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ITALY

SELECTED ISSUES

July 2025

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ITALY

SELECTED ISSUES

July 1, 2025

Approved By
European Department

Prepared By Yan Chen, Gee Hee Hong, Jenny Lee, and Sylwia Nowak

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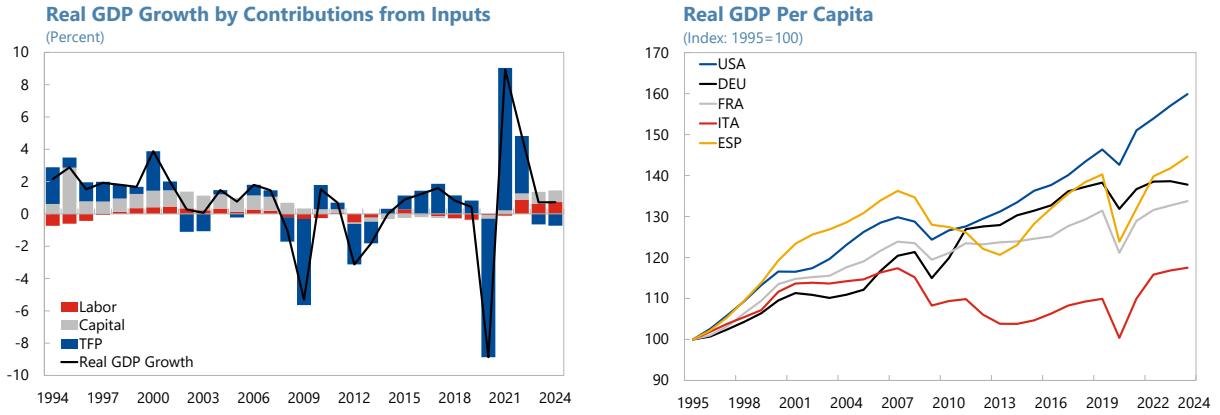
POTENTIAL GROWTH—ADJUSTING TO AGING[1]

Italy's population is rapidly aging. Looking ahead, this is expected to materially weigh on potential growth. Several policy actions can help counter this impact, including efforts to raise female labor force participation, upskill the workforce, and boost total factor productivity. Implementing a package of reforms could be instrumental in boosting overall productivity and growth.

A. Introduction

1. Growth in Italy has been on a declining trend for the past decades. Real GDP growth has declined from above or around 2 percent in the 1980s and 1990s to below 1 percent in 2024 (Figure 1). As a result, economic growth of 0.7 percent in Italy in 2024 was among the lowest in the euro area, including amid regional disparities. Per capita real GDP has also fallen behind that of peer economies, as growth in real GDP per capita experienced a prolonged decline following the onset of the global financial crisis and through the euro crisis. Underlying this trend is notable variation over time and generally subdued contributions to growth from total factor productivity (TFP) and capital, while labor's contribution has recently been supported by a strong labor market.

Figure 1. Trends in Economic Growth



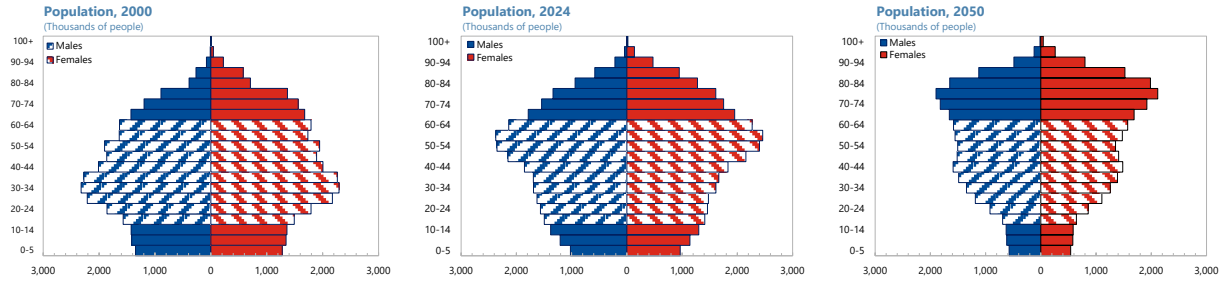
Sources: ISTAT; Eurostat; Haver Analytics; Istat; and IMF staff calculations.

2. Looking ahead, population aging is projected to shrink the size of the labor force, challenging labor's contributions to growth. The United Nations' population projections indicate that Italy's population has likely passed its peak (United Nations, 2024a). Under the UN's low-fertility population projection, Italy's population is projected to decline markedly by 10 percent by 2040 (17 percent by 2050)—equivalent to a loss of 6 million people relative to the 2024 level. Over the same period, the working-age population is projected to decline by 19 percent (31 percent by 2050), and the population pyramid will become increasingly top-heavy. While people in the 50–65 age range accounted for 28 percent of the working-age population in 2020, the same age range is projected to account for 35 percent in 2050 (Figure 2). This outlook is confirmed by only 1.18 children born per

[1] Prepared by Yan Chen (main author) and Gee Hee Hong, with invaluable support from Jenny Lee. We thank the Italian authorities for valuable feedback and comments.

woman in 2024 (Istat Demographic indicators, 2024)—below the replacement rate of 2.1 births per woman needed to prevent population decline in the absence of migration (United Nations, 2024b). As the population is aging, fewer people are available to support economic activity and demands on pension and healthcare systems will likely increase.

Figure 2. Population Pyramids, 2000–2050



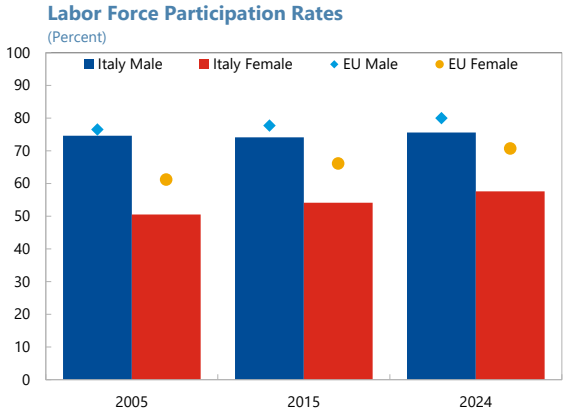
Sources: United Nations and IMF staff calculations.
Note: Shaded areas denote the working-age population. The projection for 2050 assumes the low fertility scenario.

B. Methodology

3. Amid an aging population, this paper assesses the prospects for potential growth in Italy, taking into account the impact of demographics. The assessment is based on a skill-augmented Cobb-Douglas production function, which allows to decompose long-term real GDP growth into contributions from skill-augmented labor, capital, and TFP. While population projections are inherently uncertain, amid the current low birth rate, the assessment builds on the UN's low fertility population projection scenario, with medium scenarios for mortality and migration (see Annex for details). Even if the fertility rate ends up higher than assumed in the UN's low fertility scenario, it will take close to two decades or more before those additional people enter the workforce.

- ***Heterogeneous, skill-augmented labor.*** The analysis accounts for the heterogeneity in labor input across age, gender, and skill level. In particular, at 58 percent in 2024, Italy's female labor force participation rate is about 13 percentage points below the EU average (Figure 3). Moreover, as current entrants to the labor market tend to have a higher share of skilled workers than entrants that joined a few decades ago, the analysis allows for the share of skilled labor in the overall workforce to increase over time, as young people age into older age brackets, carrying their skill-levels with them.

Figure 3. Labor Force Participation



Source: Eurostat and IMF staff calculations.

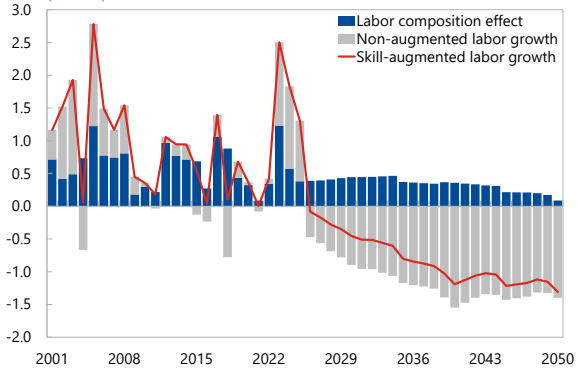
- ***Capital.*** The capital stock is computed through the perpetual inventory method, using historical data from ISTAT, combined with staff's forecast of gross fixed capital formation (including residential investment) through 2030. For subsequent years, two different passive scenarios are considered. One scenario (low capital scenario) assumes a constant investment ratio of 23 percent of GDP from 2031 and onwards (corresponding to the 2025–30 average investment ratio in staff's growth projections) and a depreciation rate corresponding to its average historical rate of 5.2 percent. The second scenario (high capital scenario) assumes that as capital is being replaced, it embodies new technologies, keeping capital's effective contribution to growth unchanged at the 2030 level—corresponding to also keeping constant the combined contributions to growth from capital and TFP. This could for example occur with increased investment in intangible capital (see the second study in this Selected Issues Paper, "Unlocking the Productivity Potential of Italian Firms"). This corresponds to an assumption that adoption of advanced technologies such as artificial Intelligence holds potential for significant productivity and output gains (see for example Chang and others, 2025, in the context of Korea).

- ***Total factor productivity.*** Historical data on TFP is computed as the portion of real GDP that is not explained by capital and skill-augmented labor. For the scenario period, full implementation of the NRRP is assumed to provide a boost to TFP growth amounting to around 0.65 percent higher level of TFP by 2030—broadly consistent with estimates for the euro area by Bańkowski and others (2024). After 2031, annual TFP growth is assumed to remain constant at 0.2 percent, allowing for a lasting impact of reform implementation. [2]

C. Scenario Analysis—Passive Scenarios

4. Applying the skill-augmentation approach to compute labor's contribution to growth shows that skill improvements help mitigate the decline in the labor force. While the total size of the labor force is shrinking amid population aging, new higher-skilled entrants propagate over time, resulting in an increasing share of high-skilled workers and a declining share of low-skilled workers, though with medium-skill workers dominating. In turn, while the size of the *effective* labor force continues to decline, the improved skill-composition helps mitigate the decline relative to what the non-skill augmented population projections would suggest (Figure 4).

Figure 4. Skill-Augmented Labor

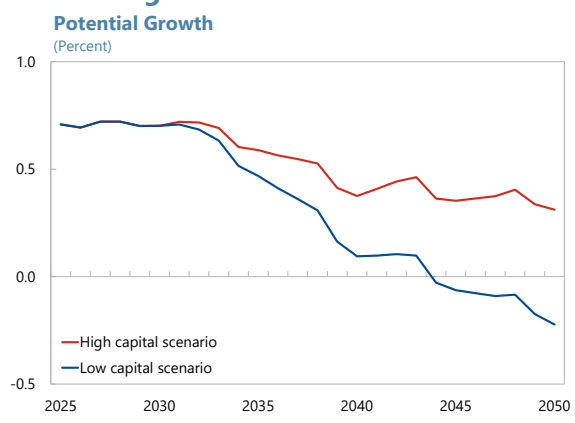


Source: Eurostat; United Nations; and IMF staff calculations.

[2] An AR(1) on historical data (excluding the Global Financial Crisis, the sovereign debt crisis, and the COVID-19 pandemic) was also estimated and extend through the forecast horizon. Resulting TFP growth was slightly below the main approach.

5. A passive scenario with a mechanical extension of the factors of production point to a marked weakening in potential growth ahead. Leveraging passive projections of labor, capital, and TFP, the production function provides the resulting outcome for potential growth—leveraging both the low- and high-capital scenarios for capital's contribution as described above (Figure 5). After broadly constant annual potential growth at about 0.7 percent, contributions from labor steadily diminish due to the unfavorable demographics (as shown in Figure 4), while capital's contribution also weakens in the low capital scenario and TFP growth remains subdued. As a result, the passive scenarios point to potential growth by the early 2040s that ranges from just above zero to above 0.4 percent.

Figure 5. Passive Scenarios



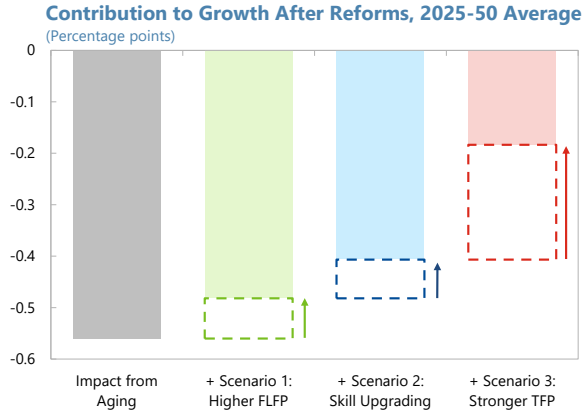
Source: Eurostat; ISTAT; and IMF staff calculations.

D. Scenario Analysis—Alternative Scenarios

6. To illustrate the importance of effective policy measures to help lift potential growth, three scenarios are considered. These scenarios simulate the potential impact of actions to (i) increase female labor force participation; (ii) accelerate skill upgrading; and (iii) boost TFP growth.

