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WHAT IS A MAJOR REVISION OF GDP?

National accounts, with Gross Domestic Product (GDP) as the most significant aggregate or measure of a country's economic activity, serve as the backbone of economic analysis, policy formulation, and international economic comparisons. National accounts provide a comprehensive picture of a country's economic activity, income, and expenditures. Given their key role, it may seem counterintuitive that these figures—so frequently cited, analyzed, and used in a country's critical economic and political decisions—are subject to significant revisions, i.e., changes and corrections. However, major revisions of national accounts and GDP recalculations are not only a regular but also a necessary and strictly regulated process, especially within the European Union. "Data revision represents a normal phenomenon in the production of European statistics," states Eurostat's revision policy, "by which their quality is improved". Far from being a sign of weakness of a statistical system or evidence of manipulation, major revisions of national accounts are fundamental to improving the quality, reliability, and comprehensiveness of macroeconomic data produced by national statistical institutions. According to *Eurostat's guidelines on revision policy for PEEIs*, "Revisions have to be considered a normal phenomenon to increase progressively the quality and in particular the accuracy of the data. Revision policy should be recognized as an important aspect of good governance in statistics. Good governance in statistics, in turn, is part of public sector transparency and accountability more broadly. "

DO OTHER COUNTRIES CONDUCT MAJOR GDP REVISIONS?

Within the European Union, the concept of periodic, coordinated, and synchronized major revisions is formalized and regulated primarily by the European GDP Revision Policy and aforementioned implementation guidelines, followed by strict monitoring of this process by Eurostat. Coordinated, synchronized major revisions in the EU are conducted in five-year cycles. The previous major revision was carried out in 2018 and 2019, and prior to that in 2014, which was of particular significance for the Statistical Office of the Republic of Serbia. This coordinated approach ensures that all EU member states, along with other countries aligning with international standards, simultaneously update their national accounts using the latest methodologies and improved data sources.

The practice of conducting major revisions in European countries has a long history and is part of the process of unification and uniformization of the EU's legal and information systems, as well as ensuring the comparability of statistical data between countries and deriving supranational macroeconomic indicators (such as EU aggregates that imply an identical methodology for calculating and classifying the underlying statistical inputs for compiling national accounts). The coordinated and harmonized approach gained importance precisely with the strengthening of European institutions as information support for the formulation of European policies and development programs, following successive improvements to the European System of National and Regional Accounts (ESA) itself, which involved changes to accounting definitions and formulas for calculating individual macroeconomic aggregates, the introduction of new classifications, etc. (especially after the implementation of ESA 1995 in the late 1990s, which replaced the previous ESA 1979/SNA 1968). Therefore, major revisions of national accounts are neither ad hoc and arbitrary changes to statistical data, nor are they evidence of deficiencies and inaccuracies in statistical data.

Instead, they represent a planned, iterative improvement of a country's statistical system, which is simultaneously part of an international process of harmonizing, upgrading, and developing macroeconomic, balance of payments, and fiscal statistics, as well as ensuring the international comparability of statistical data. By regulating and supervising the major revision process, the EU unequivocally demonstrates that GDP revisions are an indispensable tool for upgrading national information systems, thereby improving their quality, reliability, and comprehensiveness.

ESA 2010 AND THE MAJOR REVISION OF 2014

The year 2014 marked the synchronized implementation of ESA 2010 across all EU member states. This new system, as an upgrade to the previous ESA 1995, introduced several important methodological changes aimed at better reflecting the complexities of modern economies. For example, research and development expenditures were reclassified from intermediate consumption to gross fixed capital formation, which led to an "overnight" increase in GDP across all EU countries due to the capitalization of these costs, even though there was no real increase in GDP based on the previously applied methodology. Similarly, government expenditures on military equipment were recognized as part of government investments in capital goods and included in GDP calculations for the first time.

For the Republic of Serbia, the 2014 major revision was of exceptional significance. Serbia officially joined EU member states in this synchronized process, adopting the then newly introduced ESA 2010 methodology to the extent possible at that moment. This participation demonstrated Serbia's commitment to harmonizing its statistical system with the European statistical system within the EU integrations (accession) process, leading to a significant improvement in the system of national accounts. In the 2014 revision, the so-called non-observed economy—i.e., estimates of the "grey economy" (including the production and trafficking of narcotics and prostitution)—was included in the official GDP estimates for the first time, which drew considerable attention from the expert public and sparked criticism that overlooked the fact that these inclusions are mandated by the European regulation on national accounts itself. The 2014 major revision also utilized new, previously unavailable data sources, such as the Census of agricultural holdings, conducted for the first time since 1960, which radically upgraded not only agricultural statistics but also the system of national accounts. As a result of the 2014 major revision, previously published GDP figures were increased by about 7%, which was also a subject of criticism and unfounded, baseless rumors regarding the "artificial inflation" of GDP. However, as previously pointed out, even though the SORS (Statistical Office of the Republic of Serbia) had formally adopted ESA 2010 as the methodological framework for compiling national accounts and GDP estimates, there were still elements of this framework that remained inapplicable due to missing data sources, as well as a lack of methodological knowledge and experience in producing newly introduced indicators and implementation of formulas. The SORS sought to overcome these deficiencies by intensifying the development of the statistical system with EU support through numerous projects and pre-accession assistance projects (IPA) that have continued to this day, the results of which would be successively implemented in the subsequent major revisions of 2019 and 2024.

