



Regional Economic Report

October – December 2016



BANCO DE MÉXICO

March 17, 2017

Outline

- I. Regional Economic Report
- II. Results October – December 2016
 - 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 2016 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.

Outline

I. Regional Economic Report

II. Results October - December 2016

A. Economic Activity

B. Inflation

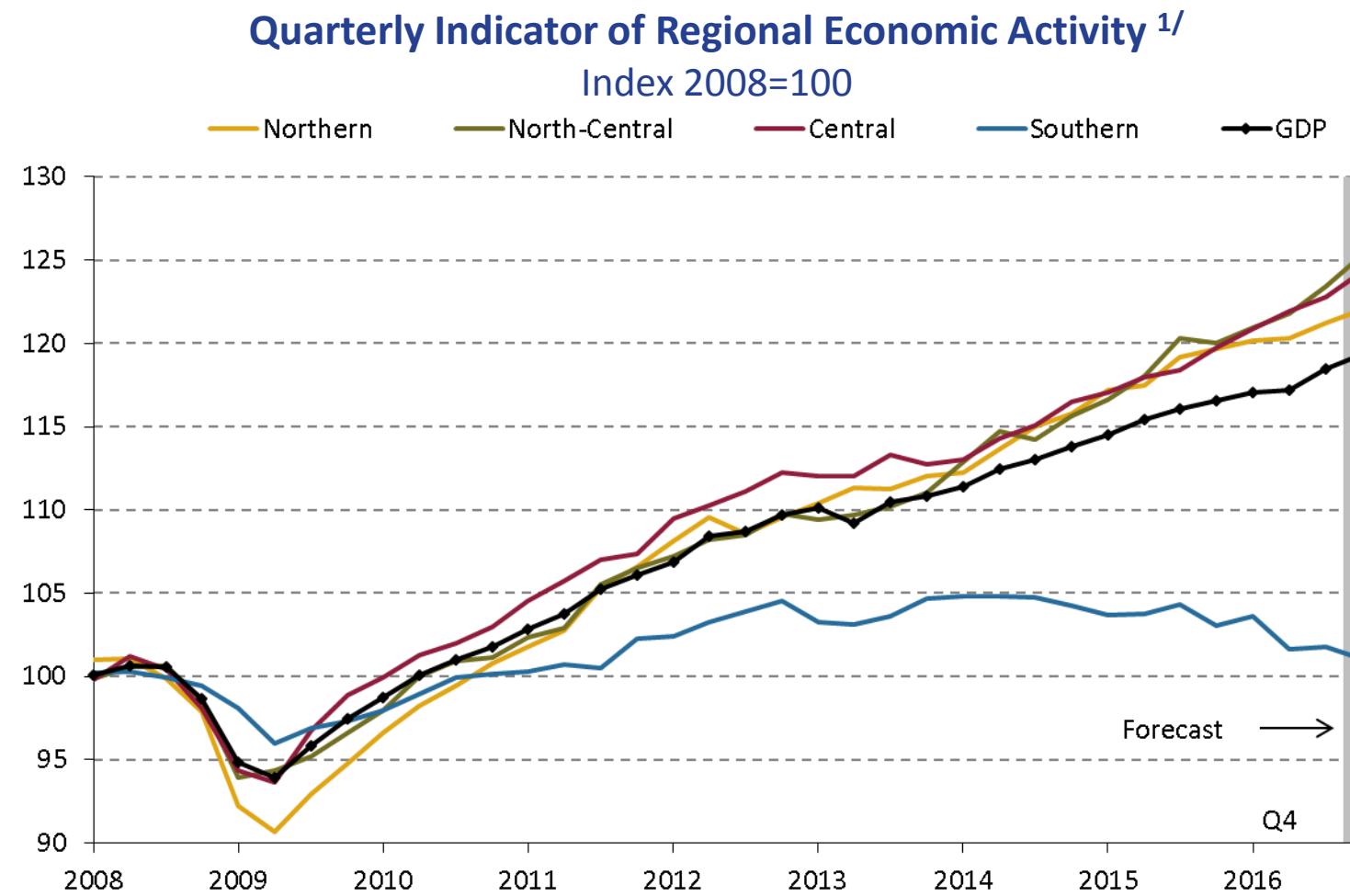
C. Economic Outlook

III. Final Remarks

Economic Activity

- In Q4 2016, economic activity in Mexico kept expanding, although at a more moderate pace than in the previous quarter.
 - ✓ This growth is principally attributed to the dynamism of the services' sector, while the industrial production, as a whole, kept exhibiting stagnation it had presented since mid-2014.
 - The expansion of the tertiary activities has been practically widespread across all sectors comprising it.
 - Within the industrial activity, the mining kept contracting, whereas the manufacturing production presented a favorable trend, reflecting both the recovery of external demand and the dynamism of the domestic market. In turn, there was a rise in the levels of construction activity, with respect to Q3 2016.
- The dynamism of the Mexican economic activity in the reference quarter was manifested across most regions of the country. Indeed, even though the growth rate in the Northern region is estimated to have somewhat moderated, in the Central regions a greater dynamism is foreseen as compared to Q3 2016. On the other hand, it is estimated that in the South the level of economic activity somewhat contracted.

Based on available timely information, it is estimated that in Q4 2016 the growth of the economic activity in Mexico was mainly associated to the fact that the Central and Northern regions kept expanding, although the latter at a slightly more moderate pace. The Southern region exhibited a slightly lower level of economic activity, as compared to that in Q3 2016.



1/ The value of the Gross Domestic Product (GDP) for Q4 2016 corresponds to the observed data.
Source: Estimated by Banco de México with seasonally adjusted data from INEGI.

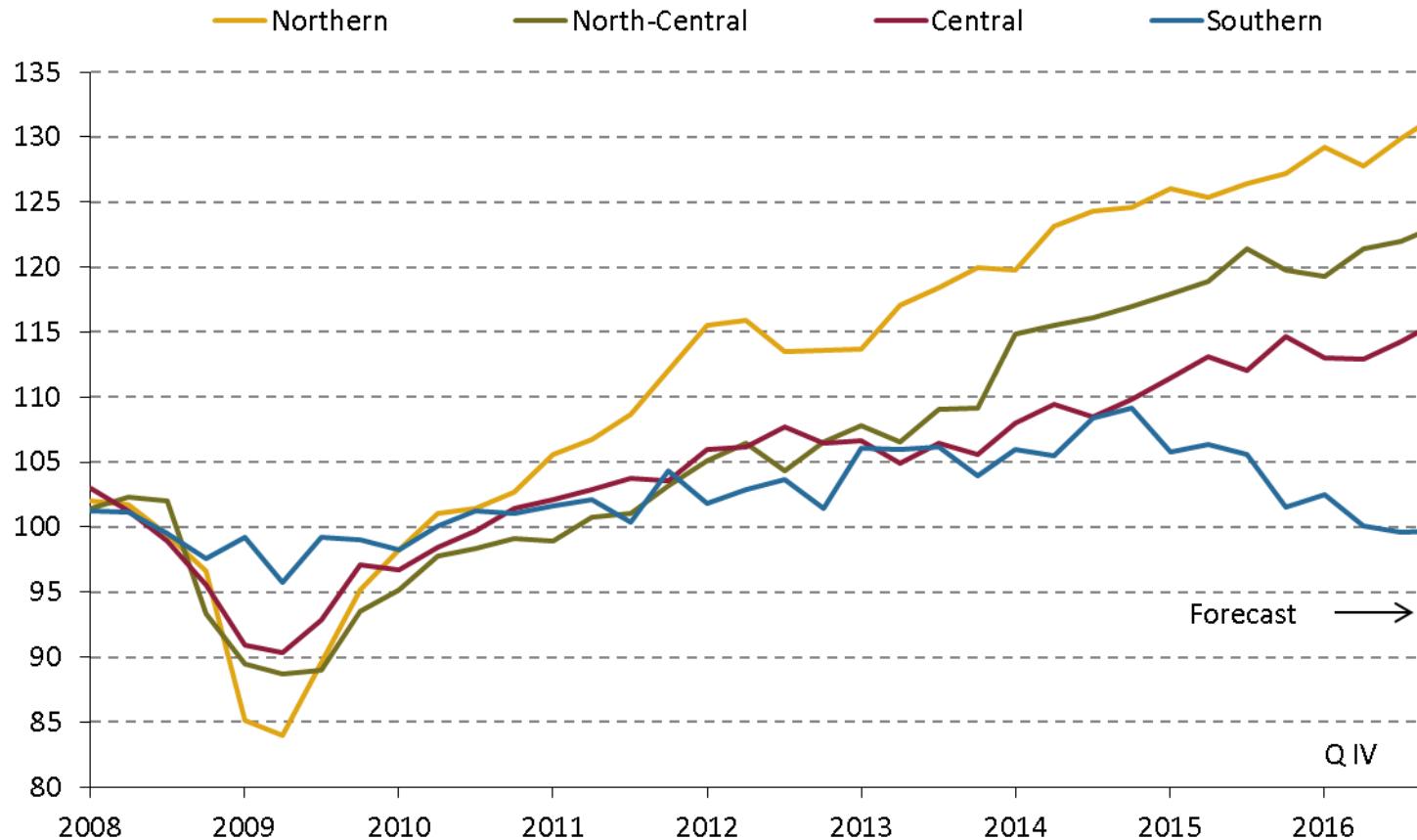
Economic Activity

- The growth in the Northern and Central regions is principally attributed to the favorable performance of manufactures, construction and the tertiary activities, particularly retail trade.
 - ✓ In the same vein, tourism and agricultural production in the Central regions, along with the recovery in non-oil mining in the North-Central region also favorably affected the observed expansion.
- Finally, the evolution of the economic activity in the South, in part, was a consequence of the performance of oil mining and the weakness of construction and retail trade, which was partially offset by a higher dynamism in tourism and greater agricultural production.

In Q4 2016, manufacturing production observed a positive trend, which is manifested both in the recovery of external demand and the persisting dynamism of the domestic market. Thus, it is estimated that the Central and Northern regions maintained an upside trajectory in their manufacturing production. Meanwhile, in the Southern region this activity remained at levels similar to those in Q3 2016.

Regional Manufacturing Indicator

Index 2008=100, quarterly average



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

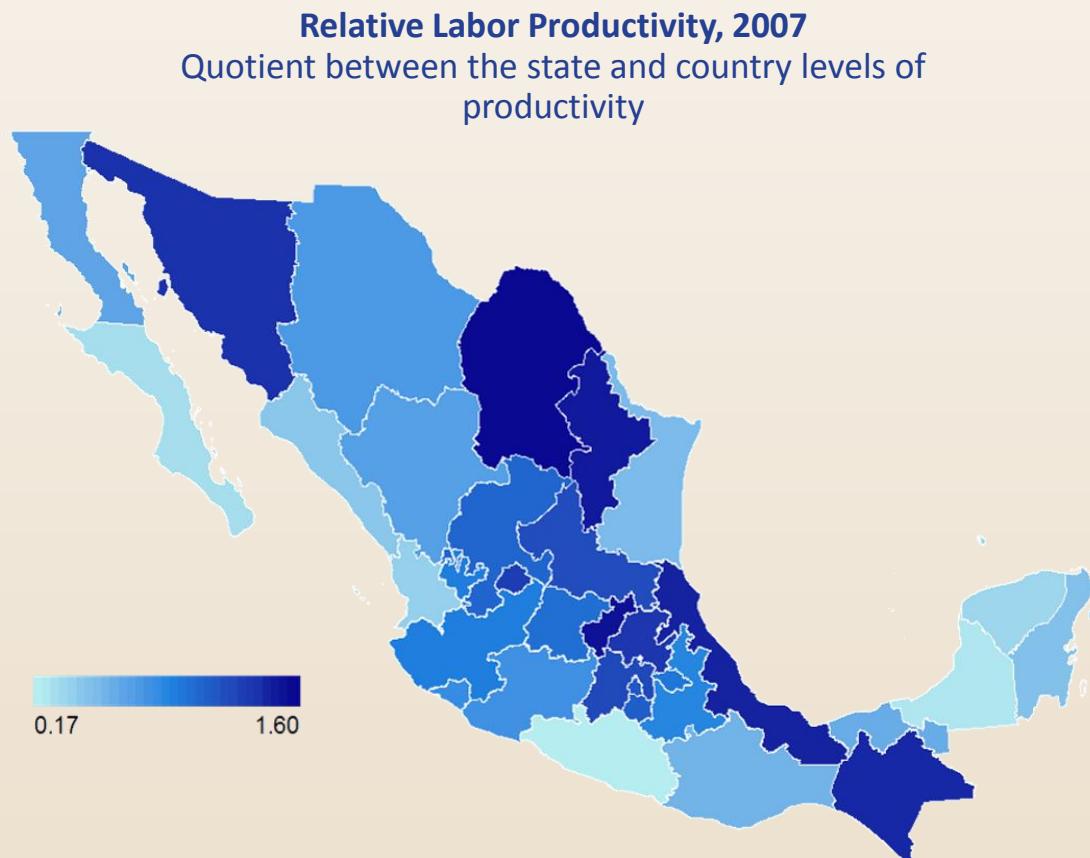
Box:

Determinants of Labor Productivity in Regional Manufacturing Industry

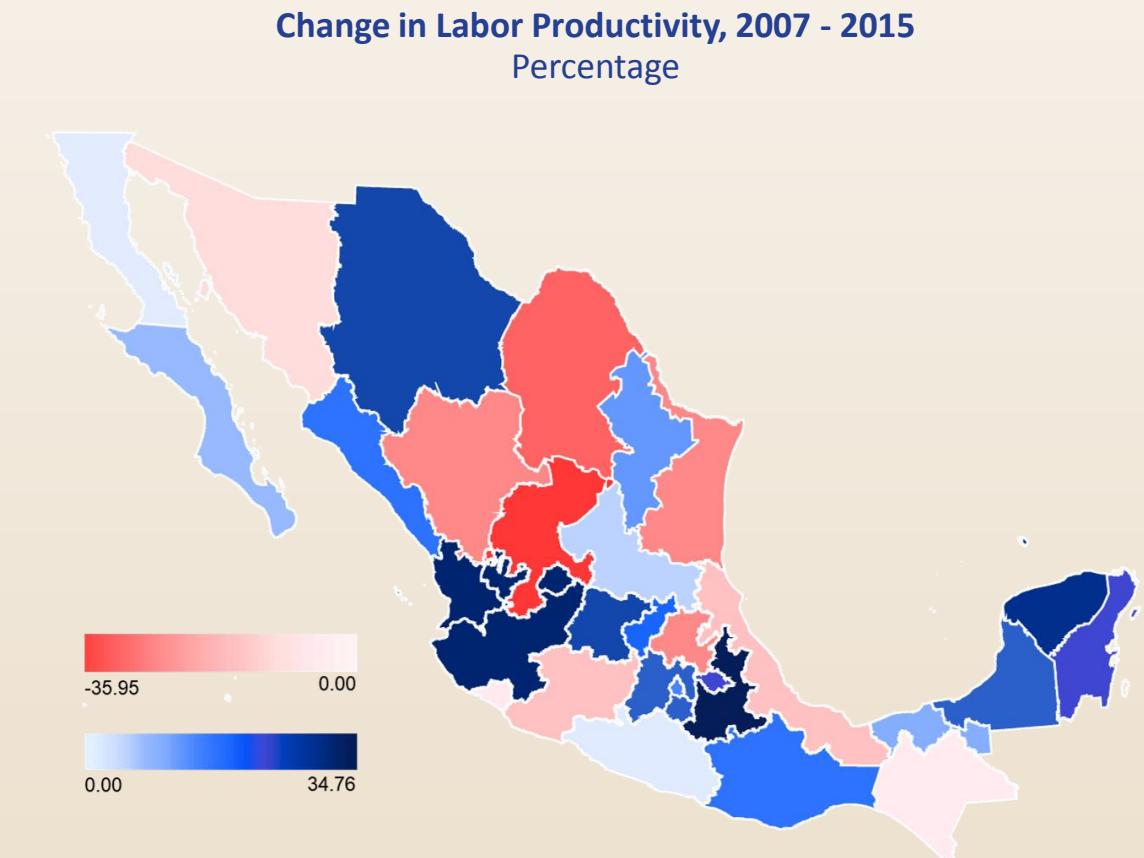
- **Labor productivity**, in the long term, is one of the key factors affecting the living standards of the population, given that it impacts the purchasing power of households via higher wages and/or lower prices. Furthermore, it reduces production costs and increases the return on investment in businesses.
- The goal of this Box is to analyze the **determinants of labor productivity in the manufacturing sector in the period of 2007 – 2015**, using states of Mexico as units of analysis.
- Specifically, it seeks to identify the effect of exports, foreign direct investment (FDI), labor force and infrastructure onto labor productivity, which turns out to be highly relevant in light of the possibility that protectionist policies may be implemented by the incoming administration of the U.S.

Box:
Determinants of Labor Productivity in Regional Manufacturing Industry

- It can be observed that both the level of labor productivity in 2007 and the adjustment of this variable in the period from 2007 to 2015 are highly heterogeneous at the regional level.



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



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

Box:
Determinants of Labor Productivity in Regional Manufacturing Industry

- A **1 percent increment** in exports and in **FDI** is associated to an **increment of 2.93 percent** and of **0.80 percent** in the **Manufacturing Labor Productivity Index (MLPI)**, respectively.

The Result of Estimates

Variables	Elasticities
Exports	2.93
FDI	0.80
Labor force	12.43
Infrastructure	7.61
Controls	✓
Observations	224
Number of entities	32

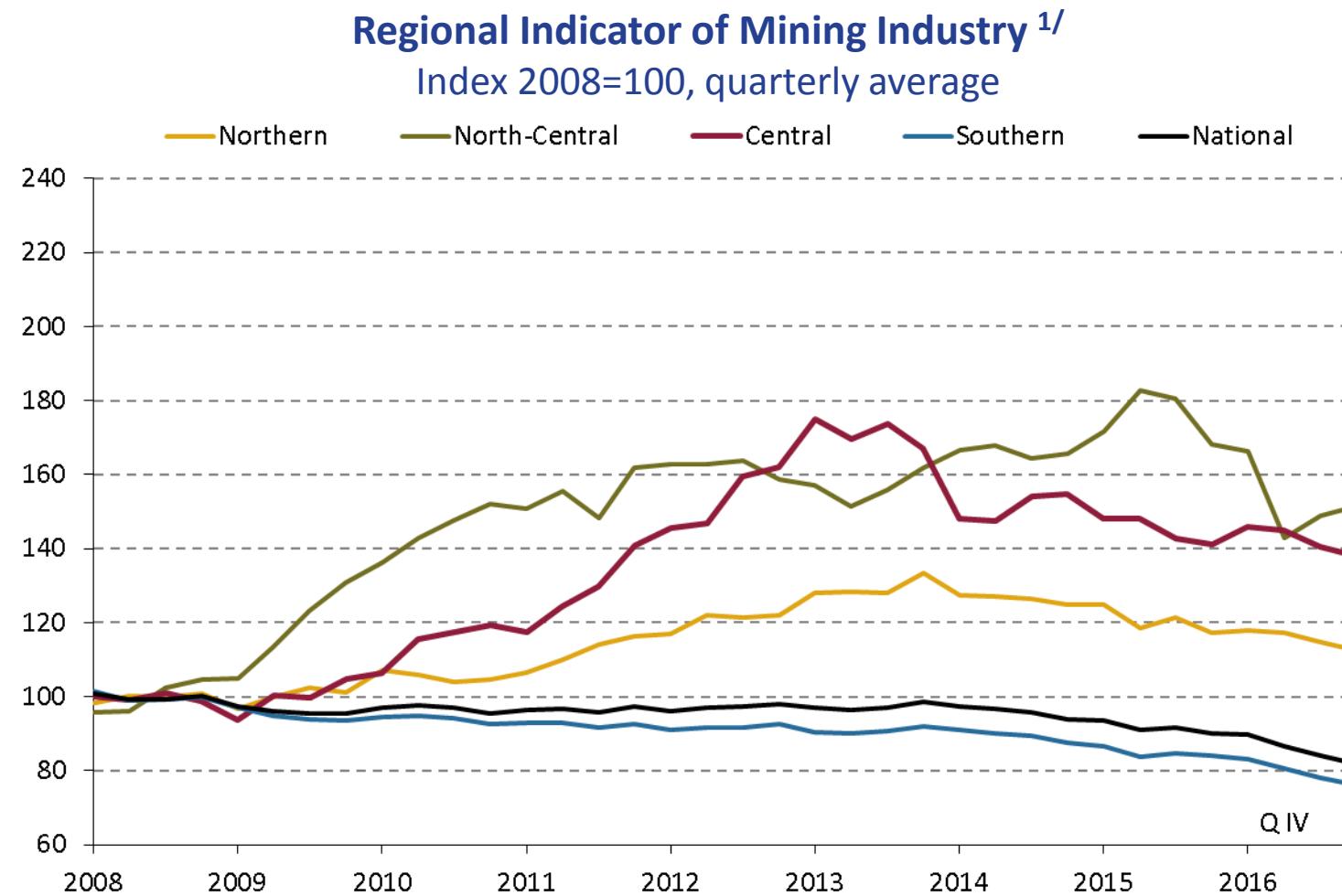
Source: Estimated by Banco de México with data from INEGI and the Ministry of Economy.

Box:

Determinants of Labor Productivity in Regional Manufacturing Industry

- Evidence presented in this Box suggests that, if the **policies that maintain or encourage the attractiveness of the regions as destinations for FDI, as well as the policies aimed at developing export activities** persist, labor productivity could observe higher levels.
- Hence, **it is necessary to boost the attractiveness of the FDI in the states of Mexico** by means of actions that encourage improvement in infrastructure and human capital, as well as in security conditions and the rule of law.
- As a consequence, this could lead to **an increment in both productivity and in regional export capacity**, which would translate in a **higher income level of the population**, and, therefore, in a **greater dynamism of the domestic market**.

Mining kept contracting, largely as a result of the lower crude oil production platform, as well as the decrease in the mining-related services. It stands out that in the North-Central region, the evolution of mining was more favorable, following a plunge that had been observed since mid-2015.



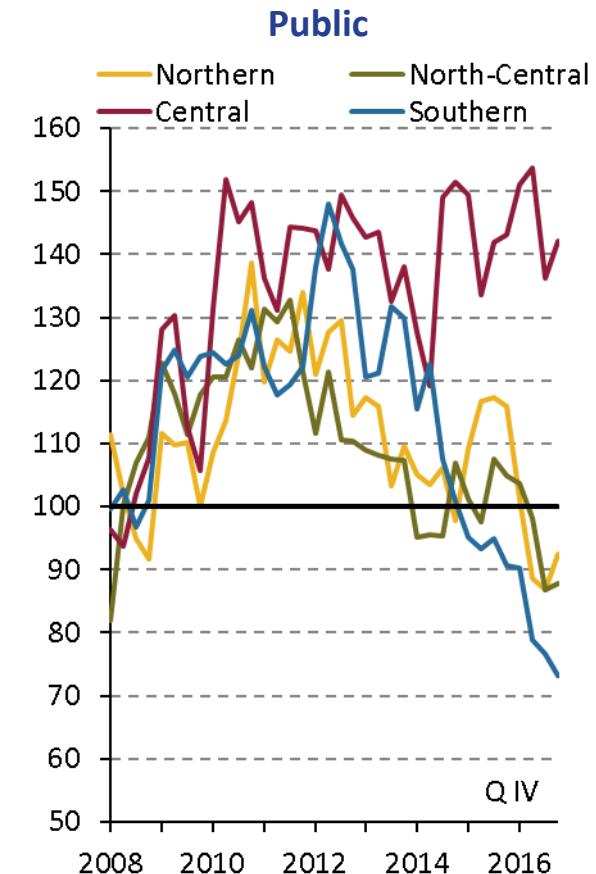
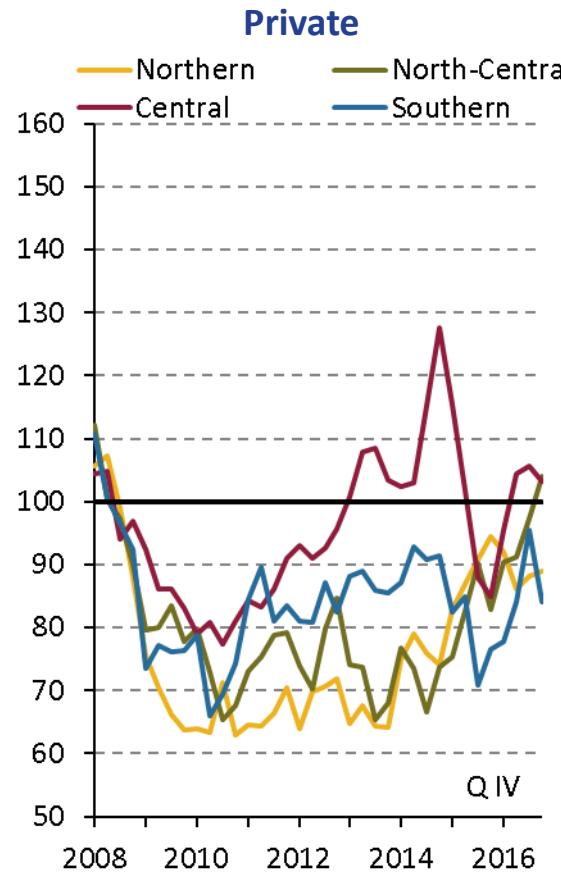
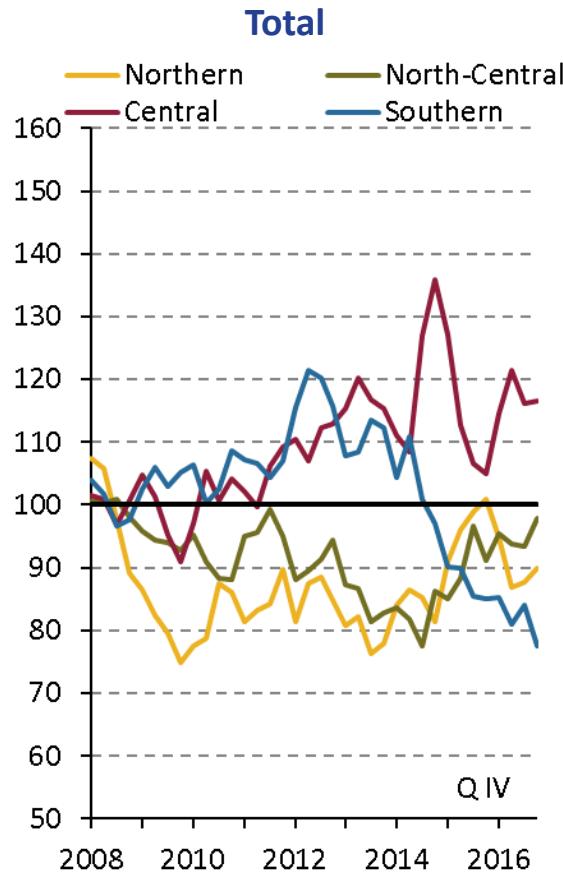
1/ The values in Q4 2016 are preliminary.

