EY

Building a better
working world

# EY Italian Macroeconomic Bulletin

N°1 | December 2022

Index

Executive summary

‣ New challenges related to geopolitical uncertainty that have arisen as a result of the conflict between Russia and Ukraine are negatively affecting the global economic growth, which is expected to reach 1.3% in 2023, compared to the past 10-years average growth of 2.7%, and 3.1% in 2022.

‣ Inflation has reached historical high levels globally. In OECD countries it is expected to reach 9.4% in 2022, compared with an average of 1.6% between 2013-2019. Such level of inflation, which is significantly higher than in the pre-pandemic period, negatively affects growth, also due to tighter monetary policy from central banks.

‣ Rising energy prices are only one of the causes of the high inflation rates, to which some structural changes in the global economy have to be added, such as the energy transition journey and the reorganization of supply chains, with a trend towards reshoring of manufacturing activities.

‣ The ECB's (European Central Bank) reaction, aimed at pursuing price stability, could contribute to the slowdown in economic growth in the eurozone as a side effect of restrictive monetary policy. Along with increased government spending to support European economies, higher interest rates also pose an additional challenge to public finances, particularly in countries with high public debt.

‣ The Italian economy showed strong vigor in the first three quarters of 2022, driven mainly by domestic demand (household consumption and investment), continuing along the path of recovery started in 2021 after the pandemic crisis. However, short-term indicators outline an uncertain outlook for the current and next quarters, as a result of the high inflation rate and its effect on real disposable income and business costs.

‣ EY's forecasts for Italy indicate a growth of 3.8% in 2022 and 0.6% in 2023, while inflation rate is expected to decrease from 8.2% in 2022 to 7.1% in 2023. The forecasts remain subject to a scenario of high uncertainty and thus present important risks (both downward and upward), mainly related to the global macroeconomic environment.

Real GDP - % change, Italy

Gross Domestic Product
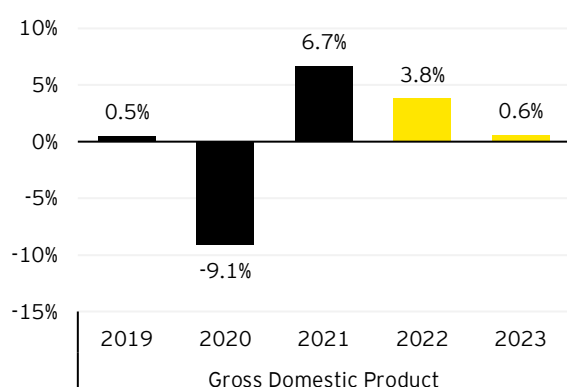
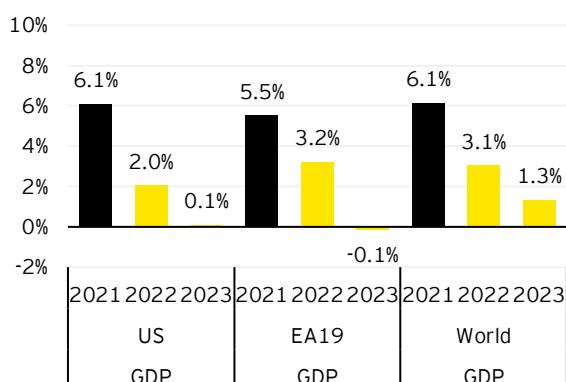**Consumer prices - % change, Italy**

Consumer Price Index
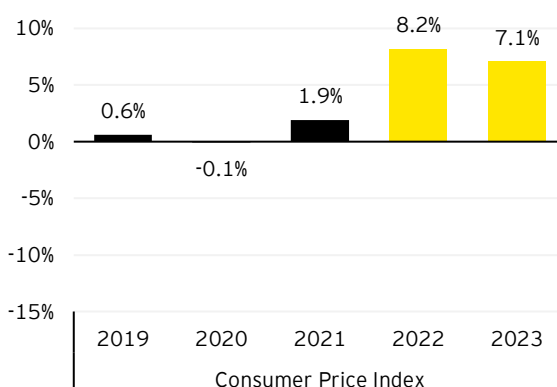
Source: ISTAT and forecasts from EY Italy's Macroeconometric Model, "HEY-MoM" (see Technical Appendix for details). Yellow bars represent the forecast horizon.
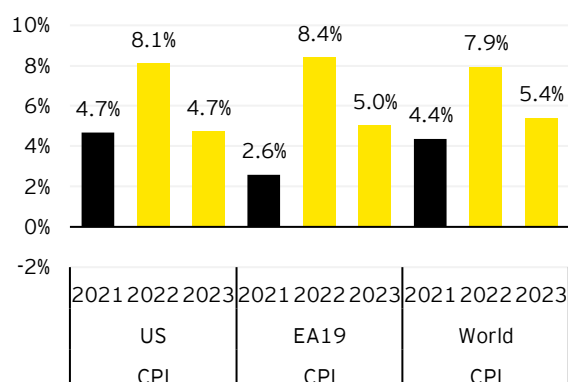
The global scenario

The global economy is facing new geopolitical challenges: in a world where the economic crisis related to the COVID-19 pandemic is still developing its effects, the Russia-Ukraine war and related uncertainty further reduce economic activity. This will result in a slowdown in global real Gross Domestic Product (GDP) growth, expected to reach 1.3% in 2023,[1] compared to an average growth of 2.7% over the past 10 years[2] and 3.1% in 2022.[3]

In particular, one of the main elements to consider in the global macroeconomic scenario is the inflation rate, which has never been so high in advanced countries in decades. It is interesting to observe that the average inflation rate in the OECD countries is expected to be 9.4% in 2022, almost six times the 2013-2019 average.[4] Inflation deteriorates the economic outlook because it results in higher production costs for businesses, a reduction in real income for households, and also because it pushes central banks towards tighter monetary policies in order to pursue their statutory goals (generally identified as a 2% inflation rate over the medium term), thus resulting in a slowdown of the economic activity.

Real GDP - % change

	US GDP			EA19 GDP			World GDP		
Year	2021	2022	2023	2021	2022	2023	2021	2022	2023
Value	6.1%	2.0%	0.1%	5.5%	3.2%	-0.1%	6.1%	3.1%	1.3%

Consumer prices - % change

	US CPI			EA19 CPI			World CPI		
Year	2021	2022	2023	2021	2022	2023	2021	2022	2023
Value	4.7%	8.1%	4.7%	2.6%	8.4%	5.0%	4.4%	7.9%	5.4%

Source: Oxford Economics. CPI: Consumer price index. Yellow bars represent the forecast horizon.

The main challenge for the European and global economy in recent months has been the fluctuations in the energy market. Indeed, we have witnessed a sharp rise in energy prices, mainly related to the countermeasures that the Russian Federation have put in place as a response to economic sanctions by Western countries, after the invasion of Ukraine.

---

[1] Reference is made to the latest OECD, IMF, European Commission and Oxford Economics forecasts.
[2] Average calculated on real annual growth from 2011 to 2021.
[3] Real GDP represents the value of all goods and services produced by an economy in a given year, adjusted for price changes.
[4] OECD Economic Outlook, November 2022 – Confronting the Crisis.