- ***Increasing female labor force participation.*** Several policy actions could help lift women's participation in the labor force, including by expanding access to publicly-provided childcare during standard working hours, making parental leave benefits more gender neutral, and removing policy-induced disincentives to female employment such as tax credits for dependent spouses.[3] In this respect, Italy has taken several steps to help boost women's participation, including by expanding access to childcare centers through ongoing investments under the National Recovery and Resilience Plan. Simulations show that gradually raising the female activity rate at a constant pace from its current level to the EU average by 2050 could boost annual potential growth by about 0.1 percentage points (Figure 6). This is broadly in line with IMF (2025), which shows an additional impact on Italian average

Figure 6. Alternative Scenarios



Sources: Eurostat; ISTA: Draghi Report (2024); and IMF staff calculations.
Note: Scenario 3 includes also the impact of higher private and public investment on TFP

[3] See IMF 2024a for further details.

annual real GDP growth over 2025–2100 of slightly above 0.1 percentage point from closing Italy's gender gap in labor force participation by three-fourths by 2040.

- ***Accelerating skill upgrading.*** Education reform could help support skill-upgrading. This policy scenario assumes a gradual reduction in the entry of low-skilled workers into the labor market, reflecting skill upgrading among individuals aged 15-24. Specifically, starting from 2025, the proportion of low-skilled entrants for each gender at age 25 declines annually by 0.2 percentage point. Of this reduction, 30 percent is reallocated to become medium-skilled entrants, while the remaining 70 percent shifts to become high-skilled entrants. Applying this approach each year boosts the share of high-skilled workers over time. For example, the share of high-skilled male entrants increases from 13.6 percent in 2024 to 17.2 percent in 2050, and the share of high-skilled female entrants increases from 18.9 percent to 22.5 percent over the corresponding period. In turn, the marginal effect is to lift annual potential growth relative to the baseline (on average by about 0.1 percentage points), with the gains increasing over time as the share of high-skilled workers in the population permanently increases.

- ***Boosting TFP growth.*** This scenario is underpinned by the menu of policy actions mentioned in the Draghi report, with a reduction in the private cost of capital helped by progress toward a capital market union (Draghi, 2024a).[4] The scenario considers the impact for Italy of higher private and public investment, corresponding to the simulations discussed in Box 3 of the Draghi report (Draghi, 2024b). This includes an initial increase in private and public investment by approximately 2 percentage points of baseline GDP (i.e., GDP without the additional investment), and with investment gradually rising by 3.6 percentage points of baseline GDP by 2034 and beyond. With the additional investment going into innovative sectors, the level of TFP increases by a cumulative 2 percent above the baseline over a 10-year horizon, extended to continue at a higher annual rate of 0.2 percentage points above the baseline beyond the 10-year period.[5] As a result, potential growth is lifted by slightly more than 0.2 percentage points each year on average, with a relatively larger impact in the near term when the initial investment surge takes place.

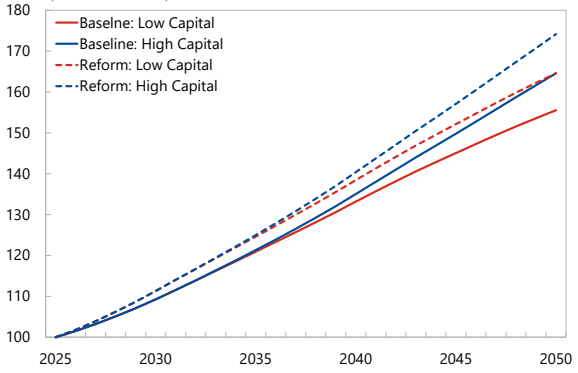
7. A multipronged approach, targeting multiple areas, would materially lift the growth outlook. A package of reforms that helps lift female labor force participation, boosts skills, and generates permanently higher TFP growth could materially help counter the adverse impacts of aging over the next decades. Layering the impact of the three policy scenarios could help lift average annual potential growth by around 0.4 percentage points during 2025–2050. Moreover, as simply adding the impact of individual reforms would not capture potential interaction effects between reforms, the combined effect could be even larger, including as careful sequencing of reforms can amplify the impact of individual reforms (see for example Budina and others, 2023).

[4] Policy assumptions in the exercise in this paper correspond to those in the "IMF" scenario in the Draghi Report.

[5] The accompanying study, "Unlocking the Productivity Potential of Italian Firms," discusses policy measures that could help encourage innovation activities by Italy's private sector (see second study in this Selected Issues Paper).

8. Effective reform implementation would also help boost per capita income. In the passive scenarios with both low- and high-capital assumptions, real GDP per capita increases over time, as the decline in the total population outpaces real GDP growth (Figure 7). In turn, Italy's real per capita GDP in the passive scenarios increases by 55 and 65 percent by 2050 relative to the 2025 level—corresponding to an average annual growth rate of between 1.8 and 2 percent. Policy action could further lift these gains, with a package of reforms as described above resulting in real GDP per capita that increases by 65 and 74 percent by 2050 relative to the 2025 level (an average annual growth rate of between 2 and 2.2 percent). Nonetheless, amid high debt and aging-related expenditures ahead, decisively bringing down debt as a share of GDP will require the expansion of aggregate output, not only per capita output.

Figure 7. Impact on Per-Capita Income

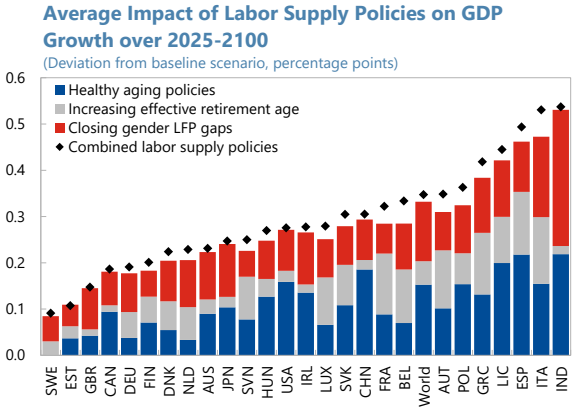


Source: ISTAT; and IMF staff calculations.

E. Concluding Remarks

9. In addition to the policies considered in this study, other potential factors could also be subject to change over time and impact growth. For example, the share of the population that participates in the labor force may increase (i) as the retirement age in Italy is linked to longevity; and (ii) if the effective retirement age increases for a given overall retirement age (for example as a result of policy actions). In this respect, IMF (2025) finds an effect for Italy of more than 0.5 percentage points higher average annual real GDP growth over 2025–2100 from implementing a package of labor supply policies that includes (i) implementing healthy-aging policies; (ii) increasing the effective retirement age; and (ii) closing by three-fourth the gender labor force participation gap (Figure 8). Net migration could also increase, helping to offset the underlying population decline.

Figure 8. Impact of Labor Supply Policies



Source: World Economic Outlook, April 2025.

10. Overall, Italy's significant demographic challenges put a premium on policy actions to help boost potential growth. While estimating potential growth is subject to uncertainty, the downward trend in growth is clear. All else equal, an aging population with a low natural replacement rate will shrink the labor force and compress potential growth. Even as policies already in place (e.g., the indexing of the retirement age to longevity) could support labor force participation beyond what is captured in the analysis here, fully counteracting the drag on growth from the

declining population remains a challenging task. Fortunately, carefully designed policy measures can help reverse the trend. In this respect, Italy's ongoing National Recovery and Resilience Plan includes important investments and reforms to help boost productivity and growth. The analysis illustrates that it is possible to mitigate much of the drag from aging by boosting female labor force participation and skill levels and targeting investment toward innovating sectors. In addition, policy actions at both the European-wide and national levels are essential and can help make a lasting impact (see IMF 2024b and Chapter 2 of this Selected Issues).

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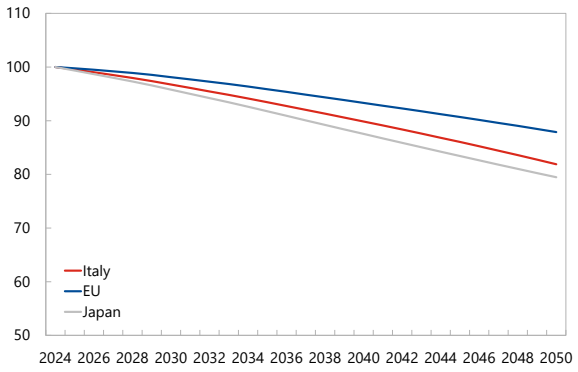
Annex I. Technical Details

1. This annex contains the technical details underlying the scenario analysis in the main text. It covers assumptions for population projections, the methodology for the production function, and the approach for computing the skill-augmented labor input.

A. Population Projections

2. Population projections are based on UN low-fertility population projections. This scenario points to a steady decline in the population (Annex Figure 1). In addition to the low fertility assumption (which assumes the fertility rate declines from 0.96 births per woman in 2025 to 0.79 in 2037 and gradually increases to 0.85 in 2050 [1]), the scenario incorporates a "medium" mortality assumption (life expectancy at birth increasing from the current 84 years to over 87 years in 2050) and a "medium" international migration assumption (net migration at 1 percent per 1,000 population in 2050, equivalent to about 50,000 migrants, from the current 1.87 percent per 1,000 population). To maintain data continuity, we use Eurostat's historical population data up to 2024 and extend it by applying annual growth rates derived from UN population projections, segmented by five-year age intervals, to estimate population projections for the years 2025 to 2050.

Annex I. Figure 1. Population Projections



Source: United Nations and IMF staff calculations.

B. Production Function

3. The assessment employs a standard Cobb-Douglas production function with competitive product and factor markets. Output growth in the production function can be expressed as follows:

$$\Delta \ln Y = \Delta \ln A + \overline{v_K} \Delta \ln K + \overline{v_L} \Delta \ln L ,$$

where $\overline{v_K}$ *and* $\overline{v_L}$ are shares of capital and labor in income, with values computed from the Penn World Tables (v10.0, with data through 2019) and held constant for projection years at the 2015–2019 average levels. This results in $\overline{v_K}$ =0.48 and $\overline{v_L}$ = 0.52 (Penn World Tables through 2019).

[1] For comparison, the medium fertility scenario assumes a gradual increase in the fertility rate from 1.21 in 2025 (above the rate observed in 2024) to 1.35 in 2050.

C. Skill-Augmented Labor

Methodology

4. Labor input L is heterogenous across age cohort, gender, and skill. This reflects an assumption that workers with higher levels of education have higher average output. Skill levels (j) are grouped into three categories—high, medium, low—proxied by educational attainment, with historical data reported by Eurostat, and further divided by gender and age cohort. For simplicity, the following only uses the subscript for skill (j) as this is the main area of focus in the skill-augmentation. Skill-augmented labor (L) is then defined as the weighted sum of the number of workers by skill type:

$$L = {L_1}^{\omega_1} {L_2}^{\omega_2} \cdots,$$

and its growth rate is defined as:

$$\Delta \ln L = \sum_j \overline{\omega_j} \Delta \ln L_j,$$

where $\overline{\omega_j}$ = the labor cost premium/discount to reflect marginal productivity and L_j = hours worked for each skill-type j.

Computing the Weights, $\overline{\omega_j}$

5. Hourly earnings are used as proxy for the labor cost premium/discount, as standard in the literature. Data are from Eurostat, with hourly earnings differentiated by age, gender, and skill level, and with survey data available for select years. Due to limited data on hourly earnings by skill level in terms of educational attainment, but the availability of such data by occupation from Eurostat, we match skill levels according to Annex Table 1. This allows to calculate the augmented labor at disaggregate levels.

6. Using the medium-skill wage as the numeraire, three variables are computed. These are (i) gender-specific wage premia for high-skilled workers (ii) gender-specific wage discounts for low-skilled workers; and (iii) the gender wage gap. For the projection years, weights are fixed at their 2022 values (latest available year).

7. The approach results in the following computed values:

- ***Wage premium.*** The wage premium for high-skilled workers relative to medium-skilled workers is around 2. That is, high-skilled workers earn about twice as much as medium-skilled workers of the same gender.
- ***Wage discount.*** The wage discount for low-skilled workers relative to medium-skilled workers is around 0.9. That is, low-skilled workers earn 10 percent less than their medium-skilled counterparts.

- ***Gender wage gap.*** The gender wage gap is defined as the ratio of wages for a medium-skilled woman relative to a medium-skilled man. The computed value of the gender wage gap is around 0.6. That is, medium-skilled women earn about 40 percent less than their male counterparts.

Annex I. Table 1. Matching of Occupation, Educational Attainment, and Skill Levels

By Occupation		By Education		Skill
Code	Definition	Code	Definition	
OC1	Managers	ED5-8	Tertiary education	High
OC2	Professionals			
OC3	Technicians and associate professionals			
OC4	Clerical support workers	ED3-4	Upper secondary and post-secondary non-tertiary education	Medium
OC5	Service and sales workers			
OC6	Skilled agricultural, forestry and fishery workers			
OC7	Craft and related trades workers			
OC8	Plant and machine operators and assemblers	ED0-2	Less than primary, primary and lower secondary education	Low
OC9	Elementary occupations			

Source: Eurostat and IMF staff calculations.