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

During Q4 2016, the construction sector expanded in different regions of Mexico. Indeed, in the Northern and the Central regions the evolution of the sector was positive, as a consequence of the incipient recovery of public construction, while private construction continued growing in the Northern region and observed higher dynamism in the North-Central region. In contrast, in the South construction resumed its downward trajectory, as a result of a lower volume contracted by both the public and the private sectors.

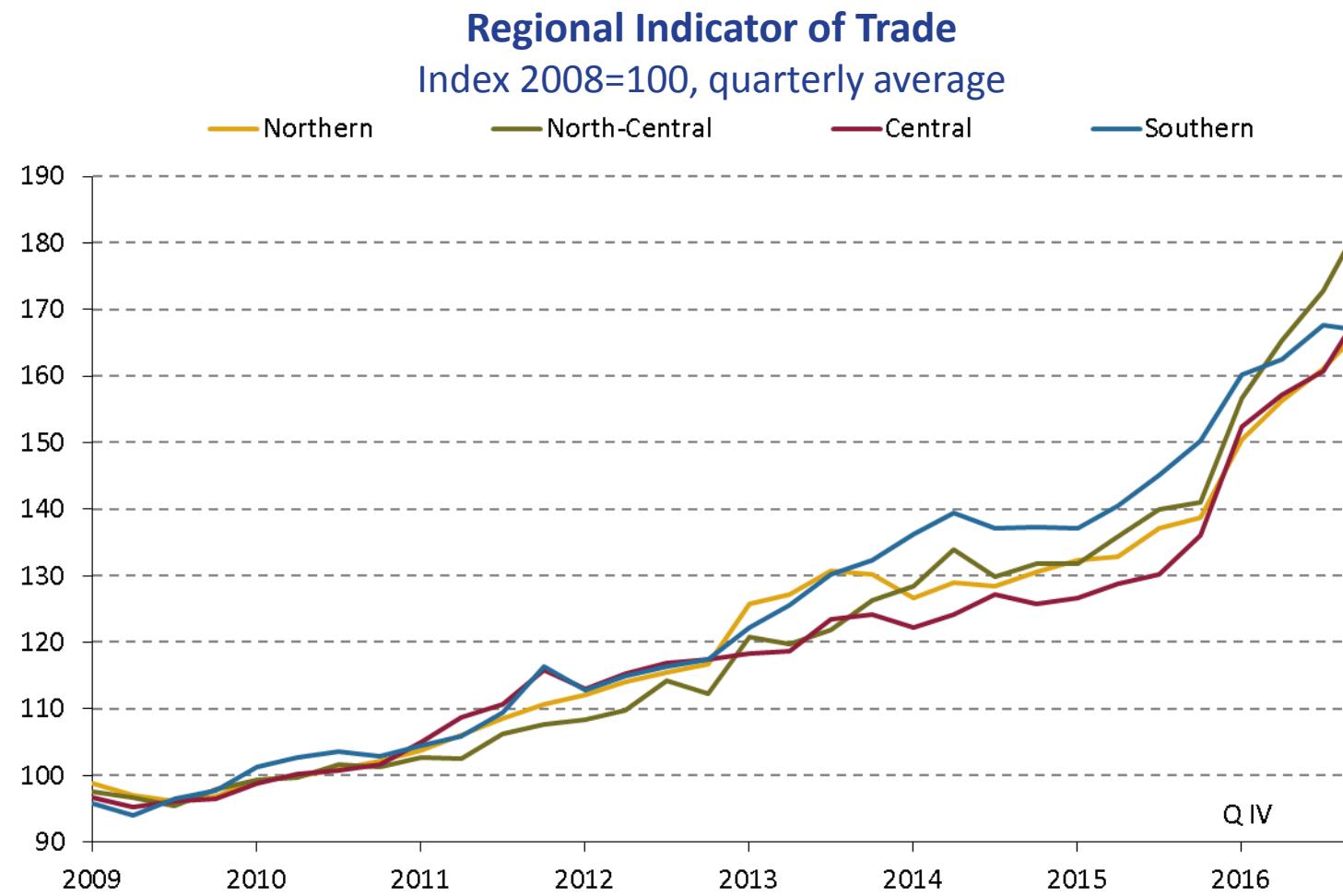
Real Value of Production in the Construction Industry by Region

Index 2008=100, quarterly average



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

Trade kept exhibiting a positive trend across most regions of Mexico in Q4 2016. Indeed, except for the relative stagnation in the Southern region, the growth rate of trade accelerated in the remaining regions.

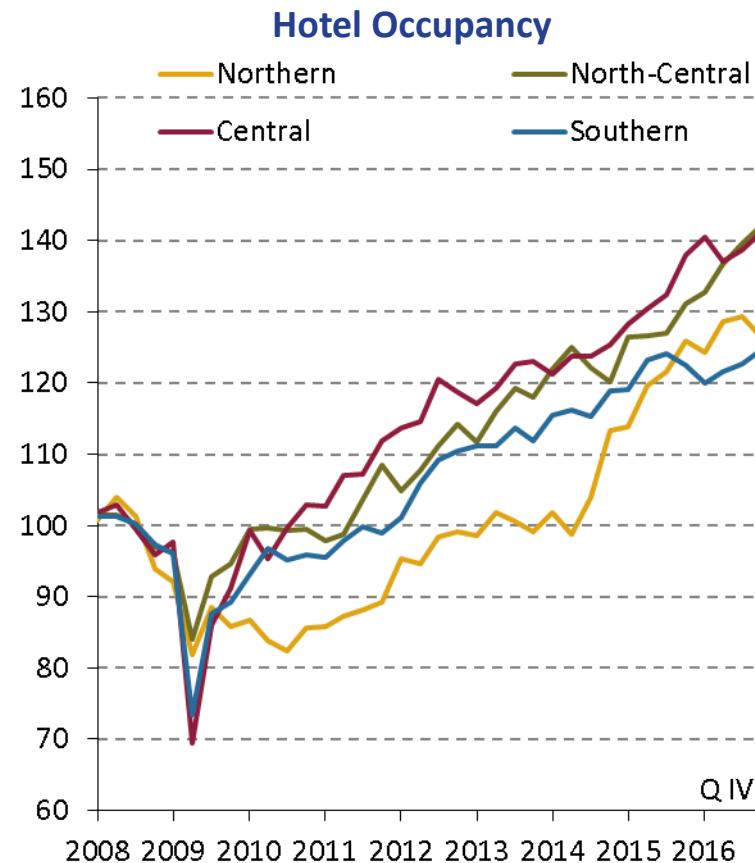


Source: Estimated by Banco de México with seasonally adjusted data from INEGI.

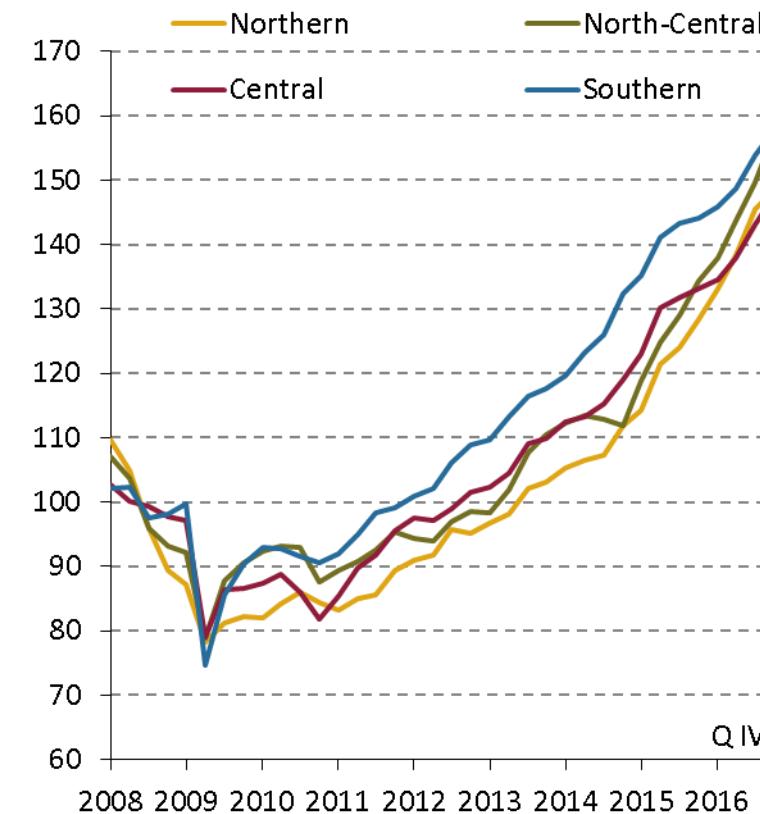
Tourism kept expanding in Q4 2016. Indeed, hotel occupancy continued growing in all regional economies, except for the Northern one, where this indicator contracted in the reference quarter. The inflow of passengers presented a favorable performance in all regions, thus maintaining a positive trend.

Regional Indicators of Activity in Tourism

Index 2008=100, quarterly average

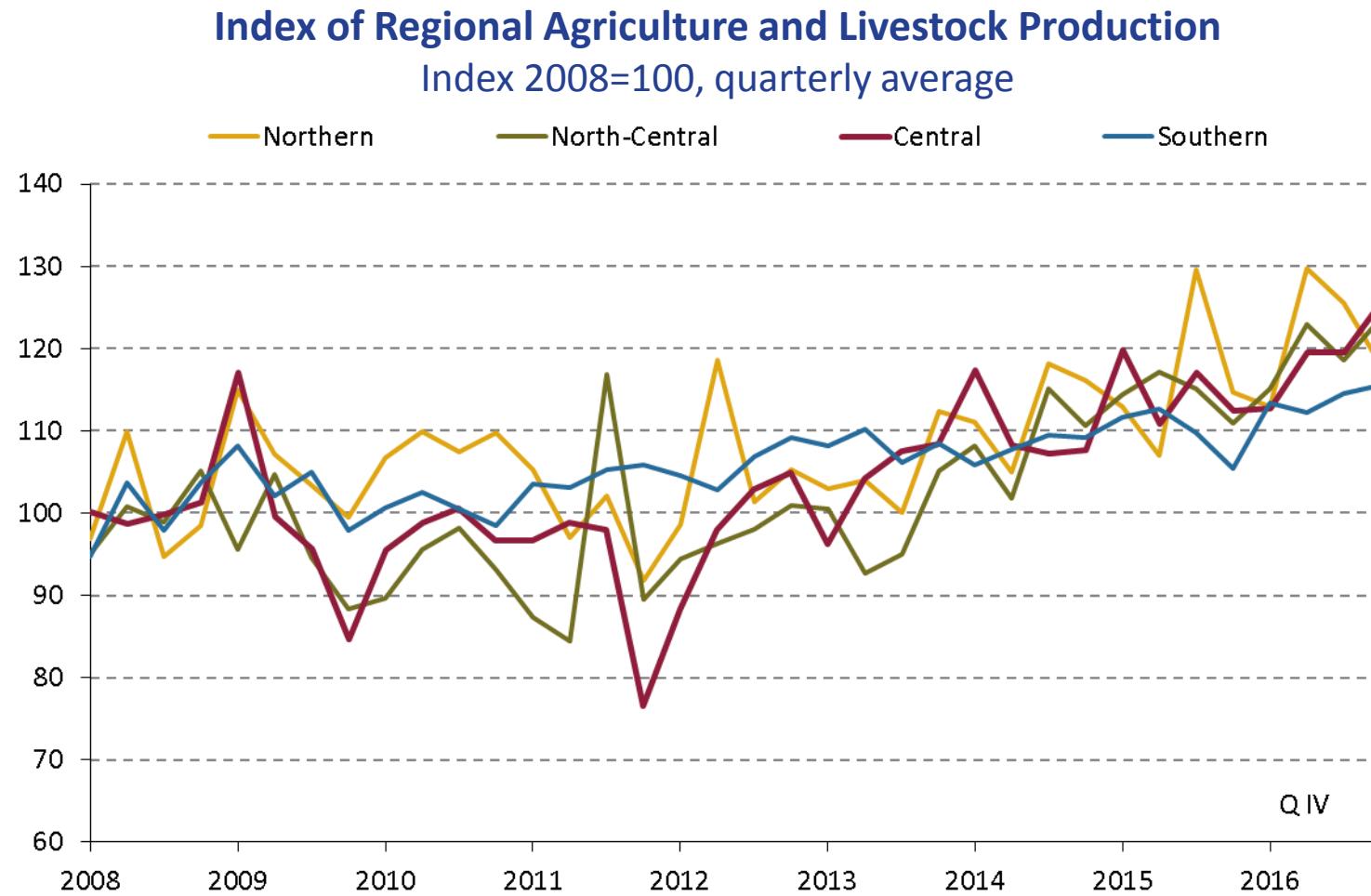


Inflow of Passengers to Airports



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).