THE DYNAMIC NATURE OF STATISTICAL ESTIMATES

Major revisions in the EU serve as indirect testimony to the nature of national accounts: they are not a one-time, fixed calculation like a company's profit and loss account or a VAT return. National accounts estimates are inherently dynamic estimates, continuously subject to refinement, recalculation, and correction, given that users require long series of data that must be comparable and consistent throughout the entire observation period—i.e., time series for GDP calculations that stretch back to 1995. Otherwise, conducting macroeconomic analyses, making projections, and forecasting would not be possible if historical data were not aligned with the most recent data and insights into economic reality, as well as the methodological formulas and principles in effect at the time of the revision. Thus, for instance, when the so-called accrual principle was applied in the 2024 revision to calculate general government final consumption expenditure, it caused a significant change in this aggregate across the entire period back to 1995, as well as in the very structure of GDP—particularly in the early years of the series, when the relative importance and share of the government in GDP creation was greater than in subsequent years. However, this correction was necessary to ensure the consistency of the entire data series for general government final consumption expenditure and GDP.

Therefore, unlike business and tax accounting calculations, GDP estimation can be characterized as dynamic and fluid. This fluidity stems from several factors:

1. Inherent imperfections of source data: Despite the greatest efforts regarding collection and control, raw data used for statistical calculations and estimates always possess inherent imperfections. Initial estimates often rely on partial (incomplete) or provisional data, and sample-based indicators, which are subsequently replaced by more comprehensive and verified information. For example, monthly or quarterly GDP estimates are typically based on short-term—i.e., quarterly—indices and are later revised when more comprehensive annual economic, monetary data become available from annual statistical surveys, corporate financial statements, and tax returns. Without these inherent imperfections and the continuous influx of better information, there would be no need for major revisions. One should not lose sight of the fact that administrative sources used in GDP calculations are also very often subject to mathematical and numerical errors (and corrections), omissions, incorrect identifiers, duplicate entries, and other deficiencies that can only be discovered after a longer period, once provisional calculations have already been made. This is precisely why national accounts in all countries are allowed flexibility in GDP calculation, meaning that the initial estimates are considered "provisional," while the "final" estimate is usually considered to be the one obtained by compiling supply and use tables three years after the expiration of the reference year (which is the deadline prescribed by Eurostat). In the meantime, statistical institutions may publish provisional GDP estimates that are enriched and refined by newly arrived data from statistical surveys and administrative sources, or through revisions and corrections of administrative sources such as the Tax Administration or the Customs Administration. These are so-called short-term or routine revisions, through which the initial GDP estimate—obtained as the sum of four quarterly GDP estimates—is gradually adjusted with new, "fresh" data, recalculations, and control procedures. Accordingly, the SORS, like most European countries, publishes three official GDP estimates: the first provisional estimate as the sum of quarters, and the second provisional estimate nine months after the end of the reference year (on the 1st of October the year after the reference year) and, finally, three years after the expiration of the reference year, based on the results of the compilation of supply and use tables, when the previous two estimates are revised.

2. Changes to the methodological framework: As previously mentioned, the largest changes and alterations in the published national accounts data of the SORS are actually a "consequence" of applying ESA 2010. Examples include the inclusion of the "grey" economy in GDP during the 2014 revision (which became mandatory only with the introduction of ESA 1995), or the application of the Perpetual Inventory Method for calculating the consumption of fixed capital in the 2024 revision, which was only recently fully regulated and harmonized by Eurostat. Revisions allow statistical institutions to incorporate these upgraded methodologies into their national accounts systems, which have also caused significant upward or downward GDP adjustments in other countries.

3. New data sources: The compilation of national accounts relies on a vast number of data sources—surveys and inquiries, administrative records, tax returns, financial statements, and much more. New data sources become available over time, offering better coverage, granularity, or timeliness. Revisions enable the integration of these improved inputs, which were not available at the time the provisional, preliminary calculations were made.

SYSTEM CONTROL AND VALIDATION MECHANISMS IN GDP CALCULATION

Revisions of widely publicized economic indicators of the highest national and economic-political significance, such as GDP, are sometimes perceived by the public and the media outside of their methodological context. Due to the complexity of statistical calculations of macroeconomic indicators, routine data corrections can cause confusion; therefore, for a complete understanding of these adjustments, it is crucial to examine the strict procedures and control systems that accompany the compilation of national accounts. Modern statistical systems, particularly the European System of Accounts (ESA 2010), are based on robust control mechanisms that prevent arbitrary changes to macroeconomic indicators and ensure high data reliability. Institutions such as Eurostat and the International Monetary Fund (IMF), in cooperation with national statistical offices, apply established validation methods and have direct access into the source data, enabling them to conduct independent revisions, cross-checks of calculations, and detailed quality analyses. The system of national accounts is integrated and interconnected, meaning that any unfounded change would create contradictions within the very structure of the system; thus, inherent control mechanisms effectively guarantee the consistency and integrity of official statistics.

