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A change of reference year for annual regional aggregates in national accounts

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Changes of base or reference year in countries' systems of national accounts are a normal part of statistical work. They are an opportunity to incorporate into measurements, for the base year and those that follow or precede it, all the progress in concepts, methodologies and information sources that has occurred since the last estimate of gross domestic product (GDP). The System of National Accounts 2008 (2008 SNA) recommends that this type of updating be carried out at least every five years to reflect the current behaviour of the different economic sectors, thereby providing better tools for decision-making and economic policymaking.

International organizations, for their part, must reflect these changes in a reliable and timely manner. Accordingly, the Statistics Division has proceeded to update the reference year in its calculations of regional aggregates in this area. ECLAC has been presenting information on regional aggregates of national accounts with reference year 2010 since 2014. This reference year lies a long way in the past and does not fully reflect the relative shares of the countries in these aggregates.

The Statistics Division is now presenting the methodology and results obtained using a new reference year, 2018, for series of economic indicators and regional aggregates of national accounts.

The new series of regional aggregates have been arrived at by analysing the information available in the countries of the region and the impact of developments in production structures, prices and exchange rates.

The updated information on dollar-denominated GDP series, foreign trade indices and prices can be found in CEPALSTAT and may be consulted on the website. A document likewise presented there explains the changes that our users will encounter because of the adoption of the new reference year.

1. Calculation methodology for the regional aggregates of Latin America and the Caribbean

The reference year currently employed to calculate the annual regional aggregates in CEPALSTAT is 2010. This reference year has been taken as a fixed base year to construct the national accounts series, foreign trade indices and price indices published hitherto.

The methodology adopted to prepare the different regional GDP series by supply and demand component at constant 2018 prices consists in reinterpolating and extrapolating the dollar-denominated 2018 values converted at the exchange rate published by the International Monetary Fund (IMF) with the respective volume indices of the GDP components, obtained from the official series in local currencies. These series are processed by each component of GDP.

The volume indices used are obtained from the countries' official growth rates, without distinguishing between fixed base and chained indices.

The regional aggregates for Latin America and the Caribbean are obtained as the sum of the dollar-denominated country data. Growth rates and deflators are calculated from the regional aggregates thus derived.

2. Changing the reference year for the different series of national accounts at ECLAC to 2018

The team at the Economic Statistics Unit of the Statistics Division of ECLAC has been engaged since 2021 on this project to update the reference year for the GDP series and their components. This has involved several stages of analysis to arrive at the results published in this document with a new reference year, 2018.

It is important to realize that preparing these series with a new reference year does not strictly involve compiling national accounts series, since this process is carried out by each of the countries in the region when they update or change their base year. What ECLAC is concerned with in updating the reference year is changing the period over which the different macroeconomic variables are compared.

In this framework, the methodologies used by other international organizations were reviewed. These currently use different reference years when carrying out calculations for the region. One group clusters around the year 2010 (2010 and 2011) and another around the year 2015 (2015 and 2017). Most present results with reference to a fixed base year, and only one presents regional aggregates for volume data by chainage.¹

Taking as a basis local-currency GDP information from the perspective of supply and demand at current and constant prices published by the countries and spliced for the period 1990 to 2021, as the availability and levels of disaggregation of measurements in the countries of the region permitted, we proceeded to determine the reference year for updating the series in CEPALSTAT.

Two considerations were taken into account in the process of choosing the reference year:

- a. The distance between the reference year and the current year, bearing in mind that the recommendation is to update every five years (2008 SNA).
- b. The year selected must be one that was economically stable in the region.

Traditionally, 2020 would have been used as the reference year, but given the contingency resulting from the outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), alternative years were evaluated in consideration of the difficulties encountered by the compilers in collecting data and compiling their national accounts².