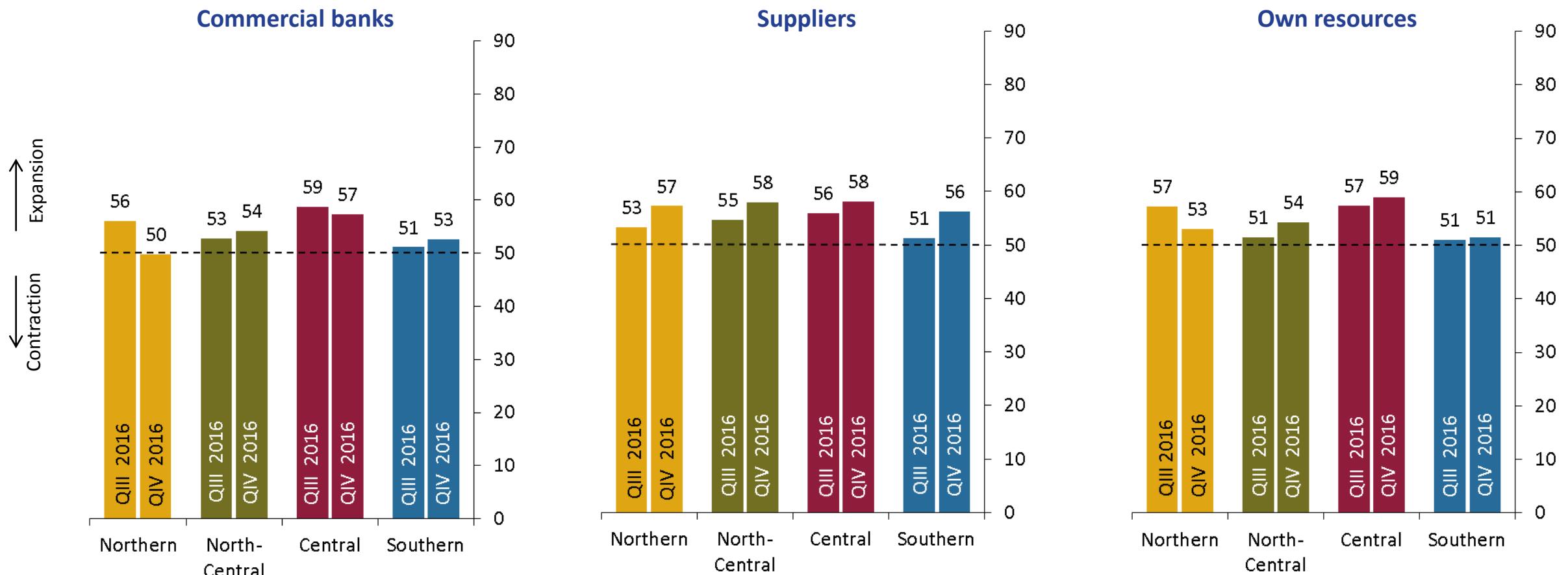
In Q4 2016, the agriculture and livestock production generally expanded. Thus, in the Central and Southern regions, production in this sector increased with respect to Q3 2016, thus maintaining its growing trend. In contrast, in the Northern region this activity kept declining.



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 the information relative to the value generated by land cultivation and approximates a measurement of the gross production value, rather than that of added value generated in the sector.

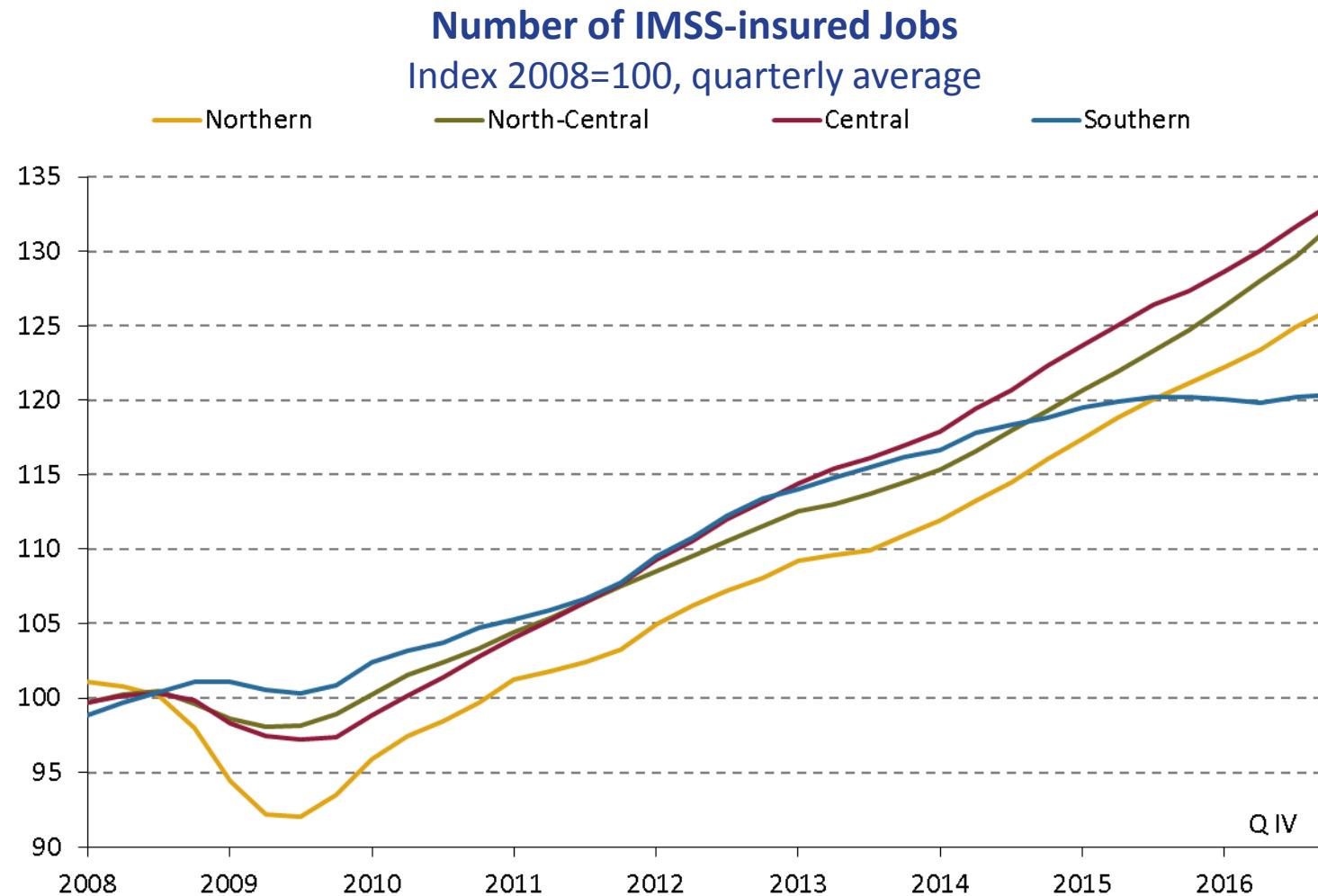
The intensity of businesses' bank credit use was greater, particularly in the Central, North-Central and Southern regions, during Q4 2016. Likewise, the use of supplier credits was more intensive as compared to Q3 2016 in all regional economies. Finally, the use of own resources to finance businesses was also more intensive in the reference quarter across all regions, and especially among businesses located in the Central region.

Change in the Use of the Main Sources of Financing Diffusion indices



Source: Banco de México.

During Q4 2016, the number of IMSS-insured jobs maintained a positive trend in the Northern and Central regions. In the Southern region, this indicator observed a slightly higher level, as compared to Q3 2016, following a drop in the first two quarters of 2016.



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

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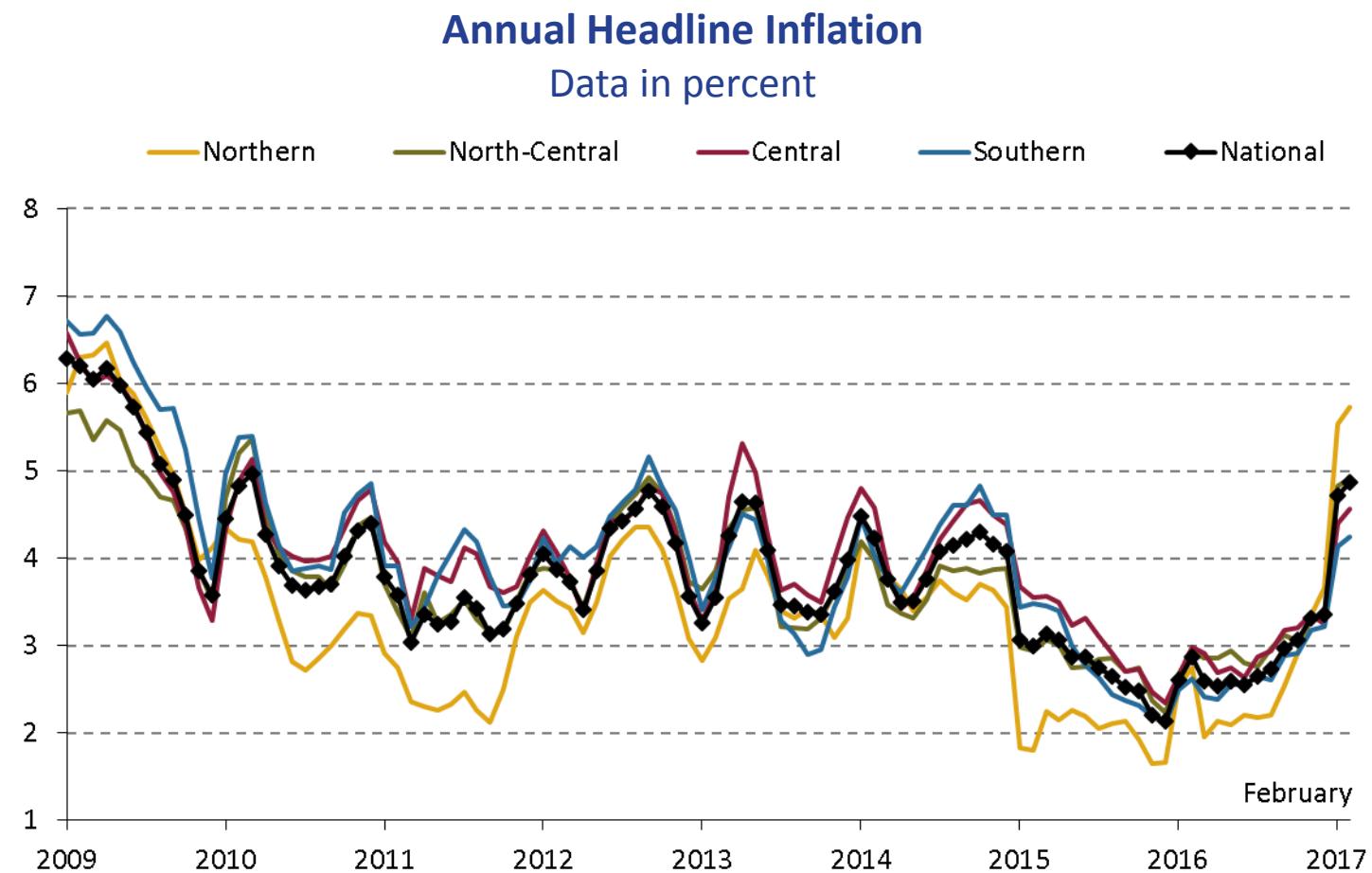
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Inflation