The quality of source data as inputs for the compilation of national accounts is also variable in nature, which directly affects the precision of preliminary GDP estimates. In this context, benchmarking is applied—a procedure by which short-term, high-frequency indicators are aligned with comprehensive, low-frequency data sources, such as annual financial statements. The first annual GDP estimate is compiled nine months after the end of the reference year based on complete statistical surveys, followed by a regular revision of previous quarterly estimates, which ensures the mutual consistency of quarterly and annual calculations and the recalibration of models for greater precision in subsequent cycles. In 2023, it was precisely the complete annual reports that suggested stronger economic activity than initially indicated by the quarterly metrics, leading to a significant revision of the GDP growth rate and level. These corrections were implemented under conditions of high inflation and market disruptions which, on a global level, as well as in Serbia, hampered initial calculations and necessitated subsequent revisions.

Revisions in national accounts represent a standard, regular, and necessary element of modern statistical practice in all countries. They are not a sign of systemic deficiencies, but rather a transparent and professional procedure aimed at improving data quality and reliability of statistical indicators. Through continuous methodological refinement, regular quality checks, and the inclusion of new data sources, statistical institutions ensure an objective representation of economic reality and provide a reliable basis for decision-making, despite all the challenges entailed in collecting and processing primary data. Understanding this process is crucial both for the proper evaluation of statistical calculations and for recognizing the rigorous work continuously invested to provide the most precise picture of the national economy.



IF THE SORS CONDUCTS A REVISION, DOES THAT MEAN THE PRE-REVISION ESTIMATES WERE INACCURATE OR WRONG?

When the SORS announces a "major revision" of key indicators such as GDP, which affects data series stretching many years into the past (e.g., back to 1995), it is natural to wonder whether the numbers we previously relied upon were inaccurate. The short answer is: it does not necessarily mean they were "wrong" in the sense of being incorrect; rather, it means that the revised data are now more precise, complete, and reliable. Compiling time series of statistical data can be compared to a jigsaw puzzle or a camera lens that "sharpens" the photo. The final, fully assembled puzzle or clear photograph does not imply that the earlier, partial puzzle was "wrong," but rather that the complete puzzle is a much more accurate and detailed representation, built on a foundation of more information. When the SORS first published GDP data for, say, 2019, those calculations were made using the best available data sources and assumptions at that moment. Those data served their purpose at the time, providing crucial insights. Of course, absolute infallibility cannot be attributed to statistical institutions, and calculation errors are surely possible. However, these are never driven by a motive to manipulate data; instead, they are most frequently the result of errors within the data sources themselves or mathematical errors, which are corrected in the shortest possible time through revisions, with users being notified transparently and without any concealment. Thus, major revisions reassess previously published historical data, often going back decades, to incorporate new information and methods.

As previously stated, data revisions are also influenced by certain methodological changes. For instance, in the 2019 revision, the reclassification—i.e., the relocation—of a certain number of state-owned enterprises from the non-financial corporations sector to the general government sector resulted in a GDP increase of more than 1%. The reason for this adjustment lies in the different method used to calculate the GVA (Gross Value Added) of institutional units within the Government sector compared to the GVA formula applied to market enterprises. For the Government sector, the sum-of-costs method is used (compensation of employees + consumption of fixed capital) which resulted in the aforementioned reclassified enterprises shifting from a position of generating negative value added and reducing GDP to now showing a positive GVA. Similarly, the improvement of the FISIM (Financial Intermediation Services Indirectly Measured) estimation by applying the reference rate method required by SNA 2010 during the 2014 major revision (which led to a 5% upward increase in this aggregate) resulted in an upward adjustment of the financial sector's GVA, and consequently, of GDP. This does not mean that the FISIM estimates under the old methodology and the GDP of that time were wrong, but rather that the application of the new methodology provides a better and more precise estimate of this aggregate, as well as of GDP.



It is vital to understand that every published statistical data, including GDP, in any country, is always an **estimate**. This means it is not an exact, perfectly precise figure, as such precision is, by the very nature of statistics, impossible due to the complex nature of the economy, the use of sampling, and the varying degrees of accuracy in the data disclosed in financial statements or statistical questionnaires used by official statistics. The role of statisticians is not to make these estimates "accurate" in an absolute sense (as they can never be), but to make them as reliable as possible, with minimal risk of materially significant errors for the users.

WHY THE HISTORICAL STATISTICAL DATA ARE CHANGED?

Several factors contribute to these comprehensive revisions, all of which aim to make the picture of our economy clearer and more accurate throughout its entire history (dating back to 1995, the starting point of the GDP data series prescribed by Eurostat):

Better, more complete historical data: The original estimates for previous years relied on data that were available at that specific time. Over time, more comprehensive and detailed data relating to those past periods become available. For example, instead of the preliminary data used for the initial calculation—such as short-term and sample-based quarterly statistics—the SORS may now have access to the full annual financial statements of all enterprises for that year.

