect to the national average



Volume of Sales by Gasoline Station ^{1/}
Millions of liters a year



^{1/} The average of regional and national prices were estimated using the volume of sales by municipality as a weight.

Source: Prepared by Banco de México with data from CRE.

^{1/} Data for Mexico correspond to 2017, and figures of the U.S. and Brazil, to 2016.

Source: Prepared by Banco de México with data from CRE, SENER, Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, Global Petrol Prices and World Bank.

Box: Considerations on the Determinants of Regional Gasoline Prices in Mexico

- Logistics costs and the average monthly volume of retail sales have a positive and statistically significant impact on gasoline prices.
- In contrast, the density of gas stations has a negative and statistically significant relation with gasoline prices.

Price Determinants of Low Octane Gasoline at the Municipality Level

| | | Beta coefficients |
|--------------------------------|------------|----------------------|
| Logistics cost | 0.5734*** | 0.3236*** |
| Density | -0.0003*** | -0.0222*** |
| Volume of sales by gas station | 0.0036*** | 0.0712*** |
| Temporary effects | ✓ | ✓ |
| Fixed effects | ✓ | ✓ |
| Observations | 3871 | 3871 |
| R ² | 0.8693 | 0.8693 |
| Number of entities | 32 | 32 |

Note: Symbols ***, ** and * denote statistical significance at 1, 5 and 10 percent, respectively. Estimates exclude border municipalities.

Source: Prepared by Banco de México with data from CRE.

Box:

Considerations on the Determinants of Regional Gasoline Prices in Mexico

- The results presented in this Box suggest that gasoline prices can be lowered by taking actions that decrease logistics costs of this fuel in different regions of Mexico.
 - ✓ Thus, it is necessary to continue fomenting measures that would facilitate investment throughout the logistics chain (fuel supply, warehousing and distribution) to be able to cut costs in that market.
- Similarly, concentration in the gasoline market, measured by the density and the volume of sales in gas stations, affects this fuel's price. This highlights the importance of promoting conditions of competition in that sector, especially at the local level.
 - ✓ The following steps can be made: fostering the entrance of new competitors in sales, monitoring alliances among suppliers and eliminating restrictions as the local level that can limit competition, for example, the requirements of minimum distances between gas stations.

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Final Remarks

- It is relevant to stress that the heterogeneity in the degree of synchronization between different regions and the U.S. suggests that some of them have managed to more fully exploit their comparative advantages than others, which has led to higher productivity and value added generation that have not been homogeneous in Mexico.
- Thus, for all regions to fully exploit these comparative advantages, it is necessary to encourage improvement in infrastructure and human capital, as well as in safety conditions, the rule of law and the institutional framework.
- This would generate higher productivity and higher competitiveness in Mexican regions, which could be reflected both in greater integration in international markets and a higher dynamism of the domestic market.



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