

NOWCASTING SUPPLY SECTORS: UPDATING GDP TRACKING

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- This report aims to improve real-time activity assessment, providing a framework that is able to nowcast the headline GDP figure simultaneously with key supply sectors. We believe this framework will allow us to better assess the evolution of the dynamics of cyclical sectors and non-cyclical sectors, in the context of contractionary monetary policy and restrictive financial conditions.
- In the exercise related to industrial GDP, we consider not only IBGE's monthly surveys (e.g., the monthly industrial survey and labor market survey) but also data on electricity consumption in industry and heavy vehicles toll road flow. Regarding services GDP, we add to the batch of IBGE's monthly surveys certain health sector data that provides substantial help in tracking the recovery of non-cyclical services sectors seriously affected by COVID-related mobility restrictions.
- Regarding farm GDP, we built a proxy based on IBGE's official methodology. We use IBGE's monthly estimates for the main crops' output and lay out a path for the agricultural sector's growth in the current year based on each product's seasonality. The livestock sector is measured based on IBGE's quarterly slaughter data and our outlook for the following quarters.
- In 3Q22, after we started the quarter with a +0.3% QoQ-sa headline GDP growth projection, our nowcaster currently points to 0.8% QoQ-sa growth, reflecting 2.3% QoQ-sa farm output growth, 0.3% QoQ-sa industry growth, and 0.6% QoQ-sa services growth.

Introduction

In May 2022, we published a special report¹ presenting the methodology behind our model to nowcast Brazilian GDP² as timely monthly activity indexes (e.g., industrial production, retail sales, services, etc.) are released. Supplementing the previous publication, this new report aims to improve real-time activity assessment, providing a framework that is able to nowcast not only the headline GDP figure, but also the economy's key sectors (from a supply standpoint), as follows: farm output, industry, and services³. We believe that this addition to the methodology we introduced in May will allow us to better assess the evolution of the dynamics of cyclical sectors (more sensitive to domestic monetary policy cycles) and non-cyclical sectors (e.g., commodity-related) of the economy. For example, in 3Q21, headline GDP stayed virtually flat (slight 0.1% QoQ-sa), mainly due to the loss of much of the grain harvest in the period (farm output tumbled almost 8% in the quarter), while the services sector continued to strengthen, climbing 1.3% QoQ-sa. In the context of contractionary monetary policy and restrictive financial conditions, this nowcast framework could prove useful.

¹ **Santander Brazil Special Report: "Nowcasting Brazilian GDP with LASSO"** – May 16, 2022 – Available on: <https://bit.ly/Std-special-051622>

² The IBGE (Brazilian national statistics institute) usually releases GDP data with a two-month delay for the referenced quarter.

³ We highlight that the computation of headline GDP requires the inclusion of a relevant series: indirect taxes, which account for roughly ~15% of total GDP.

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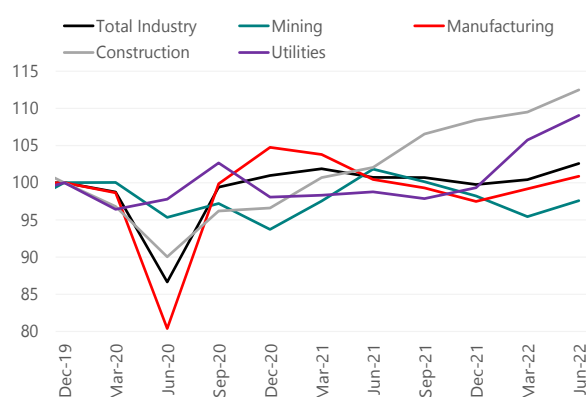
For non-farm sectors like industry and services, the framework is the same as that used to nowcast headline GDP: based on a LASSO (least absolute shrinkage and selection operator) model, we carry out a sequence of nowcasts considering the information flow that becomes available throughout a given quarter. We make use of only publicly available explanatory variables that are released before the official GDP data. For farm output, we estimate both the agricultural and the livestock sectors based on IBGE's official methodology and build a proxy. For agriculture, we use IBGE's estimates for each product's full year output and calculate a seasonal distribution among the current year's quarters. The IBGE updates these estimates monthly. The livestock sector is measured based on IBGE's quarterly slaughter data and our outlook for the following quarters. The following sections detail the nowcasting modelling for each supply key sector.