The years from 2015 to 2018 were evaluated in terms of the standard deviation of GDP in levels with respect to the moving average centred on the different years for the Latin American countries. Under these principles, 2018 was selected as the reference year, and the weights in the 33 countries of the region were analysed with their changes relative to 2010, the reference year used previously. The largest weighting changes are in the 20 economies with the highest weights in the region, while most of the countries' weights have remained the same over time. The differences in these weights can be explained by the following factors:

- a. Differences in the countries' real growth rates.
- b. Differences in price variation.
- c. Exchange-rate variability over the years analysed.

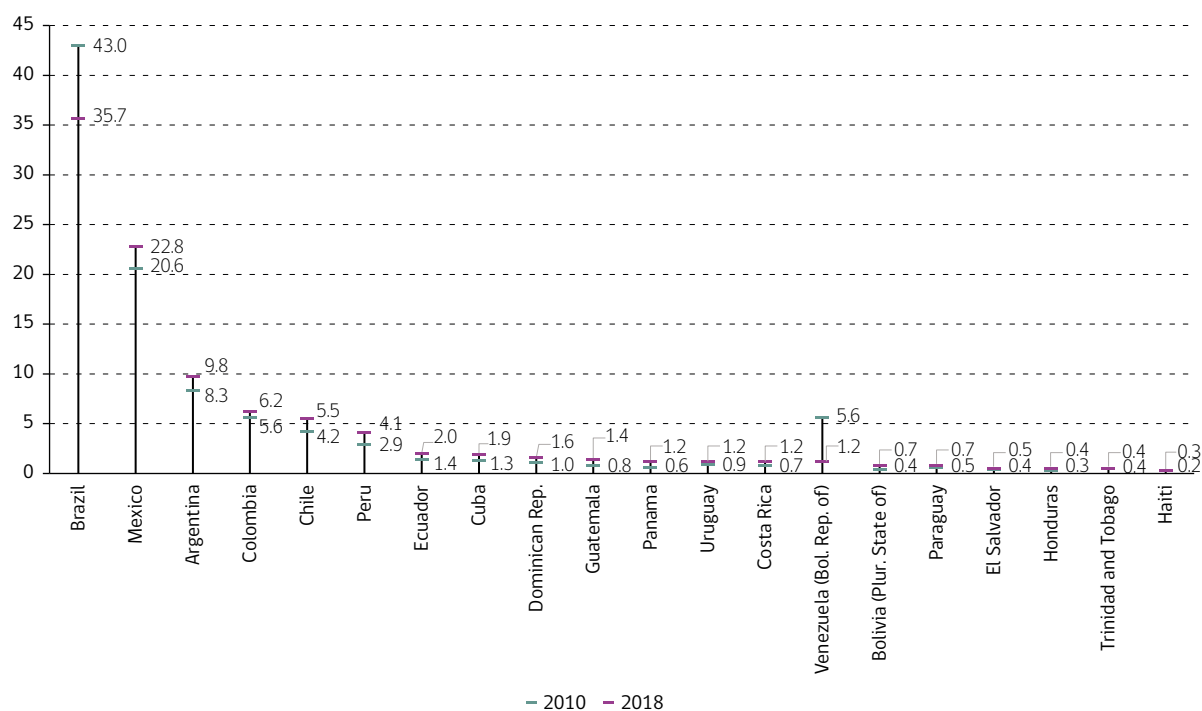
This new composition of the weighting structure for the reference year impacts the results for the performance of the regional economy of Latin America and the Caribbean and the subregional economies of Latin America and, separately, the Caribbean.

¹ The methodology used by the countries to present their results in constant values are series with a fixed base that is associated with the term "change of base year" to refer to the updating of a country's national accounts. When the chained volume series compilation methodology is adopted, the term "change of reference year" is used. The change in terminology also reflects the loss of additivity of the resulting time series, as only series expressed in the same set of prices over the whole time period analysed are additive.

² For more information on the statistical challenges faced by the countries of the region in compiling their economic statistics and their responses to them, please consult ECLAC, "Compiling national accounts, balance-of-payments and foreign trade statistics in the framework of the coronavirus disease (COVID-19) health emergency", COVID-19 Reports, June 2020 [online] https://repositorio.cepal.org/bitstream/handle/11362/45685/1/S2000357_en.pdf.

