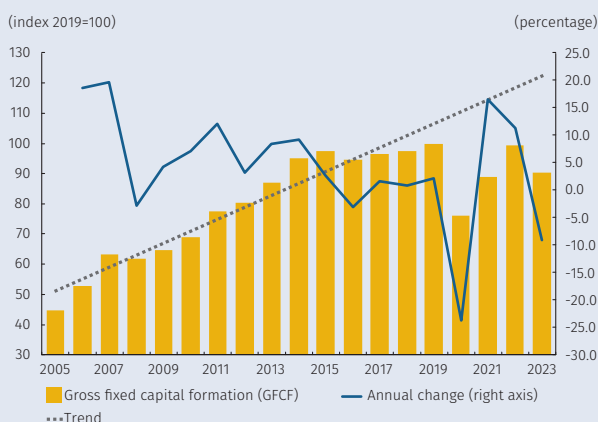


# Box 2 Investment Outlook and Recent Development

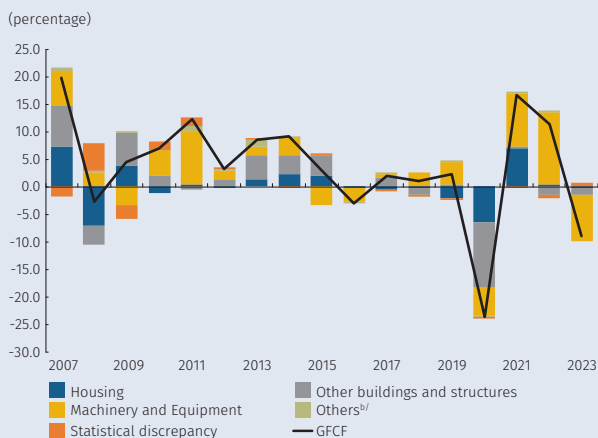
Camilo López  
Andrés Herrera  
Nicol Rodríguez  
Sebastián Quintero\*

Graph B2.1  
Gross fixed capital formation and its components

### A. Gross fixed capital formation<sup>a/</sup>



### B. Annual growth of GFCF and contributions



a/ The trend line uses information up to 2019.  
Note: Series in constant prices, seasonally adjusted and corrected for calendar effects.  
Sources: DANE; calculations by Banco de la República.

Investment, a crucial driver of a country’s economic growth, is intricately linked with increased productive capacity and infrastructure. After a notable upturn in certain investment components in 2021 and 2022, Colombia experienced a significant investment decline in the past year. High levels of inflation, a slowdown in economic activity, a reduction in macroeconomic imbalances, low confidence, and the high cost of both internal and external financing all contributed to investment’s weakening. The adjustments in public policies related to investment sectors, such as housing subsidies and energy transition policy, brought about uncertainty and further added to the decline. This Box seeks to further assess the outlook for this spending sector, describing the recent behavior of investment and its principal components and reviewing the expected evolution of some of its main determinants. It should be noted that this forward-looking analysis is subject to considerable uncertainty and revisions<sup>1</sup> of national data provided by the National Department of Statistics (DANE for its Spanish acronym).

## 1. Gross Fixed Capital Formation

With average growth rates of 5.8% between 2005 and 2019, investment in gross fixed capital formation (GFCF) increased its share of GDP from 16.7% to 21.8% in the years prior to the COVID-19 pandemic, performing well and reaching levels slightly above those suggested by its trend line (Graph B2.1, Panel A). Following the 2020 pandemic shock, GFCF enjoyed a strong rebound, exhibiting yearly adjustments above 10% and historically high levels of machinery and equipment investment through 2022. This occurred under circumstances of pent-up demand, and an expansive macroeconomic policy.

Investment in gross fixed capital formation (GFCF) performed well in the years prior to the COVID-19 pandemic, with average growth rates of 5.8 % between 2005 and 2019, reaching levels slightly above those suggested by its trend component and raising its share of GDP from 16.7 % to 21.8 % in those years (Graph B2.1, Panel A). Following the pandemic’s shock in 2020, GFCF showed a strong recovery, with annual adjustments of more than 10% and historically high levels of

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1. Specifically, between 2018 and 2021, investment was the second most revised component of GDP on average, coming in behind imports but ahead of exports and final consumer consumption expenditure. The difference between the numbers in the initial national accounts release for a given time and the final release, which was made two years later, is referred to as revisions.