New and improved administrative data, registers, and databases (e.g., from ministries or government agencies), or more complete results of statistical surveys for a given year, may only become available well after the preliminary GDP estimate has been published. Sometimes, during a major revision, specific errors in previous calculations can be identified and corrected, as can assumptions applied in the calculations (which, from a contemporary perspective and based on new insights, may prove to have been imprecise or even incorrect). Similarly, administrative data originally used in calculations, such as financial statements or tax records, can contain errors or omissions that affect their quality and, consequently, the statistical indicators compiled for a specific year in the past. These issues are rectified during a major revision using better, more complete sources, insights, and findings.

Improved statistical methods: The global economy and individual national economies are constantly evolving, and so are the methods statisticians use to measure a country's economic performance. Over time, new economic phenomena emerge (such as the digital economy), and international statistical standards are updated to better capture these changes. Organizations like Eurostat (for EU member states and candidate countries, like Serbia, which align with EU standards) are regularly introducing new methodologies to ensure consistency and comparability across nations, often requiring the recalculation of already published series. A good example of this, regarding the 2024 major revision, is the application of the perpetual inventory method (PIM) for calculating the consumption of fixed capital. This is a sophisticated statistical method for calculating how much fixed assets (such as buildings, machinery, and infrastructure) are consumed in the generation of GDP (essentially, it is a revaluation of depreciation costs), which yields significantly different results from accounting data on asset depreciation. The application of this method, as required by ESA 2010, significantly altered previous estimates, particularly affecting Government Final Consumption Expenditure (GFCE) and the GVA of institutional units belonging to the government sector—not just for the year the method was implemented, but across the entire historical period back to 1995.

It is important to note that the SORS is still in the ongoing process of developing and adopting the ESA 2010 methodology, supported by the European Union and numerous technical assistance and support projects aimed at improving national accounts. This is a complex, intricate, and long-term endeavor that cannot be finalized through a single one-off revision. EU countries mostly completed this transition over the preceding decades—specifically in 1999, when the implementation of the new ESA 1995 (SNA 1993) system began. Understandably, these countries have had the time to develop, stabilize, and upgrade their administrative and statistical data sources, and to establish the national information systems upon which current statistical frameworks and ESA-compliant GDP calculations rest. In contrast, many administrative data sources in Serbia have only relatively recently become available and usable for statistical purposes (for instance, the obligation to submit financial statements for sole-proprietors/unincorporated enterprises using the double-entry bookkeeping entered into force in 2020, the CROSO employment database became available only as of 2016, etc.). The situation is similar for statistical data sources and surveys that have been conducted in EU countries for decades. For example, the 2012 Census of Agriculture was the first one in 50 years (the previous one having been conducted in 1960), and there is no need to understate what a monumental upgrade this represented, not only for this branch of statistics but for the entire system of national accounts as well.

Consequently, Serbia has, we can say, only "recently" (starting with the 2014 major revision) begun applying certain major methodological innovations and Eurostat requirements that other EU countries, with their longer history of implementing the SNA/ESA methodological framework, had already integrated into their national accounts systems during previous major revisions. This is the main reason why the magnitude of GDP data revisions in Serbia is much larger compared to EU countries; these nations implemented those upgrades in the past and had no need to revise their data on those grounds during the 2024 major revision. The SORS is now in the final phase of fully implementing ESA 2010, and it can be expected that future major revisions (the next one will be in 2029, when the new ESA 2025 is to be implemented) will be of a smaller magnitude than the revisions of 2024, 2019, or 2014.

THE "MOVING TARGET" FACTOR AND EVOLVING UNDERSTANDING

Statistical estimations for any given year are always performed at a specific point in time and within a past informational context, utilizing the best available data and assumptions that were valid at that exact moment of the initial calculation. However, from the perspective of subsequent years—based on hindsight and new information—these original assumptions or data sources may prove to be incomplete or even incorrect. As time passes, we gain a clearer historical perspective, allowing us to improve our understanding of past economic events and frequently obtain information or data that were simply unavailable at the time the calculations were executed. Every GDP estimation, therefore, represents a "moving target," and statisticians have a very limited time each year (a few months after receiving financial statements from the Serbian Business Registers Agency and statistical questionnaires) to perform calculations and deliver a GDP estimate. Yet, as previously noted, the data and assumptions used in these estimates may only show themselves to be incomplete or insufficiently reliable well after time has passed and the data have been published. This is inherent to the very nature of statistically tracking dynamic phenomena and to the imperfections of statistical data sources themselves.



WHY ARE ALL GDP REVISIONS BY THE SORS UPWARD, NEVER DOWNWARD? WHY ARE THEY SO "HUGE"?

Although GDP revisions can theoretically be both upward and downward, and individual components of GDP do get adjusted downward, in the Republic of Serbia—as well as in most countries—revisions have almost always been upward. This is especially true for corrections driven by innovations within the methodological framework itself, namely ESA 2010. As a rule, all "major" methodological updates have had a positive effect on GDP, meaning they led to upward adjustments across all countries in previous revisions, and Serbia—i.e., the SORS—is no exception to this.