» Figure 1. Latin America and the Caribbean: country weights, reference years 2010 and 2018

(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official information from the respective countries.

3. The main impacts on the regional aggregates of the change in reference year to 2018

Once 2018 has been selected as the reference year, the evolution of the levels and growth rates of GDP in the region evince some differences. The 2021 growth rate of GDP in Latin America and the Caribbean is 6.6% when the reference year taken is 2018, whereas a rate of 6.3% is obtained for the same year when the reference year is 2010. However, the decline in 2020 is 6.8% with both reference years.

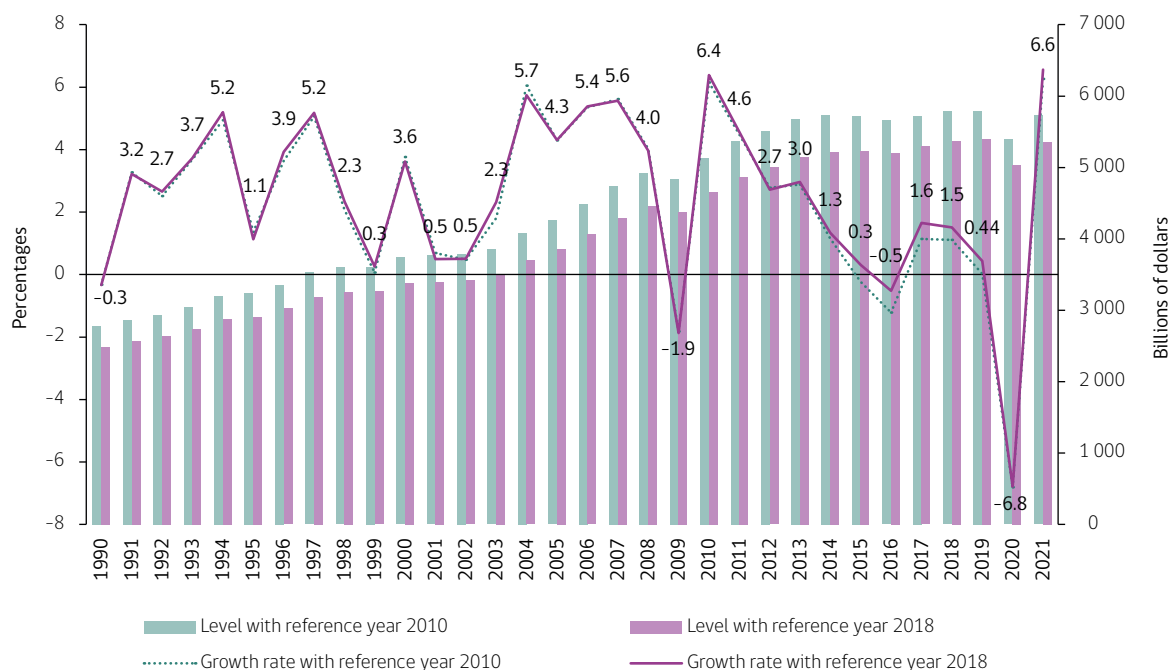
If performance is reviewed by decades, regional GDP growth in the period 2011-2020 is 0.8% with the new reference year, which is higher than the 0.5% obtained using 2010 as the reference year.

For the whole series in constant levels, figure 2 shows a lower level of GDP when this is calculated using 2018 rather than 2010 as the reference year. Meanwhile, the evolution of aggregate regional GDP calculated with the different reference years shows differences explained by changes in country contributions to regional GDP due to the changing structure within the region.

For 1994, 1995, 1996, 1998, 1999, 2003, 2015, 2016, 2017, 2018, 2019 and 2021, it can be seen that the rates are higher when 2018 is the reference year than when 2010 is. For 1995, 2001 and 2004, the situation is reversed.