investment in machinery and equipment seen until 2022. This occurred amid a backdrop of expansive macroeconomic policy and pent-up demand despite a slow transition between the structuring and the completion of infrastructure programs. In 2023, investment fell by 8.9%, and its share within the national product shrank to 17.8% as contributions from all its components also diminished. In that year, machinery and equipment adjusted from those historical highs to levels closer to those observed before the pandemic. Concurrently, construction investment lagged (Graph B2.1, Panel B). This took place in an environment characterized by adjusting domestic demand, a restrictive monetary policy in the face of high levels of inflation, changes in the public policy for the allocation of housing subsidies, low levels of investment in public works, and high external and local uncertainty, among other factors.

The authors' estimates foresee that gross fixed capital formation would continue to fall year-on-year in 2024 by between 2.0% and 7.8 %, further narrowing its share in the national product.<sup>2</sup> Despite favorable investment activity in other buildings and structures buoyed by the execution of large regional and national infrastructure projects. This further deterioration would ensue as investment in housing and machinery and equipment items fell for the second consecutive year amid low levels of business and household confidence, fewer subsidies allocated for housing purchases, high uncertainty, and continued contractionary monetary policy seeking the convergence of inflation to the 3.0% target. By 2025, investment is expected to recover and fall to a level between 1 % and 8 %, with annual improvements in all its components. This would be consistent with a recovery process foreseen for domestic demand as external and internal financial conditions relax, external demand dynamics improve, and the structuring of new infrastructure programs intensifies.

## 2. Machinery and Equipment

Investments in tools or machinery for use in production are referred to as machinery and equipment. Such investments contribute significantly to the economy's overall gross capital formation and have been a major factor in explaining both the vigor of overall investment and the variable's recovery following the pandemic.

The behavior of machinery and equipment investment responds to a set of determinants widely documented in the literature (*Banco de la República*, 2023). Consequently, this exercise considers the following inputs: 1) the capital utilization cost (CUC), a measurement that includes tax aspects, relative prices of investment, and interest rates;<sup>3</sup> 2) economic activity, defined as GDP excluding investment in machinery and equipment, which is featured in the literature to capture the so-called "accelerator effect"; 3) the real exchange rate (RER)<sup>4</sup>, because machinery and equipment are tradable goods; 4) the industrial confidence indicator (ICI), which capture the perception and expectations of businesspersons to realize investments; and 5) the degree of the economy openness, which can measure the level of the imported machinery and equipment purchases component and its use in exportable production. In addition to these principal factors, some literature includes additional variables that can influence investment decisions, such as the firms' access to credit, the price of oil, and uncertainty associated with return on investments. The latter could be relevant insofar as it considers the elevated importance of machinery and equipment purchases and investments made by oil sector companies in the country.

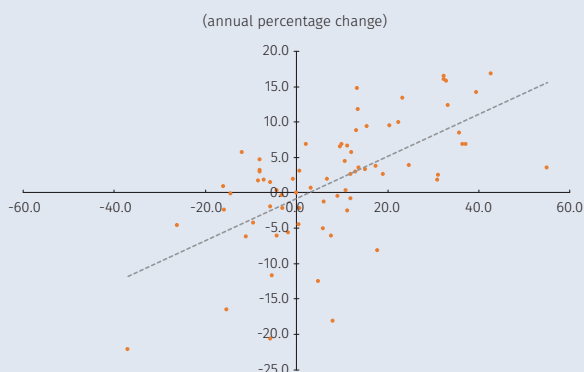
2 *Banco de la República's* technical staff employs a battery of tools for forecasting the GFCF and its components that allow for the analysis of its performance and provide signals on its future evolution. These complement the central forecasting models, although they do not necessarily yield the same results. Some of the methodologies used are dynamic factor models, elastic net regressions, ArimaX models, unobserved component models, and FMOLS regressions.

3 The functional CUC format employed in the analysis presented here follows a methodology similar to that of Salazar and Zapata (2020). It is defined as  $CUC_t = \frac{IPP_{bienes\ de\ capital,t}}{IPP_{total,t}} \times \frac{1}{(1-\tau_t^k)} \times (r_t + \delta(1-\tau_t^k))$ . The first component refers to the relative price of capital goods, measured using the producer price index (PPI); the second is taxation, where  $\tau_t^k$  is the effective corporate income tax rate, and the third component is interest rates net of depreciation, where  $r_t$  is the real interest rate computed using the fixed term deposit rate (DTF for its Spanish acronym), and the observed inflation  $\delta$  is depreciation.