Oil and natural gas prices can be taken as a benchmark to observe changes in energy prices: Despite the recent declines, from the beginning of 2019 to the end of November 2022, there has been a price increase of 54% and 392% respectively. The decline in recent months is mainly related to lower demand and the mild weather experienced this autumn, which allowed storage facilities in many European countries to be filled and reduce the risk of possible supply-demand imbalances. In addition to this, there is also a first draft of a coordinated European response that aims to reduced price fluctuations in the energy market, through the identification of new parameters to which gas prices can be linked, an improvement in the functioning of the energy market, the introduction of new energy solidarity measures between European countries, as well as the implementation of price caps on Russian gas and oil.[5]

It is also important to point out that price increases are not limited to energy commodities alone. Take as an example the price of wheat, which has more than doubled in the past year, or the price of palm oil, which has risen about 71% in the past 12 months. These figures are but the latest movements of a phenomenon that began during the pandemic and has been exacerbated by recent geopolitical tensions. This adds complexity to the security of food supply, as reported in the second joint statement by the Food and Agriculture Organization of the United Nations (FAO), the International Monetary Fund (IMF), the World Bank, the World Food Program (WFP) and the World Trade Organization (WTO) on the global food security and nutrition crisis.[6] Indeed, Ukraine is a central country in the export of food commodities such as sunflower oil, corn and wheat.[7]

Gas by source (2022, mln m³)
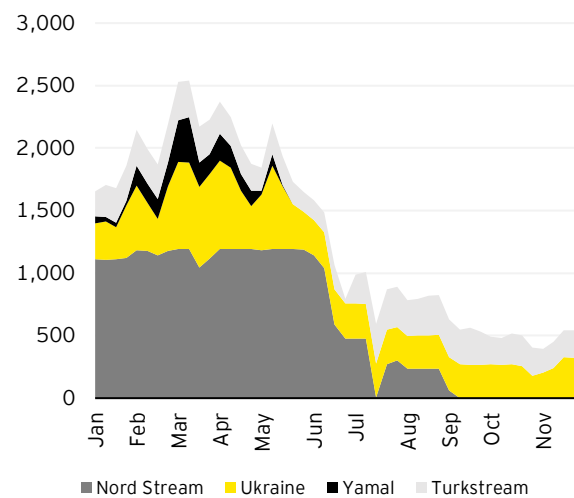
Gas storage - end of November 2022
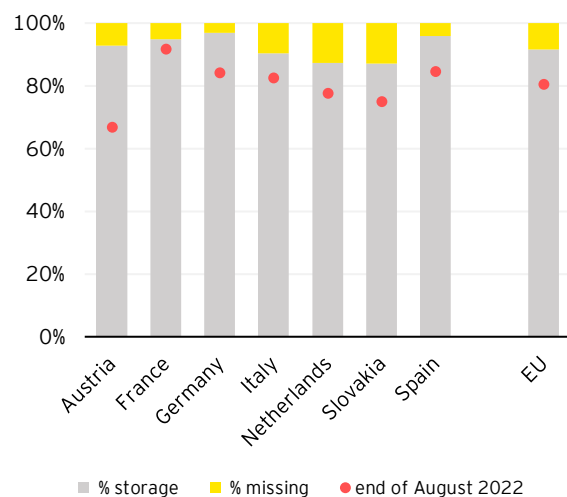


Source: Bruegel, Gas Infrastructure Europe

---

[5] For more details refer to https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/eu-action-address-energy-crisis_en.
[6] https://www.imf.org/en/News/Articles/2022/09/21/pr22313-second-joint-statement-by-the-heads-of-fao-imf-wb-wfp-and-wto-on-the-global-food-security.
[7] https://www.weforum.org/agenda/2022/07/ukraine-s-food-exports-by-the-numbers/.

Possible risks and disruptions to commodity flows along supply chains affect not only advanced countries such as Italy, Spain and the United Kingdom, but also less economic advanced countries such as Egypt, Libya, and Algeria, for which these issues might translate into a food crisis.

Oil and gas price
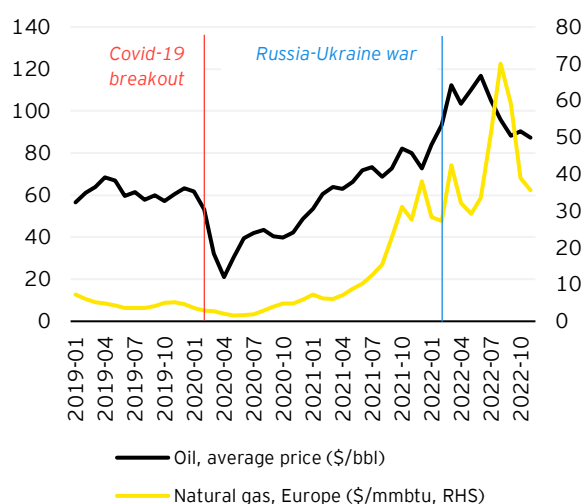
Energy and non-energy commodity price index - World
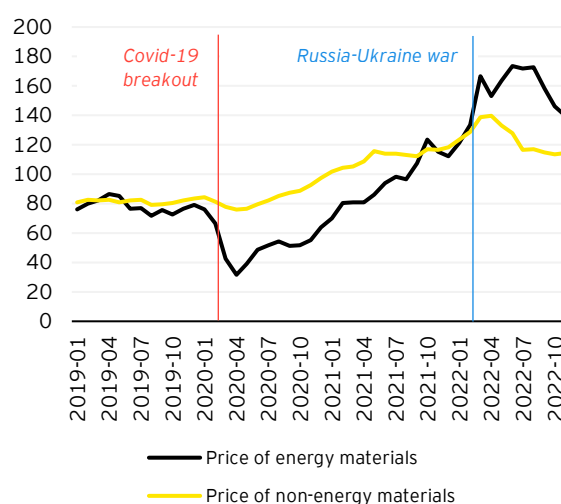
Source: World Bank. The average oil price is calculated as the average of the price of Brent, Dubai oil and WTI. Natural gas price, on the other hand, refers to natural gas quoted in the Title Transfer Facility (TTF). The energy and non-energy price indices consider the price of various commodities globally (for example, the energy price index considers the price of crude oil, such as Brent and WTI, coal, and LNG; for the non-energy price index, the prices of grains, food and beverages, oils and flours, and other commodities are considered). The indexes refer to the global market.

The role of monetary policy

In order to pursue price stability, which in the United States and the Euro Area is generally identified with an inflation rate around 2% over the medium term, monetary policy has changed pace dramatically from the more accommodative policy adopted in previous years. Through an increase in the key interest rate,[8] central banks make borrowing more expensive and encourage saving, thereby influencing consumer demand for goods and services as well as business investment. This can help reduce inflation but can also

---

[8] In the Euro Area, it represents the rate at which the European Central Bank lends to banks operating in the European Union. There are three major rates: the main refinancing rate (referred to above), the marginal (overnight) refinancing rate and the rate on overnight deposits at the central bank. The three rates combine to set the terms of loans to private banks in the Eurozone, consequently influencing the general level of interest rates and, with them, the cost of money and thus of public and private debt.

result in lower economic activity. It is important to note how the communication of these measures are increasingly dictated by short-term contingencies even more in such a fluid scenario: phrases such as "how far we need to go, and how fast, will be determined by the inflation outlook"[9] are increasingly common in ECB communications, demonstrating a timely attention to sudden changes in the economic scenario and readiness to react, with monetary policy direction being defined meeting-by-meeting.

Together with higher interest rates, central banks also consider the use of unconventional monetary policy instruments such as quantitative tightening, i.e., a reduction in balance sheet activities, which takes the form, for example, of repayment of loans bestowed by central banks through ad-hoc programs (such as the ECB's TLRO[10]). These operations are expected to contribute positively to achieve price stability.