This phenomenon is not accidental; it stems from a deliberate and often necessary conservatism embedded in the practice of national accountants, combined with profound caution and professional (as well as public) responsibility to avoid overestimation. This is particularly crucial when facing the inherent shortcomings of preliminary data, and especially in fast-developing economies that are susceptible to external shocks and structural disruptions or changes. In small and developing economies, shocks such as hyperinflation or international monetary and financial turmoil have a significantly stronger and deeper impact than in developed nations, which inevitably reflects on the source data used as inputs in statistical calculations. Under such conditions, the inherent, normal deficiencies and imperfections of data become even more pronounced, which unavoidably degrades their quality and usability for compiling national accounts and additionally complicates the process—particularly regarding the "balancing," or reconciliation, of GDP calculated via the production and expenditure approaches.

National statistical institutions are very much aware of the significant implications that their published GDP data have on the current politics. Overestimating economic growth, even unintentionally, can lead to misguided fiscal and monetary policies, create unrealistic market expectations, and potentially undermine public trust if subsequent downward revisions turn out to be substantial. Therefore, when faced with incomplete or less detailed data, or extreme and unexplainable numbers during the initial phases of GDP calculation, conservatism is applied. This mirrors the approach taken by corporate accountants in similar situations, who act to protect their company's equity from being compromised by distributing and consuming something that does not actually exist. This inherent conservatism and heightened caution do not represent a deliberate attempt to underestimate economic reality, but rather a responsible risk management strategy in conditions where data quality and usability are affected by various external factors that statistics can neither influence, control, nor predict.

This approach, along with the constant professional caution and responsibility of national accountants, is intensified in dynamic economies like Serbia, where the pace of structural change and the impact of external shocks impose significant challenges on data compilation. Preliminary estimates—especially those for industries undergoing rapid transformation or those particularly affected by external factors or inflation—may rely on proxy indicators or older reference values that do not fully capture the scale and depth of these changes. Hence, there is a frequent occurrence of unusual values (outliers), as well as extreme and unexplainable shifts that cannot be fully assessed and understood within the year-on-year dynamics and the limited time available for calculations.

Thus, for instance, the process of applying double deflation to GVA—deflating output and intermediate consumption separately— in an inflationary environment becomes exceptionally complex and prone to errors and results difficult to explain. Rapid and uneven price changes mean



that input-output coefficients, which describe the relationship between intermediate consumption and output, can become distorted or quickly outdated. This leads to deviations of nominal figures from the real physical production measured by short-term statistics.

Furthermore, the inherent deficiencies of short-term indicators—both of the sample-based volume indicators and of the price indices used as summary deflators—further amplify the need for caution in accepting extremely high (as well as low) values. These values are then "smoothed" or "normalized" using regular statistical techniques applied by all countries to minimize the risk of error and distortions that threaten the internal consistency of GDP components. Together, all these factors cause significant problems in accurately grasping economic activity in the short run. Especially in "crisis" years (as the entire period from 2020 to 2024 could be characterized), they dictate extreme caution in estimating GDP to avoid overestimation. Ultimately, when these disruptions are analyzed from the "calmer" five-year perspective of a major revision and more complete information is obtained, it routinely leads to an upward correction of GDP.

Consequently, the combination of a cautious initial estimate, inherent conservatism, and the aforementioned challenges of measuring dynamism—alongside the disruptive effects of inflation and external shocks on data quality and reliability in developing economies—frequently results in the underestimation of preliminary estimates, leading to upward GDP adjustments in major revisions. To reiterate, the systematic upward adjustment of GDP in major revisions is neither an anomaly nor a form of intentional manipulation. Instead, it is the logical outcome of robust statistical verification and control practices applied by national accountants in environments characterized by rapid changes, pronounced inherent deficiencies in source data, and the presence of significant inflationary pressures and external shocks.

Keeping the above in mind, a 5% upward GDP revision becomes more understandable and not as "radical" as it seems and as it is frequently portrayed by economic analysts and the media. To make it clearer to readers, it is equivalent to an unscheduled 5% increase in the wages of all employed workers and the profits of business owners, reflected by GDP calculated via the income approach. When this 5% GDP upward adjustment is viewed from this "income-based" perspective, the subjective perception of the scale of the major revision changes entirely, considering, for example, that nominal wage growth in Serbia amounted to 14% in 2024, whereas in the EU it was a mere 5%. This example also indicates that when discussing the magnitude of major revisions in Serbia and comparing it to other developed and "mature" statistical systems and economies, we must bear in mind the specific and unique historical, political, and economic context of the country.

WHY ARE MAJOR REVISIONS A "GOOD THING"?

Major GDP revisions, as previously highlighted, do not indicate incompetence or calculation errors; rather, they signify the commitment of national statistical institutions to continuous improvement and the provision of the most accurate and internationally comparable data. Here is why they are essential and represent a positive enhancement to a country's information system:

- **Increased Accuracy and Reliability:** Revisions ensure that published GDP data extending back through history are based on the most comprehensive and highest-quality data available, as well as the most advanced statistical methods. This means that the final, revised figures are more precise and reliable for analyzing long-term economic trends and making informed decisions regarding the national economy.