» **Figure 2. Latin America and the Caribbean: comparison of GDP levels and growth rates with 2010 or 2018 as the reference year, 1990–2021**

(Percentages and billions of dollars)

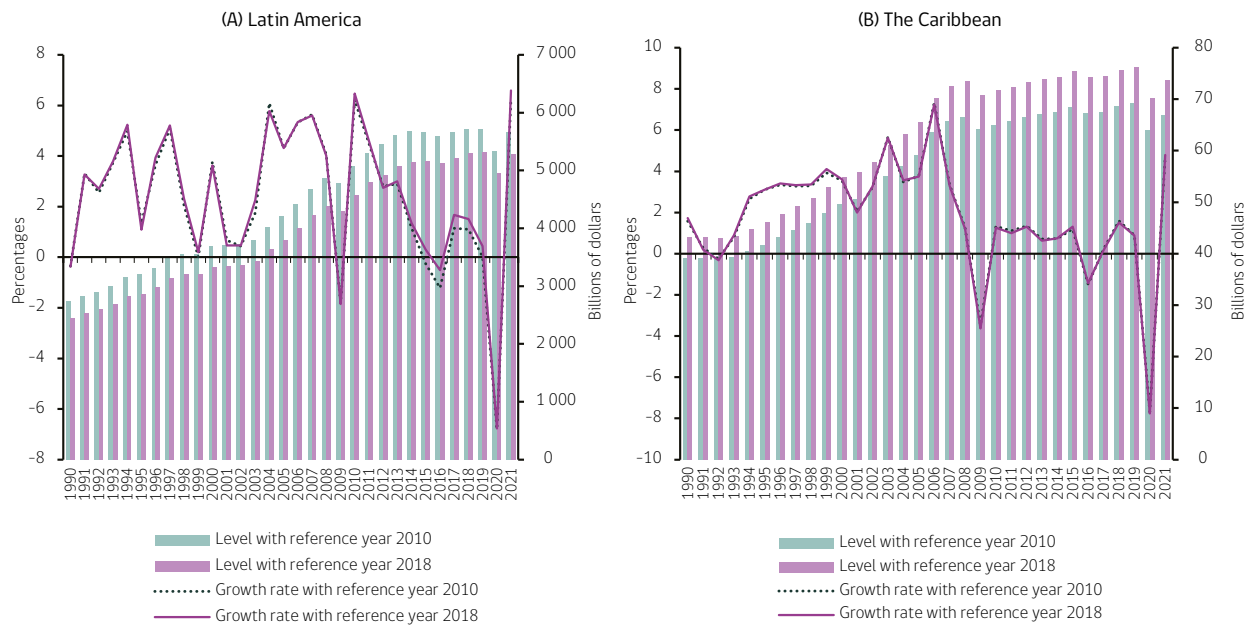


Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official information from the respective countries.

In analysing the impact of the regional aggregates by subregion, we can see that the levels for Latin America are lower when 2018 is the reference year than when 2010 is, which is the opposite of the situation with the Caribbean subregion, where the levels are higher when 2018 is the reference year. This is mainly due to the recomposition of the countries in the subregions between the two reference years.

» **Figure 3. Latin America and the Caribbean: comparison of subregional GDP levels and growth rates with 2010 or 2018 as the reference year, 1990–2021**

(Percentages and billions of dollars)