Industrial GDP

Industrial GDP, which currently accounts for roughly 20% of total GDP, contains four subsectors, notably mining (~25%), manufacturing (~51%), construction (~12%), and utilities (~12%). We note that the industrial sector reached a 25% contribution to GDP in the first decade of the 2000s but has suffered a continued deterioration since then, worsened by the domestic great recession of 2014-16. Regarding the dynamics throughout the COVID period, the sector's contribution fell almost 15% during the strictest periods of social distancing measures (2Q20) but showed a V-shaped recovery (mainly in manufacturing) as a result of government stipends (Emergency Aid) and demand shifting from services toward goods. However, amid rising cost pressures and lingering supply chain bottlenecks, we saw a resumption of its deterioration from 2Q21 onward. Regarding the post-pandemic economy, industrial GDP posted a strong 1H22 performance, owing to three main factors: (i) an increase in demand for goods, in the wake of increasing disposable income (labor market + transferences) and savings stipends; (ii) longer cycle for the construction sector, benefiting from historically low interest rates; and (iii) expansion of industrial public utility services, favored by an increase in electricity generation and a reduction in the contribution from thermoelectric power plants (which have lower added value, due to higher costs of production).

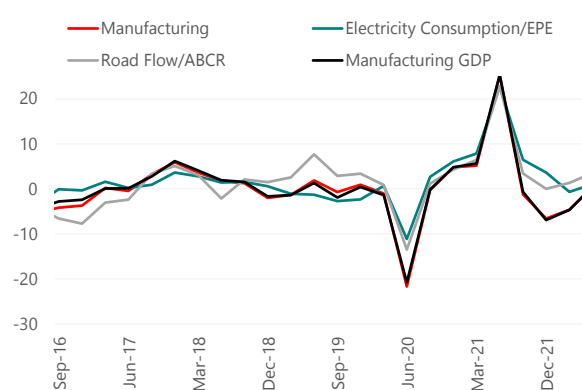
As aforementioned, based on the LASSO model, we carry out a sequence of nowcasts considering the information flow that becomes available throughout a given quarter. The first batch of monthly variables considered in this exercise are the subsectors of IBGE's monthly industrial survey (manufacturing and mining), which help us to directly cover almost 80% of industrial GDP. Moreover, to examine the construction subsector, we consider two official indicators: (i) the construction real wage bill (employment times real income) and (ii) construction supplies, deriving the information from the labor market monthly survey (PNAD) and from the monthly industrial survey, respectively. Lastly, we also consider two additional indicators of industrial activity: electricity consumption in industry (from *Empresa de Pesquisa Energética*) and heavy vehicles toll road flow (from *ABCR*).

Figure 2.A – Industrial GDP (sa, 4Q19=100)



Sources: IBGE, Santander.

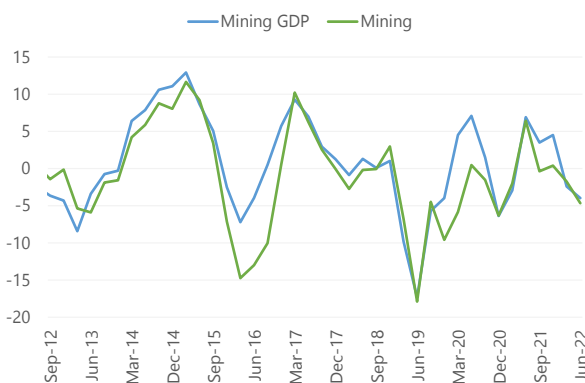
Figure 2.B – GDP x Monthly Indicators (nsa, YoY%)



Sources: IBGE, ABCR, EPE, Santander.