8. Labor input for skill-type j, L_j, is computed as follows:

$$L_j = wapopl_j * lfpr_j * \left(1 - uempr_j\right) * hours_j,$$

where for each skill-type j, $wapopl_j$ denotes the working-age population, $lfpr_j$ denotes the labor force participation rate, $uempr_j$ denotes the unemployment rate, and $hours_j$ denotes hours worked. For simplicity in the passive scenarios, all components of L_j are held constant at their 2024 values, except $wapopl_j$. Taking together, the change in the economy-wide total skill-augmented labor over time is driven by (i) changes in the skill composition as entrants today have higher average skill-levels than entrants in earlier decades and (ii) changes in the size of the working-age population for each skill type, as the population various over time in line with UN population projections.

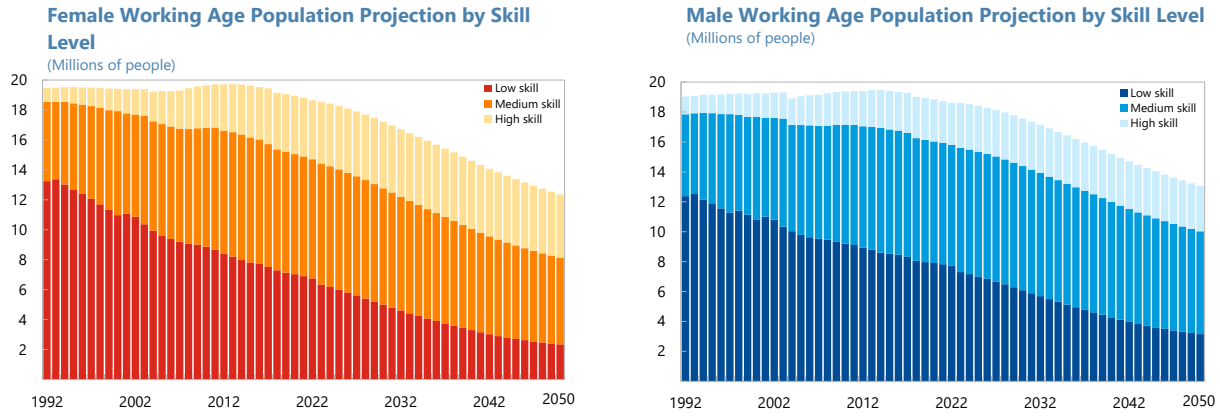
9. Other assumptions include:

- ***Population distribution.*** The population is evenly distributed within the 5-year age brackets.
- ***New entrants arrive during ages 15 through 25.*** Entrants at age 15 may acquire skills and transition from low to medium or high skill levels, or from medium to high skills, until age 25. Entrants in the 20-24 age cohort have, on average, higher skills than those entering at age 15.

- ***No skill upgrading for most workers.*** With the exception of those entering at age 15, workers maintain their entry skill levels throughout their working life. This implies no mid-career skill upgrading or loss of skills with age.

10. Putting it all together, the share of medium-skilled workers increasingly dominates the workforce but with an improved skill composition. Leveraging the detailed data breakdown across age, gender, and skill-level, the skill composition of the overall labor force will vary over time as people with a given skill level age and eventually exit the labor force at age 65 and new entrants arrive. Specifically, the skill composition changes over time through a propagation mechanism whereby all future entering cohorts at age 15 will have the same skill mixes as the cohort that entered the labor force in 2023. As the education attainment has improved over time for younger workers in Italy, this propagation mechanism will lead the average skill level of the entire workforce to increase. The result is that while the size of the overall working-age population gradually shrinks, the share of high-skilled workers increases over time and the share of low-skilled workers declines (Annex Figure 2).

Annex I. Figure 2. Skill Propagation



Sources: United Nations; Eurostat; and IMF staff calculations.

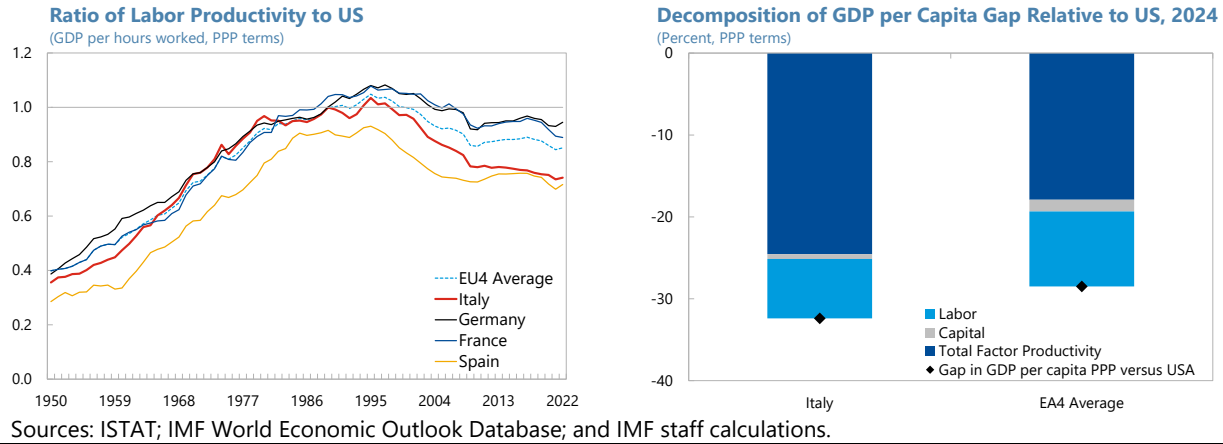
UNLOCKING THE PRODUCTIVITY POTENTIAL OF ITALIAN FIRMS [1]

Italy has a significant and widening productivity gap compared to its peers. Using firm-level datasets, this study explores deep firm-level roots of Italy's productivity malaise and unveils interconnected factors that play a key role in weakening business dynamism across firms' lifecycle. The study finds that part of the productivity gap relates to Italy's leading firms and young firms with high growth potentials—both widely considered as the engines of productivity and innovations—as they are falling behind their global counterparts. A combination of Italy-specific and regional factors, such as a shortage of high-skilled workers, lack of risk capital, and limited market size, appears to hamper these firms from unlocking their growth potentials. Additional policy actions, carefully coordinated both at domestic and regional levels, are urgently needed to lift productivity and revive Italy's private sector.

A. Introduction

1. For nearly three decades, Italy has suffered from sluggish productivity growth. Following an impressive catch-up toward United States labor productivity levels during 1950–2000, Italy's productivity growth has again fallen behind the global frontier (Figure 1). A striking productivity gap to the United States has emerged for most advanced European economies, with United States productivity growth outpacing that of others since the early 2000s. Italy shows a pronounced disparity also compared to its European peers (Adilbish and others, 2024; Carpinelli and others, 2025). This divergence is evident across various productivity metrics, with a shortfall of 30 percent in labor productivity (measured as output per total hours worked) and a gap of more than 20 percent in terms of total factor productivity (TFP).

Figure 1. Productivity Relative to the United States



Sources: ISTAT; IMF World Economic Outlook Database; and IMF staff calculations.

[1] Prepared by Gee Hee Hong, with invaluable support from Jenny Lee. We thank the Italian authorities for valuable feedback and comments.

2. Weak productivity growth is particularly challenging in the context of growing demographic pressures, which will weigh on growth. Italy's workforce is expected to shrink markedly amid rapid population aging and an extended period of low fertility. [2] Current United Nations population projections suggest that Italy's working-age population could shrink by over 30 percent by 2050. Unless the impact on growth from this trend is offset by productivity- and employment-boosting policies, aggregate output growth would likely decrease. Stagnant and declining aggregate economic growth may have far-reaching adverse impacts, particularly on the sustainability and affordability of the social welfare system concerning pensions and healthcare. This could weaken resilience and further strain public finances, exacerbating existing vulnerabilities.

3. A rich literature offers several explanations for Italy's stagnant productivity growth. Some studies focus on the challenges related to technological adoption, highlighting Italy's specialization in low-technology sectors and limited human capital development as obstacles (Schivardi and Schmitz, 2012). More broadly in the global context, a failure to transition from low value-added products to higher value-added products within the global value chain has also been identified as a bottleneck (Giordano and Zolllino, 2016). Some researchers point to the current bank-dependent funding structure as a hindrance to intangible investment (Calligaris and others, 2016). In addition, managerial practices that are typical of family-owned businesses are prevalent in Italy and are noted as factors that could hinder digital transitions and technology adoption (Pellegrino and Zingales, 2017).

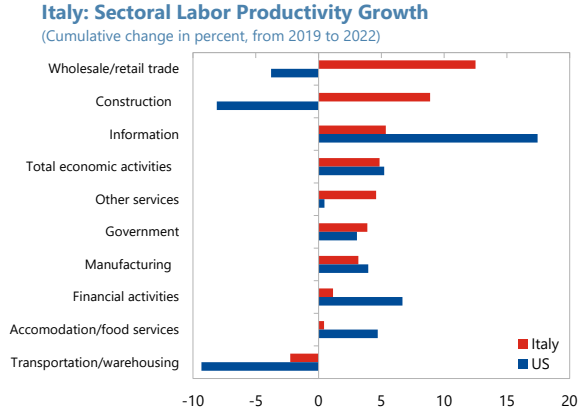
4. This paper leverages micro-level evidence to examine the sources of Italy's aggregate productivity weakness. The paper examines the productivity challenge through the lens of a Schumpeterian "creative destruction" process—a mechanism through which more productive firms replace less productive ones, thereby driving overall productivity growth (Aghion and others, 2016). The paper focuses on two groups of firms known to be engines of growth and innovation. The first group comprises Italy's large, leading firms, which are often recognized as producers of innovations (Garcia-Macia and others, 2016) and which serve as conduits for knowledge diffusion (Andrews and others, 2016). The second group consists of Italy's young, high-growth firms, or "gazelles" (Sterk and others, 2021), which introduce new business models and disruptive technologies. Examining the status of these firms and identifying the main bottlenecks they face will then inform the policies that can help address Italy's productivity weakness.

[2] See accompanying Selected Issues paper on potential growth for a more comprehensive discussion. Furthermore, IMF Country Report No. 2023/274, "Population Aging in Italy: Economic Challenges and Options for Overcoming the Demographic Drag" discusses measures to boost productivity and raise active employment in Italy. On female labor force participation, see IMF Country Report No. 2024/241, "The Paradox of Italy's Low Fertility and Low Female Labor Force Participation."

B. Drivers of Italy's Persistent Productivity Growth Slowdown

5. The strong post-pandemic economic recovery provided temporary gains in labor productivity, rather than a structural improvement. The recovery from the COVID-19 pandemic was associated with an increase in labor productivity (measured by output per worker)— increasing from 2020 to 2024 by nearly 9 percent cumulatively. The gains were concentrated in sectors that benefited from the strong growth rebound, such as wholesale and retail trade, and from generous policy support (e.g., construction; Figure 2).

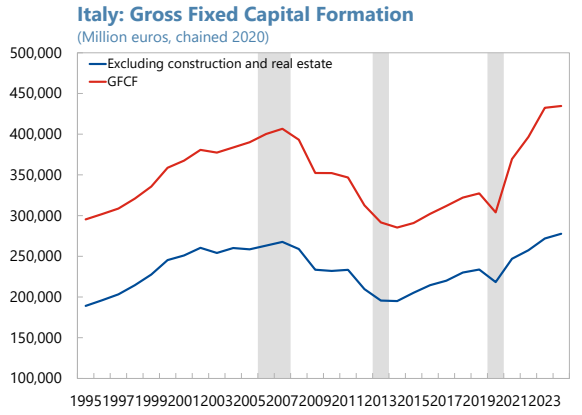
Figure 2. Sectoral Productivity Growth



Sources: ISTAT and IMF staff calculations.

6. Private investment growth has generally been highly procyclical in Italy, reflecting various intertwined links in the economy. Capital deepening is a critical pillar of productivity growth. In Italy, a series of economic shocks have led to a sharp retrenchment of investment, hampering the build-up of the capital stock (Figure 3). The sensitivity of investment to economic activity was significant, with private investment falling by 13 percent from 2007 to 2009 during the Global Financial Crisis (GFC), nearly twice the 7 percent output decline. The subsequent sluggish recovery was exacerbated by the Sovereign debt crisis, in 2014 pushing gross fixed capital formation to its lowest point since 1995 and further depleting the capital stock. The pronounced procyclicality of investment in Italy may stem from several interconnected factors, such as high public debt with limited fiscal space to cushion economic shocks and a previously weak banking sector that cut back on lending to firms. More recently, investment activity has strengthened (also after excluding sectors that benefited from the Superbonus), with capital formation catching up to pre-GFC levels in 2022.