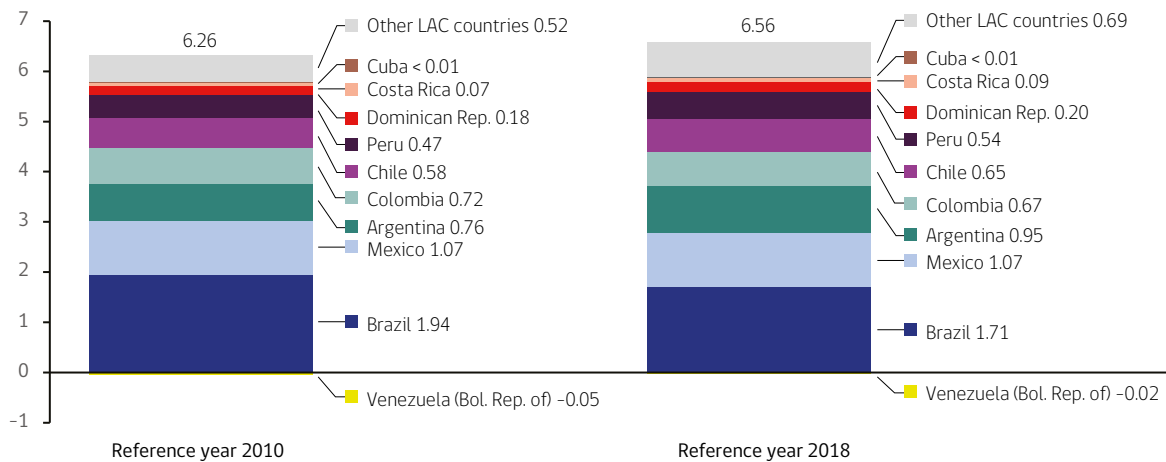


Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official information from the respective countries.

Figure 4 shows the impact of the changes in the contributions of the top 10 countries on the percentage change in GDP for Latin America and the Caribbean in 2021, the contributions being different because of the shift in the countries' shares of regional GDP.

» **Figure 4. Latin America and the Caribbean (10 countries): contributions of the top 10 countries to the percentage change in regional GDP, 2021**

(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official information from the respective countries.

4. Analysis of the 2010 structure versus the 2018 structure by measurement approach

The behaviour of regional GDP in Latin America and the Caribbean and subregional GDP in Latin America and in the Caribbean separately will be affected by the new structure of relative shares of the different economic activities in the measurement using the supply approach and the changes in each component of demand, in accordance with the changes in relative share structures within the economies accounting for the highest weightings in the total. For example, if the structure of the value added shares of the different economic activities within the GDP of Latin America and the Caribbean is analysed for the reference years 2010 and 2018, it is found that the shares of some economic activities increase, examples being the category of wholesale and retail trade, goods repair, and restaurants and hotels, whose share increases from 13.9% in 2010 to 15.8% in 2018. The same is true, as the following table shows, of the categories of financial intermediation, real estate, business and rental activities; and public administration, defence, compulsory social security, education, health and other community, social and personal services.

The decline in the GDP share of mining and quarrying between the two reference years (5.5% in 2010 and 3.9% in 2018) is largely due to the mineral crisis around the world and especially in the region, with falls in the production levels of commodities such as oil, coal, copper and nickel, which are the main mining commodities in the region. This behaviour is also reflected in the structures of the economies of the countries producing these commodities.

» Table 1. Latin America and the Caribbean: structure of value added shares within GDP by economic activity, reference years 2010 and 2018

(Percentages)