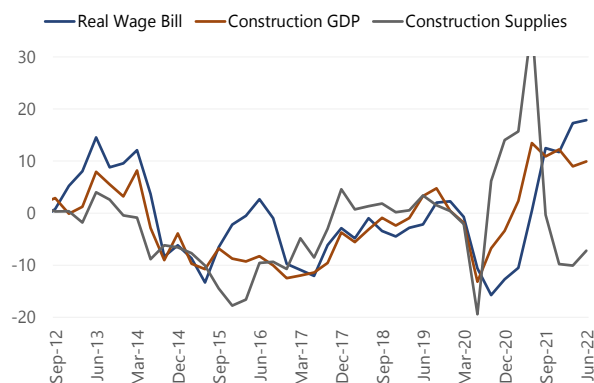


Figure 3.A – GDP x Mining (nsa, YoY%)



Sources: IBGE, Santander.

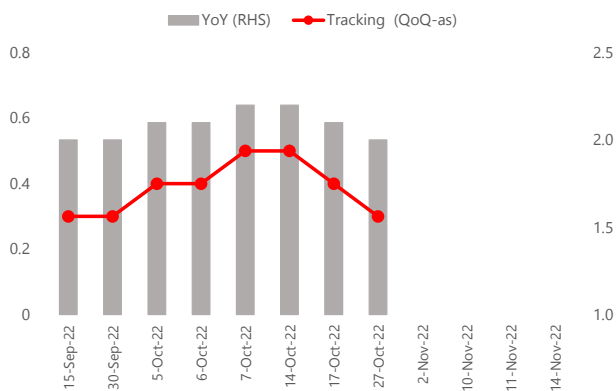
Figure 3.B – GDP x Monthly Indicators (nsa, YoY%)



Sources: IBGE, Santander.

Finally, we present below the evolution of our nowcasts of 3Q22 industrial GDP growth (official data to be released on December 1, 2022). Following the strong performance seen in 1H22 (especially in the second quarter), the industrial monthly survey pointed to a positive kickoff for 3Q22, and our nowcasting started the quarter at +0.3% QoQ-sa (+2.0% YoY). In August, as surveys of goods-related sectors (industry and retail) showed lower-than-expected declines, we raised our quarterly tracking to +0.5% QoQ-sa (+2.2% YoY), but September’s weak prints for coincident industrial indicators prompted us to lower our quarterly tracking to +0.3% QoQ-sa (+2.0% YoY).

Figure 4 – 3Q22 Industrial GDP Growth Nowcasting Updates



Sources: IBGE, Santander.

Services GDP

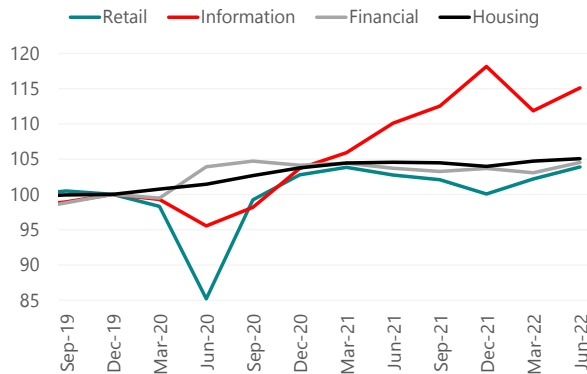
Services GDP, which currently accounts for roughly 60% of total GDP, contains seven subsectors: retail⁴ (~22%), transport (~5%), information (~5%), financial (~9%), other services (~22%), rents (~14%), and public services (~24%). Mobility-related activities suffered the most during the worst periods of the COVID outbreak, leading to a 10% decline in services GDP in 2Q20. The recovery of mobility levels from 2Q20 onward occurred only gradually, and the services sector was the laggard in the resumption of economic activity (suffering again with the resurgence of the pandemic in 2021). Regarding the post-pandemic economy, services GDP posted a strong 1H22 performance, based on two main factors: (i) the consolidation of the economic reopening (and normalization of mobility levels) and (ii) an increase in disposable income.

⁴ In Brazilian national accounts, retail is measured as part of the services sector.