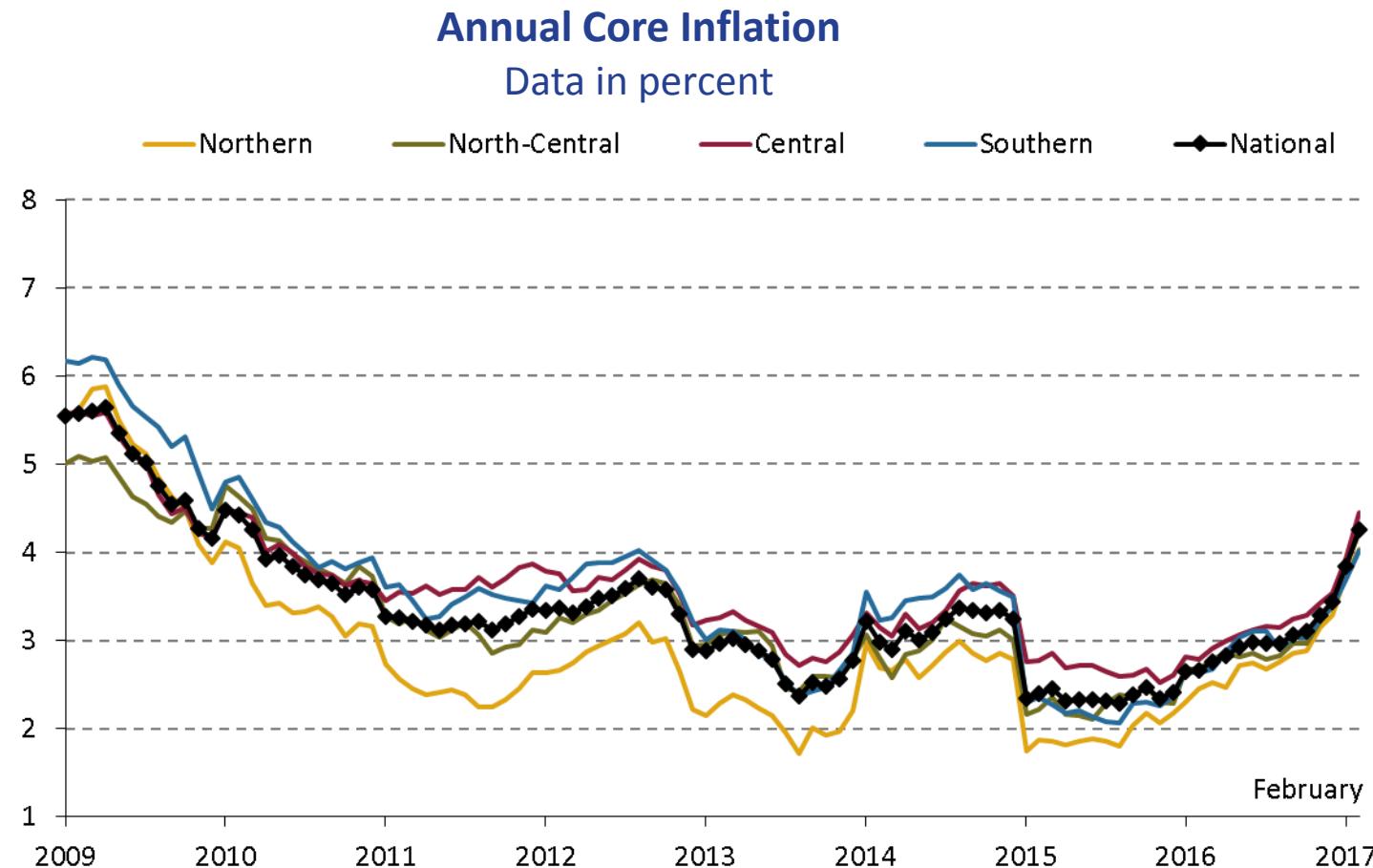
- In Q4 2016, annual headline inflation maintained an upward trend that had been perceived since mid-2016.
 - ✓ This performance was fundamentally associated to the additional depreciation of the national currency, which derived from the complex external juncture faced by the Mexican economy, especially in light of the elections in the U.S. and their outcome.
- As of January 2017, derived from the process tending to the liberalization of some energy prices, in particular gasoline and L.P. gas, the prices of these fuels spiked, reason why the upward trend, which had been exhibited by headline inflation, exacerbated. Thus, annual headline inflation at the national level increased to 4.72 percent in January and to 4.86 percent in February.
- It should be mentioned that the effects that have been observed so far have been indirect, normal and expected, associated to price increments in the referred energy products.

The factors that affected inflation in Mexico, both in Q4 2016 and in early 2017, were also reflected in the evolution of headline inflation across different regions.



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

Core inflation maintained its upward trend in all regional economies in Q4 2016. This derived from the changes in the relative prices of merchandise with respect to services, which resulted from the depreciation of the national currency.

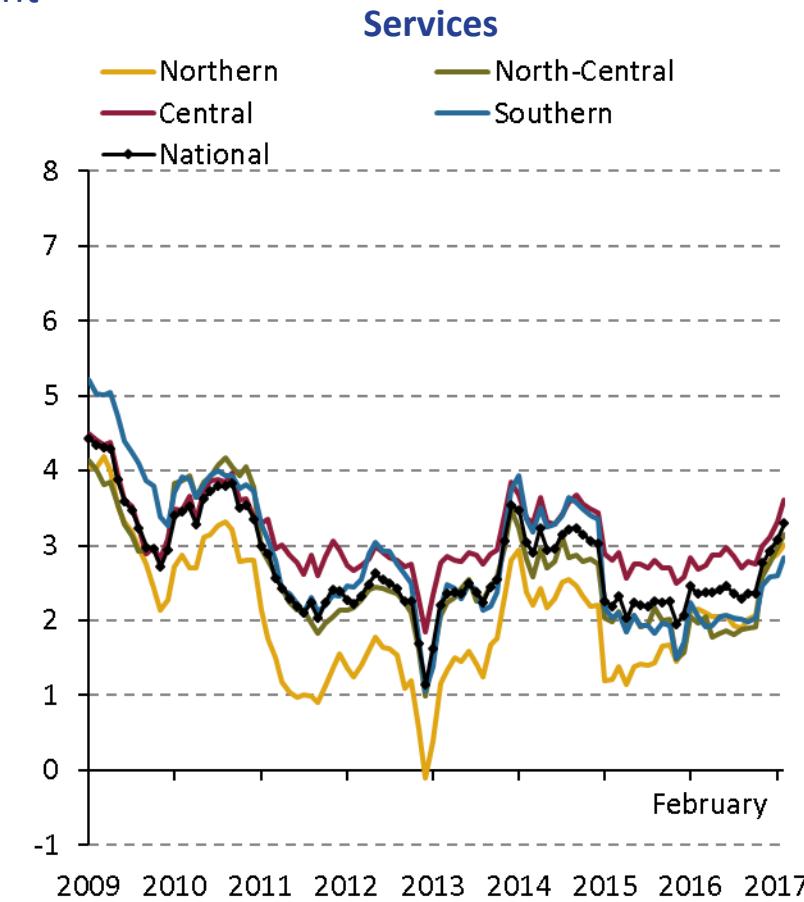
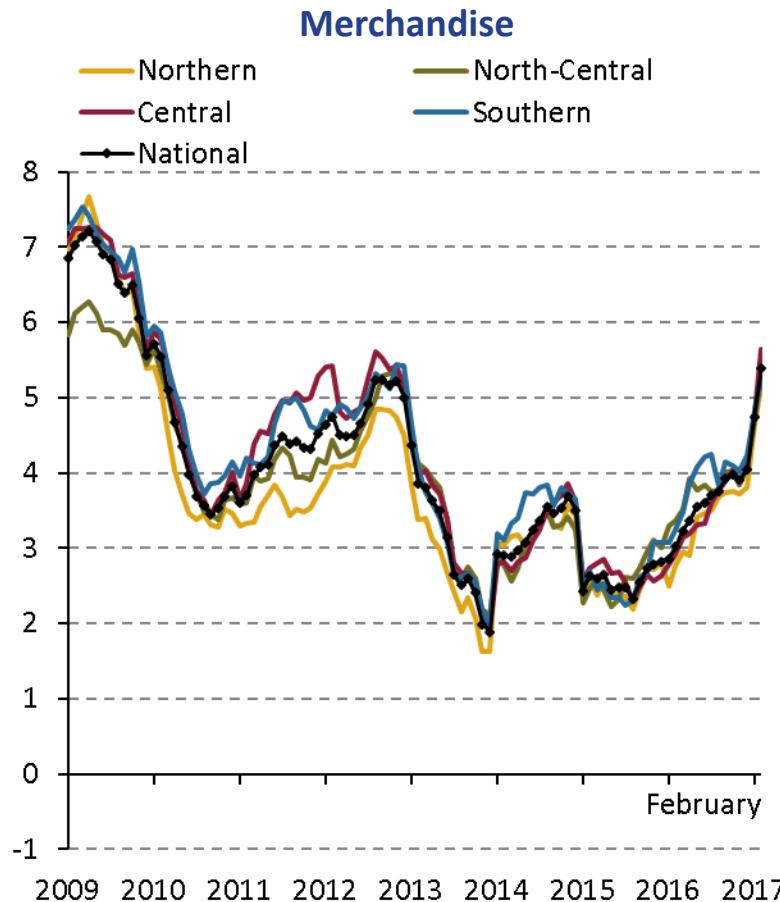


Source: Estimated by Banco de México with data from INEGI and own data.

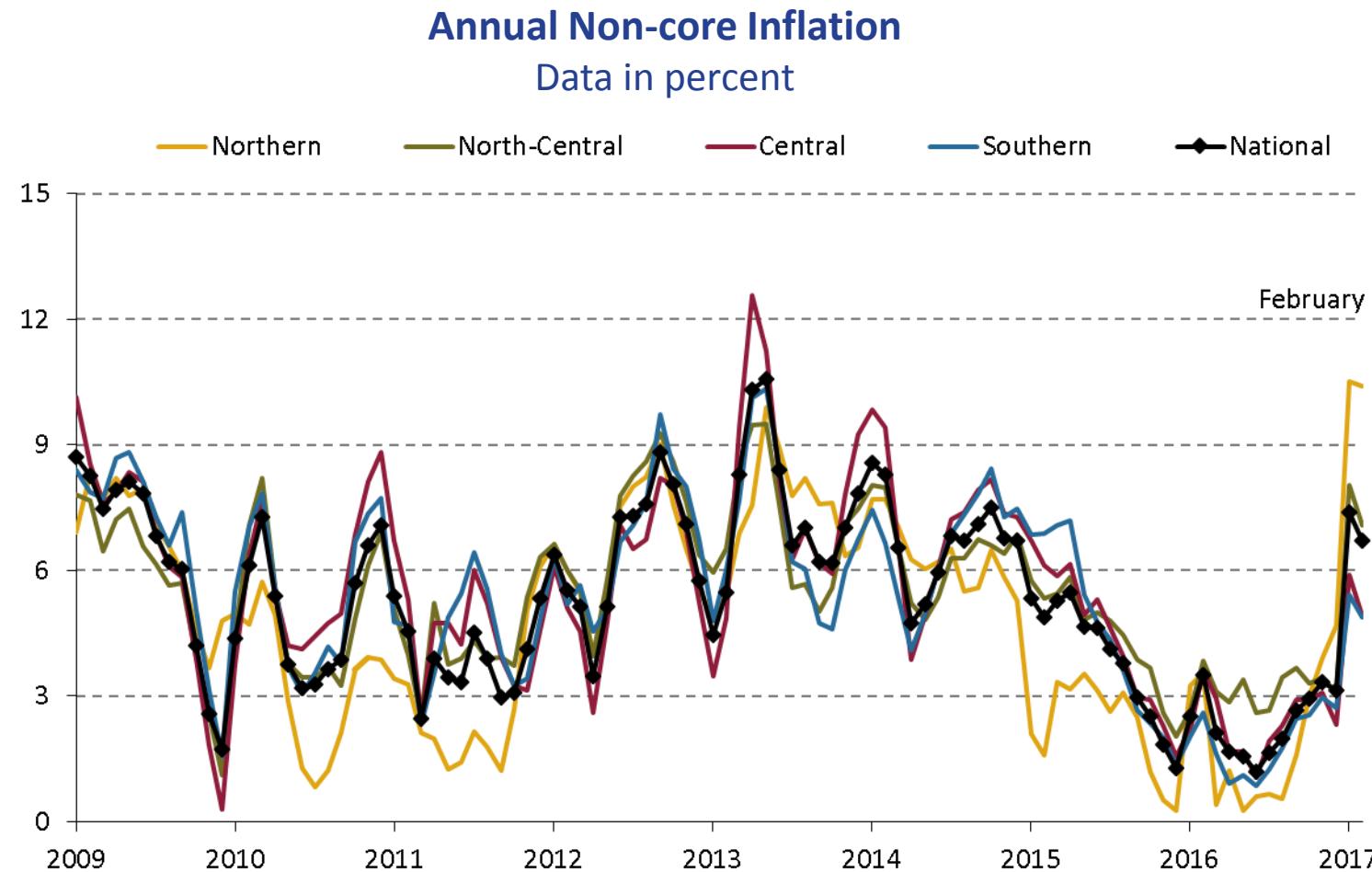
Furthermore, increments in energy prices that were registered in early 2017 generated indirect, natural and expected impacts on the prices of some goods and services that use them as inputs.

Components of Annual Core Inflation

Data in percent



In Q4 2016, most regions observed moderate annual growth rates in the non-core component, which fluctuated around 3 percent, even considering the price increments in some fruit and vegetables in this period. Subsequently, the changes in the price determination of some energy products in early 2017 caused the acceleration in the annual growth rate of non-core inflation in all regions.