- **International Comparability:** Adopting new international methodologies ensures that Serbia's GDP data can be compared with that of other countries, not only for the present but also for historical comparisons, as well as for formulating comparative projections and future GDP forecasts. This is of vital importance for understanding the country's economic performance in a global context over time.
- **Better Policy Decisions:** Governments, businesses, and researchers rely on robust economic data to formulate policies, make investment decisions, and conduct research. By continuously refining and improving GDP estimates, including historical series, statistical institutions provide a sounder foundation for this critical decision-making.
- **Transparency and Trust:** Statistical offices are transparent about their revision policies, explaining why and how figures change—sometimes dramatically—across historical periods. This commitment to transparency builds trust in official statistics, reinforcing their role as an independent and authoritative source of economic information.

Major revisions are a testament to the dynamic nature of economic-statistical measurement and the dedication of statisticians to providing the clearest possible picture of our economic reality. This continuous effort to refine and improve initial estimates is the cornerstone of a credible national statistical system. It demonstrates a commitment to accuracy in informing the public and reflects the very nature of economic measurement and our understanding of the economy, which evolves alongside better information and advancements in measurement methods.

WERE THE REAL GDP GROWTH RATES ADJUSTED IN THE MAJOR REVISION?

In the 2024 Major revision (as is the case in most countries), the strategy for recalculating historical values is to ensure that previously published GDP growth rates do not change significantly, unless a specific need to do so is identified based on new insights, newly available data, or subsequently detected calculation errors. The average change in the growth rate over the 1995–2022 period was -0.1 percentage points, which represents a relatively minor adjustment to the average growth rate.

More significant adjustments to the GDP growth rates were recorded in the opening years of the 1995–2022 series, primarily driven by the revision of the General Government Sector. Namely, during this period, due to the relatively underdeveloped non-financial corporations sector (private business sector), the share of the government sector in GDP generation—and consequently the effects of the Government sector revision—had a more pronounced (negative) impact on previously published GDP growth rates. This subsequently led to a downward adjustment of both the cumulative growth rate for the entire 1995–2022 period and the average annual growth rate for the same period.

DID THE REVISION AFFECT THE CHAIN-LINKED REAL GDP VALUES?

Any change in nominal GDP inevitably affects chain-linked volume measures, since chain-linking is performed on a new, revised (selected) base year. When discussing chain-linked GDP values (the so-called real GDP), we would like to point out to readers several methodological principles of this statistical calculation, which is frequently a subject of misunderstanding and misinterpretation. First and foremost, it is important to understand that chain-linked GDP values as standalone figures, do not actually possess analytical significance or economic meaning, and they can only be observed as a series and within a GDP data series. These are artificially constructed values used to track the dynamics of physical volume of production over a long period. Therefore, chain-linked values cannot be used to draw conclusions about the level and structure of GDP in market and monetary terms, but solely as an analytical tool for tracking GDP dynamics. By themselves, the individual amounts of chain-linked real GDP values for specific years carry no informational content. To draw conclusions about the level and structure of GDP, as well as the real GDP growth in a given year, nominal GDP and real GDP expressed in the prices of the previous year are used. Similarly, for international comparisons of GDP, nominal GDP amounts converted into Purchasing Power Parities (PPPs) are used, not chain-linked values. When it comes to international comparisons, it is particularly incorrect, from both a statistical and economic standpoint, to utilize chain-linked measures of physical volume, since chain-linking is affected by differing inflation rates as well as the production and price structures of individual countries. It should also be borne in mind that wages and salaries of employees and profits of business owners are paid out and spent in nominal amounts, just as the Government budget is planned and spent in current prices—not in the prices of some base year from the past. Consequently, a comparative analysis of the level and structure of GDP between two economies is virtually meaningless if we were to use chain-linked GDP values. It is only possible to compare the dynamics of GDP growth between two countries based on chain-linked volume measures, or to compare productivity dynamics. Therefore, chain-linked values hold analytical significance only for tracking the dynamics of economic activity in long data series, and any changes in amounts resulting from a revision are simply a mathematical, computational consequence of the chain-linking process itself, from which it is impossible to draw any economic conclusions.

In this regard, we will also address the question of why the average increase in chain-linked GDP values (around 7%) is greater than the average annual increase in nominal GDP. This seemingly surprising difference does not represent any computational error or unexpected deformation of the series, but is simply a mathematical and statistical consequence of the chain-linking procedure itself and the adjustment of GDP growth rates. Simply put, in the years preceding those for which growth rates were revised downward, chain-linking artificially (mathematically) increases the absolute amounts of the chain-linked values in order to reflect those lower year-on-year growth rates. Consequently, it is understandable that comparing the average annual change—i.e., the revision of the nominal GDP level by year—with the average change in the absolute amounts of chain-linked real GDP values by year is meaningless, as these are statistically non-comparable variables. If, however, we look at real GDP in in previous year's prices, which is the only correct way to draw conclusions about the impact of a revision on changes in the level of real GDP, real GDP (in previous year's prices) increased on average by 4.1% (over the 2000–2022 period), while nominal GDP increased by 4.2% over the same period. This proves that there is absolutely no question of any "manipulation," and that the GDP revision was carried out in a sound accounting and economic manner, consistent with previous revisions and the practices of other EU member states.