Monetary tightening by the Federal Reserve and the ECB also has several spillover effects on other economies. For example, raising interest rates by the Fed has been shown to have strong global impacts, such as a decline in credit supply, large reductions in international credit flows, and general tightening of financial conditions.[11]

This adds uncertainty to the scenario, making the decisions of the FED and ECB even more complex, which must be monitored very carefully, not only by looking at current decisions but also by examining the future path. However, as mentioned above, the change in the pace of monetary policy has an immediate effect on the economy, due to the increased cost of debt for

Monetary policy reference interest rates
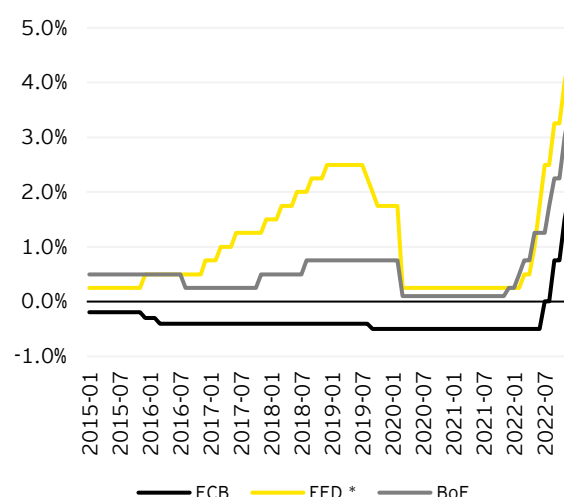
ECB balance sheet (€B)
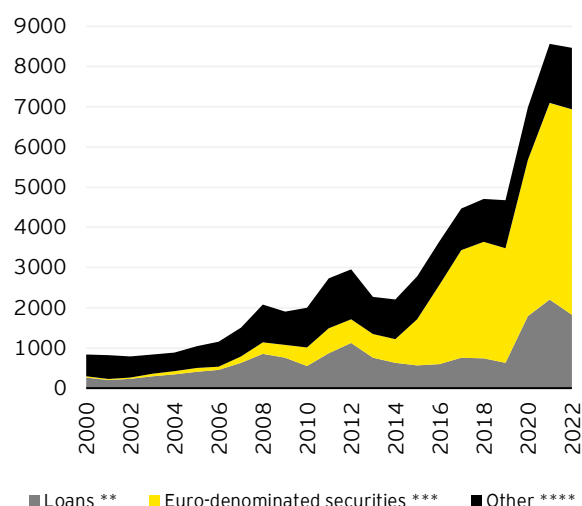
Source: European Central Bank. For acronyms - ECB: European Central Bank; FED: Federal Reserve; BoE: Bank of England. The latest ECB balance sheet figure refers to December 2, 2022.
* it refers to the upper limit of the Federal Reserve's benchmark rate range. The lower limit is currently 4.25%.
** it considers loans to euro area credit institutions related to monetary policy operations denominated in euros. Different items include main refinancing operations and LTROs.
*** it considers euro-denominated securities of euro area residents. Different items include assets acquired for monetary policy purposes.
***** miscellaneous items include gold and foreign currency-denominated claims on euro area residents and non-euro area residents.*

---

[9] Speech by Christine Lagarde, President of the ECB, at the European Banking Congress, Frankfurt, Nov. 18, 2022.
[10] Longer Term Refinancing Operations (LTROs) are open market operations conducted by the European Central Bank to manage interest rates and liquidity in the Eurozone.
[11] Miranda-Agrippino, S., & Rey, H. (2020). US monetary policy and the global financial cycle. The Review of Economic Studies, 87(6), 2754-2776.

Interest rate on debt - Eurozone

Firms * — Households **
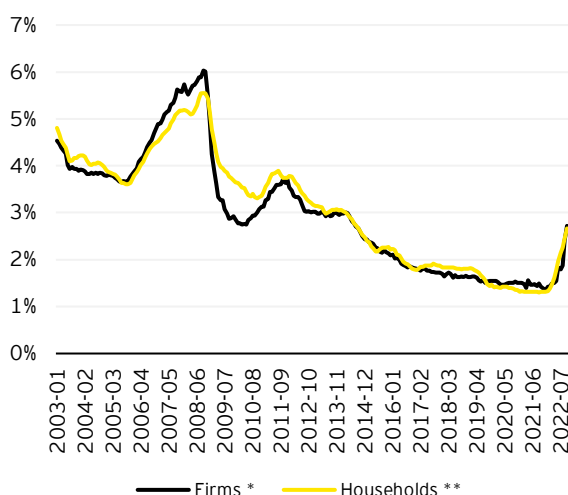
Interest rate on debt - Italy

Firms * — Households **
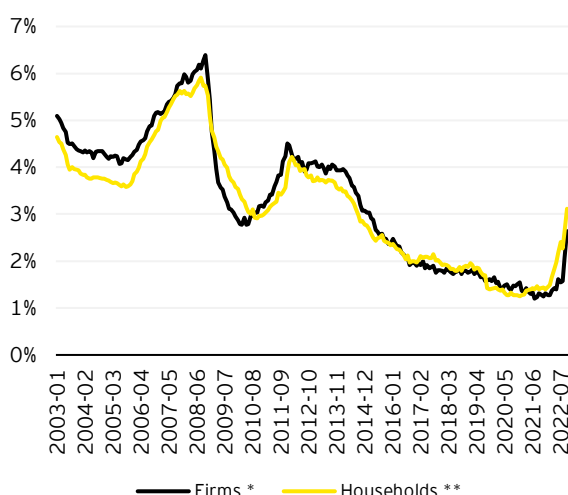
Source: European Central Bank.
* it refers to the average cost of bank loans.
** it refers to the average cost of home purchase loans,
calculated as a 24-month moving average on the aggregation
of short-term and long-term rates on new volumes.

households and businesses. This represents a downside risk for the economic activity, entailing a reduction of private consumption and investment.

Higher interest rates, economic uncertainty and the end of bond purchase programs by the European Central Bank (such as the PEPP[12]), have led to an increase in government bond yield, which is clear when analysing the 10-year Italian government bond. The recorded increase will have an impact on future debt issuances, resulting in increased pressure on public finances and the sustainability of the debt itself, which is currently around 150% of GDP. Specifically, it is estimated that for every one percentage point increase in interest rates on government bonds, persistent and uniform across the maturity curve, interest expenditure would grow by 3 billion over the next 12 months (and 39.4 billion over the next five years).[13]

In order to ensure the achievement of its objectives, it is necessary for the ECB to ensure a smooth transmission of monetary policy throughout the monetary union, calibration of interest rate policy, the possible use of forward guidance[14] and asset purchases/reductions so as to steer the yield curve while preventing interest rate spikes in some countries.

---

[12] The Pandemic Emergency Purchase Program is the program implemented by the ECB to counter the impact of the pandemic on the euro area economy. Through the PEPP, the ECB could purchase different types of assets in the financial markets, resulting in a reduction of related interest rates. The program was terminated in March 2022. For more information on the program and related impact, refer to https://cepr.org/voxeu/columns/ecbs-asset-purchase-programme-granted-debt-sustainability-pandemic-its-termination.
[13] *L'impatto di un rialzo dei tassi sulla spesa per interessi* – Osservatorio dei Conti Pubblici Italiani, https://osservatoriocpi.unicatt.it/ocpi-pubblicazioni-l-impatto-di-un-rialzo-dei-tassi-sulla-spesa-per-interessi.
[14] Forward-looking guidance, or "forward guidance," is information that the central bank can provide regarding its future monetary policy intentions, based on its assessment of the outlook for price stability. For more information, https://www.ecb.europa.eu/ecb/educational/explainers/tell-me/html/what-is-forward_guidance.it.html.