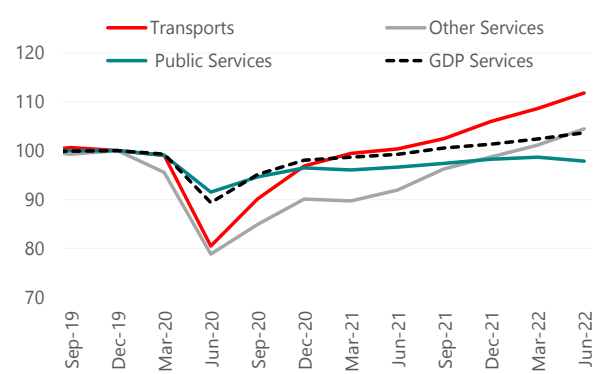
Regarding the variables we considered in this exercise, IBGE's services monthly survey is the highlight, studying the most cyclical segments of services GDP (circa 30%). We also consider broad retail sales, in order to track the retail GDP subsector, and manufacturing industry and heavy vehicles toll road flow, in order to track the transport GDP subsector. Lastly, we consider the employment population of the services segment (from transportation, food and accommodation services, and services provided to firms) and health services data, from the labor market survey and Health Ministry. The latter is useful in tracking the recovery of those parts of the non-cyclical services sector (health, education, and public administration) that were seriously affected by mobility restrictions and that account for a significant share of total GDP.

Figure 5.A – Services GDP (sa, 4Q19=100)



Sources: IBGE, Santander.

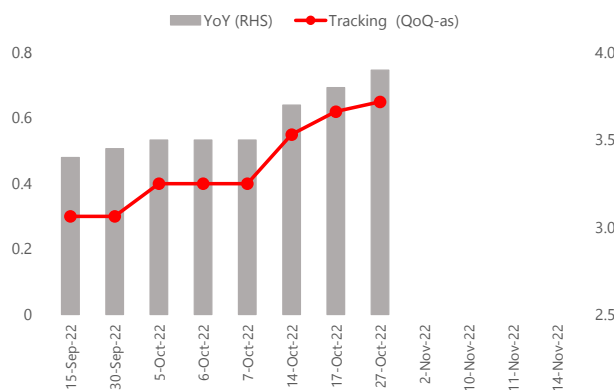
Figure 5.B – Services GDP (sa, 4Q19=100)



Sources: IBGE, Santander.

Finally, we present below the evolution of our nowcasts of 3Q22 services GDP growth. Following the strong performance in 1H22, July's positive surprise in services real revenue pointed to a positive kickoff to 3Q22, and our nowcasting started tracking +0.3% QoQ-sa (+3.4% YoY) growth. As August's goods sectors data pointed to more positive surprises, we raised our tracking to +0.4% QoQ-sa (+3.5% YoY), and the new surprise in August's services prompted us to raise our tracking to +0.6% QoQ-sa (+3.7% YoY). The improvement in expectations for the tertiary sector in September slightly raised our interannual tracking to +3.9% YoY.

Figure 6 – 3Q22 Services GDP Growth Nowcasting Updates



Sources: IBGE, Santander.

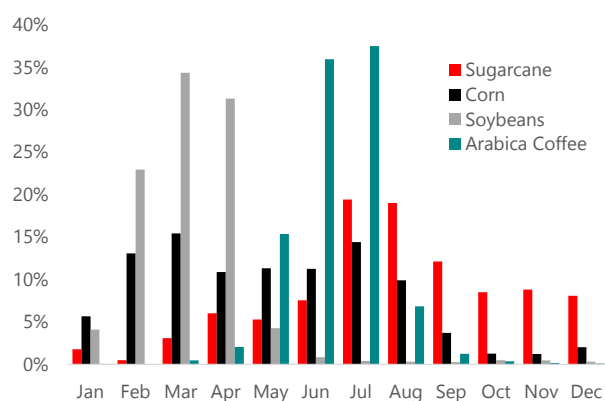


Farm GDP

Farm GDP represents only 5-10% of total GDP, but large variations are frequent in the sector and often have a substantial impact on the headline GDP growth results. To track farm GDP, we calculate a proxy based on IBGE's official methodology. Farm output is composed of agricultural and livestock outputs. IBGE accounts for the main agricultural products' output in GDP as a seasonal distribution of the current full year estimates obtained in IBGE's own monthly Agricultural Survey (LSPA, in the Portuguese acronym). Each release of the LSPA provides updates on each product's output estimate, based on the observed evolution of crops and the climate and productivity outlook. The seasonal distribution is based on fixed parameters, estimated in IBGE's 2006 agricultural census. Therefore, each product's full year output estimate is distributed throughout the year's 12 months, and this proportion does not change over time.