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

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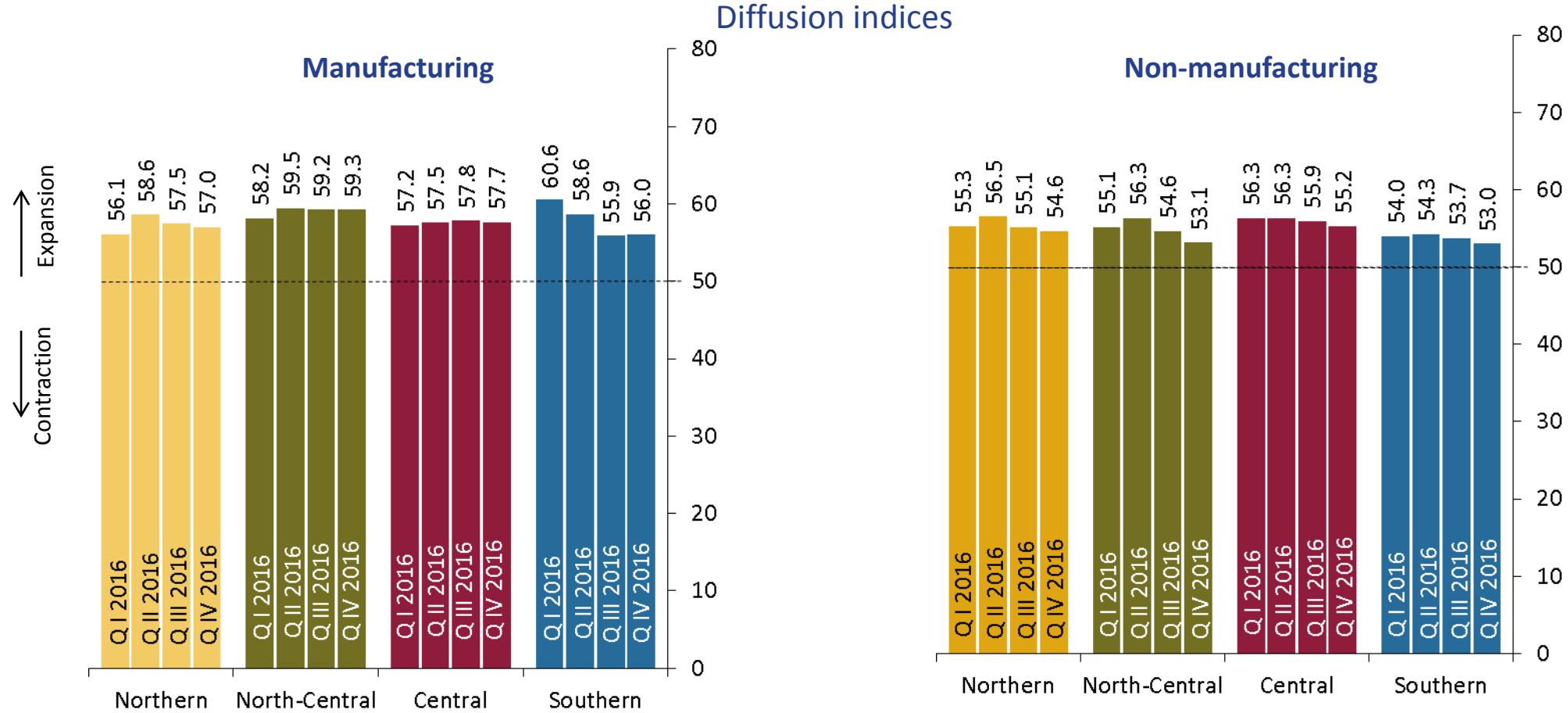
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Economic Outlook

- In general, business agents consulted for this Report anticipate demand for own goods and services to expand over the next 12 months in all regional economies, even though this signal somewhat weakened, as compared to the expectations in the previous quarter.
- Consulted business contacts stated that their expectations are based on the following:
 - ✓ Domestic context: the expected evolution of business support activities, national tourism, agriculture and livestock production, trade, pharmaceutical industry and non-residential private construction.
 - ✓ External context: that the better-than-expected performance of the U.S. economy and the depreciation of the real exchange rate will boost inbound tourism and exports of minerals, of agricultural products and of manufactures, especially automotive and car parts, aerospace, electronic and electric products.

Indices of manufacturing and non-manufacturing orders indicate that the activity will keep expanding over the next 3 months in all regional economies of Mexico. In the manufacturing sector, the indicator presented a level similar to that observed in the previous quarter across all regions. In the non-manufacturing sector, the sign of expansion weakened slightly in the four regions.

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



1/ Seasonally adjusted data.

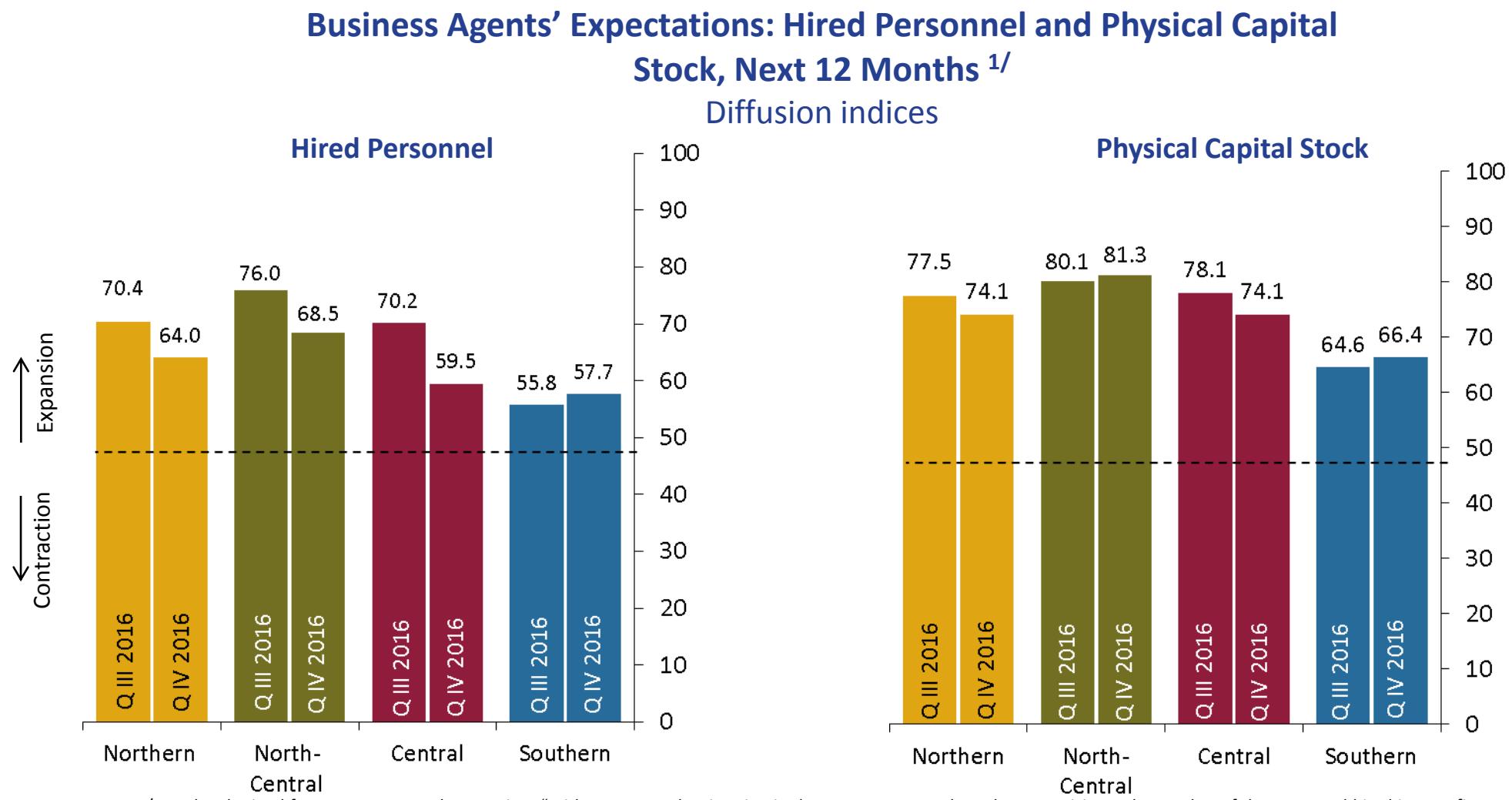
Source: Banco de México.

Business agents interviewed by Banco de México generally anticipate an expansion of demand for own goods and services in all regional economies over the next 12 months, even though this signal weakened in the four regions with respect to Q3 2016.



1/ Results obtained from responses to the question: "With respect to the situation in the current quarter, how do you expect demand for own goods and services to modify over the next 12 months?", from interviews conducted by Banco de México.

Consistent with the estimated growth in demand for own goods and services, business agents anticipate an increment in the number of hired personnel and the volume of physical capital stock.



^{1/} Results obtained from responses to the question: "With respect to the situation in the current quarter, how do you anticipate the number of the personnel hired in your firm to change over the next 12 months?", and "How do you expect the physical capital stock in your firm to modify over the next 12 months?", from interviews conducted by Banco de México.

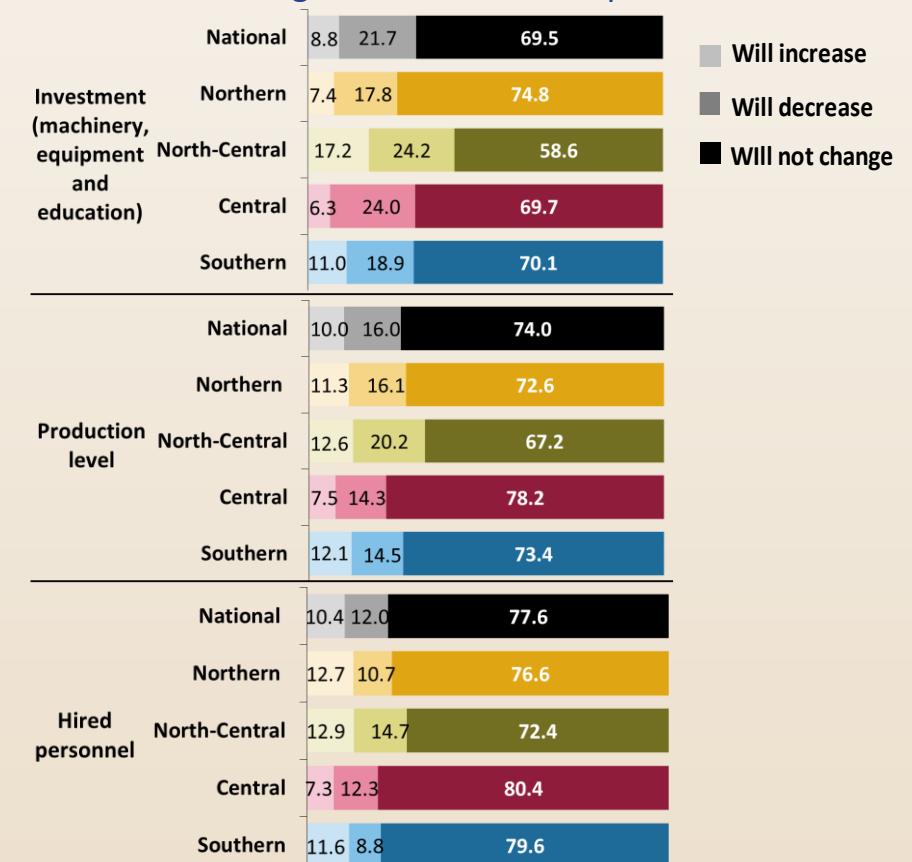
Box:

Business Expectations in the Manufacturing Sector in view of the New Administration in the U.S.

- ✓ In January 2017, Banco de México conducted interviews among business contacts in the manufacturing sector with respect to **the expected change in the level of their businesses' activity over the next 12 months, as a consequence of different elements that may be part of the economic policy to be carried out by the new U.S. administration.**
- ✓ Most interviewed contacts both at the national level (69.5 percent) and in each region expect no adjustment their investment plans.
- ✓ However, some business agents (21.7 percent) anticipated a drop in the expected investment.
- ✓ Most business contacts at the national level did not anticipate any adjustments in the expected levels of production (74 percent) and employment (77.6 percent), although some of these contacts expect a decrease in the level of production (16 percent) and in the volume of hired personnel (12 percent).

Expected Change in the Economic Activity of Manufacturing Businesses, Next 12 Months

Percentage distribution of responses

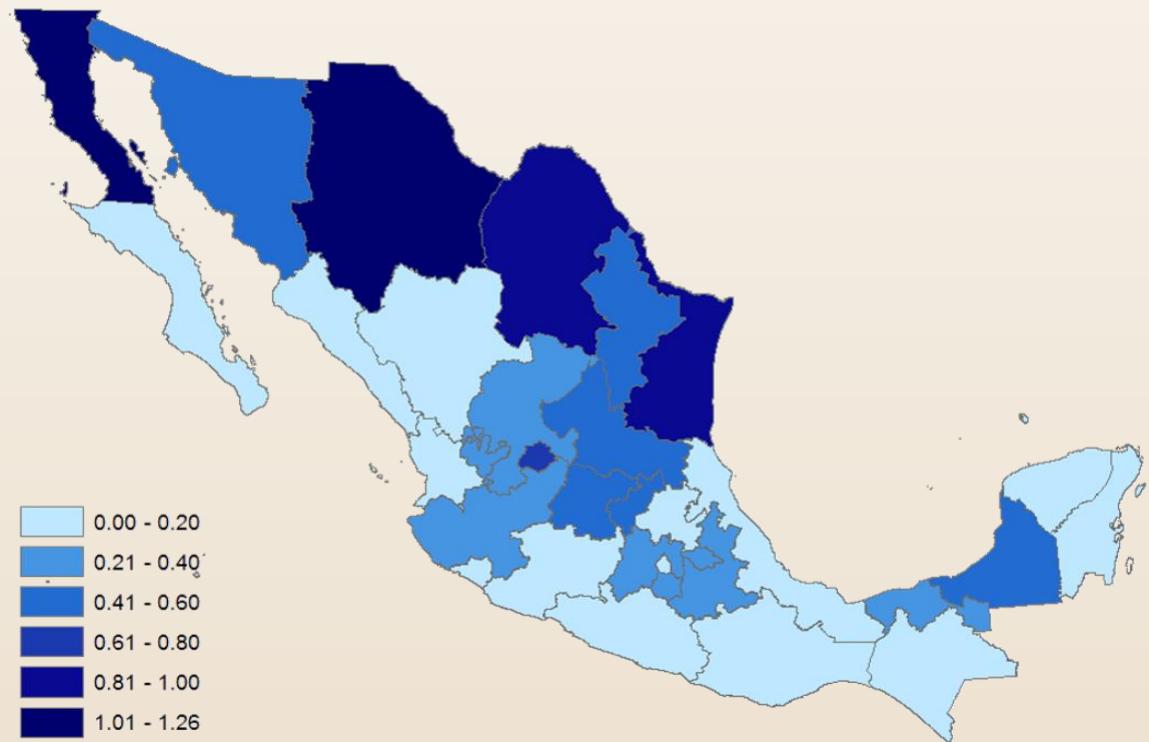


Source: Estimated by Banco de México based on the results of the Monthly Survey of Regional Economic Activity.