Finally, we point out to readers that chain-linked real GDP values naturally change depending on the chosen reference year, because GDP amounts are expressed in the prices of different (reference) years, and this is not a matter of any manipulation, but simply a mathematical-statistical rule. The choice of the reference year will also affect the magnitude of the chain-linked GDP values. Furthermore, readers must bear in mind that the chain-linked values of individual GDP components, whether from the expenditure or production side of GDP, are non-additive; i.e., summing up the chain-linked values of final consumption, investment, government expenditure, and net exports will not yield the chain-linked value of GDP. This is the so-called chain-linking residual, which is again a pure mathematical-computational phenomenon, rather than the result of an error or inconsistency in the calculation of either nominal or real GDP.

THE 2024 MAJOR GDP REVISION – METHODOLOGICAL EXPLANATIONS

In 2024, the Statistical Office of the Republic of Serbia (SORS) conducted a major—or benchmark—revision of GDP and all domains of the system of national accounts, in line with the five-year national accounts revision cycle observed by all European countries under the supervision of Eurostat. The previous GDP revision was carried out in 2018 and 2019 and, as in all EU member states, represents a regular, continuous process through which the system of national accounts and the estimation of macroeconomic indicators are enhanced and refined via the adoption of new methods and improvements to statistical and other data sources. SORS publicly announced the upcoming major revision to all its users on October 2, 2023, on its website. Representatives from Eurostat and the IMF were also notified of the commencement and progress of the revision.

In the 2024 Major revision, numerous improvements of the national accounts methodology were made, resulting from the continuous support provided by the EU to SORS through multiple regional and national IPA projects during the period following the previous major revision in 2019. Furthermore, the 2024 revision incorporated new data sources and improved existing ones, both administrative and statistical. Most notably, these include the results of the 2022 Census of Population, Households and Dwellings and the 2023 Census of Agriculture. Additionally, data sources concerning sole proprietorships (unincorporated enterprises) and local kind-of-activity units collected via the Statistical Business Register were improved, a new survey on subsidies was introduced, and employment analytics were enhanced.

In terms of methodological improvements, it should be noted that the Perpetual Inventory Method (PIM) was applied for the first time in estimating the consumption of fixed capital, which had significant effects on GDP. Moreover, the transition to the so-called "accrual principle" in estimating General Government Final Consumption Expenditure (replacing the previously applied "cash principle") triggered a major revision of this GDP component and of GDP itself. Based on the improved and new methods and data sources, GDP for 2022, as the reference year, was revised upward by 5.1%, while the average increase in nominal GDP for the entire 1995–2022 period amounted to 4.7%. As for the real GDP growth rates, they remained close to previously published levels, with minor adjustments depending on the year. For instance, the 2.5% real growth rate for 2022 was slightly adjusted upward to 2.6%. On average, the real growth rate was adjusted by -0.1 percentage points across the entire 1995–2022 period.

Below we provide explanations for the most significant changes—namely, improvements in methodology and data sources—and their effect on the previously published data for nominal GDP

at current prices. The effects of the revision on GDP are presented for the year 2022 and, as previously highlighted, the effects of the revision for the 1995–2021 period are close to the level observed in 2022:

THE EFFECTS OF THE REVISION ON THE EXPENDITURE SIDE OF GDP:

- The application of the PIM in estimating the consumption of fixed capital¹, as well as the adoption of the accrual principle in valuing general government expenditure instead of the "cash" principle used hitherto (cash-accrual adjustments), caused an upward revision of general government final consumption expenditure by 19.2% and of GDP by 3.1% (the effect of the PIM on GDP was +1.6%, cash-accrual adjustments accounted for +2.2%, while other adjustments stood at -0.7%). The revision driven by the PIM and the transition to the "accrual principle" for valuing government consumption and expenditure accounts for approximately 60% of the total revision of expenditure measure of GDP. This demonstrates how "objective" methodological changes can significantly contribute to GDP adjustments, independently of recalculations driven by improvements to data sources.
- Based on the data from the 2022 Census and the 2023 Census of Agriculture, the estimation of Gross Fixed Capital Formation (residential housing and investments of agriculture holdings) was revised upward, resulting in an increase in nominal GDP of approximately 1% in 2022, with a similar effect throughout the rest of the 1995–2021 series. (The revised data are based on the improved coverage of dwellings. Additionally, an under-coverage of census units was identified in certain municipalities within the 2011 Census data, which had caused an understatement of the housing stock throughout the entire unrevised 2011–2022 series).
- The revision of the housing stock data consequently led to a revision of the estimates for imputed rent for owner-occupied dwellings by approximately RSD 56 billion or 1.2%, resulting in an upward adjustment of nominal GDP for 2022 by about 0.8%. This change affected Household Final Consumption Expenditure and was reflected on the production side by the exact same amount.
- Based on a change in the method for calculating the non-observed economy, a downward adjustment was applied to the final consumption expenditure of Non-profit Institutions Serving Households (NPISHs) by approximately 6.5% (RSD 5.5 billion), resulting in a downward adjustment of GDP by about -0.1%. In addition, a minor adjustment was made based on the application of the PIM for calculating the consumption of fixed capital.
- Based on data from the Customs Administration, a correction was made to the export and import data for electricity for the 2016–2020 period, which caused a GDP adjustment of between -0.1% and -0.2% during this timeframe.