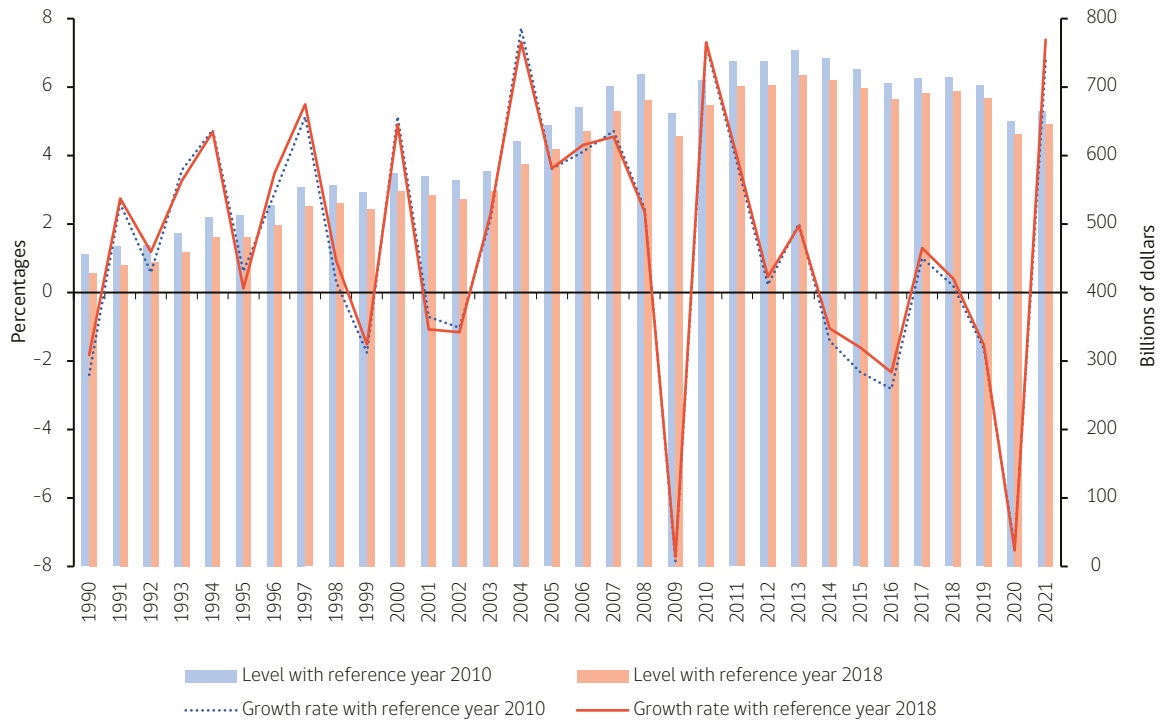
Economic activity	2010	2018	Change
Crop-growing, livestock, hunting, forestry and fisheries	4.8	4.8	↓
Mining and quarrying	5.5	3.9	↓
Manufacturing	13.8	12.9	↓
Electricity, gas and water supply	2.3	2.4	↑
Construction	6.0	5.7	↓
Wholesale and retail trade, goods repair, and hotels and restaurants	13.9	15.8	↑
Transport, storage and communications	7.7	7.3	↓
Financial intermediation, real estate, business and rental activities	16.9	17.3	↑
Public administration, defence, compulsory social security, education, social and health services, and other community, social and personal services	18.4	19.5	↑

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official information from the respective countries.

Manufacturing is one of the economic activities that are usually observed in most detail. With reference year 2010 this activity represents 13.8% of GDP, while with reference year 2018 the share is 12.9%. If the manufacturing value added series for Latin America and the Caribbean is analysed in constant dollars, it transpires that levels are lower with the new reference year. For example, the value is US\$ 665.499 billion for 2021 when the reference year is 2010 but US\$ 645.545 billion when it is 2018. This also influences the resulting percentage changes, with growth rates of 6.8% and 7.4% when the reference year is 2010 or 2018, respectively (see figure 5).

» **Figure 5. Latin America and the Caribbean: comparison of manufacturing value added levels and growth rates with 2010 or 2018 as the reference year, 1990–2021**

(Percentages and billions of dollars)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official information from the respective countries.