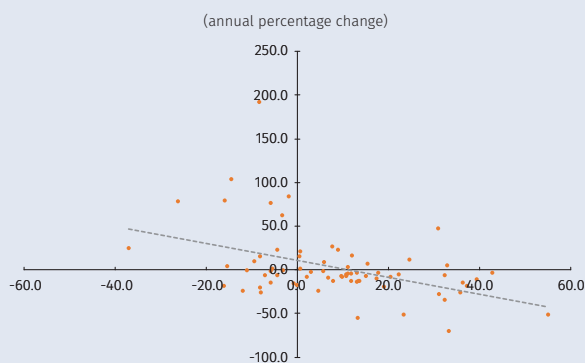
4 The real exchange rate is measured using the consumer price index (CPI) to avoid possible collinearity problems with the relative price component of the CUC, which is computed using on the PPI.

**Graph B2.2**  
 Linear relationship of investment in machinery and equipment (M&E) and some of its determinants

**A. Investment in M&E versus ICI**



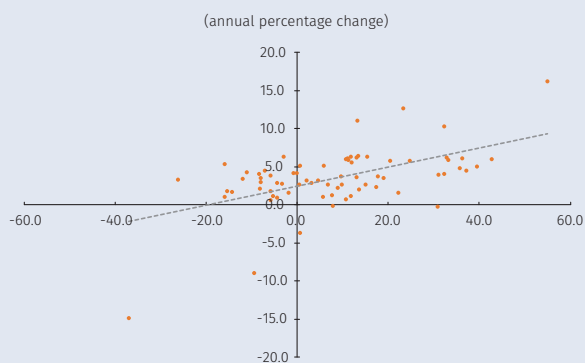
**D. Investment in M&E versus CUK**



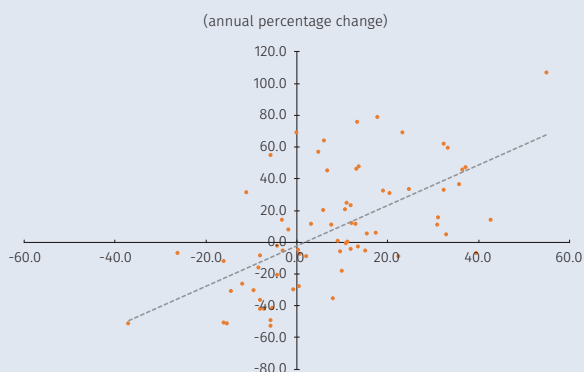
**B. Investment in M&E versus RER**



**E. Investment in M&E versus GDP**



**C. Investment in M&E versus Brent**



**F. Investment in M&E versus imports of goods and services**

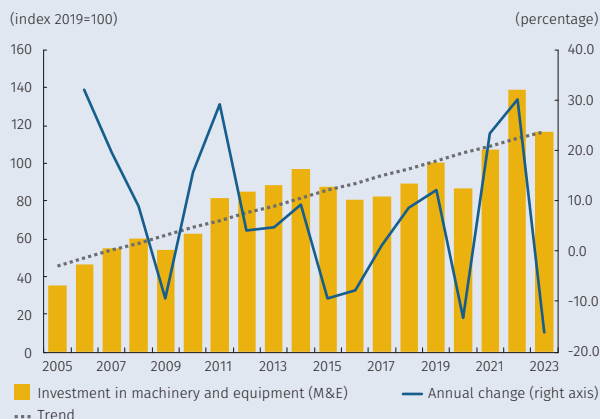


Note: using quarterly information between 2006 and 2023.  
 Sources: DANE, Fedesarrollo, and Banco de la República; calculations by Banco de la República.

Graph B2.2 shows the linear relationship between annual variations in machinery and equipment investment (horizontal axis) and each determinant (vertical axis). The trend line provides a visual representation of the type of relationship among them. In this case, the ICI, imports, Brent price, and GDP display a positive relationship vis-a-vis investment, while RER and CUK show negative relationships.