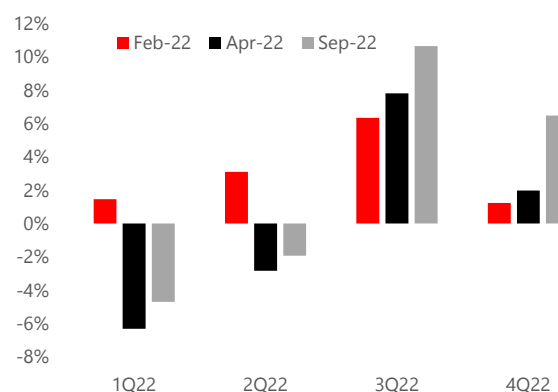
For our proxy, we use the most important products in terms of contribution to farm GDP and the best fit with IBGE data, including cotton, soybeans, corn, wheat, sugarcane, coffee, rice, and beans, among others. An important feature of this methodology is that, in every LSPA release, it is possible to outline a path for agricultural GDP for the four quarters of the current year. As IBGE revises its estimates for each product monthly, this path can undergo considerable changes throughout the year. As an example, Figure 7.B shows the evolution of our proxy in 2022 as IBGE made successive revisions in its agricultural output estimates. Because of declines in the soybean crop, a consequence of the drought in southern Brazil in 1Q22, our proxy for 1H22 has suffered considerable reductions since February. For 2H22, on the other hand, there were significant improvements as the outlook for the second corn crop got better.

Figure 7.A – Seasonal Distribution of Selected Agricultural Products (% of full-year output)



Sources: IBGE, Santander.

Figure 7.B – 2022 Farm GDP Proxy Evolution (YoY)

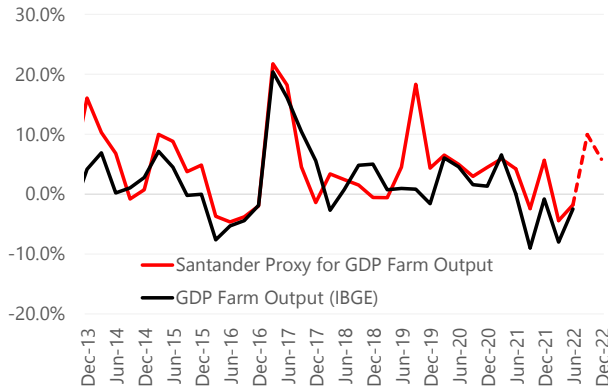


Sources: IBGE, Santander.

As for the livestock output, we used IBGE's quarterly livestock slaughter survey, which covers the output of beef, pork, and poultry products. Usually there is considerable uncertainty regarding these indicators, but we make assumptions for the YoY variations for each quarter, considering the sector's outlook. Since livestock represents a smaller fraction of farm GDP (<30%), the greater margin of error of the forecasts for this sector tends to have limited impact on our proxy.

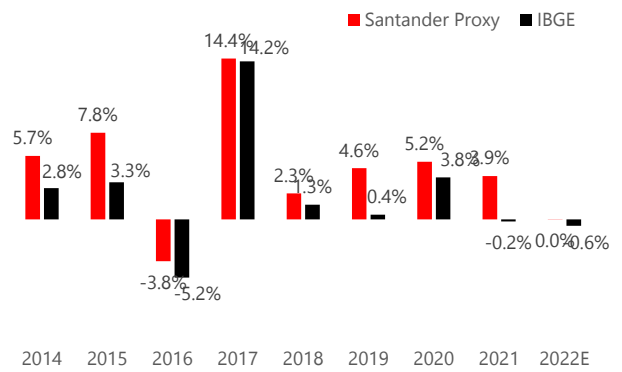


Figure 8.A – Farm Output (YoY)



Sources: IBGE, Santander.