Box: Export Diversification across Mexican Regions

- In the wake of the implementation of the North American Free Trade Agreement (NAFTA), the trade and financial relation between Mexico and the U.S. intensified.
- In view of the possibility that the U.S., which is the largest trading partner of Mexico, may implement protectionist policies that would hamper trade, this Box seeks to:
 - ✓ Give the regional analysis of the current state of the degree of export diversification in terms of markets of destination and subsectors.
 - ✓ Describe the expectations regarding the diversification of export markets that are considered as viable by business agents of the manufacturing sector, who were consulted by Banco de México.

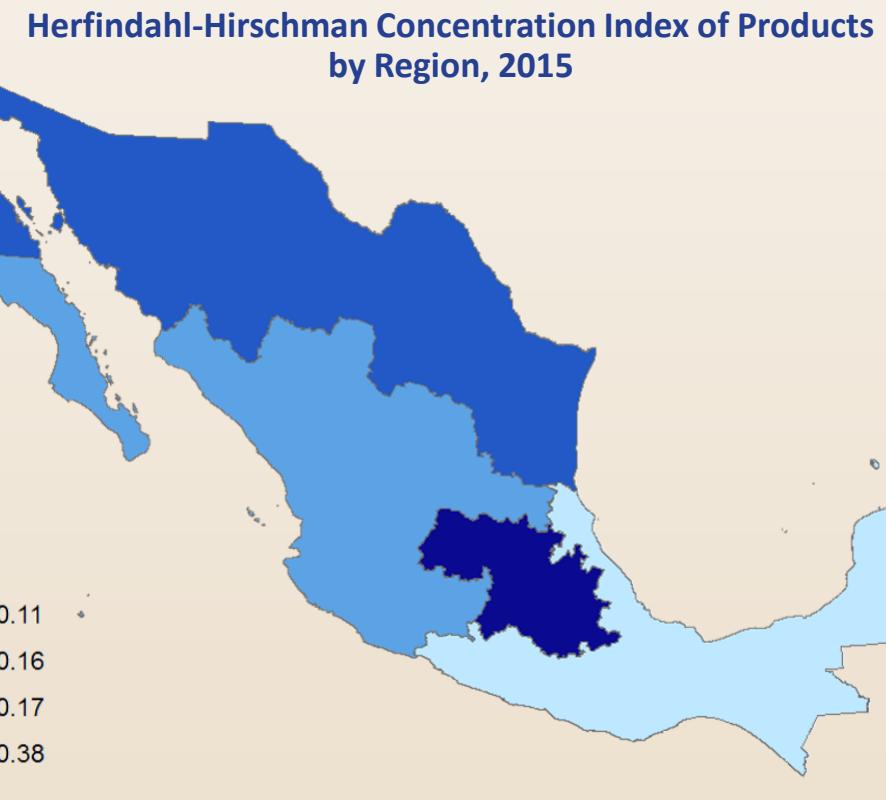
Value of Exports as a Share of GDP
by State, 2015



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

Box:
Export Diversification across Mexican Regions

- To determine the degree of export diversification at the regional level, two Herfindahl-Hirschman concentration indices were calculated, which take values ranging from 0 to 1. The closer to 1 is the index, the lower is the export diversification, either in terms of markets or products.



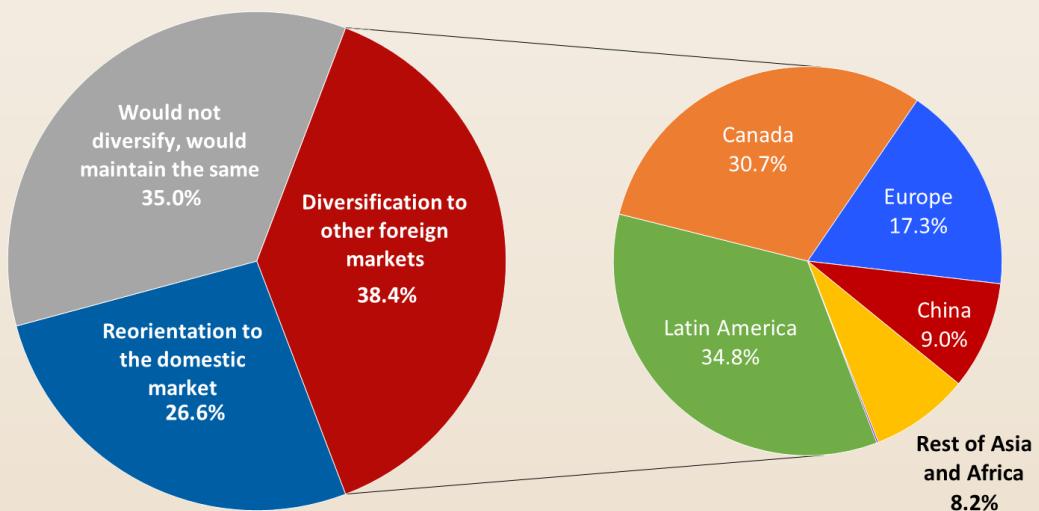
Source: Estimated by Banco de México with own data and data from INEGI.

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

Box: Export Diversification across Mexican Regions

- In January 2017, Banco de México consulted business agents in the manufacturing sector, who currently export a part of their production to the U.S. regarding the possible strategies of market diversification in a scenario, in which the U.S.-Mexico trade relation is affected.

Strategies of Market Diversification Implemented by Manufacturing Companies that Export Production to the U.S.
Percentage distribution of responses



Possible Destinations of Market Diversification of Manufacturing Companies that Export Production to the U.S., by Region
Percentage distribution of responses

	Latin America	Canada	Europe	China	Rest of Asia and Africa
National	34.8	30.7	17.3	9.0	8.2
Northern	32.3	33.0	20.2	3.4	11.1
North-Central	32.9	21.9	27.6	9.0	8.6
Central	39.5	34.2	7.3	15.4	3.7
Southern	26.1	8.7	26.1	19.6	19.5

Source: Prepared by Banco de México based on the results of the EMAER, in January 2017.

Source: Prepared by Banco de México based on the results of the Monthly Survey of Regional Economic Activity (EMAER), in January 2017.

Box:
Export Diversification across Mexican Regions

- A greater commercial integration between Mexico and the U.S. has gained importance for the economic performance of Mexico, especially in its Northern region.
 - ✓ As a result of this process, the concentration of exports both in terms of destinations and subsectors is far from homogeneous across regions.
- In light of new challenges in the international environment faced by Mexico, business agents in the manufacturing sector interviewed by Banco de México see **the international diversification of markets as a viable and necessary strategy in the medium term.**
 - ✓ To do that, among other things, a greater and better **provision of transport infrastructure** will be required. In particular, in accordance with consulted business agents, it is relevant to have a port infrastructure that would prompt businesses to invest more in more regions, thus boosting their export capacity, taking advantage of the existing commercial agreements and treaties with Europe, Latin America and Asia.

Risks to Economic Activity

Upward risks



A higher-than-expected increment in the levels of private investment, especially in the automotive sector.



That various public infrastructure projects that are currently being developed, in particular in transport, will become operational faster than previously estimated.



Business contacts in the Northern and Southern regions signaled that, as a consequence of the liberalization of gasoline prices, the level of investment in the energy sector could be greater than anticipated.



In the North-Central and Southern regions, it was stressed that, given the recent depreciation of the real exchange rate, the inflow of foreign tourists to these regions will exceed the expectations.

Downward risks



That protectionist policies can be adopted by the new U.S. government, causing a decrease in both Mexican exports and the flows of FDI.



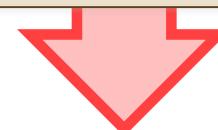
The possible deterioration in the perception of public safety.



New episodes of volatility in international financial markets that would lead to greater uncertainty regarding the exchange rate.



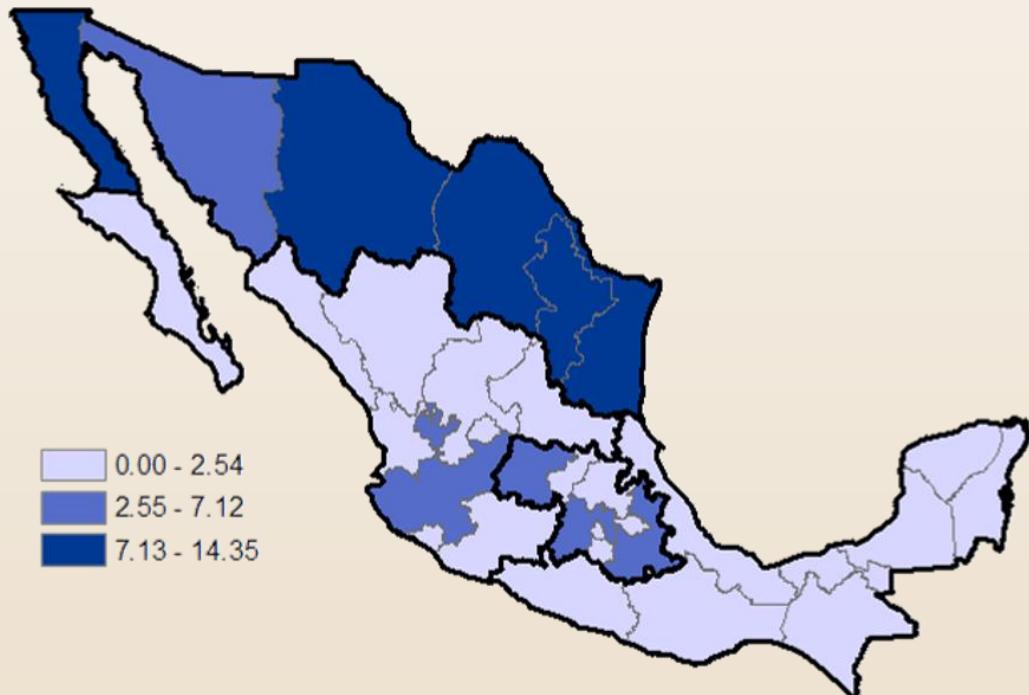
Some business contacts interviewed in the Southern region kept considering the existence of social conflicts in some entities of the said region as a factor of risk.



Box: Foreign Direct Investment and Exports in the Manufacturing Sector

- The goal of this Box is to analyze the relation between the **FDI** and **exports** across states.

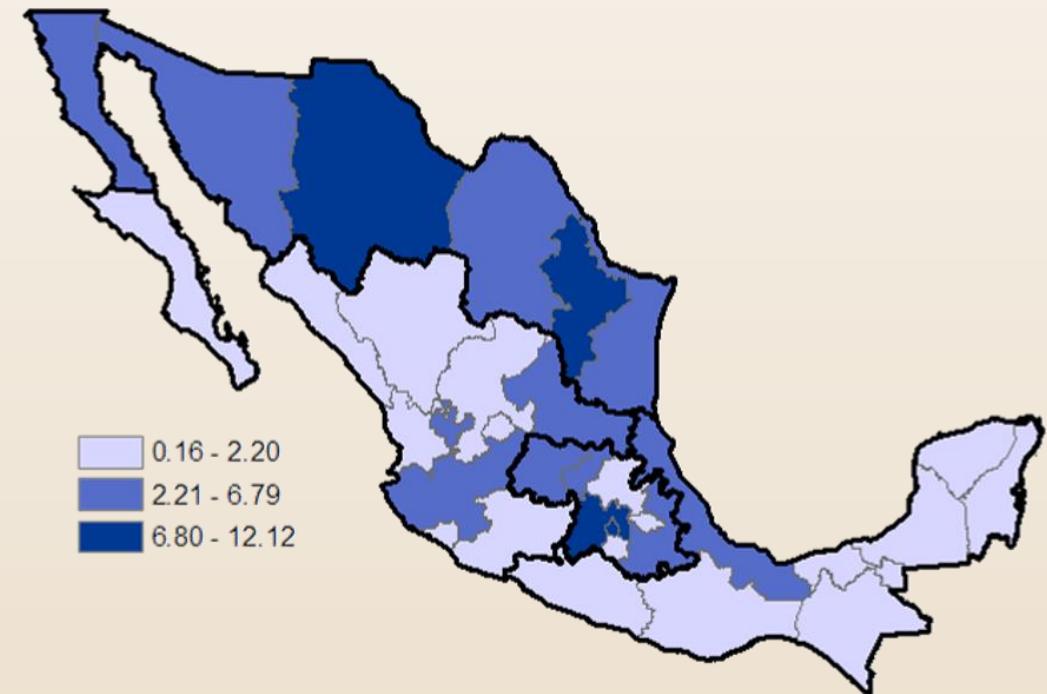
Manufacturing Exports, 2007 – 2015
Percentage distribution



Note: To visualize the information on the map, three groups were defined on the map to identify regions with high, medium and low export levels based on Jenks Natural Breaks technique.

Source: Estimate by Banco de México with data from INEGI.