Between 2010 and 2019, investment in machinery and equipment recorded an average growth rate of 7.0% and a 34% share in gross fixed capital formation. This investment component suffered an annual drop of -13.0% in 2020 as a result of the COVID-19 pandemic shock and rebounded between 2021 and 2022, enjoying annual growth of 23.3 % and 30.3 %, respectively (Graph B2.3), increasing its average share of GFCF to 46 % during these two years. The latter took place in the context of growing domestic demand and in import and export volumes, which in turn boosted production and demand for capital goods. This ulti-

**Graph B2.3**  
Investment in machinery and equipment<sup>a/</sup>



a/ The trend line uses information up to 2019.

Note: Series in constant prices, seasonally adjusted and corrected for calendar effects.

Sources: DANE; calculations by Banco de la República.

mately favored investment in machinery and equipment, particularly those related to industry and transportation equipment. A low cost of capital use driven by the fall in relative investment prices and favorable interest rates - reflecting an expansionary monetary policy stance - also contributed to the above. This was further compounded by high oil prices, which rose, on average, from USD 43 per barrel (Bl) in 2020 to USD 99 Bl in 2022.

However, by 2023, this investment component recorded a significant annual decline (16.2 %) from those historically high levels, largely as a result of reduced spending on industrial capital goods and transportation equipment. Nonetheless, their levels remain above those recorded before the pandemic. The latter occurred in the midst of a necessary adjustment process experienced by the external deficit and domestic demand. Machinery investment is expected to decrease further in 2024, with a slight improvement foreseen in 2025. The variables that would explain investment's decline this year would be the low growth of economic activity and trade, declining industrial confidence, and the high cost of capital use, among others.

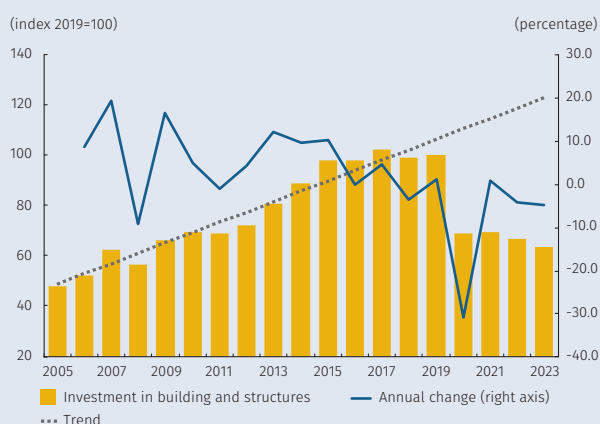
### 3. Other Buildings and Structures

The investment component for other buildings and structures includes investment in public works and finished commercial buildings; therefore, it closely follows the construction and completion of national non-residential infrastructure. This element has traditionally represented around 35% of Colombia's investments and is, hence, the second-highest contributor to domestic investment performance. Similarly, physical infrastructure activity is characterized as one of the main drivers of economic growth, productivity, and regional integration.

Between 2013 and 2019, investment in other buildings and structures improved significantly, mainly due to the expansion of mining infrastructure as a result of high oil prices and favorable investment conditions enjoyed by this segment at the beginning of the last decade. This is in addition to an expansion in ground transportation infrastructure through fourth-generation (4G) concessions.<sup>5</sup> During this period, the share of this component in GFCF increased, becoming the main driver of investment growth. In recent years, investment in other buildings and structures has not recovered notably since the pandemic shock and continues at levels well below those suggested by its previous trend (Graph B2.4). This has translated into a downward projection for its investment performance (Graph B2.1, panel B), as well as a declining share of GDP - from 8.4 % in 2019 to 4.8 % in 2023- well below its historical average of 7.5 %.

The persistent contraction of this investment component is a product of weak performance in the public works category. On the one hand, the existing 4G works schedule has reached high progress levels, which implies a lower marginal investment contribution. In fact, according to the National Infrastructure Agency (ANI for its Spanish acronym), nineteen out of thirty projects have reached a completion rate above 90%. However, the pending execution of works within this program has slowed due to the difficulties associated with the con-

**Graph B2.4**  
Investment in buildings and structures<sup>a/</sup>



a/ The trend line uses information up to 2019.

Note: Series is in constant prices and seasonally adjusted and corrected for calendar effects.

Sources: DANE; calculations by Banco de la República.

5 The fourth-generation concessions (4G) are Colombia's largest road infrastructure development project in recent decades. They encompass thirty road projects throughout the country, with an investment in the construction stage (CAPEX) of COP 57.7 trillion in 2022 constant pesos.

struction of certain road projects.<sup>6</sup> The lower 4G payments have not been offset by the structuring and implementation of other large-scale civil engineering projects or programs.