¹ The effect of the PIM on the expenditure side of GDP resulted in an identical upward GDP adjustment on the production side for units and enterprises belonging to the General Government Sector, due to the specific method used to calculate output and GVA. Namely, as previously highlighted, the gross output of the General Government Sector is compiled using a specific method as the sum of costs (intermediate consumption + compensation of employees + consumption of fixed capital). The application of the PIM led to an increase in the value of the consumption of fixed capital (prior to the major revision, historical bookkeeping data from financial statements were used), and consequently to an increase in GVA and, ultimately, GDP.

An overview of the revision of GDP components by the expenditure approach is presented in the following table:

	2020		2021		2022	
	EUR billion	Impact on GDP, %	EUR billion	Impact on GDP, %	EUR billion	Impact on GDP, %
Final consumption expenditure of households	0.5	1.1	0.5	1.0	0.5	0.8
Final consumption expenditure of non-profit institutions serving households (NPISH)	0.0	-0.1	0.0	0.1	0.0	-0.1
Final consumption expenditure of general government	1.3	2.8	1.5	2.8	1.9	3.1
Gross fixed capital formation	0.5	1.0	0.5	0.9	0.6	1.0
Changes in inventories	0.0	0.0	0.0	0.1	0.1	0.2
Acquisitions less disposals of valuables
Exports of goods and services	0.0	0.1	0.0	0.0	-	-
Imports of goods and services (-)	0.1	0.3	0.0	0.0	-	-
GDP change	2.2	4.7	2.6	4.8	3.1	5.1

¹⁾ In 2022, the year for which data are presented in the table, there were no changes to import and export data.



EFFECTS OF THE REVISION ON THE PRODUCTION SIDE OF GDP:

- Based on the application of the PIM in estimating the consumption of fixed capital, the calculation of output and GVA for the general government and non-profit institutions sectors was revised, resulting in an upward adjustment of GDP by 1.8% in 2022, with similar effects across the remainder of the 1995–2021 series. This change accounts for approximately 35% of the total GDP increase compiled via the production approach.
- The calculation of GVA for sole proprietorships (unincorporated enterprises) was enhanced, with significantly improved availability of financial statements as the primary data source (available since 2020). Furthermore, in estimating the GVA of sole proprietorships, all sole-proprietors who failed to submit financial statements and whose business status is suspended ("frozen") are now treated as inactive and are excluded from the GVA calculation. This led to a significant reduction in the number of unincorporated enterprises considered economically active, as well as a downward adjustment of GDP by approximately -1%.
- Regarding the production approach to GDP measurement, the most significant change relates to the calculation of GVA by economic activity, which is now conducted at the level of local kind-of-activity units (local KAUs / establishments) rather than at the enterprise level, as was the case prior to the revision. This means that an enterprise's GVA is broken down into its primary and secondary activities, enabling greater precision in GVA estimates by economic activity and improved

consistency with short-term statistics, which are also based on establishment-level data. This modification affected not only the levels but also the structural composition of GVA across economic activities.

In addition to the above, the revision of GVA data by economic activity is the result of harmonization with source data—namely, enterprise financial statements and statistical surveys—during the process of balancing GDP estimates from the expenditure and production approaches through the so-called *commodity flow* analysis, which is carried out when compiling Supply and Use Tables (SUTs). The 2024 major revision provided an opportunity to align statistical data with source data and to eliminate the understatement of GVA across several economic activities where accumulated discrepancies had become most apparent (primarily during and after the COVID-19 pandemic, a period characterized by data distortions and high inflation). Furthermore, relatively minor changes in national accounts indicators by economic activity resulted from the reclassification of enterprises and their (re)sectorization. In this major revision, 680 enterprises were reclassified into their appropriate economic activity based on updates to the Statistical Business Register.

The 2024 major GDP revision and the comprehensive upgrade of the system of national accounts have enabled substantially better alignment of the GDP estimation methodology with the European System of Accounts (ESA 2010), alongside enhanced quality of the national accounts system in terms of accuracy, reliability, exhaustiveness, and consistency with short-term statistics (cross-domain consistency). The 2024 major revision marks another important milestone in finalizing the harmonization of the Statistical Office of the Republic of Serbia with European statistical regulations, standards, and practices in the field of national accounts.

CONCLUSION

The Statistical Office of the Republic of Serbia (SORS) remains consistent in its long-standing practice of complete transparency and professional openness toward its users. As it has done in the past, SORS stands ready to address all questions, comments, and concerns raised by the professional public, recognizing data revision not as a sign of weakness, but as an essential, positive process for enhancing the quality and reliability of macroeconomic indicators under the supervision of Eurostat and the IMF—the most eminent and relevant macroeconomic and statistical authorities.

The information and explanations presented in this publication, along with other methodological materials publicly available on the SORS website, provide all well-intentioned users with sufficient elements for an in-depth understanding of the system of national accounts and the core nature of the executed revisions. SORS emphasizes its readiness to provide further clarifications in the future to ensure the correct interpretation of statistical data and a better understanding of them by users.

SORS remains dedicated to a continuous dialogue with the professional public and the media, and will continue to provide all necessary clarifications aimed at ensuring the proper understanding and interpretation of official statistical data.



MAJOR REVISIONS OF NATIONAL ACCOUNTS
Methodological and Technical Explanations