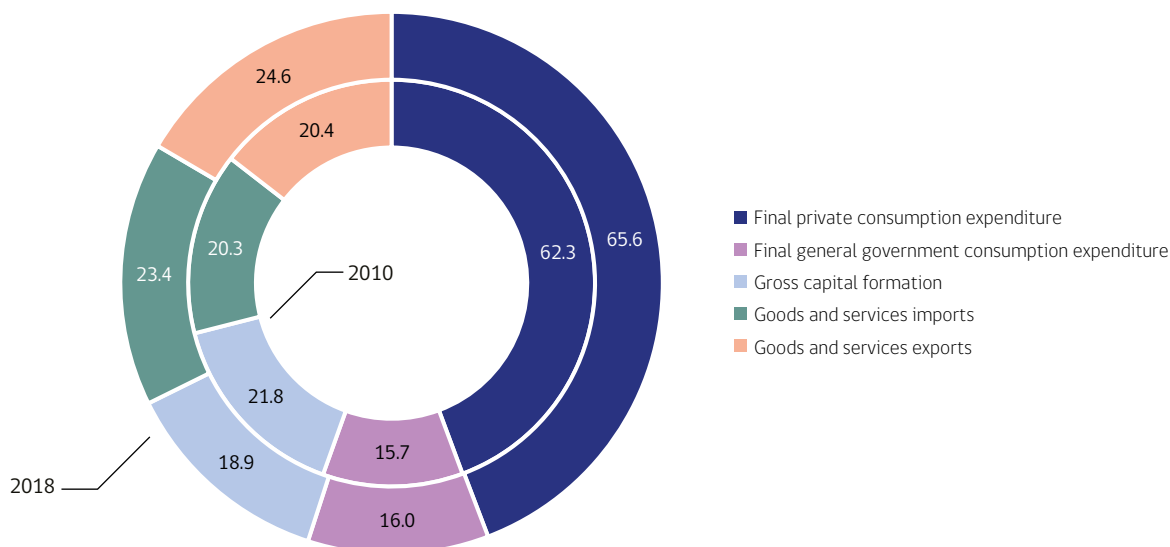
When the results of the regional aggregates are analysed by demand component, the share of private final consumption expenditure is found to have risen from 62.3% with reference year 2010 to 65.6% with reference year 2018, while gross capital formation fell from 21.8% to 18.9% of GDP between the two series. These changes in structure are due to movements in the shares of the countries within the group and the way these components evolved in each country over the last decade.

For the decade from 2010 to 2020, by demand component, the percentage growth in final consumption expenditure was 1% with reference year 2018, compared to 0.8% with reference year 2010. At the same time, investment as measured by gross capital formation shows a fall of 0.5%, as compared to a fall of 1.5% when the earlier reference year is taken.

As figure 6 shows, government consumption expenditure maintains its weight, while the higher share of total consumption expenditure in regional GDP is offset by a lower share for gross capital formation in the region.

» **Figure 6. Latin America and the Caribbean: gross domestic product shares by demand component**

(Percentages)



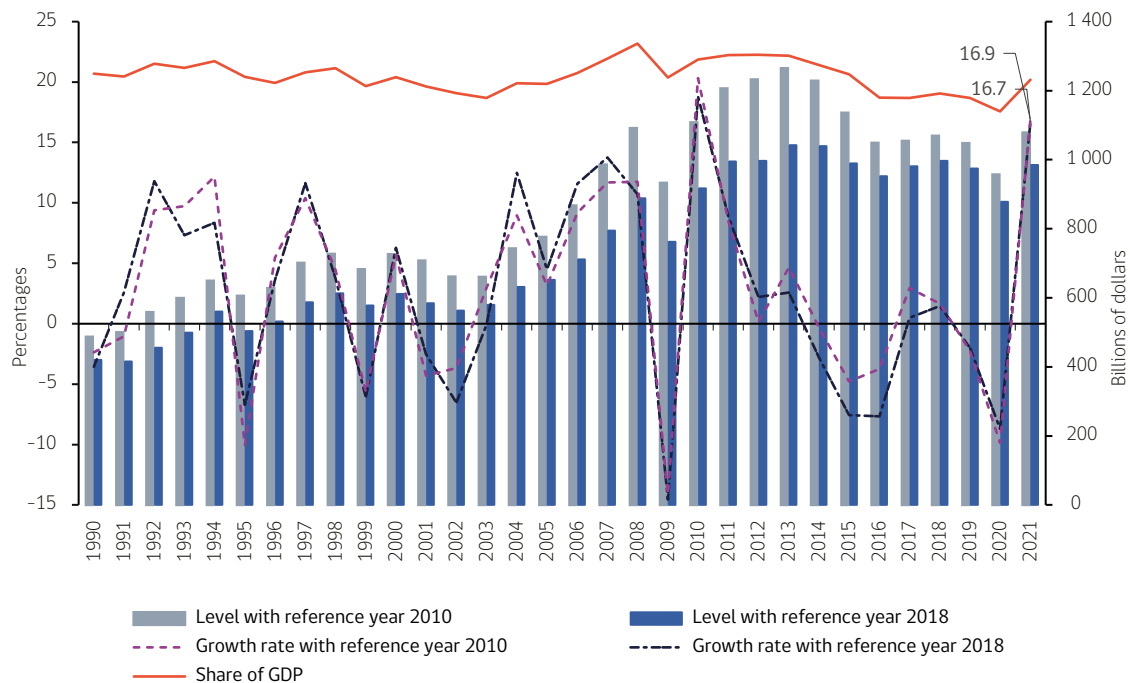
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official information from the respective countries.