10-year Italian bond (BTP) yield rates
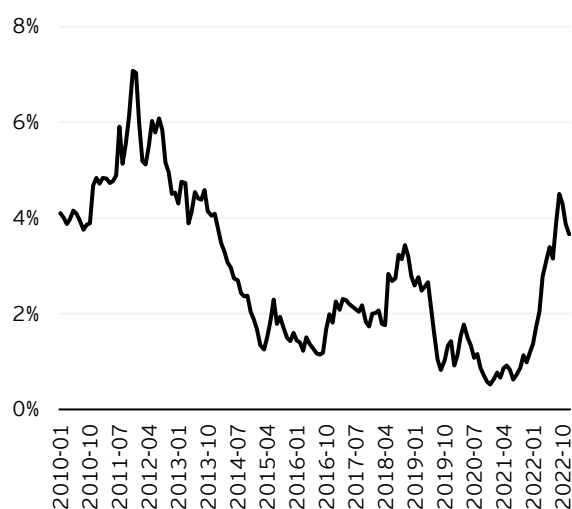
**Public deficit and debt - % GDP, Italy**
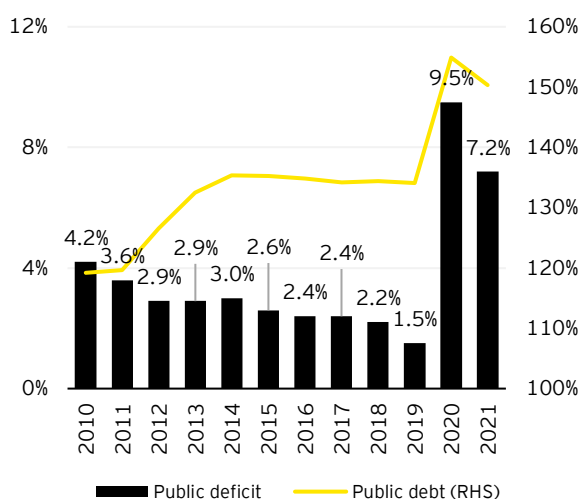

Source: Refinitiv, Banca d'Italia.

Issues along supply chains and rising prices

In addition to higher energy prices, the higher inflation is also related to issues along value chains that have characterized the global economy since the acute phase of the pandemic in 2020. The Russian-Ukrainian crisis adds to an already complex situation, in which a globally uneven economic recovery in the aftermath of the pandemic crisis created bottlenecks in the supply of components and inputs critical to economic activity. These pressures are showing signs of easing in recent months.
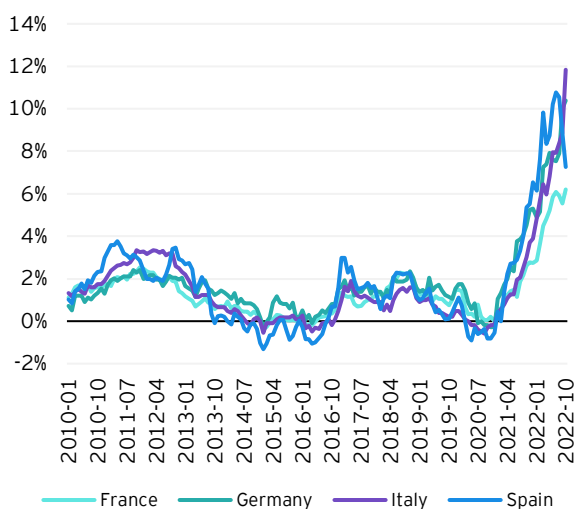
Global supply chain pressure index
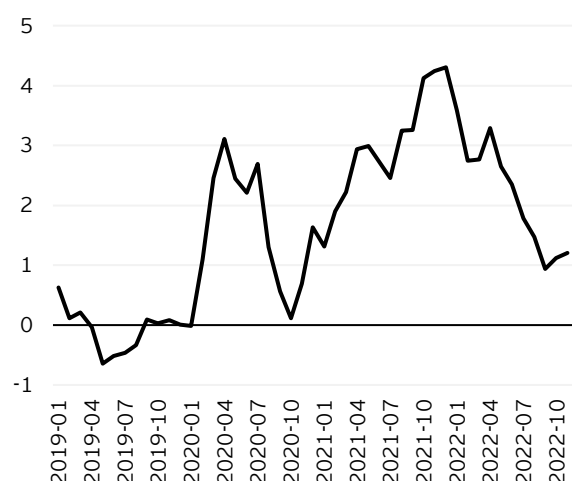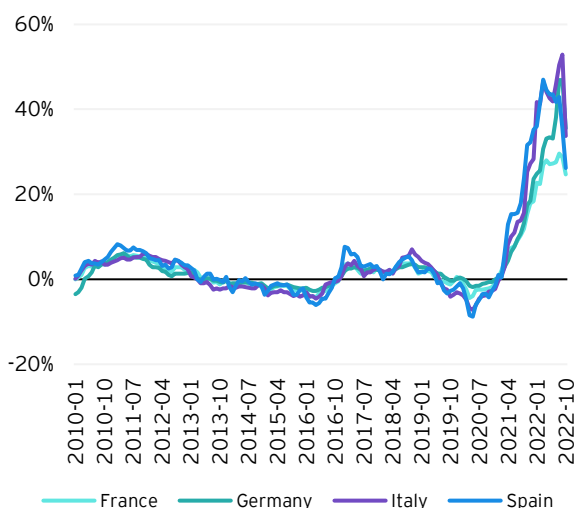

Baltic Dry Indices
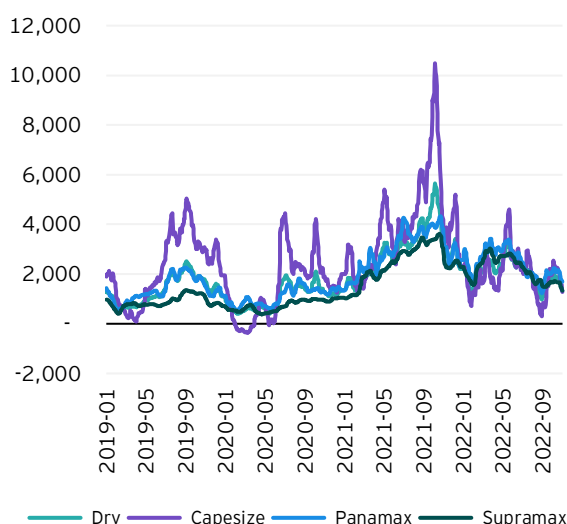
Source: Federal Reserve Bank of New York, Refinitiv

Consumer price index - % change YoY

Legend: France — Germany — Italy — Spain

Producer price index - % change YoY

Legend: France — Germany — Italy — Spain

Source: Eurostat

These dynamics are evident when analyzing the Global Supply Chain Pressure Index (GSCPI) provided by the New York FED.[15] The index shows that in recent months there has been a substantial decline from the value recorded in April 2022. This decline can be attributed to a reduction in delivery times, ease of port congestion, and a clearing of backlog orders, raising the prospect of lower inflation in the future. This is also due to a slowdown in consumer demand for durable goods, which is helping to soften supply chain bottlenecks.

A similar situation is shown by the Baltic Dry indices,[16] which have returned to pre-pandemic levels in recent months after registering record highs in 2021 due to issues along value chains and post-pandemic recovery.

These improvements, along with the decline in energy prices in recent months, are also reflected in the reversal of the trend of the producer price index[17] (PPI), which show the first signs of cooling, suggesting a possible easing of inflationary pressures in 2023.

While the current dynamics along supply chains are dominated by recent geopolitical developments and the pandemic crisis, it is also important to emphasize the presence of additional factors impacting supply chains both at the European level (as in the case of Brexit) and at the global level (climate change, sustainability, and energy transition): even though some signs of recovery have been observed, pressures remain and portend substantial persistence of the inflationary phenomenon for at least another year, also considering the particularly uncertain scenario.[18]

---

[15] The GSCPI is an index of supply chain conditions, constructed by the Federal Reserve Bank of New York, which combines variables from several transportation and manufacturing sector indices, such as those for lead times, prices and inventories. When supply chain pressures decrease, the value of the index decreases and vice versa.