Stock of Foreign Direct Investment in the Manufacturing Sector, Average 2007 – 2015
Percentage distribution

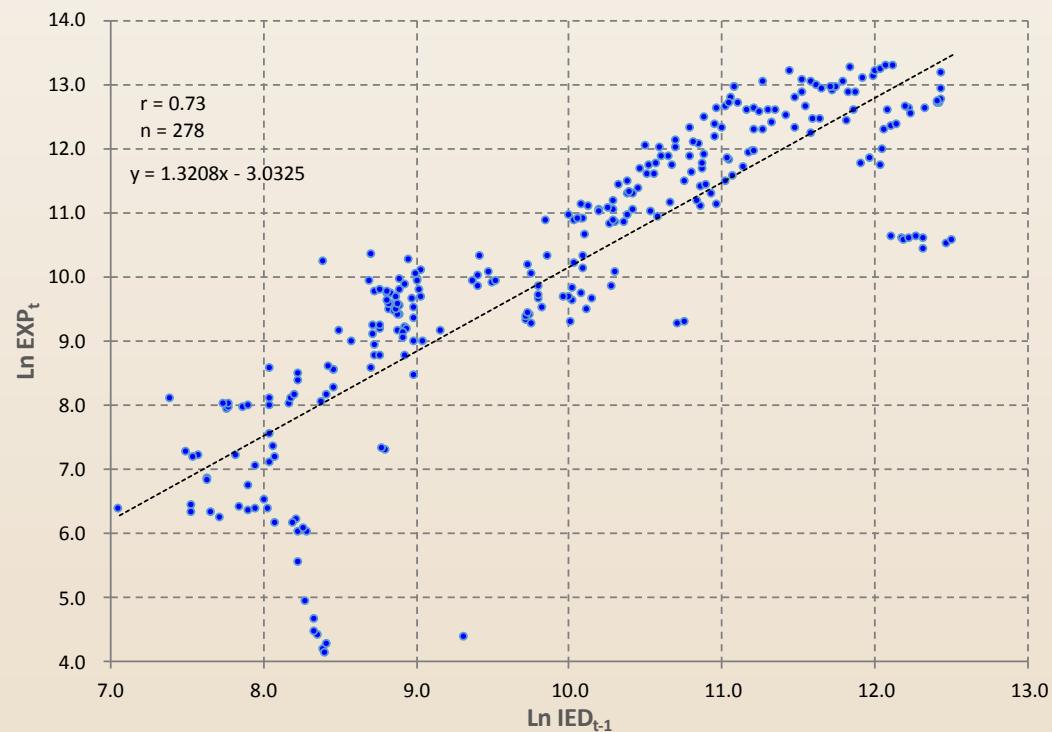


Note: To visualize the information on the map, three groups were defined on the map to identify regions with high, medium and low export levels based on Jenks Natural Breaks technique.

Source: Estimated by Banco de México with data from the Ministry of Finance.

Box:
Foreign Direct Investment and Exports in the Manufacturing Sector

**Stocks of FDI and Exports in the Manufacturing Sector, by State,
2007 – 2015**



Note: In the linear regression equation that adjusts the point cloud, $y = \ln(\text{EXP}_t)$, and $x = \ln(\text{IED}_{t-1})$.

Source: Prepared by Banco de México with data from INEGI and the Ministry of Economy.

**Granger Causality Test for Panel Data
VAR Panel-Granger Causality Wald Test**

Causality relation	Chi-square (χ^2)	P-value
$\ln(\text{IEDS}_{t-1}) \not\Rightarrow \ln(\text{EXP}_t)$	18.068	0.000 ***
$\ln(\text{EXP}_{t-1}) \not\Rightarrow \ln(\text{IEDS}_t)$	1.550	0.213

Estimates realized using the methodology of Abrigo and Love (2015).

Note: *** denotes the significance level of 1 percent.

Source: Estimated by Banco de México with data from INEGI and the Ministry of Economy.

Box:

Foreign Direct Investment and Exports in the Manufacturing Sector

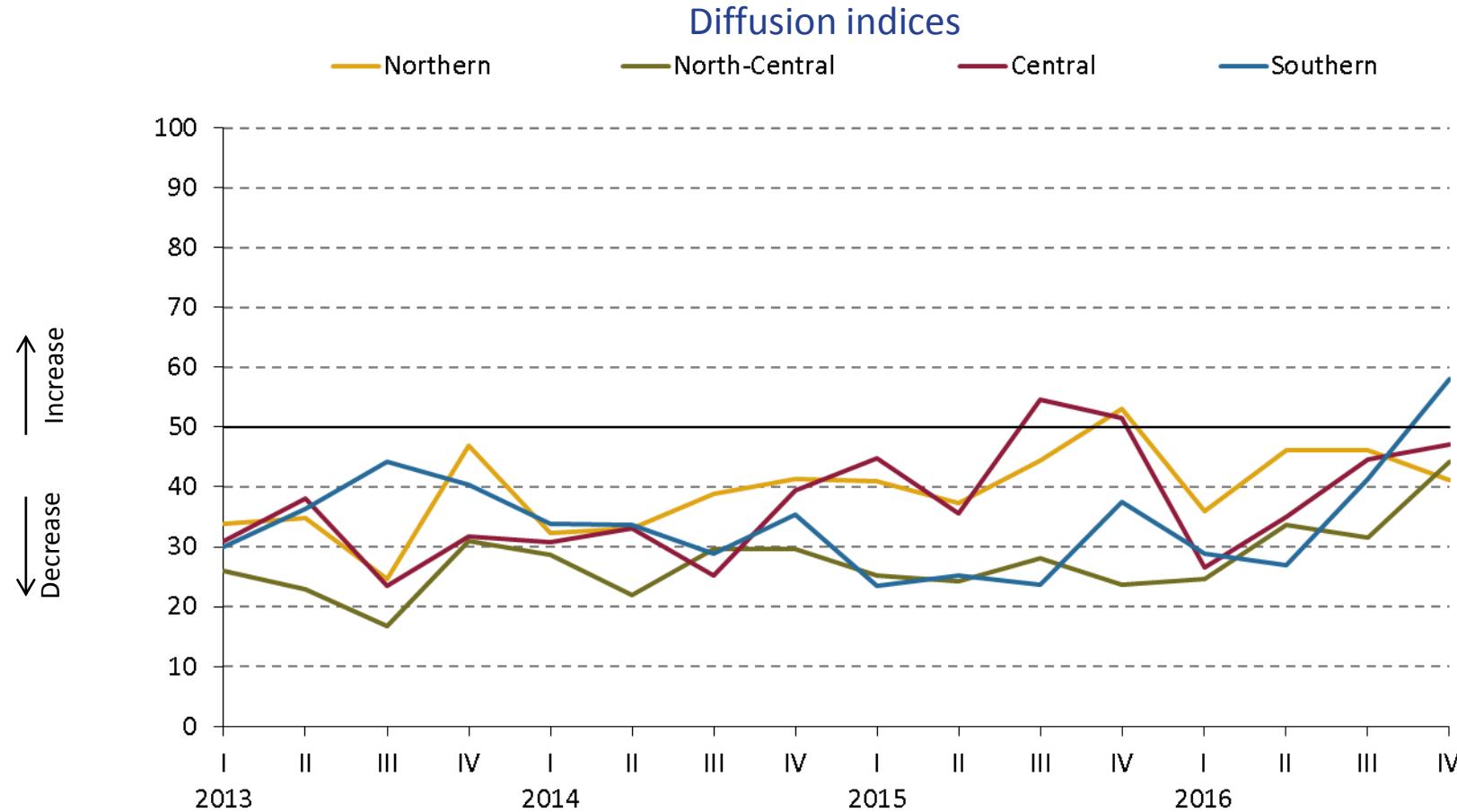
- This Box shows that the **FDI and manufacturing exports are closely related** at the level of states of Mexico. In particular, the regions with higher levels of FDI tend to subsequently present greater exports.
- Thus, **the implementation of public policies that encourage the attraction of this type of investments could contribute to the generation of a more solid manufacturing exports platform**, which, in addition, would lead to higher productivity at the regional level.
- In particular, **investment in infrastructure and human capital at the regional level is necessary**. Also, the regulatory framework, security conditions and the rule of law should be strengthened across states.

Economic Outlook

- As regards the prices of own goods and services, business agents generally anticipate lower changes than in the previous year across all regions, except for the Southern region, where, on average, the price increment is expected to be higher than that observed in 2016.
 - ✓ It should be noted that the expectations of a lower growth rate of prices weakened in the Central and Southern regions, relative to Q3 2016, while in the Northern one the indicator persisted at a level similar to that observed, on average, in 2016.
- With respect to wage costs over the next 12 months, interviewed agents in the North-Central and Southern regions anticipate a lower annual change rate as compared to 2016. In contrast, in the Northern and Central regions, the growth rate is estimated to be higher than that observed in 2016.
- Regarding the future evolution of input prices, the signal of a greater annual growth strengthened with respect to Q3 2016 across all regions.

As regards the sales' prices of own goods and services, business agents generally anticipate lower growth rates as compared to last year across all regions, with the exception of the Southern region. It should be noted that the expectations of a lower growth rate of prices weakened in the Central and Southern regions, with respect to the previous quarter, while in the Northern region the indicator remained at a level similar to that observed, on average, last year.

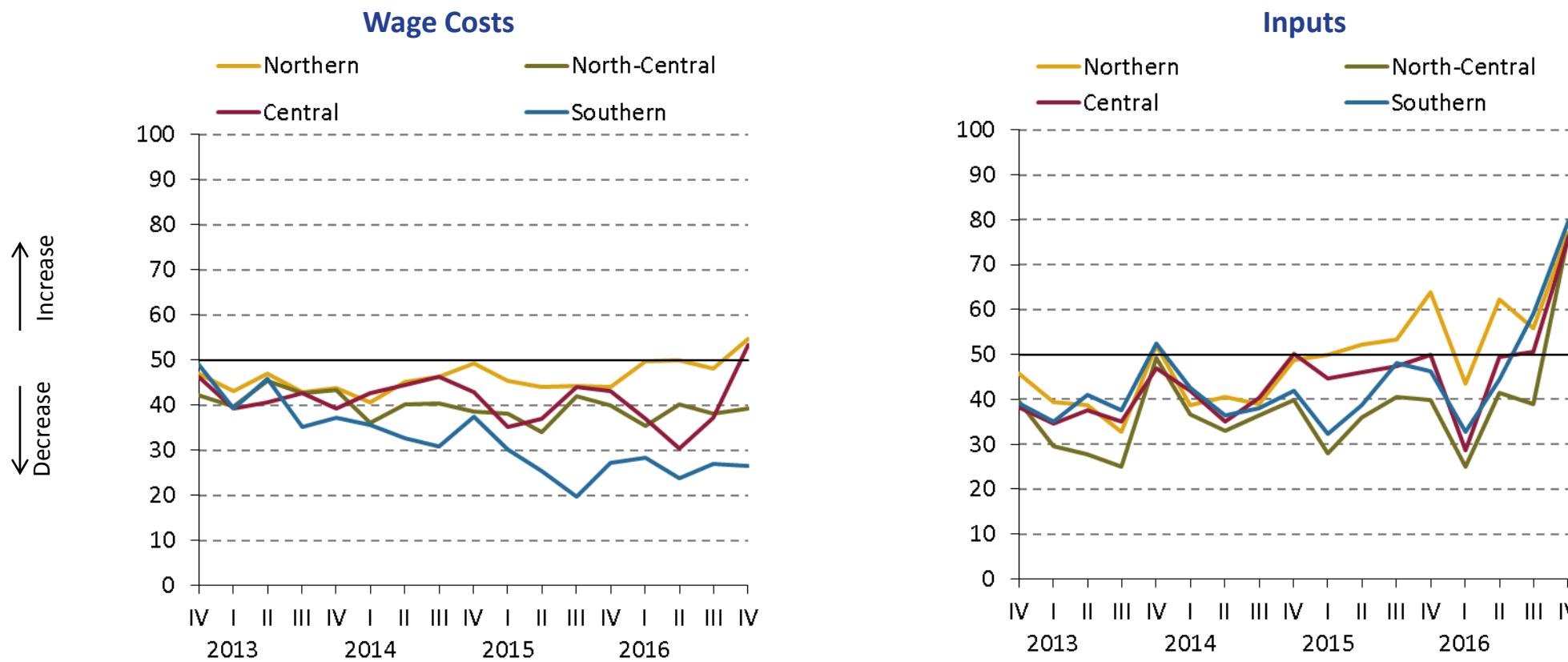
Business Agents' Expectations: Annual Change of Sales' Prices, Next 12 Months ^{1/}



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

With respect to wage costs for the next 12 months, consulted business agents in the North-Central and Southern regions anticipate a lower annual change rate with respect to 2016. In contrast, in the Northern and Central regions the growth rate is expected to be higher than last year. Regarding the future evolution of input prices, the signal of a greater growth strengthened as compared to Q3 2016.

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



1/ Results obtained from responses to the question: "With respect to the previous 12 months, how do you anticipate the adjustment in input prices (goods and services) and wage costs used in your sector in the next 12 months?", from interviews conducted by Banco de México.

Outline

- I. Regional Economic Report
- II. Results October – December 2016
 - A. Economic Activity
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 - C. Economic Outlook
- III. Final Remarks

Final Remarks

- It is essential to point out that in the context of the complex environment faced by regional economies, it is necessary to **encourage the diversification of export destinations, the sources of imports and of FDI in the Mexican states, at the same time adopting strategies that would contribute to boosting the potential growth of the domestic market.**
 - ✓ Thus, it is necessary to continue encouraging competitiveness and productivity in the regional economies of Mexico by strengthening their microeconomic functioning, at the same time reinforcing the macroeconomic framework of the country and maintaining the commitment to implementing the structural reforms in an adequate and timely manner.



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