For example, in the series with reference year 2010, Brazil accounted for 43.6% of the region's total gross capital formation, followed by Mexico with 21.9%, Argentina with 6.8%, Colombia with 6.1%, the Bolivarian Republic of Venezuela with 5.1% and Chile with 4.8%, while in the series with reference year 2018, Brazil accounted for 29.1%, Mexico 27.1%, Argentina 8.1%, Colombia 7.1%, Chile 6.9% and Peru 4.7% as proportions of regional GDP. The Bolivarian Republic of Venezuela's gross capital formation was 1.3% of regional GDP when the reference year is 2018.

In the series for Latin America, meanwhile, gross capital formation, like dollar GDP, shows a downward movement; however, when the percentage changes in the series are analysed with reference year 2018, the values increase because of the changes in the contributions by country to this variable. Thus, for example, Brazil's lower share in the series with reference year 2018 means a smaller contribution to the regional growth rate in 2021, yielding a higher percentage change than when 2010 is the reference year (see figure 7).

» **Figure 7. Latin America: comparison of gross capital formation levels and growth rates with 2010 or 2018 as the reference year, 1990–2021**

(Percentages and billions of dollars)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official information from the respective countries.

5. Conclusions

- Although changes of reference year entail changes in the economic indicators and series that users have been working with in relation to national accounts, foreign trade indices and price indices, they are necessary to keep the structures of participation by the region's countries up to date, reflect the efforts made by the countries to keep their base years current and incorporate the latest trends in international recommendations, thus reflecting the economic behaviour of our region to the greatest possible degree.
- The Statistics Division follows the fixed reference year measurement method to facilitate the employment of information by users and for consistency with the processes and methods used in other international organizations. This method also reflects structural changes in the economies of the region if reference years are kept regularly updated.
- The GDP weights of certain countries within the region, such as the Bolivarian Republic of Venezuela and Brazil, have declined since the last update of the reference year (2010), affecting the regional result. This is a consequence of economic dynamics within each country and the effects of exchange-rate variability in the region.
- The new series show regional aggregate GDP growth of 6.6% in 2021 compared with the year immediately preceding, while the decline in 2020 is still 6.8%. If performance is reviewed by decades, the regional GDP growth rate with the new reference year is 0.8% for the period 2011–2020, which is higher than the 0.5% rate obtained using 2010 as the reference year.

- e. When the same decade was analysed by demand component, the growth rate of final consumption expenditure came out at 1%, compared with 0.8% with 2010 as the reference year. Meanwhile, investment as measured by the behaviour of gross capital formation shows a fall of 0.5%, compared to a fall of 1.5% when the earlier reference year is taken.
- f. Latin America's gross capital formation as a share of GDP measured in current values for the full period remains unchanged, but changes are observed in the series measured in constant values and thus in the growth rates of investment volume corresponding to each reference year. When the regional GDP shares of the different demand items are compared, investment is found to decline to 18.9% in reference year 2018 from 21.8% when the earlier reference year is used.
- g. From the date of this publication, the series of national accounts, foreign trade indices and prices with reference year 2018 will be available in CEPALSTAT, the Statistical Yearbook and other ECLAC publications.



This publication, which is issued bimonthly, is prepared by the Statistics Division of the Economic Commission for Latin America and the Caribbean (ECLAC). This issue was prepared by Ana Victoria Vega, Patricia Marchant and Giannina López, under the overall supervision of Claudia de Camino, Chief of the Economic Statistics Unit of the Statistics Division.

The views expressed in this document, a translation of a Spanish original which did not undergo formal editing, are those of the authors and do not necessarily reflect the views of the Organization or the countries it represents.

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