[16] The Baltic Dry Index (BDI) measures the transportation costs of dry bulk such as iron ore, coal and grain. It consists of the Baltic Exchange Capesize Index (BCI), the Baltic Exchange Panamax Index (BPI) and the Baltic Exchange Supramax Index (BSI), i.e., indices that refer to the transportation costs of specific vessels and ships.

[17] The producer price index (PPI) measures the average change over time in the prices that domestic producers receive for their output. It is a measure of inflation for wholesale trade, which considers several indices that measure producer prices by sector and product category. The first difference between the PPI and the consumer price index is the goods and services taken into account: the producer price index focuses on the entire output, that is, not only on goods and services purchased by producers as inputs to their own operations or as investment, but also on goods and services purchased by consumers from retailers and directly from the producer; the consumer price index, on the other hand, focuses on goods and services purchased for consumption.

[18] For a more detailed discussion, refer to: European Bank for Reconstruction and Development (EBRD), Global supply chain in turbulence - transition report 2022-23.

The European and Italian framework

Moving from a global perspective to a regional and national focus, it is interesting to analyze the contributions of individual components of the consumer price index. Breaking down the increase in the CPI in Italy, we see that the increase in energy prices contributes about half of the total inflation (amounting to 11.8% in November 2022 compared to November 2021).

Such high inflation rates are also found in the rest of the European economies, with France, Germany, and Spain registering increases of 6.2%, 10.0%, and 6.8%, respectively, comparing November 2022 with the same month of the previous year. With reference to the producer price index (PPI), as shown in the previous graph, there has been a significant reversal in the recent months, which is expected to be reflected in a decline in consumer inflation in the near future.

Looking at the contribution of individual components to CPI, it is important to consider the weights of these components into the CPI index, as well as their persistence. While the component that has undergone the greatest change is the energy component, it can be observed that this has an overall weight in the total CPI of roughly 10%, which is why the dynamics recorded in the energy component are only partially reflected in the CPI. On the other hand, the services component has experienced significantly less volatility than the energy component, and it accounts for more than a third of the total CPI basket (38.7% as of 2022), thus defining it as a key element behind inflation rate in Italy.

The significant weight of the services sector and the low volatility of its price index are important elements to consider in understanding the direction of inflation in the coming quarters: while a reduction in the overall inflation rate is expected in 2023 due to a possible easing of pressure on the energy side, the lower volatility of the services CPI could keep inflation at high levels.

High inflation also has an impact on nominal wage growth, which is expected to rise so as to mitigate the reduction in consumer purchasing

Contributions to CPI % change - Italy
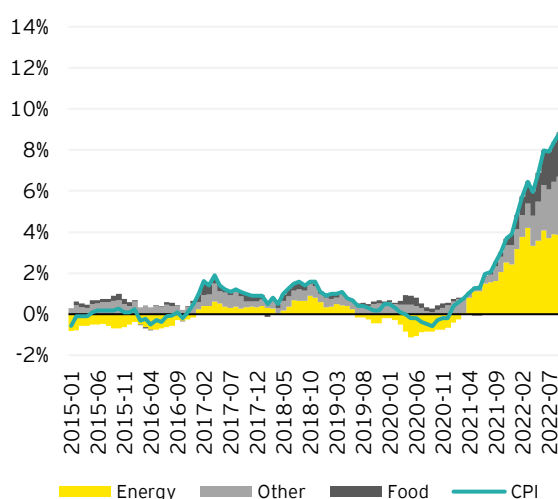
Inflation in the different components of the CPI - Italy
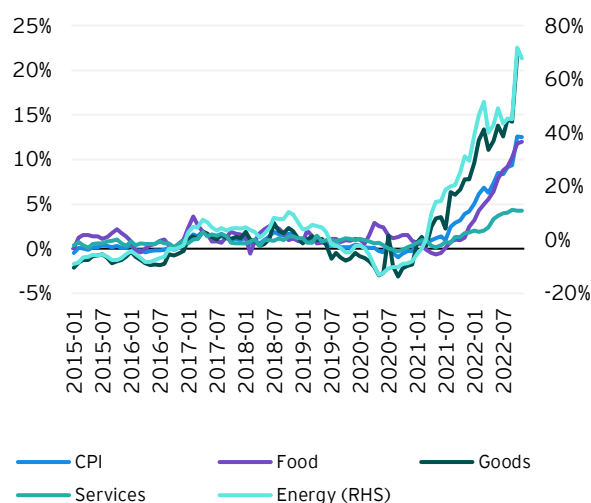
Source: Eurostat

power. Rising nominal wages could translate into further inflationary pressures in the coming years, but without necessarily leading to a wage-price spiral, as shown by empirical evidence in recent decades.[19]

Short-term indicators

In such an uncertain scenario, short-term indicators are particularly useful in interpreting the economic situation and developing a forecasting scenario for the Italian economy.

A first indicator to consider is the industrial production index,[20] which in Italy recorded a lower level (-0.2%) in the third quarter of 2022 compared to the third quarter of 2019 (pre-pandemic year). There is also a slight decline compared to the previous quarter of the same year, with a 0.5% drop, driven mainly by a decline in the output of intermediate goods and substantial stability in consumer goods.

More encouraging signs, on the other hand, come from comparing the value for the third quarter of 2022 with the same quarter of 2021, which indicates a growth of 0.3%. Finally, comparing October 2022 with September 2022, the index

shows a contraction of 1.0%, and -1.6% compared to October 2021.[21] It appears, therefore, that the Italian industry is keeping afloat despite the recent geopolitical and economic challenges, and the strong uncertainties of recent months.


---

[19] Alvarez, J, J Bluedorn, N Hansen, Y Huang, E Pugacheva, and A Sollaci (2022), "Wage-price spirals: What is the historical evidence?" IMF Working Paper 22/221.
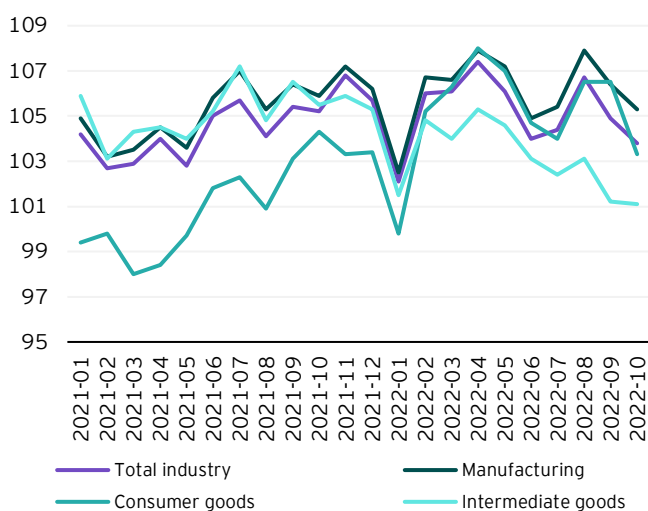[20] The industrial production index measures the change over time in the physical volume of production carried out by industry in the narrow sense (i.e., industry excluding construction). The index has base 2015 = 100.
[21] Source: ISTAT.