Figure 8.B – Farm Output (Full-Year)



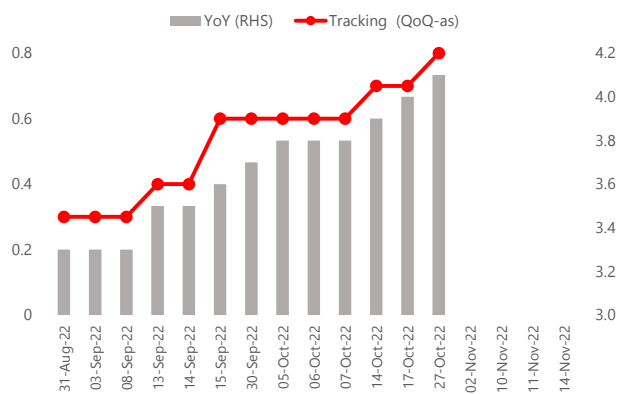
Sources: IBGE, Santander.

Finally, our farm GDP tracking is obtained through a univariate regression model, considering only the YoY variations of the observed farm GDP and our proxy. For 2H22, we expect strong results for the agricultural sector, on the heels of a record corn crop and the recovery of crops affected by the 2021 droughts.

Conclusion

As aforementioned, this report aims to improve real-time activity assessment by providing a framework that nowcasts the headline GDP figure simultaneously with supply key sectors. We believe this addition to our previous methodology will allow us to better assess the evolution of the dynamics of cyclical sectors (more sensitive to domestic monetary policy cycles) and non-cyclical sectors (e.g., commodity-related) of the economy, in the context of contractionary monetary policy and restrictive financial conditions. To summarize, in 3Q22 our nowcaster currently points to 0.8% QoQ-sa headline GDP growth (+4.1% YoY), concomitant with 2.3% QoQ-sa farm output growth, 0.3% QoQ-sa industry growth, and 0.6% QoQ-sa services growth.

Figure 9 – 3Q22 GDP Growth Nowcasting Updates



Sources: IBGE, Santander.



Figure 10 – 3Q22 GDP Growth Nowcasting Updates

3Q22 GDP Growth							Breakdown (%)		
Date	Release	Reference	Tracking (%)		Projection (%)		Farm Output	Industry	Services
			QoQ-sa	YoY	QoQ-sa	YoY	QoQ-sa	QoQ-sa	QoQ-sa
31-Aug-22	Labor Market	Jul-22	0.3	3.3	0.3	3.3	2.3	0.3	0.3
03-Sep-22	Industry	Jul-22	0.3	3.3	0.3	3.3	2.3	0.3	0.3
08-Sep-22	LSPA	Aug-22	0.3	3.3	0.3	3.3	2.3	0.3	0.3
13-Sep-22	Retail Sales	Jul-22	0.4	3.5	0.3	3.3	2.3	0.3	0.3
14-Sep-22	Services	Jul-22	0.4	3.5	0.3	3.3	2.3	0.3	0.3
15-Sep-22	IBC-Br	Jul-22	0.6	3.6	0.3	3.3	2.3	0.3	0.3
30-Sep-22	Labor Market	Aug-22	0.6	3.7	0.3	3.3	2.3	0.3	0.3
05-Oct-22	Industry	Aug-22	0.6	3.8	0.3	3.3	2.3	0.4	0.4
06-Oct-22	LSPA	Sep-22	0.6	3.8	0.3	3.3	2.3	0.4	0.4
07-Oct-22	Retail Sales	Aug-22	0.6	3.8	0.3	3.3	2.3	0.5	0.4
14-Oct-22	Services	Aug-22	0.7	3.9	0.6	3.8	2.3	0.5	0.6
17-Oct-22	IBC-Br	Aug-22	0.7	4.0	0.6	3.8	2.3	0.4	0.6
27-Oct-22	Labor Market	Sep-22	0.8	4.1	0.6	3.8	2.3	0.3	0.6

Sources: IBGE, BCB, Santander.

For details on Santander's economic activity outlook, please refer to our last reports⁵.

⁵ **Santander Brazil Special Report: "A Model to Forecast Probability of Recession in Brazil"** – June 08, 2022 – Available on: <https://bit.ly/Std-special-060822>

Santander Brazil Special Report: "Tightest Financial Conditions since 2009" – August 11, 2022 – Available on: <https://bit.ly/Std-special-081122>

Santander Brazil Economic Activity: "Financial Conditions Worsen in Mid-September" – September 14, 2022 – Available on: <https://bit.ly/Std-FCI-sep22>



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