Figure 3. Gross Fixed Capital Formation

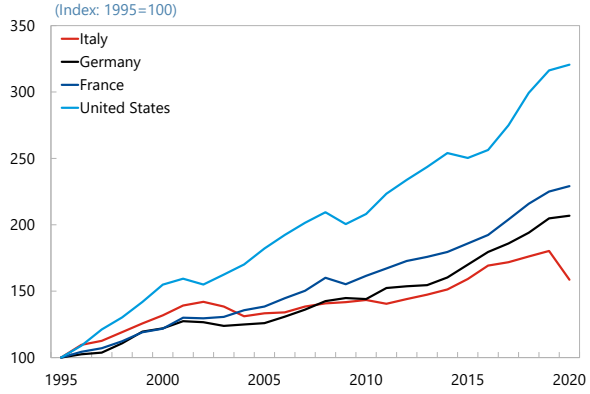


Sources: ISTAT and IMF staff calculations.
Note: Shaded bars indicate economic recessions.

7. Italy's productivity-enhancing investment and innovation efforts have also fallen short of the global frontier. Over the last three decades, intangible investment in the United States tripled in real terms relative to 1995 (Figure 4). It nearly doubled in France and Germany. By comparison, it grew by only 80 percent in Italy over the same period—followed by a dent in 2020 related to the COVID-19 pandemic. A growing gap to the frontier of this magnitude indicates that Italy's current productivity challenges can be partly traced back to missed opportunities to capitalize on the information and communication technologies (ICT) revolution, which has propelled productivity gains in other countries (Schivardi and Schmidt, 2012).

8. The government has introduced numerous measures to help reduce these gaps and facilitate productivity-enhancing investment, though not persistently. Various tax credits have been introduced to promote intangible investment.[3] Transition 4.0 is a prominent example of such tax credits. Launched in 2021 as part of the National Recovery and Resilience Plan (NRRP), Transition 4.0 offered tax credits ranging from 20 to 50 percent, depending on the size and type of firm investment, and has generated robust demand of €13.3 billion (amount covered by RRF funds).[4] In addition, a patent box regime was established to promote investments in intangible assets and intellectual property, providing partial tax deduction of 50 percent from corporate income tax for incomes arising from direct use or licensing of qualified intangible assets.[5] Furthermore, the ongoing NRRP allocates nearly half of the total funds to facilitate Italy's digital and green transition (€103.3 billion related to Milestones 1 and 2 combined and Transition 5.0, out of a total NRRP envelope of €194.4 billion[6]). Tax incentives for intangible investment, however, have been subject to frequent changes, including repeals, re-introduction, and modifications. For instance, the ACE (or Aiuto alla crescita economica) was a tax rule intended to encourage retention and productive reinvestment of corporate profits in a finance-neutral manner, and since its introduction in 2011, there have been several rounds of repeal, re-introduction, and modification. It was repealed again in the 2024 budget. The patent box has undergone a similar stop-and-go cycle.

Figure 4. Intangible Investment



Sources: ISTAT; EU-KLEMS; and IMF staff calculations.
Note: Intangible investments as per national accounts.

9. Notable gaps still exist in areas such as research and development, technology adoption, and patent activity:

- ***Research and development (R&D).*** According to Eurostat, Italy's gross domestic expenditure on R&D stood at approximately 1.3 percent of GDP in 2023, below the EU average of 2.2 percent. It is also markedly lower compared to countries at global frontiers in high value-added technologies, including Germany, Sweden, United States, Japan (with between 3 and 4 percent of GDP spent on R&D), and Korea (at close to 5 percent of GDP). To narrow this gap, the

[3] The Start-up Act, introduced in 2012, is shown to have had a positive effect on firm growth and on entrepreneurship (Finaldi and others, 2016; De Stefano and others, 2018)

[4] Transition 4.0 - Italia Domani provides more details on the scope, eligibility and take-up of Transition 4.0.

[5] Invest in Italy - Patent box regime - Agenzia delle Entrate provides details on the purpose, eligibility, and benefit of the patent box regime.

[6] Under the NRRP, Milestone 1 comprises reforms and investments related to "digitalization, innovation, competitiveness, culture and tourism," with the envelope of €41.3 billion. Milestone 2 focuses on reforms and investments related to "green revolution and ecological transition," with the envelope of €55.6 billion.

government aims to boost public R&D investment in the context of its Medium-Term Fiscal-Structural Plan (MTFSP).

- ***Technology adoption.*** A key metric to gauge firms' use of digital technologies is ICT investment, comprising investment in telecommunications equipment, computer hardware, and computer software or databases. In Italy, ICT investment as a share of GDP stood at 2.4 percent of GDP in 2022, significantly lower than in France (4.6 percent) and the United States (3.7 percent) (OECD).

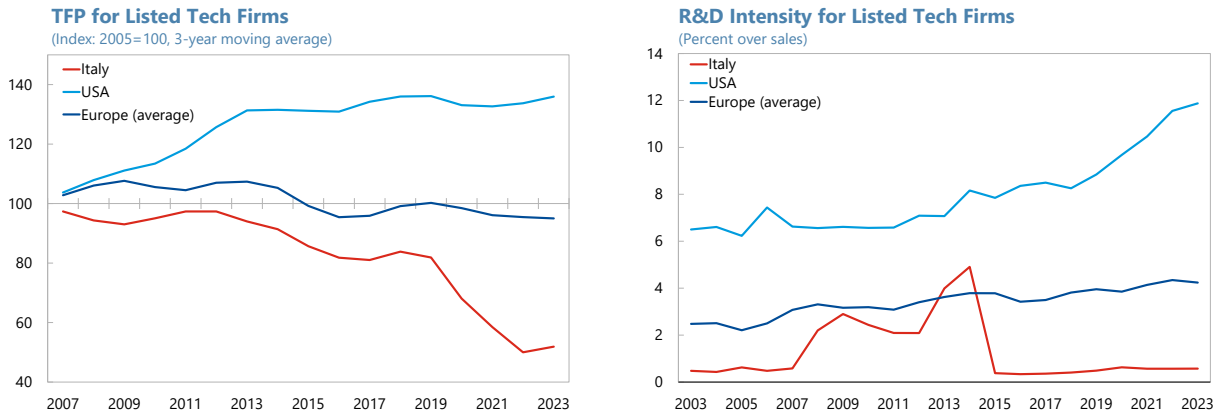
- ***Patent activity.*** Based on European Patent Office applications for 2024, Italy generates approximately 82.3 patents per million inhabitants, compared to 300 patents per million inhabitants in Germany and 160.5 patents per million inhabitants in France. This patent deficit is especially pronounced in high value-added technological fields such as artificial intelligence, biotechnology, and clean energy, suggesting potential challenges in future competitiveness. That said, recently, patent applications have grown strongly in Italy, increasing by 8.6 percent over the last five years, significantly higher than the EU27 average of 2.8 percent over the same period.

C. Firm-Level Roots of Italy's Productivity Weakness

10. Italy's leading firms are concentrated in the manufacturing sector, and few are active in the high-tech sector. Italy's leading firms—comprising publicly traded companies and large privately held businesses—are predominantly concentrated in traditional manufacturing industries such as machinery, automotive components, textiles and apparel, among others. While these sectors feature several globally competitive exporters, they tend to exhibit low R&D intensity and subdued productivity growth. Italian leading firms have a minimal presence in the global ICT sector. Additionally, Italy's top businesses are often mature, well-established companies, with most of the top listed firms (by market capitalization) founded more than two decades ago.

11. Italy's leading firms lag global leaders in the production and adoption of technologies, resulting in a significant productivity shortfall. Total factor productivity (TFP) estimates using a non-parametric approach by Gandhi and others (2023) indicate that Italy's productivity gap for listed firms relative to its counterparts in other advanced economies has widened over the last two decades (Figure 5). Among the listed firms in high-technology sectors in the United States, TFP has increased by nearly 40 percent over the last two decades. In contrast, the level of TFP among European listed firms in the same sector has remained flat, and TFP of Italian listed high-tech firms has experienced a decline of approximately 20 percent. This growing productivity gap goes hand-in-hand with a widening gap in innovation efforts. Using a firm's R&D investment relative to its sales as a measure of innovation intensity, US-listed tech firms have accelerated their efforts by four times more than their European counterparts and by ten times more than Italian ones.

Figure 5. Productivity and R&D Intensity of Leading Firms



Sources: Compustat; and IMF staff calculations.
Note: Productivity estimates are based on non-parametric approach by Gandhi and others (2020).

12. At the same time, Italy has only a small share of young firms with high growth prospects and the potential to become leading firms. In Italy, firm entry rates are relatively low compared to other countries, particularly in high-technology sectors (Figure 6). Moreover, upon entry, newly established Italian firms tend to grow at a slower pace than their counterparts in other advanced economies. For instance, using the employment share as a measure of economic footprint, the share of highly successful young firms—defined as those ranked at the 90th percentile in terms of employment growth among the total share of young firms operating for less than 10 years—is approximately 1 percent in Italy. The corresponding employment share is higher at around 5 percent in the United States. In other words, Italy's successful young firms have a smaller economic footprint than comparable firms in the United States.

13. A general weakness in business dynamism is hampering efficient resource allocation and generating an overabundance of small and mature firms. The relatively high share of well-established, leading firms and relatively few young, high growth firms in Italy highlight an overall weakness in business dynamism—the cycle of business creation, growth, and firm exit that characterizes vibrant market economies. This weakness is evident in several ways, namely through (i) the limited growth of initially productive firms, suggesting barriers to scaling up; (ii) the prolonged survival of low productivity firms that would typically exit in more competitive environments; and (iii) the slow adoption of new technologies, indicating structural rigidities. Among businesses operating for more than 25 years, the average firm size in Italy is fewer than 10 employees—lower than the European average of around 10 employees and significantly lower than the corresponding firm size in the United States of about 70 employees. Likewise, micro-sized enterprises (firms with less than 10 employees) account for roughly 16 percent of total employees, compared to 10 percent in the United States. In general, and consistent with the overabundance of small and mature firms in Italy, this lack of dynamism contributes to resource misallocation, as it reduces the "churn" that typically drives productivity improvements in advanced economies.

Figure 6. Firm Entry Rate and Business Dynamism

Sources: CompNet; BDS; and IMF staff calculations.
Note: For the bottom-left chart, "Europe" includes Belgium, Croatia, Czech Republic, Denmark, Hungary, Italy, Netherlands, Slovenia, Spain, and Sweden. Shaded bars in the bottom-right chart represent the average employment share between 2001 and 2009. Solid bars represent the average share between 2010 and 2019.

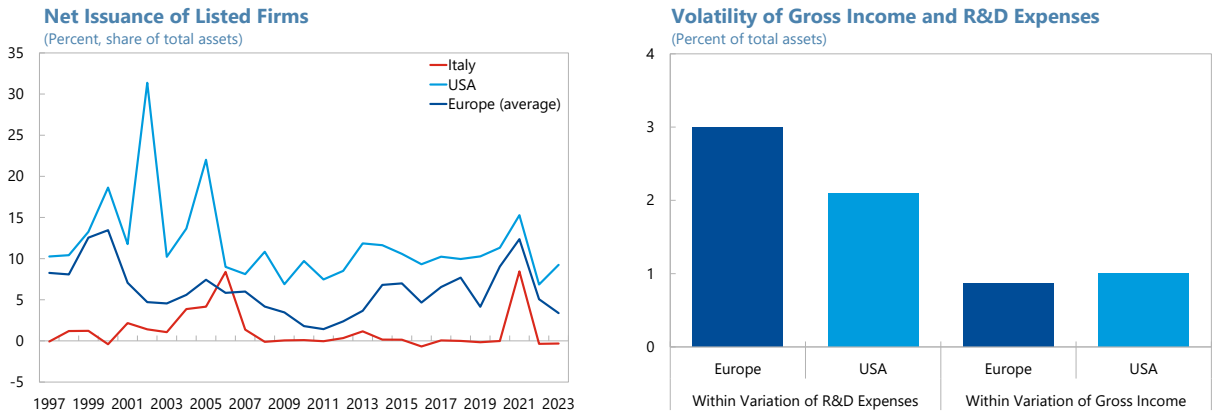
D. Drivers of Subdued Firm-Level Productivity Growth

14. A combination of regional and Italy-specific factors constrains Italian firms from scaling up and adopting and producing new ideas, holding back overall resource reallocation. These factors include (i) insufficient effective market size due to incomplete intra-EU integration; (ii) difficulties for all firms—and particularly for young firms with high growth potentials—in accessing finance, particularly the shortage in risk capital; (iii) a relative lack of high-quality human capital; and (v) size-based tax incentives. In the age of digital technologies, these constraints can be particularly detrimental for firms seeking to enter the market and scale up. For instance, firms operating in the ICT sector need a large customer base to leverage network effects and economies of scale. Additionally, these firms must continually invest heavily in R&D and secure substantial amounts of capital upfront, necessitating a financing structure that supports large-scale long-term investments in risky intangible assets (Hall and Lerner, 2010). To remain competitive, firms also need a pool of high-quality human capital. As such, enabling productivity-enhancing investment would support reaching the "high-capital" scenario discussed in the accompanying study on "Potential Growth—Adjusting to Aging" (see the first study in this Selected Issues Paper).