Industrial production index
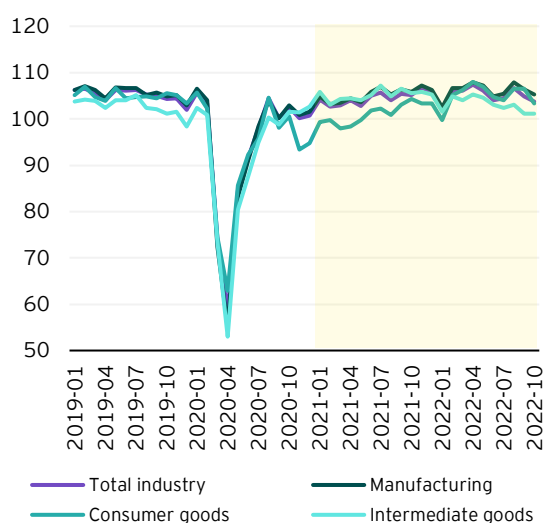
**Zoom: Industrial production index from 2021**

Source: ISTAT

Another important indicator is the PMI index.[22] From early 2022 to October 2022, there has been a contraction in the manufacturing PMI in Italy, with a subsequent recovery in November. While this demonstrates the severe impact of the energy crisis on Italian manufacturing, the sector has shown resilience, with operators slowly regaining confidence. Similarly, construction PMI index has also experienced a significant decline since the beginning of the year, with a major rebound in October and November. These movements can be traced to lower production prices and less pressure on supply chains. Finally, even with regard to the services PMI index, businesses in the sector show greater confidence in future prospects than in the previous month, with the index essentially in neutral territory (49.5 in November 2022).

PMI indices - Italy
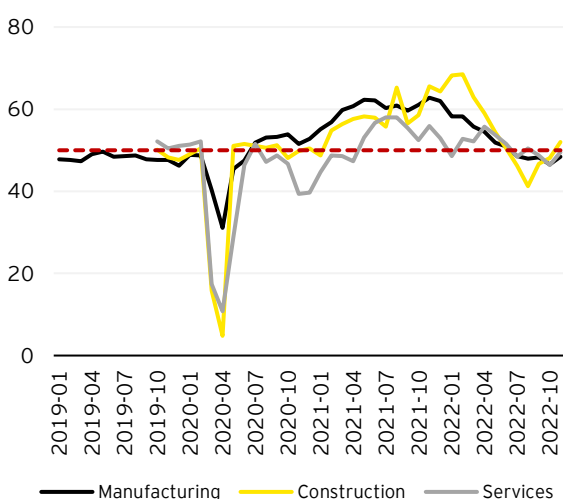
Business and consumer confidence
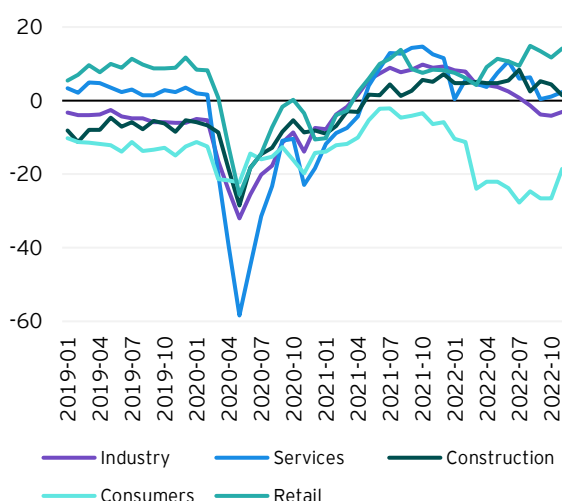
Source: S&P Global, European Commission

[22] The Purchasing Managers' Index (PMI) is one of the most popular economic indices, i.e., an index of the prevailing direction of economic trends in the manufacturing, construction and service sectors, obtained through timely surveys of the most representative companies in the relevant sectors. Values above 50 indicate an upward trend in economic activity, values below 50 a decline in it.

With reference to consumer confidence, the European Commission index[23] outlines a trend that is anything but positive, especially in the first half of 2022. Overall confidence, which was already weak prior to the current geopolitical and energy crisis, has fallen further following Russia's invasion of Ukraine and its associated consequences. Slight improvements were seen in November 2022, coinciding with the peaking of inflation in Italy and the hope of lower price increases in the coming months.

Given the symmetric nature of the energy supply shock, it is not surprising that other major European countries are also characterized by a similar negative outlook. This sentiment is reflected in the deteriorating growth outlook for the coming quarters: as an example, in its latest Economic Outlook, the OECD forecasts a GDP growth for Germany of 1.8% in 2022, and -0.3% in 2023, while the Eurozone as a whole is expected to grow by 3.3% in 2022 and 0.5% in 2023.[24]

Factors limiting economic activity, as indicated by businesses in surveys conducted by the European Commission, can be of a different nature, and have changed over time, indicating structural changes in the economy. For example, historically, the main factor of weakness in Europe and Italy's manufacturing sector has been the slowdown in demand, particularly in times of crisis and uncertainty. In recent years, however, new dynamics have emerged: material and equipment shortages have become the primary obstacle organizations face, especially since the beginning of 2021, when global supply chain problems have become particularly pervasive. Another important aspect to consider is the difficulty in finding skilled labor, which is increasingly prevalent in organizations.

Factors limiting production - EU27
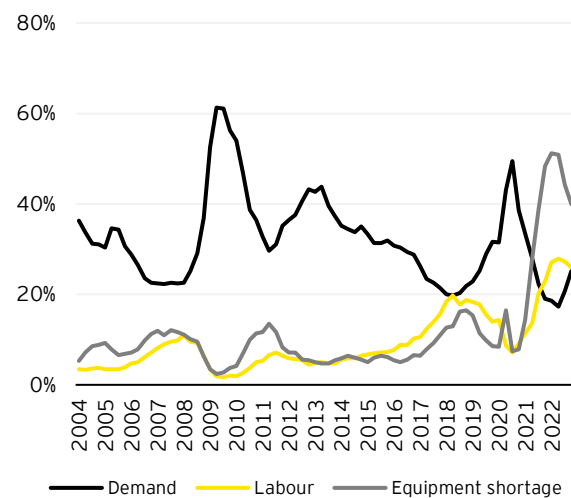
Factors limiting production - Italy
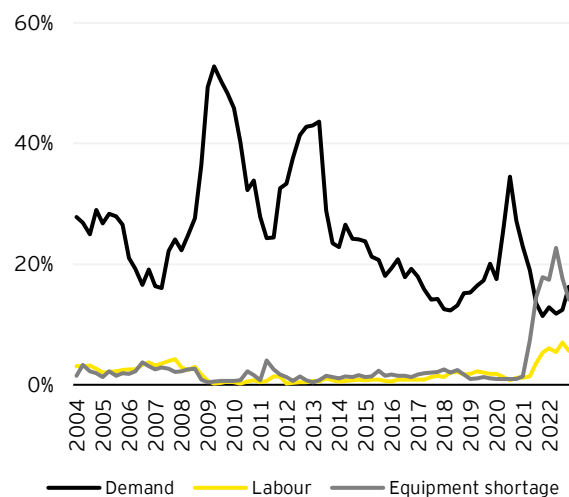
Source: European Commission. Percentages refer to the number of firms experiencing a limitation in production activity due to a specific factor.

EY forecasts on the Italian economy

The third quarter of 2022 saw GDP growth of 0.5% compared to the previous quarter, and 2.6% compared to the same quarter in 2021. This marks the seventh consecutive quarter of growth for the Italian economy, but a slowdown from the second quarter of the year.

It should be noted that the growth experienced in 2021 and the first three quarters of 2022 is mainly related to a strong domestic demand, i.e., household consumption and investment. In fact, export growth was often more than offset by import growth, which reduced the net contribution. Investment has been the most dynamic GDP component since the start of the recovery, rising to a level 20% higher than in the third quarter of 2019. Household consumption showed a vigorous recovery despite hovering around pre-pandemic levels.