In addition, production from mines and quarries, especially oil and coal, has lagged behind pre-pandemic levels, which has also been reflected in lower mining infrastructure investment.

Although investment will continue to register lower levels than those seen before the pandemic, greater activity in public works is projected for 2024 and 2025, which would contribute towards a slight improvement in the other buildings and structures category. A further boost towards large infrastructure projects is expected to happen in tandem through the execution of new projects, including the first line of Bogotá's Metro (PLM for its Spanish acronym),<sup>7</sup> the *Bicentenario* concessions (5G),<sup>8</sup> and the National Government's *Paz Total* community roads program.<sup>9</sup> As the project's cycle progresses, their investment contributions will increase in the upcoming years. Furthermore, departmental governors, local mayors, and the National Roads Institute (Invías for its Spanish acronym) will drive tertiary works.<sup>10</sup> The execution of the above projects would boost nationwide infrastructure construction during 2024 and serve to offset the lower contributions expected from the 4G concessions nearing the end of their construction cycle. This momentum would gain further traction in 2025, thanks to the expected start of new public works, as well as the execution of new stages in projects that imply greater input towards added value and investment. It is important to note that a recovery in the public works segment is contingent upon multiple factors, including adherence to work schedules, administrative effectiveness, financial closure for the projects, resource allocation, and maintaining investor confidence.

#### 4. Housing

Housing investment refers to the amounts invested in completed residential buildings, which historically represent around 24.4% of gross fixed capital formation. Its behavior is largely determined by the performance of completions within the housing construction process. Residential construction is an activity whose value-added share is 3.5%,<sup>11</sup> is characterized by being labor-intensive and maintains influential backward linkages with other sectors of the economy. Specifically, building construction accounts for 4.5% of all jobs in the country and 4.7%<sup>12</sup> of the output of other industries, primarily manufacturing.

Before the COVID-19 pandemic, housing investment showed an average annual growth of 3.2%, with some significant increases between 2014 and 2015 due to a housing market expansion.<sup>13</sup> The pandemic's shock in 2020 generated a 32.7% drop in housing investment. It recovered in 2021, exhibiting a growth rate of 39.8 %, and remained stable during 2022 and

6 Around 18 % of the resources relating to six projects show progress levels below 30 % despite having been allocated through auction in 2015. This has been ascribed to difficulties in financial closures, access problems to the territory, and security concerns, among others.

7 The first line of Bogotá's metro, whose construction began in the second half of 2023, has an aggregate investment budget (CAPEX) of COP 14.3 trillion, and its execution schedule extends through 2028.

8 The first wave of fifth-generation (5G) concessions includes fourteen multimodal infrastructure projects, whose executions extend to 2031 (Conpes 4060), with a CAPEX investment of COP 21.4 trillion in constant 2022 pesos. According to the ANI, as of March 2024, six road projects are in the preconstruction stage, one project is under construction, and the rest of the works are in either the structuring, bidding, or tendering stage.

9 The National Government's new program aims to "(...) improve and rehabilitate 33,102 km2 of the regional road network and ancestral roads (...)" (Invías, 2023: 8), with an investment of close to COP 8 trillion to be executed as of 2022.

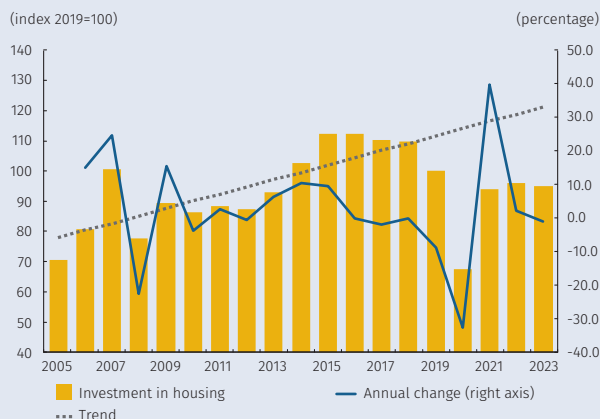
10 The regional and municipal projects that could provide additional contributions are the construction of new TransMilenio (rapid bus transport system) central lines in Bogotá and a new subway line in Medellín.