15. Persistent barriers within the EU market and its large customer base are hindering firms from scaling up. Despite substantial progress towards the single market, Italian firms still encounter obstacles when attempting to expand across European borders. A recent IMF study highlights persistent and high intra-EU barriers for both goods and services (Adilbish and others, 2025). These trade barriers arise from regulatory fragmentation, as disparate national standards and compliance requirements create de facto barriers to entry. Moreover, such constraints disproportionately impact firms with high productivity that have high growth potential, as they hamper the ability to scale up their businesses through exports. Addressing these constraints would help Italian firms to expand beyond national borders.

16. In addition, Italy's bank-dependent financing model is not conducive to facilitating persistent, yet risky, intangible investment. Italy's financial system remains heavily bank-centered—in contrast to the market-based financing in the United States and the United Kingdom. While a notable dependency on bank financing is prevalent in most European countries, Italy's reliance on bank financing is above the European average and equity financing is low (Figure 7). This financial structure has significant implications for productivity-enhancing investments. Notably, bank financing typically favors tangible assets over intangible investments, making it more difficult to finance R&D and other knowledge-intensive investment that lack collateral value. In contrast, market-based financing, with its diversified investor pool, is better suited to support high-risk investments. A key consequence of this misalignment between the funding structure and the need for intangible investment in Europe is frequent interruptions to and relatively subdued R&D spending. Firm-level analysis confirms that European firms experience greater volatility of R&D expenses than their US counterparts, even when income volatility is similar.

Figure 7. Net Equity Issuance and Volatility of R&D



Sources: Compustat; and IMF staff calculations.

17. Expanding access to venture capital could significantly enhance intangible investments in young, high-growth firms. Recent studies highlight the crucial role that venture capital plays in fostering the growth of young and innovative firms by providing equity-based financing and

strategic managerial advice.[7] According to these findings, firms vastly improve their intangible investment by as much as 100 percent upon receiving venture capital funding (Akcigit and others, 2022; Adilbish and others, 2025 for European firms). In recent years, venture capital investment in Italy has seen significant improvement, growing by 36 percent between 2023 and 2024. However, the venture capital market remains limited in Italy, even compared to its European peers—both in terms of total venture capital funding and the average size of investment per fund (Gallo and others, 2025). These financing constraints directly shape firms' growth trajectories and force many promising startups to either remain small or seek acquisition by foreign companies.

18. While an aging population tends to be associated with fewer young, high-growth firms, a high-skilled workforce can support firm formation. To explore possible factors that influence the formation of young, high-growth firms (or gazelles), a Tobit model is used, exploiting NUTS2-level regional information on population and education levels across European countries and regions over time (Adilbish and others, 2025).[8] The results indicate that adverse demographic trends can undermine gazelle formation. While the number of gazelles is positively correlated with population growth, it is negatively correlated with the median age of the population and the old-age dependency ratio. This is consistent with recent findings that link population aging to lower job mobility and lower propensity to innovate among older workers (Engbom 2019; Hopenhayn and others, 2022). By contrast, a highly educated workforce and a higher female labor force participation rate have been shown to support gazelle formation (Hsieh and others, 2024). Given Italy's adverse demographic trends, these results point to a critical need to ramp up investments in human capital to offset the declining and aging workforce.

19. Enhancing the predictability of measures to boost investment and innovation activity can support firms' investment planning. Productivity-enhancing investments often involve risk-taking behaviors due to their long gestation periods and the necessity for trials and errors. Frequent changes to incentive measures involving legal amendments or repeals, significantly impede firms' investment decision-making processes, leading to disrupted investments. A regulatory environment that promotes predictability of incentive schemes is critical to support persistent investment.

E. Concluding Remarks

20. Some of Italy's ongoing productivity challenges require solutions at the regional level. As discussed in IMF (2024), deepening the European Single Market, particularly in services, would create scale opportunities with Europe, including for Italian firms. Furthermore, the development of the European Capital Markets Union would help diversify financing options beyond bank dependence. EU-wide initiatives on artificial intelligence and other frontier technologies could also help close innovation gaps, and European labor mobility reforms could help address skill

[7] For an overview of the venture capital landscape in Europe vis-à-vis the United States, see Arnold and others (2024).

[8] Specifically, the relationship between the count of gazelle presence and demographic factors is modeled through a Tobit model, estimated at the level of NUTS2 regions. Country fixed effects control, for example, for unobserved differences between countries' educational systems that may lead to unmeasured differences in the effect of educational attainment. Year fixed effects control, *inter alia*, for the right-censoring of the gazelle-birth data.

mismatches that constrain firm growth. Supporting the EU Competitiveness Compass to lower remaining intra-EU cross-country barriers to trade in goods and services would help Italian firms—particularly those with the high potential to scale up—to expand beyond national borders.

21. In addition, domestic reforms are needed to address the structural factors in Italy that are behind its persistent productivity weakness. In the context of the NRRP, progress made in the area of the judicial system, particularly in the significant reductions of the backlog of cases, is helpful and will accelerate the exit of unproductive firms. In addition, markedly boosting productivity will require a comprehensive approach, with policy measures targeting three critical bottlenecks: (i) reducing size-based regulatory thresholds to eliminate growth disincentives to help firms growth; (ii) expanding access to market-based financing options, such as venture capital, private equity, and public equity markets; and (iii) investing in human capital. By addressing these priorities through coordinated policy action, Italy could work towards closing its productivity gap with leading economies and ensuring long-term economic resilience.

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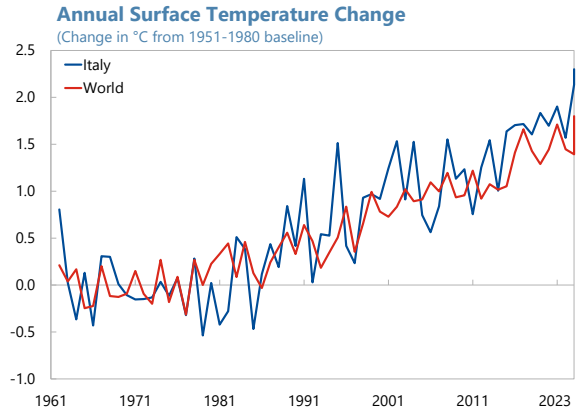
HOW CLIMATE IS CHANGING THE ITALIAN ECONOMY[1]

Climate-related disasters and energy security are macro-critical issues for Italy, given its economic structure, the importance of the agricultural and tourism sectors, and its dependence on foreign energy supply. Italy must accelerate its efforts to reduce greenhouse gas emissions to meet its 2030 climate targets and enhance energy security. Accelerating the transition to renewables, adapting to a warmer climate, and investing in renewable energy infrastructure and the grid (including at the EU level) would benefit energy security as well as help deal with extreme weather events.

A. Introduction

1. Italy is grappling with macro-critical climate shocks and increased pressures on energy resources. The changing climate is manifesting in extreme weather events—heat waves, droughts, floods, and storms—and causing significant damage and disruption. Over the past six decades, average temperatures have climbed by almost 1.5°C (Figure 1). Recent years have seen unprecedented heat waves in Italy, such as the "Cerberus" heat wave of 2023, which led to over 18,000 heat-related deaths and widespread wildfires, particularly in Sicily and Sardinia. That same year, severe storms and floods ravaged the Emilia-Romagna region, affecting nearly 50,000 people and causing extensive damage to critical infrastructure, underscoring the urgent need for renewal and reinforcement of systems such as roads, dams, and drainage networks. At the same time, increased reliance on air conditioning has strained energy grids in major cities like Rome, underscoring the urgent need for sustainable solutions amid high and volatile energy prices and the imperative to bolster energy security.

Figure 1. Temperature Over Time



Sources: FAO Temperature Change and IMF staff calculations.

2. The economic repercussions of extreme weather, rising temperatures, water scarcity, and rising sea levels are profound. In agriculture, climate change is diminishing yields and harming livestock welfare, driving up costs and reducing productivity. The tourism sector is also impacted, with more frequent and intense heatwaves making popular summer destinations less attractive and warmer winters with less snowfall shortening the ski season and reducing winter tourism revenue. In addition, the financial sector is feeling the strain, as insurance companies and banks face increased claims and economic losses due to extreme weather events, weighing on

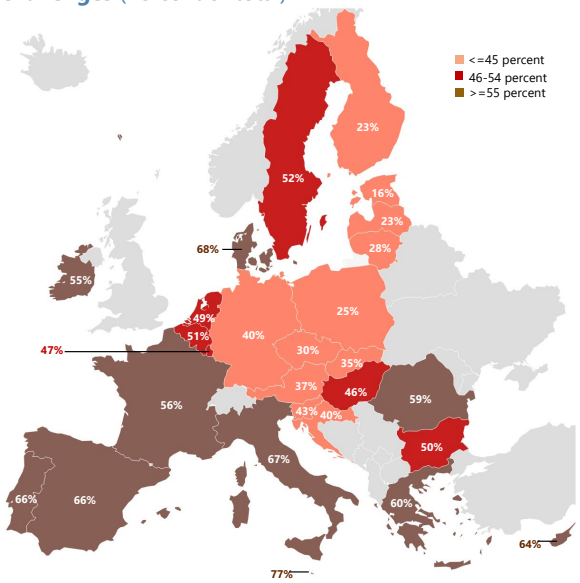
[1] Prepared by Sylwia Nowak, with invaluable support from Jenny Lee. We thank the Italian authorities for valuable feedback and comments.

profitability. In the absence of adequate insurance coverage, the financial burden of compensating for catastrophic events adversely impacts public finances.

3. Italy's population and policymakers have made note of the multiple interconnected challenges. Survey data from the European Investment Bank (EIB) indicates that nearly all Italians have been affected by environmental challenges (EIB, 2024; Figure 2). Many see early adaptation efforts as a way to create jobs, boost the local economy, and prevent higher future costs. Given the interconnected nature of these challenges, Italy is advancing a broad set of coordinated initiatives. The National Recovery and Resilience Plan (NRRP) channels EU funds into green investments, energy efficiency, and sustainable mobility. The National Energy and Climate Plan aims to cut emissions and scale up renewables by 2030. The National Climate Change Adaptation Plan boosts resilience to growing risks like heatwaves and floods, while the National Plan for Infrastructure Investments and Water Sector Safety targets infrastructure modernization and improved water resource management. The Mattei Plan aims to secure diversified and reliable energy supplies while supporting climate cooperation with partner countries. Together, these initiatives are steps towards building a more resilient, sustainable, and energy-secure future.

Figure 2. EIB Climate Survey

Survey respondents impacted by environmental challenges (Percent of total)



Source: BVA for the EIB (2024) and IMF staff calculations.

4. This paper takes stock of Italy's recent efforts to adapt to a warmer climate, reduce emissions, and bolster energy security. This paper follows up on the work in 2022 on "Securing A Smooth Green Transition" (IMF, 2022a) and is organized as follows: Section B discusses sectoral vulnerabilities in two sectors—agriculture and the financial sector—and ways to adapt these sectors to the changing environment. Section C provides a summary of Italy's recent efforts to reduce emissions, especially in transport, buildings, industry, and energy sectors. Section D concludes with considerations about potential next steps. Also see the Annex for additional details.

B. Adapting Agricultural and Financial Sectors to the Changing Climate

Agriculture

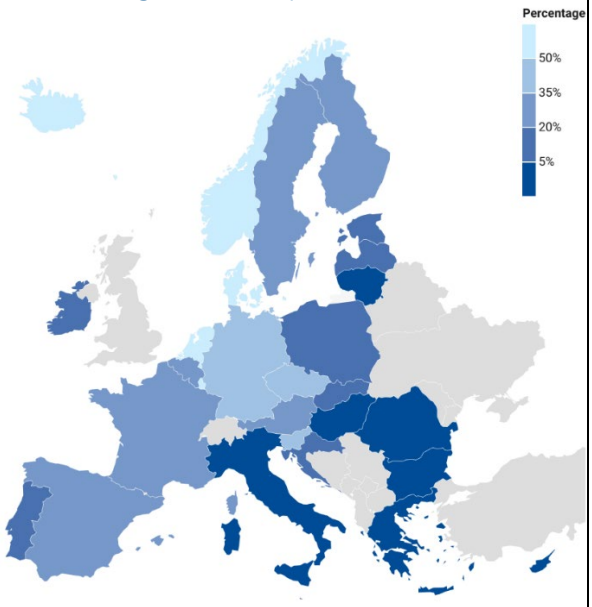
5. Agriculture in Italy is feeling the heat. Temperature and precipitation are critical inputs to crop production, making agriculture—an important sector of the Italian economy—vulnerable to

climate change.[2] Recent years have seen a significant decline in agricultural output, with gross value-added dropping by a cumulative 5.2 percent during 2019–2024, while the broader economy grew by 6.2 percent during the same period. This decline partly reflects Italy's exposure to climate-related disasters, including record temperatures, extreme heat, violent rainfall, and devastating floods. This climate-related volatility is expected to continue impacting agriculture, though the effects will vary across crops. A 2023 study by the Bank of Italy found that yields of some main agricultural products—corn, durum wheat, and grapevines—may *increase* up to a threshold of 29°C for cereals and 32°C for grapevines (Accetturo and Alpino, 2023). Beyond these thresholds, yields will decline. The G-20 Climate Risk Atlas estimates that real GDP could decline by 0.7 percent if temperatures increase by an additional 2°C and by 1.9 percent with a 4°C temperature increase above current levels (Spano and others, 2021). Even smaller temperature increases are likely to reduce crop quality. Without the adoption of smart farming practices and targeted irrigation, higher temperatures will also necessitate a significant increase in irrigation, further intensifying agriculture's dependence on water, particularly in the South, where irrigation already accounts for 50 percent of water usage.