Contributions to GDP growth

- Public expenditure
- Investments
- Imports
- Household consumption
- Exports
- GDP
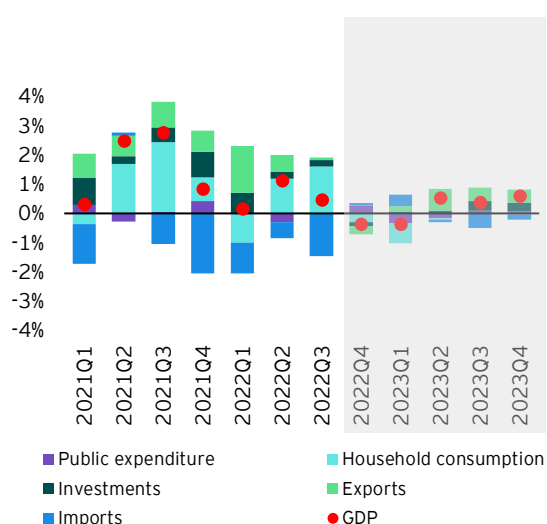
Components of GDP, index (2019Q3 = 100)
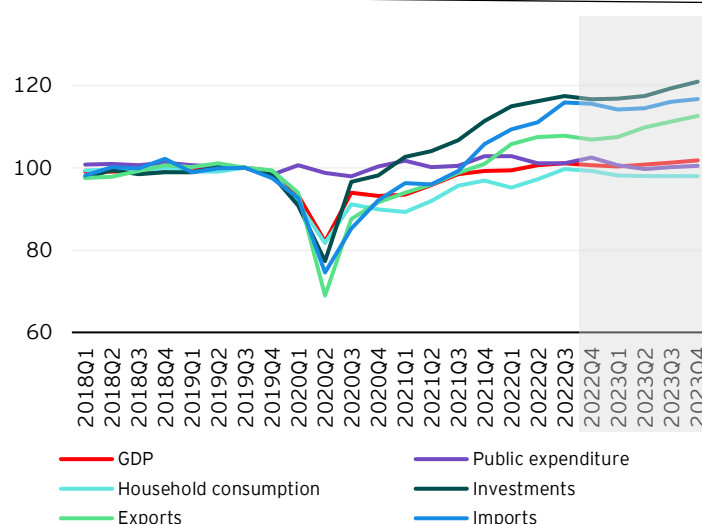
- GDP
- Household consumption
- Exports
- Public expenditure
- Investments
- Imports

Source: Forecasts from EY Italy's Macroeconometric Model, "HEY-MoM." The area in gray represents the forecast horizon.

Also, based on the information reported in the previous sections and the latest available data, it is possible to outline the outlook for the Italian economy for the coming quarters.

EY's econometric model estimates that the slowdown in economic growth experienced in the third quarter of 2022 will be followed by a slight contraction in the fourth quarter, mainly due to the significant reduction in household consumption, which is weighed down by the reduction in real disposable income. Consumption is also expected to contract in the first quarter of 2023, and then remain stable during 2023. These dynamics are also reflected in the development of demand for foreign goods (imports), which is also expected to slow in 2023.

Italian export growth will be muted due to the slowdown in the global economy, but will return to make a positive net contribution to growth.

Similar to consumption, EY's model predicts a sharp slowdown in investment as well, due to a weaker and more uncertain economic environment and a higher interest rate environment. In this regard, public investment under the NRP will play a key role in keeping total investment growth in positive territory, and for it to make a positive contribution to GDP.

With reference to the consumer price index, an easing of pressures along supply chains and a reduction in energy prices will lead to a decline in the inflation rate, which will, however, remain significantly higher than the ECB's price stability target and far from pre-pandemic levels.

Thus, taking into account the above considerations, EY's forecasts indicate real GDP growth for Italy of 3.8% in 2022 and 0.6% in 2023, while the inflation rate is estimated to fall from 8.2% in 2022 to 7.1% in 2023. Economic growth will be accompanied by a slightly expanding labor market, with the unemployment rate falling just below the 8% mark next year.

The public deficit is expected to stand at 5% in 2022 and 4.1% in 2023, and public debt to continue its descent from the peaks of the pandemic-related crisis, falling toward 145% of GDP, although still remains elevated. Economic and price growth will play a key role in reducing the public debt ratio, partly due to the activation of "nominal" factors (e.g., an increase in the value of tax revenues).

The forecasts remain subject to a scenario of high uncertainty and thus present important risks (both downward and upward), mainly related to the global macroeconomic environment.

	2019	2020	2021	2022	2023
GDP, % var.	0.5%	-9.1%	6.7%	3.8%	0.6%
Households consumption, % var.	0.2%	-10.4%	5.1%	4.7%	0.6%
Total investments, % var.	1.2%	-8.2%	16.5%	9.5%	2.4%
Exports, % var.	1.8%	-14.2%	13.5%	9.8%	3.5%
Imports, % var.	-0.5%	-12.7%	14.8%	13.8%	2.5%
Unemployment rate	9.9%	9.4%	9.5%	8.1%	7.9%
Consumer price index, % var.	0.6%	-0.1%	1.9%	8.2%	7.1%
Net lending, % of GDP	-1.4%	-9.4%	-7.2%	-5.0%	-4.1%
Public debt, % of GDP	135.6%	155.7%	151.4%	148.8%	145.5%

Source: Forecasts from EY Italy's Macroeconometric Model, "HEY-MoM." The area in gray represents the forecast horizon. GDP and its components are expressed in real terms.

Assumptions

The forecasts described above are based on a series of assumptions that outline the baseline scenario. Specifically, the following assumptions are considered:

▸ **International trade**: A slowdown is assumed in the coming quarters and a gradual recovery from the second half of 2023, with quarterly growth recovering in line with pre-pandemic growth by the end of the year, leading to annual growth of 2.3% in 2023.

▸ **Natural gas**: The price of natural gas (referred to the Dutch Title Transfer Facility) is assumed to be around $40-45/mmbtu by the end of 2022. The price is then expected to decrease in 2023, stabilizing around $35/mmbtu. This price is lower than the current price, but still significantly higher than the pre-war situation.

▸ **Oil**: Oil prices are assumed to be in line with the latest quotations, around $90 per barrel.[25] A subsequent decline in the price in 2023 is also assumed, until it reaches in the last quarter of 2023 the values recorded at the beginning of 2021 (around $60-65 per barrel).

▸ **Exchange rate**: The euro/dollar exchange rate is assumed to be at its current value (1.06).

▸ **Public expenditure**: The projections for general government consumption and public investment contained in the latest update of the Economic and Financial Document of the Italian Ministry of Economy and Finance are considered.[26]

▸ **Monetary policy and interest rates**: We assume a scenario of rising interest rates, with the short-term (3-month) interest rate rising over the next few quarters to around 3%; the long-term (10-year) interest rate is expected to follow a similar trend by maintaining a constant differential with the short-term rate, stabilizing at around 5% in 2023.

Finally, considering the current scenario and the very strong uncertainty, some downside and upside risks are listed below to support a more complete view of what might happen in the future:

Upward risks

▸ Reduction in geopolitical tensions: tensions related to the war between Russia and Ukraine could ease more quickly than expected, which could have a positive impact on the global economy and especially the European economy. A similar scenario could also occur between the United States and China over the Taiwan dispute.

▸ Reduced energy prices: reduced geopolitical tensions could lead to lower energy prices, easing pressures on inflation and growth.

▸ Further easing of tensions along the supply chain: supply chain pressures may ease further in the coming months. In this regard, short-term indicators such as the NY FED Global Supply Chain Pressure Index or the Baltic Dry Index appear to be particularly important in monitoring dynamics along supply chains.

---

[25] We consider an average of the WTI, Brent and Dubai oil price.
[26] Nota di aggiornamento del documento di economia e finanza, 2022 – versione rivista ed integrata.

Downward risks

‣ The geopolitical situation may not resolve itself in the short term, or may even worsen in the coming months, leading to a number of new challenges globally, especially for European countries.

‣ The ECB's more aggressive monetary policy could affect household consumption decisions and business investment decisions more than estimated, worsening GDP growth forecasts.