11 This applies to both residential and non-residential building construction and is measured on the supply side of the national accounts.

12 According to the 2019 input-output matrix, building construction absorbed around COP 40.7 trillion of other sectors' production for intermediate consumption.

13 In the middle of the last decade, residential building construction boomed, positively affecting market indicators including sales, launches, and starts, which presented annual adjustments of more than 10%.

**Graph B2.5**  
Investment in housing<sup>a/</sup>



a/ The trend line uses information up to 2019.

Note: Series is in constant prices and seasonally adjusted and corrected for calendar effects.

Sources: DANE; calculations by Banco de la República.

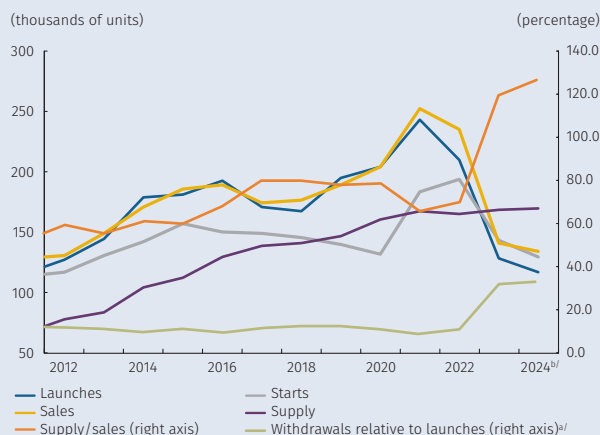
2023 at levels close to those observed at the beginning of the last decade and well below those projected by its trend line (Graph B2.5). As a result, this component's GDP share has remained below its historical average<sup>14</sup> for the last two years, with a negligible contribution to investment growth (Graph B2.1, panel B).

This positive housing investment performance took place amid a favorable cycle in residential building construction, marked by a significant increase in housing demand during 2021 and 2022, explained by the ample accessibility to subsidies, comfortable financial conditions, and the availability of household savings (Graph B2.6). This drive on the demand side boosted the construction in the public housing segment (VIS) and led to a surge in the number of completed social interest housing projects, which are characterized by their smaller size and lower value added.<sup>15</sup> Conversely, higher demand in the non-public housing segment (non-VIS) was mainly satisfied by inventories that had been accumulated and completed in previous years and thus are not featured in the national accounts.

Since the second half of 2022, leading indicators of the new housing market have consistently weakened, suggesting reduced housing investment in 2024. Specifically, in 2023 and so far this year, sales, launches, and starts have registered annual declines ranging from 20% to 40%, which would be reflected in lower housing completions (Graph B2.6). The aforementioned behavior has resulted from several factors, including changes to the policy regarding subsidies for the purchase of VIS housing, an increase in mortgage interest rates, unfavorable outcomes related to the nation's risk and uncertainty perception, among others. These factors, in turn, have resulted in a decreased demand for housing and a drop in the creation of a new supply, which, in time, will engender a fall in project completions and, in tandem, in housing investment.

Towards 2025, housing investment would begin to improve, with a possible resurgence in housing demand driving the construction and completion of residential buildings. Sales of new housing could improve going forward, driving the construction of buildings as the continuous availability of subsidies for the acquisition of VIS housing,<sup>16</sup> along with more favorable macroeconomic and financial conditions. Overall, the housing market could show a slight recovery that propels residential building construction and housing investment, contributing in part to investment recovery in 2025. However, slow recovery of housing demand and persistent accumulation of inventories could moderate or delay the dynamics of this investment item.

**Graph B2.6**  
Housing market indicators



a/ Ratio of the housing units withdrawn from and new housing units launched into the market.

b/ With 12-month cumulative information to March 2024.

Sources: Camacol; calculations by Banco de la República.

14 Between 2021 and 2023, housing investment's share of GDP was approximately 3.8%, compared to a historical average of 4.2%.

15 According to DANE's Buildings Census (CEED for its Spanish acronym), an apartment and a non-VIS home in 2023 were, on average, 40% and 200% larger than their VIS counterparts, respectively. In addition, VIS projects tend to deliver their units in the shell and core stage, while non-VIS projects often reach further construction stages, such as completing the finishings (white box stage).

16 According to the National Development Plan, 50,000 subsidies will be available through the "Mi Casa Ya" program for the purchase of low-income housing during the 2022-2026 period.

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