6. Agrivoltaics can help mitigate the impacts of climate change on agriculture. Agrivoltaics combines farming with solar energy production, maximizing land productivity, generating renewable energy, and enhancing crop yields by creating beneficial microclimates (Enel, 2022). Agrivoltaics can rejuvenate underutilized or abandoned land and reduce water consumption thanks to the shading provided by solar panels. Research shows promising yield increases. Moreover, there can be strong compatibility with other aspects of farming, such as integrating sheep grazing with photovoltaic installations. Italy was an early leader in agrivoltaics but new regulations introduced in May 2024 restricted large-scale solar panels on productive agricultural land unless installed at least 2.1 meters above ground. While this presents technical and cost challenges, the use of specially designed panels still makes agrivoltaics feasible. To support the transition, Italy has launched a €1.1 billion NRRP-funded incentive scheme, offering capital grants of up to 40 percent of investment costs. Complementing this effort, the Agrisolare initiative provides additional national funding—over €2.35 billion—for installing photovoltaic systems on agricultural rooftops,

Figure 3. Insured Climate Losses

Insured Economic Losses Caused by Weather-Related Events (Average 1980–2020; percent of total losses)



Sources: EIOPA Protection Gap Dashboard and EEA; and IMF staff calculations.

[2] While the agricultural sector itself accounts for only 2 percent of the GDP, the broader agri-food system, including processing, distribution, and retail, contributes around 15 percent to the overall GDP.

helping farms reduce energy costs and emissions without using farmland. Together, these programs aim to decarbonize the sector while maintaining agricultural productivity.

Financial Sector

7. Italy's financial sector faces increasing climate-related risks but also plays a crucial role in financing the country's green transition. Physical risks arise from damage to property, infrastructure, and land, leading to financial losses for homeowners, businesses, and insurers, while undermining debt servicing capacity and collateral values. Transition risks emerge from shifts in climate policy, technological advancements, and market sentiment as the world pivots to a lower-carbon economy. Italian banks are exposed to both types of risks. Between 1980 and 2023, Italy suffered €134 billion in economic losses from weather- and climate-related disasters, yet only 4 percent of these losses were insured—significantly below the EU average of 18 percent (European Environment Agency, 2024). Similarly, the European Insurance and Occupational Pensions Authority (EIOPA) has flagged Italy as having the second largest weather-related insurance protection gap in the EU (EIOPA, 2024; Figure 3). At the same time, the financial sector supports the decarbonization through green lending, targeting energy-efficient buildings, industrial emission reductions, and climate-resilient infrastructure—sectors that remain carbon-intensive and capital-constrained. Italy has also successfully mobilized capital through sovereign green bonds, first issued in 2021, which finance climate-aligned investments in clean energy, sustainable mobility, and building efficiency.

8. To strengthen financial resilience against climate risks, Italy introduced a new mandatory disaster insurance scheme for all companies, effective March 31, 2025. Under this law, all firms operating in Italy—except agricultural companies—must insure their assets against natural disasters and catastrophic weather events, including floods, earthquakes, and landslides. Coverage is compulsory for buildings, equipment, and land. Insurers are required to offer these policies at market price, supported by up to €5 billion in reinsurance from the state-owned insurance and finance company SACE on market conditions. Noncompliance may result in penalties for insurers and the loss of government incentives for companies. [3]

9. The effectiveness of the new scheme will ultimately depend on its design—particularly how well it balances risk-sharing, incentives for prevention, and equitable access. When properly structured, such schemes can promote resilience by pooling risk across firms, which helps stabilize premiums and reduce systemic exposure. Premium differentiation based on exposure and mitigation efforts—such as discounts for firms that adopt flood barriers or seismic retrofitting—can align private incentives with public goals. In this way, mandatory insurance can act as a catalyst for prevention by encouraging firms to invest in resilience. However, several concerns remain:

- ***Geographic inequality.*** Companies in high-risk areas might face prohibitive insurance premiums, leading to economic disparities and potentially discouraging businesses from

[3] While this decree initially applied to firms in Italy of all sizes, the implementation deadline was postponed to October 1, 2025 for medium-sized enterprises, and January 1, 2026 for small and micro enterprises. The deadline for large enterprises remains March 31, 2025 but sanctions will not be triggered until 90 days after the deadline.

operating in these regions, resulting in economic desertification. However, risk mutualization among a large number of insured firms could mitigate concentration risk for insurers, helping to stabilize premiums and support broader coverage across diverse geographic areas.

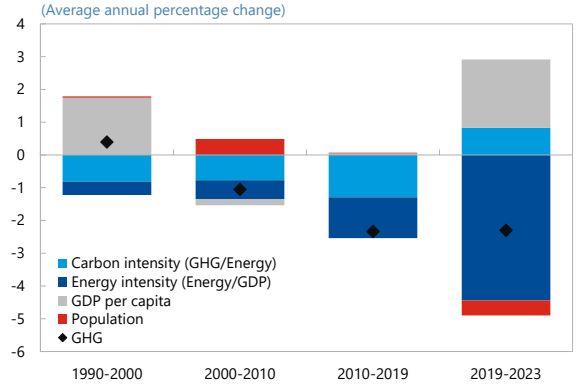
- ***Moral hazard.*** With guaranteed insurance coverage, businesses might invest less in disaster prevention, relying instead on insurance payouts, which could inadvertently encourage riskier behavior. This risk can be mitigated through pricing structures that reward mitigation efforts, reinforcing the role of insurance in promoting resilience.

- ***Residential homes remain vulnerable.*** The scheme currently focuses on businesses, leaving residential homes vulnerable. With only 6 percent of residential homes in Italy insured against natural disasters, the gap in coverage raises important questions about broader societal resilience.

C. Recent Efforts to Reduce Emissions and Adapt to Global Warming

10. Amid the impact of weather-related challenges, Italy has made substantial progress in curbing greenhouse gas emissions, though gaps to reach its targets persist. Italy has contributed to global emission reductions, with net greenhouse gas (GHG) emissions declining by 30.5 percent between 1990 and 2023 (European Commission, 2024).[4] The Kaya identity—which breaks down the evolution of GHG emissions into changes in carbon intensity, energy intensity of GDP, GDP per capita, and population size—reveals that past progress in Italy has been mainly driven by improved energy efficiency and less so from a greening of energy sources (Figure 4). In line with this, the Bank of Italy (2021) emphasizes that Italy's emissions reductions since the early 2000s stem largely from structural shifts away from energy-intensive industries, energy efficiency gains, and a gradual increase in renewable energy use. Nonetheless, Italy remains among the top 20 largest emitters worldwide, contributing about 0.8 percent of global GHG emissions in 2021. In addition, carbon intensity has crept up in recent years due to increased fossil fuel usage—though it remains below the EU average. Moreover, Italy faces a significant mitigation gap between business-as-usual emissions and its 2030 climate goals. To achieve these targets, Italy's emissions would need to be reduced by nearly 30 percent relative to levels in 2023.

Figure 4. Greenhouse Gas Emissions

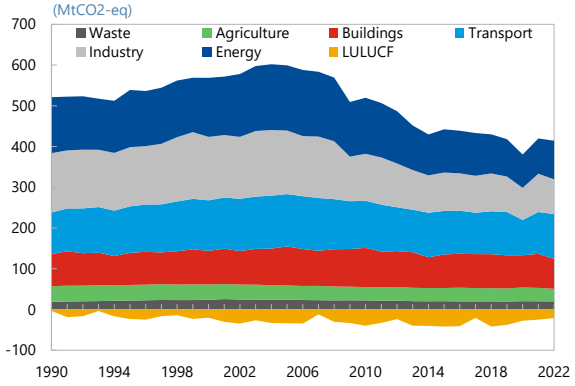


Sources: Haver Analytics and IMF staff calculations.

[4] Net GHG emissions include Land Use, Land-Use Change, and Forestry (LULUCF), a sector within GHG inventories that focuses on emissions and removals related to land use and land-use change activities.

11. Greenhouse gas reductions have been uneven across sectors. The *energy* and *manufacturing* sectors, which are subject to the European Union's Emissions Trading System (ETS), have delivered the largest reductions since 1990. In contrast, the *transport* and *building* (i.e., housing) sectors, which account for nearly half of total emissions, have been relatively slowly to decarbonize so far (Figure 5). That said, decarbonization in these sectors may soon intensify, as they are scheduled to be covered under a new emissions trading system, ETS2, starting in 2027, with the monitoring and reporting of emissions beginning this year.

Figure 5. Emissions by Sector

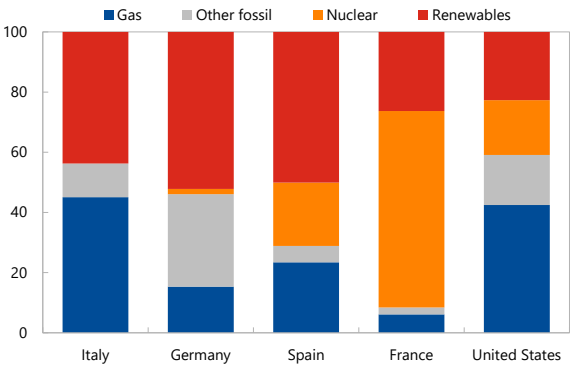


Sources: European Environmental Agency and IMF staff calculations.

Energy

12. Italy relies heavily on imported fossil fuels for electricity generation, rendering the energy sector a large GHG emitter. Despite noticeable improvements since 1990, the energy sector remains the second largest carbon emitter, accounting for 21 percent of total emissions. This high emission level reflects a heavy reliance on fossil fuels for electricity generation (Figure 6). Moreover, Italy stands out among major economies with the highest share of electricity generated from natural gas—45 percent, of which 94 percent is imported. As a result, the price of natural gas plays a crucial role in determining electricity prices. When demand peaks, the marginal (most expensive) gas-powered plants are the last to be fired up, setting the market price for all electricity generated at that time, even if cheaper renewable sources are available.

Figure 6. Electricity Generation by Source



Sources: Ember and IMF staff calculations.

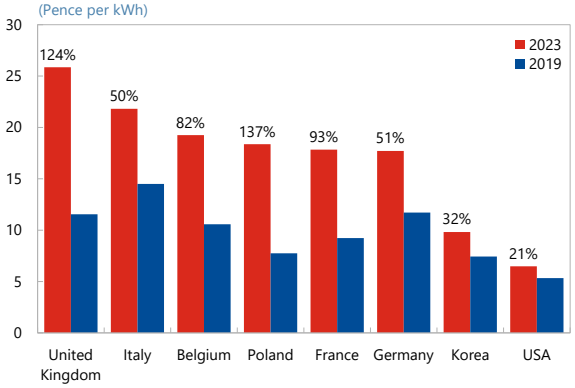
13. Italy's reliance on fossil fuels is economically costly and poses risks to energy security. Electricity prices are among the highest in Europe, largely due to Italy's heavy dependence on foreign energy (Figure 7). In 2022, net imports accounted for nearly 80 percent of Italy's gross available energy, markedly above the EU average of 63 percent (Dolphin and others, 2024). This high dependency is compounded by a relatively concentrated set of energy suppliers, increasing Italy's

vulnerability to external supply shocks. Moreover, a relatively high share of GDP in Italy is spent on energy consumption (7.1 percent in 2019, compared to the EU average of 6.7 percent), leaving limited room to absorb energy price shocks without significant economic fallout. Since 2022, Italy has reshaped its energy strategy to enhance security and reduce reliance on Russian gas, cutting net energy imports by nearly 10 percent between 2022 and 2023.

Figure 7. Industrial Electricity Prices

Industrial Electricity Prices Including Taxes

(Pence per kWh)



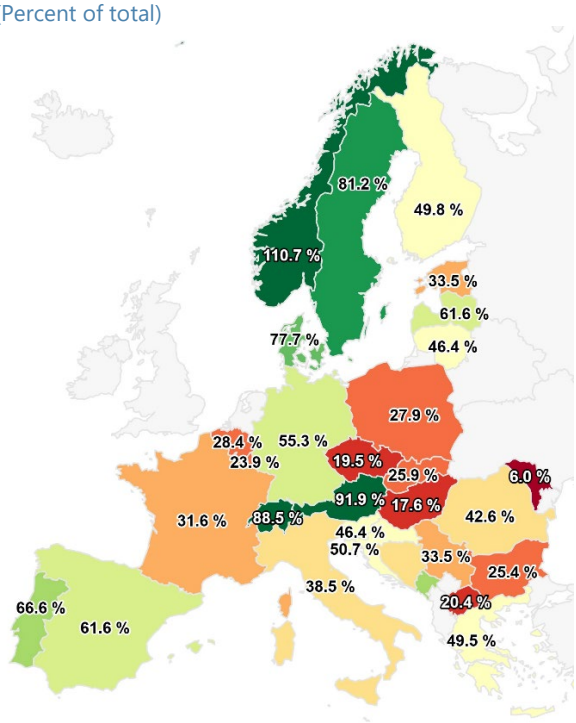
Source: UK DESNZ/IEA and IMF staff calculations.