‣ U.S.: High inflation and tight monetary policy could lead to a worsening economic outlook. Given the synchronicity of the U.S. and European business cycles (historically, the European one lags a few quarters behind), the U.S. economic trends should be closely monitored to anticipate possible negative spillovers to Italian economy.

‣ Private consumption may react more strongly to rising prices during 2023, weighing on GDP growth.

‣ Slowdown in emerging economies: the strong appreciation of the dollar significantly increases domestic price pressures and the cost of living crisis in emerging economies. Capital flow trends may create additional difficulties for these countries ("flight-to-safety" effect). [27]

‣ Uncertainties related to China's zero-covid policies: the abandonment of restrictive zero-covid policies in China could result in further increases in energy prices; on the other hand, the continuation of these policies could weaken the global economic recovery.

‣ PNRR: Failure to meet PNRR targets and its partial implementation could slow the pace of growth of investment, and thus of the Italian economy as a whole. The issue could also have repercussions on the potential GDP and thus on medium- to long-term growth prospects.

---

[27] IMF World Economic Outlook, *Countering the cost-of-living* – Oct 2022

Technical Appendix

HEY-MOM: Hybrid EY Model for the Macroeconomy[28]

Building a new macro-econometric model has required optimizing an inevitable trade-off between building a model that emphasizes data information (such as the ARIMA and VAR models, which make no use of economic theory whatsoever) or a model that pays attention only to the foundations on which its relationships are based (in the extreme case, the calibrated RBC-DSGE models that pay no attention to the data in their variables).[29] This trade-off has been emphasized many times in the literature, see for example the reflections in Granger (1999) and Pagan (2003).

In constructing HEY-MOM, an attempt has been made not to neglect either of the above two ingredients (economic theory and data), in an effort to produce a hybrid model with a careful balance in specifying relationships (a) based on micro-founded economic behavior and at the same time (b) careful in the application of rigorous statistical information evaluation techniques. An example of a hybrid model is MARTIN, the model currently in use at the Australian Central Bank (see Cusbert and Kendall, 2018).

In a nutshell, the role of HEY-MOM is to unify the analytical framework of macroeconomics in EY. To do this, the model refers to the main aggregates of the Italian economy, grounded in empirical data, non-monetary in nature, with explicit long-run relationships between the variables it studies, and geared mainly towards establishing short-term forecasts (over a two-year horizon).

The economic foundation

Rigidity in the movement of prices and wages implies rigidity in the speed with which macroeconomic systems adjust to unexpected shocks. Thus, on the one hand, in the model market demand drives short-term fluctuations, as outlined by Keynesian theories, while in the long-run, supply determinants drive the state of the economy.

Long-run output (the potential of the economy) depends on the joint effect of trends in total factor productivity, labor supply and duration in hours, and, finally, the capital stock. These factors are combined by Cobb-Douglas-type technology with constant returns to scale. The demand for factors of production is that which minimizes cost given a planned level of output in the context of an economy in which oligopolistic forms of competition hold, in which firms are free to set prices on the basis of a margin over labor costs and, at those prices, are willing to collectively meet any level of market demand. Wages are defined on the basis of a "Phillips curve" driven by inflation rate inertia, labor productivity, and the distance between actual and natural unemployment rates (defined by the long-run state of the labor market). Actual output is composed of the following domestic and foreign demand items: private (household) and public consumption; private and public investment by asset type (residential and nonresidential buildings, machinery and equipment, and R&D spending); and imports and exports.

In each period, the gap between actual and potential output feedbacks to prices (through changes in margins), which, in turn, interact with demand components. In this way, equilibrium between supply and demand is achieved.

---

[28] Il modello è stato realizzato in collaborazione con il Dipartimento di Scienze Economiche dell'Università di Bologna.
[29] "ARIMA" sta per "Autoregressive integrated moving average", "VAR" per "Vector autoregression", "RBC-DSGE" per "Real Business Cycle - Dynamic. Stochastic General Equilibrium".

Data evaluation techniques

The rate at which the economic dynamics outlined above evolve over time is estimated using econometric methods based on the actual time series of the variables of interest in the model.

To this end, the model uses a combination of the London School of Economics approaches and Fair's (2004) review of the Yale Cowles Commission approach. The synthesis carried out in HEY-MOM uses cointegration methods (Engle and Granger, 1987, and Johansen, 1995) to estimate long-run relationships among nonstationary variables (Dickey and Fuller, 1979), interpretable in light of economic theory and identified by state relationships whose parameters are estimated on the basis of error-corrected models (Hendry et al., 1984, and Pesaran et al., 2001). In the absence of exogeneity of some explanatory variables in the model, the relationships are first inspected following the instrumental variables estimation approach, and then finally estimated at three stages (Hsiao, 1997).

The overall result is a model composed of 74 equations, of which 29 are stochastic and 45 are accounting identities. The forecasts and analyses performed are conditional on the delineation of scenarios for 65 exogenous variables classifiable into: fiscal and monetary policy instruments, foreign bloc, and economic indicators.

Bibliographical references

▸ Cusbert, T. e E. Kendall (2018), "Meet MARTIN, the RBA's New Macroeconomic Model", Reserve Bank of Australia Bulletin, March.

▸ Dickey, D. A. e W. A. Fuller (1979), "Distribution of the Estimators for Autoregressive Time Series with a Unit Root", Journal of the American Statistical Association, Vol. 74, pp. 427–431.

▸ Engle, R. F. e C. W. J. Granger (1987), "Co-integration and error correction: representation, estimation, and testing", Econometrica, Vol. 55, pp. 251–276.

▸ Fair R. C. (2004), Estimating How the Macroeconomy Works, Harvard University Press.

▸ Granger, C.W.J. (1999), Empirical Modeling in Economics: Specification and Evaluation, Cambridge University Press.

▸ Hendry, D. F., A. R. Pagan e J. D. Sargan (1984), "Dynamic specification", in Z. Griliches e M. D. Intriligator (ed.), Handbook of Econometrics, Vol. II, North Holland.

▸ Hsiao, C. (1997) "Cointegration and dynamic simultaneous model", Econometrica, Vol. 65, No. 3, pp. 647-670.

▸ Johansen, S. (1995), Likelihood-based Inference in Cointegrated Vector Autoregressive Models, Oxford University Press.

▸ Pagan, A. R. (2003), "Report on modelling and forecasting at the Bank of England", Quarterly Bulletin, Bank of England, Spring.

▸ Pesaran, M.H., Y. Shin and R. J. Smith (2001), "Bounds approaches to the analysis of level relationships", Journal of Applied Econometrics, Vol. 16, pp. 289–326.

EY | Building a better working world

EY exists to build a better world of work, help create long-term value for clients, people, and society, and build trust in financial markets.

Supported by the use of data and technology, EY teams in more than 150 countries build trust through audit services and help clients grow, transform, and drive business forward.

Working in the fields of audit, consulting, tax and legal assistance, strategy, and transactions, EY professionals ask the best questions to find innovative answers to the complex challenges facing the world today.

"EY" means the global organization of which the Member Firms of Ernst & Young Global Limited, each of which is an autonomous legal entity, are a part. Ernst & Young Global Limited, a "Private Company Limited by Guarantee" under English law, does not provide services to clients. More information on EY's collection and use of data and individual rights that fall under data protection legislation can be found at ey.com/EN/privacy. EY Member Firms do not provide legal services where not permitted by local regulations. For more information about our organization visit ey.com.

ey.com/IT

Contacts

Mario Rocco
Partner, Valuation, Modelling and Economics Leader, EY
mario.rocco@it.ey.com

Alberto Caruso
Senior Manager, EY
alberto.caruso@it.ey.com

Luca Butiniello
Senior Analyst, EY
luca.butiniello@it.ey.com