14. While Italy is making headway in expanding renewable energy, it still trails its peers in terms of the share of renewables in total energy consumption. Accelerating the transition to renewables, which are typically produced domestically, helps reduce GHG emissions while enhancing energy security by reducing reliance on energy imports and thereby mitigating risks of foreign supply disruptions. Italy leads among major euro area economies in the share of *domestic* energy production from renewables, with 75 percent of its energy production in 2022 from renewable sources (Eurostat, 2025). However, renewables still account for a smaller share of Italy's *total* final energy consumption compared to some European counterparts (Figure 8).

Figure 8. Renewable Electricity

Europe: Renewable Share of Electricity Load, 2024

(Percent of total)



Source: Energy-Charts.info and IMF staff calculations.

Industry

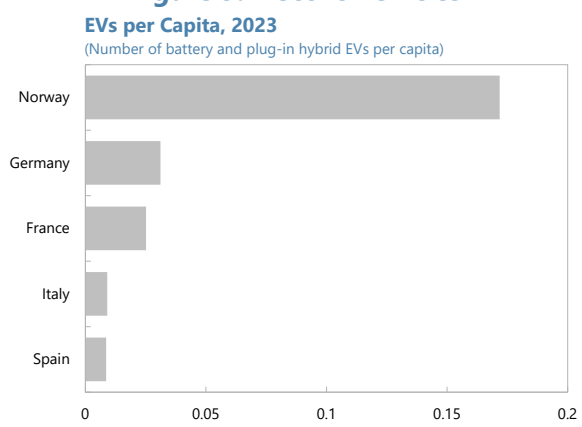
15. Improving the performance of climate laggards could further green the Italian industry. The manufacturing industry, Italy's third most polluting sector, has reduced its emissions by 43 percent since 1990 to 20 percent of total emissions in 2023. Enhancing the environmental performance of Italian firms that have higher emissions relative to the scale of their operations than their counterparts in other advanced economies ("climate laggards") could further green the Italian industry (Capelle and others, 2023). These "climate laggards" typically operate older physical capital, are less knowledge-intensive, have weaker management practices, and exhibit lower productivity. If these firms improved their environmental performance to the 25th percentile of emission intensities for their industry, total emissions by Italian firms in the sample could fall dramatically: by 43 percent in manufacturing and nearly 67

percent in other sectors (excluding finance, energy, and utilities).[5] This analysis underscores the potential for substantial emission reductions through targeted improvements in environmental practices.

Transport

16. With electrification of the transportation sector having progressed relatively slowly, new measures have been implemented. Emissions from the transport sector have risen by nearly 6 percent since 1990, with private cars being the main culprits, responsible for almost 60 percent of sectoral emissions. In 2023, the transport sector was the largest contributor to GHG emissions, accounting for 30 percent of the total. In turn, the Italian authorities have increased the emphasis on this challenge, with electrification of transport a cornerstone of Italy's National Energy and Climate Plan. This plan aims to boost the share of renewables in transport to 34.2 percent by 2030 and promote the adoption of electric vehicles (EVs). However, the uptake of EVs has so far been sluggish, partly due to the high upfront costs (Figure 9). In this respect, a €1 billion subsidy scheme in the 2024 budget provided a temporary boost. More recently, instead of subsidies, the 2025 budget earmarked €1.6 billion to support the broader automotive supply chain, focusing on production investments and technological advancements. Complementing these efforts, the NRRP allocates over €31 billion to sustainable mobility, including high-speed rail, regional network electrification, and fleet renewal, with an emphasis on the South. Additionally, the multi-year strategic infrastructure plan, published as part of Italy's *2025 Public Finance Document*, supports the development of modern, low-emission transport systems, reinforcing the shift toward greener mobility.[6]

Figure 9. Electric Vehicles



Sources: Bruegel on Eurostat and European Alternative Fuel Observatory; and IMF staff calculations.

[5] This study is based on firm-level data on emissions, balance sheets, and income statements for over 3,000 listed firms headquartered in 65 countries from 2010 to 2022. The counterfactuals are constructed, within industry, by assuming that all Italian firms with emission intensities above the 25th percentile of the distribution of emission intensities reduce their intensities to the level of the firm in the 25th percentile, while keeping their production constant. Firms in the financial, utilities, and energy sectors are excluded. The sample is biased towards large, listed firms, which report emissions from their operations.

[6] The *Strategies for Infrastructure, Mobility, and Logistics* is Italy's official multi-year infrastructure plan, annexed to the *2025 Public Finance Document*. It outlines national priorities for sustainable transport, logistics, and infrastructure development, aligning with EU climate goals and complementing the NRRP through long-term investment in low-emission, resilient systems.

Buildings

17. Decarbonizing Italy's buildings remains a formidable challenge. Despite €220 billion spent on the Superbonus [7] and other renovation tax credits, Italy's housing stock remains among the oldest and least energy-efficient in Europe Around 60 percent of buildings fall into the two lowest energy efficiency classes, compared to 12 percent in Germany [8] (Housing Europe Observatory, 2023). Over 70 percent of Italian dwellings were built before 1980—prior to the introduction of modern energy standards—and many lack adequate insulation or modern heating systems. As a result, the use of buildings accounts for the largest share of final energy consumption in Italy, with heating and cooling alone responsible for 44 percent of total energy use in 2022. Italy also has one of the highest shares of gas-based residential heating in Europe, further compounding the climate challenge. The scale and age of the building stock, combined with regional disparities in renovation activity and persistent energy poverty, underscore the complexity of decarbonizing the building sector. Moreover, the transition poses distributional challenges, as lower-income households tend to live in less efficient homes and spend a higher share of income on energy. Moving forward, addressing this issue requires extensive renovations to improve energy efficiency, including upgrading insulation, installing energy-efficient windows, and adopting technologies such as heat pumps and smart thermostats, while also integrating renewable energy sources.

18. Several programs aim to reduce GHG emissions from residential buildings. Some tax deductions are still available—though they have been scaled back since 2024—for energy efficiency interventions (Ecobonus) and general renovations (Renovation bonus). Additional measures involve mechanisms to incentivize the use of renewable thermal energy and the integration of renewable energy sources into buildings, as well as support for municipal energy efficiency investments and district heating. The *Conto Termico* program supports the installation of heat pumps, biomass, and solar thermal systems, with improvements incentivized through tradable white certificates that electricity and gas distributors can use to meet annual energy savings obligations. In addition, Italy plans to update its strategy for the energy retrofitting of the national building stock. Importantly, Italy stands to benefit from the forthcoming EU Social Climate Fund—financed through the second EU Emissions Trading System (EU ETS 2), which covers buildings and road transport—providing resources to support targeted building upgrades and clean heating solutions for vulnerable households and help ensure a fairer transition.

[7] The Superbonus 110 scheme, introduced in 2020, offered homeowners a 110 percent tax credit for energy efficiency and seismic improvement projects. By 2024, the total take-up of the Superbonus and other home renovation tax credit schemes reached about €220 bln in 2024 (around 10 percent of GDP). Despite the substantial fiscal costs, the growth impact is assessed to be limited due to import leakages, high price markups, low renovation additionality, displacement of other construction activity, and misuse of public funds. See Annex VII in 2022 Italy Staff Report (IMF, 2022b) for a detailed description of the scheme and Box 1 in for its growth impact.

[8] Energy Performance Certificate (EPC) ratings are not fully comparable across EU countries, as each member state uses its own methodology, thresholds, and climate adjustments.

D. Concluding Remarks

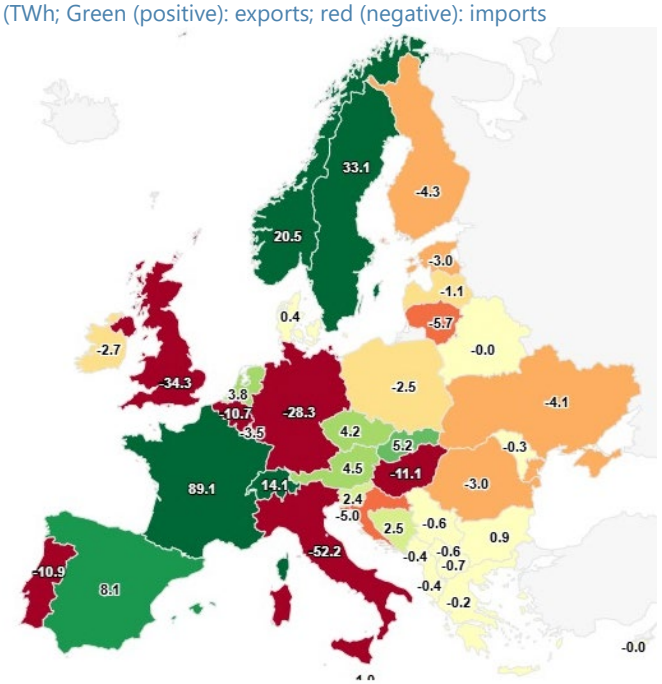
19. Italy's efforts to accelerate the transition to renewables, adapt to a warmer climate, and enhance energy security are steps in the right direction, though they will need to be accelerated to meet 2030 climate targets. Accelerating the transition to renewables and adapting to a warmer climate are crucial for bolstering energy security and mitigating the impact of extreme weather. Achieving these targets can stimulate growth by fostering innovation, creating green jobs, and enhancing energy efficiency. Transitioning to a sustainable economy can also attract investment and boost long-term competitiveness (IMF, 2022c; IMF, 2025). Without substantial acceleration in renewable energy adoption and robust climate adaptation strategies, Italy risks falling short of its goals. Italy's National Climate Change Adaptation Plan, finalized in 2024, will guide the country in achieving its 2030 climate goals, including a 33 percent reduction in greenhouse gas emissions from 2005 levels and a 30 percent share of renewable energy sources. Despite these efforts, more ambition is required, as current policies are unlikely to meet the 2030 targets.

20. Investing in renewable energy infrastructure should go hand in hand with deeper integration of electricity markets in Europe to further improve energy security. This investment can significantly reduce import dependency and enhance energy resilience. Greater energy market integration within the EU can better balance supply and demand across countries, leading to lower and less volatile electricity prices, increased resilience to market disturbance, and better utilization of renewable energy sources (Zachmann and others, 2024). However, the electricity market in Europe is only partially integrated, with only 30 to 70 percent of capacity available for cross-border electricity trading in 2024 (ACER, 2024), with Italy less integrated than many peers (Figure 10). Studies suggest that cost savings from the shift to renewables and further electricity market integration could amount to around 40 billion euros annually by 2030 across the EU (IMF, 2025). Enhanced grid integration is essential to achieve these savings. This deeper integration is essential for maximizing the benefits of renewable energy and ensuring a stable and secure energy future for Europe.

Figure 10. Electricity Trading

Cross-Border Electricity Trading, 2024

(TWh; Green (positive): exports; red (negative): imports

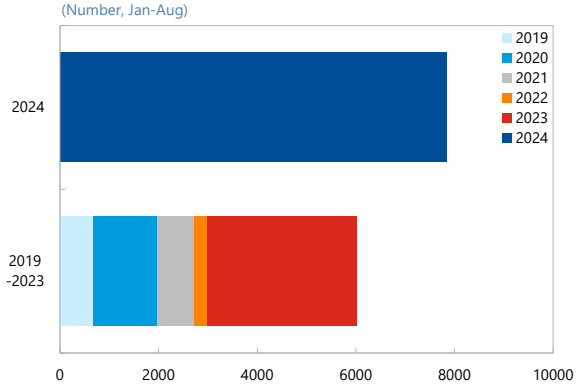


Sources: Energy-charts.info and IMF staff calculations.

21. Decisive policy actions are needed to address challenges such as insufficient energy storage capacity and grid infrastructure limitations. Energy market integration calls for increased investment in storage capacity to prevent price cannibalization, which could deter investments in

renewables and slow the energy transition. Price cannibalization occurs when multiple renewable energy sources with similar generation patterns produce an abundance of power simultaneously, leading to a surplus that drives prices below zero. This phenomenon reached a record level in Europe in 2024 (Figure 11). Addressing these challenges requires investment in increased storage capacity, such as batteries and long-term solutions like hydrogen. Additionally, enhancing interconnection capacity between regions and countries is crucial. These measures will help stabilize prices, encourage further investment in renewable energy, and ensure a smoother and more resilient energy transition.

Figure 11. European Power Markets



Sources: ICIS and IMF staff calculations.

22. The Draghi report discusses how decoupling the price of green electricity from natural gas could help stabilize electricity prices and reduce the impact of unpredictable gas prices on consumers. The report highlights that, currently, natural gas sets the price 63 percent of the time, despite only comprising 20 percent of the electricity mix (Draghi, 2024). Achieving a decoupling of the price of green electricity from natural gas prices could be facilitated through long-term power purchase agreements, allowing companies to sign extended deals directly with renewable energy producers. This approach would make renewable energy sources more competitive, potentially lower consumer electricity bills when renewables are abundant, and strengthen energy security by reducing reliance on gas. However, several concerns need to be addressed. First, decoupling prices may require significant regulatory changes and adjustments to the existing market structure, which could be complex and time-consuming. Second, stakeholders invested in fossil fuels may resist changes that could significantly reduce the value of their existing oil, gas, and coal reserves, leaving them with "stranded assets" that are no longer profitable due to declining demand in a greener energy market. Despite these challenges, the benefits of decoupling energy prices from gas prices make it a compelling strategy for a more stable and sustainable energy future (Draghi, 2024).

23. Implementing a well-calibrated comprehensive package of reforms could help Italy meet its climate targets while enhancing energy security. A departmental paper prepared by the IMF's European and Research Departments note that individual policy tools such as carbon pricing, energy efficiency standards, and accelerated permitting procedures for renewables can all help improve energy security (Dolphin and others, 2024). In this respect, a well-calibrated policy package aimed at cutting emissions by 55 percent from 1990 levels by 2030 could significantly enhance Italy's energy security metrics by 5 percent by 2030 while also lowering energy expenditure by 0.35 percentage points of GDP. Moreover, integrating these individual tools into a cohesive strategy can drive substantial improvements in both environmental and economic outcomes. By ramping up its climate policy agenda, Italy can progress towards a net-zero world and improve its energy security.

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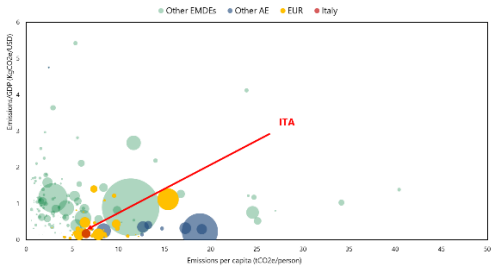
Annex I. Emissions Intensities and Climate Risks

1. This annex provides details on developments related to GHG emissions. The IMF's *Comprehensive Surveillance Review* notes that an update on climate change mitigation issues should be presented every three years for the world's 20 largest emitters of greenhouse gases. This annex complements the main text by providing detailed data on emissions intensities and climate risks (Annex Figure 1) as well as cross-country comparisons (Annex Figure 2).

Annex I. Figure 1. Emissions Intensity and Climate Risks

GHG Emissions Intensity Vs. Total Emissions, 2021

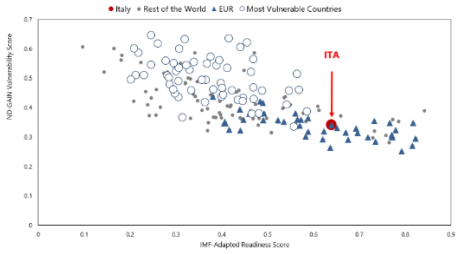
Italy is one of the top 20 largest GHG emitters.



Sources: IMF Climate Change Indicators Dashboard (2023) and World Economic Outlook (2023)
Note: Bubble size indicates total GHG emissions excluding land-use and land-use change and forestry. Outlier Palau is excluded.

Climate Risks and Readiness (ND-GAIN, 2021)

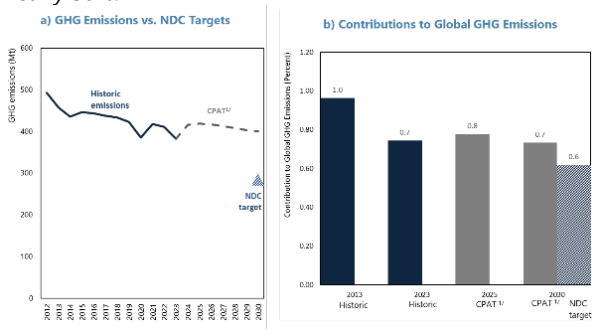
Italy faces very low vulnerability and strong readiness to face climate change risks.



Sources: IMF Climate Change Indicators Dashboard (2022)
Note: The Vulnerability Score assesses a country's current vulnerability to climate, reflecting exposure, sensitivity, and adaptive capacity. The Readiness Score assesses a country's readiness to leverage public and private sector investment for adaptative actions.

GHG Emissions vs. NDC targets

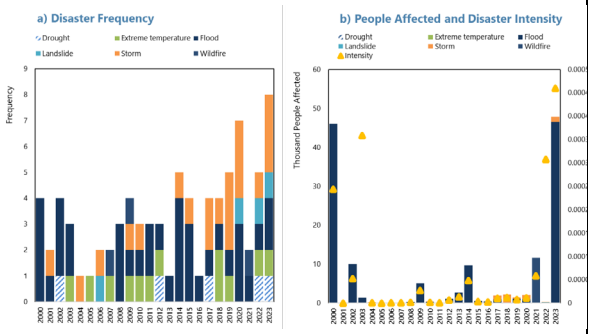
Italy contributes 0.8% of global GHG emissions and faces a significant mitigation gap between business-as-usual (BAU) emissions and its NDC target. To achieve its 2030 target, Italy's emissions would need to be reduced by nearly 30%.



Sources: IMF Climate Change Dashboard with data from the UNFCCC, EDGAR, FAO and IMF Staff-calculations.
Note: GHG emissions exclude Land Use, Land-Use Change and Forestry.
1/ CPAT estimations are indicative as they are based on uniform assumptions across all countries across the globe (i.e., no new mitigation policies, 50% reduction in explicit subsidies if applicable, energy prices based on average IMF-WB forecasts, and macroeconomic projections from the latest WEO).

Key Natural Hazard Statistics

Italy's most prevalent hazards are floods and storms, with floods historically affecting a larger population. In 2023, severe storms, floods and landslides struck the Emilia-Romagna region, impacting nearly 50,000 people.

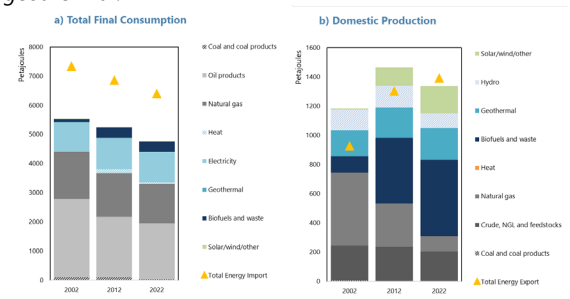


Note: Intensity is defined as (Total death+30% Total Affected)/Total population.
Sources: EMDAT and Staff calculations using Pondi and others (2022).

Annex I. Figure 1. Emissions Intensity and Climate Risks (Concluded)

Energy Mix

Italy ranks among the largest energy importers in the EU and globally. Italy has gradually shifted energy production away from natural gas, with renewables, biofuels and geothermal.

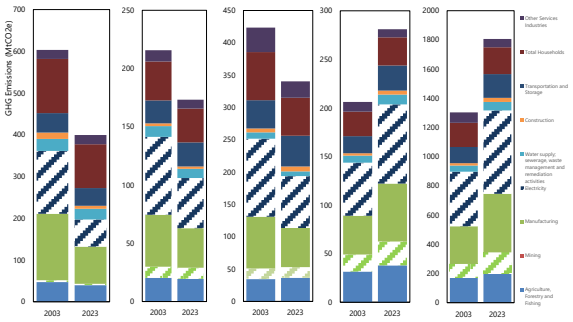


Sources: IEA World Energy Balances.

Notes: M=Mitigation, T=Transition, A=Adaptation.

Emissions by Sector

Over 65 percent of Italy's emissions originate from households, manufacturing, and electricity; emissions in these three sectors have declined since early 2000s.

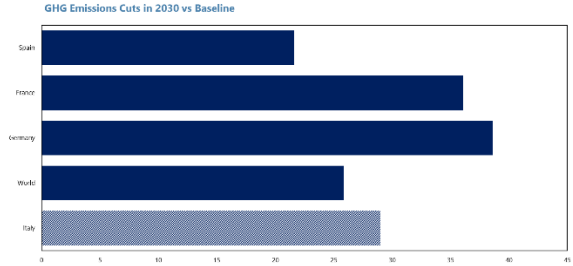


Note: GHG emissions excluding land-use and land-use change, and forestry are shown. Rather than presenting emissions by UNFCCC sector, the chart shows emissions by economic activity.
Source: OECD Air Emission Accounts; UNFCCC; EDGAR; IMF staff calculations.

Annex I. Figure 2. Cross-Country Comparison and Pricing

Multilateral Component: Comparison vs. Peers

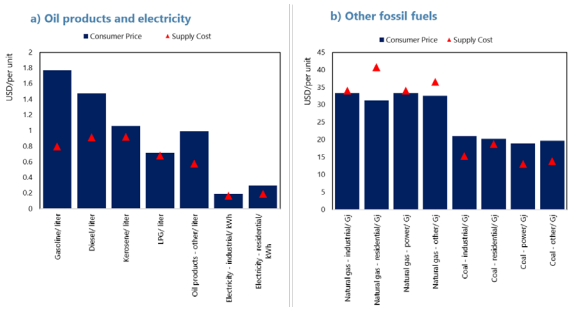
The NDC target implies GHG emissions reductions comparable to those of key peer countries and exceeds the global reductions outlined by all current NDCs.



Sources: IMF Climate Change Dashboard with data from the UNFCCC, EDGAR, FAO and IMF Staff-calculations.
Notes: The above chart is based on CPAT estimations, which are indicative as they are based on uniform assumptions across all countries (i.e., no new mitigation policies, 50% reduction in explicit subsidies -if applicable-, energy prices based on average IMF-WB forecasts, and macroeconomic projections from the latest WEO).

Explicit Consumer Fuel Subsidies

Consumer prices are well above supply costs for most fuels.

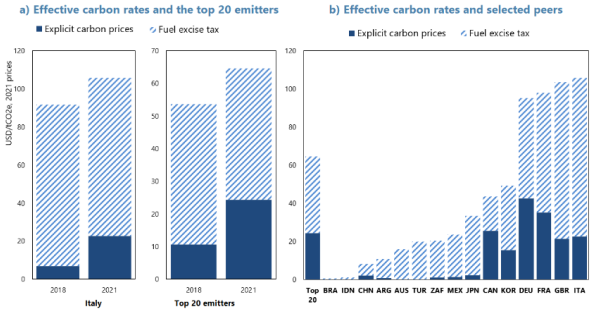


Sources: IMF Climate Change Dashboard (2021) and IMF Fossil Fuel Subsidies database.

Annex I. Figure 2. Cross-Country Comparison and Pricing (Concluded)

Effective Carbon Pricing

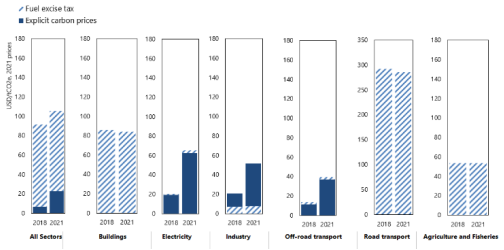
Although Italy's explicit carbon prices align with those of other large emitters, the markedly higher fuel excise taxes position the country at the forefront of effective carbon pricing.



Source: OECD Effective and Net Effective Carbon Rates.

Effective Carbon Pricing by Instrument

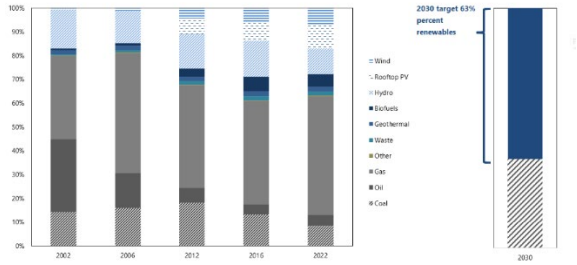
Fuel excise taxes are highest in the road transportation sector, while explicit carbon pricing focuses on the electricity, industry and off-road transportation sectors.



Source: OECD Effective and Net Effective Carbon Rates.

Electricity Generation Mix

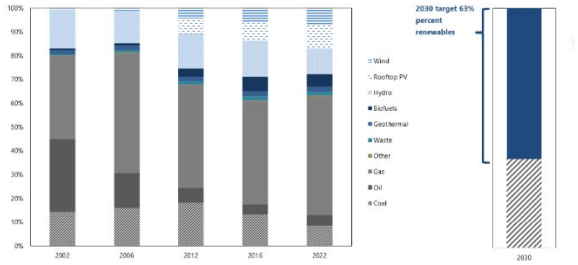
Gas remains the dominant source of electricity generation.



Source: IEA World Energy Balances; IMF staff calculations.

Methane Emissions: Significance and Drivers

Ranking 41st out of 90 methane emitters, Italy's methane emissions primarily originate from agriculture and waste.



Source: IEA World Energy Balances; IMF staff calculations.

Notes: M=Mitigation, T=Transition, A=Adaptation.