Navigating the New Economy: The sectoral and regional effects of GenAI

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Content

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Navigating the new economy: the sectoral and regional effects of GenAI

This article offers insights into the role of generative AI (GenAI) in shaping economic outcomes across regions and sectors. Our objective is to assess the extent to which GenAI is set to reshape regional and sector-specific productivity and thus international competitiveness, trade, capital flows and GDP.

In brief:

- We expect GenAI to significantly impact productivity; however, the outcomes will be region- and sector-dependent.
- Productivity gains driven by GenAI could notably influence international competitiveness, especially in sectors deeply engaged in global trade, due to differential cost reduction capabilities.
- Disparities in GenAI technology adoption across regions may prompt changes in global investment patterns, contingent on barriers to cross-border capital flows and investor home bias.

In this article, we build on previous EY research examining GenAI's impact on capital investment and total factor productivity (TFP) to analyze the implications for global trade, investment flows, and sectoral outcomes across various regions.[1]

1 in this article, we account for 11 regions: Western Europe, Southern Europe, Central and Eastern Europe (CEE), the Middle East and North Africa (MENA), and Sub-Saharan Africa, USA and Canada, Developed Asia and Oceania, Latin America, the Association of Southeast Asian Nations (ASEAN), South Asia, and the Rest of Europe and Central Asia. Details on the composition of these regions can be found in the full report which accompanies this article.

We begin with an assessment of how GenAI is projected to drive productivity growth in different sectors and regions. Utilizing the EY UPGRADE CGE model[2], we then quantify the economic impact of GenAI adoption, incorporating productivity enhancements and capital investment as key inputs. EY findings detail the expected macroeconomic effects of GenAI, with a particular focus on international trade and capital flows. Finally, we explore the projected sectoral outcomes, considering both direct and indirect effects arising from the broader macroeconomic shifts associated with GenAI deployment.

Key findings:

- **GenAI is set to deliver significant productivity enhancements across sectors.** We expect health care and advanced manufacturing to lead the way, with estimated global Total Factor Productivity (TFP) gains by 2033 ranging from 1.2% to 2.5% and 1.0% to 2.4%, respectively, depending on the AI adoption scenario.
- **We expect GenAI to boost economic growth,** particularly in Developed Asia and Oceania, Western Europe and the USA and Canada, with a global real GDP increase of up to 1.4% by 2033. GenAI's impact on productivity will shape this growth both directly and indirectly through shifts in global trade and investment activity.
- **The health care sector, following its considerable TFP gains, is likely to receive the most substantial boost in output from GenAI,** with a potential increase in global output of up to 2.5%. Other sectors, including education, public administration, and professional services, are also poised to benefit significantly from GenAI integration. In contrast, sectors with more limited GenAI adoption, such as agriculture and construction, may experience comparatively modest output growth.
- **GenAI-driven productivity gains do not ensure output growth at the region- and sector-level,** given that shifts in comparative advantage and capital flows affect such growth. Highly traded sectors are particularly vulnerable to these economic shifts, while domestically oriented services, such as health care, will be less exposed to GenAI-driven changes in comparative advantage. Moreover, the additional demand for Information and Communication Technology (ICT) hardware that supports GenAI solutions is likely to stimulate growth along the supply chain, especially in the USA and Canada.

[2] The EY UPGRADE CGE model, developed by EY Economic Analysis Team, is based on the GTAP modeling framework and incorporates the latest version of the GTAP database. It also features extensions to expand the modeling capabilities. In this study, the extensions involved the introduction of upward-sloping labor supply curves to capture employment effects, as well as a dedicated investment module which allowed us to model shifts in investment spending across sectors (e.g., higher investment in ICT hardware due to the deployment of GenAI technologies). Development of this customized module was in line with the investment modeling methodology developed by the European Commission's Joint Research Centre, published in Tamba et al (2022). Although our simulations involved the use of a recursive-dynamic model, for simplicity, we present all outcomes as cumulative deviations from the baseline scenario in 2033, which is the final year of our projections.

Chapter 1

Unleashing efficiency: GenAI's role in shaping sectoral productivity gains throughout regions

GenAI is driving significant productivity gains in health care and advanced manufacturing sectors, heralding a new phase of economic growth.

GenAI, as a general-purpose technology, has a broad range of applications across various economic activities. However, some sectors are more susceptible to AI-induced enhancements in productivity. To understand the potential sectoral impact of GenAI, we must account for two key factors:

- The extent to which tasks within a sector are prone to AI-driven automation or augmentation
- The share of labor costs in the overall production expenses of a sector

AI's potential to revolutionize production hinges on its capability to automate or improve tasks traditionally performed by humans. Concurrently, the financial upside of such technological advancements manifests in reduced labor costs for equivalent output, a benefit that is more pronounced in labor-intensive sectors. Consequently, sectors that are both more open to AI integration and where labor represents a higher share of total costs are likely to experience a more significant boost in overall productivity.

Building on this framework, we have analyzed AI-driven TFP gains for 27 distinct economic sectors, detailed in Figure 1. As with our past analyses, we have considered both conservative and widespread AI adoption scenarios. The widespread AI adoption scenario assumes that AI is adopted at a similar pace as information and communications technology (ICT) during the 1990s and 2000s. The conservative scenario assumes 60% slower integration (based on existing relationship between AI and ICT adoption).

Harnessing the AI wave: sector-specific productivity projections

Globally, over the coming decade, we anticipate the health care sector witnessing the most substantial AI-driven TFP gains, ranging from between 1.2% and 2.5%. To contextualize these figures, the projected gains are comparable to the economy-wide TFP growth experienced by Western European economies during 1995–2021, which stood at 2.9%, according to Penn World Table data.

The increase of TFP in health care is largely driven by the employment of highly skilled professionals who have considerable exposure to AI. With wages being a significant cost component, AI's ability to optimize these costs is expected to lead to notable TFP enhancements. This outlook aligns with current trends and empirical evidence.

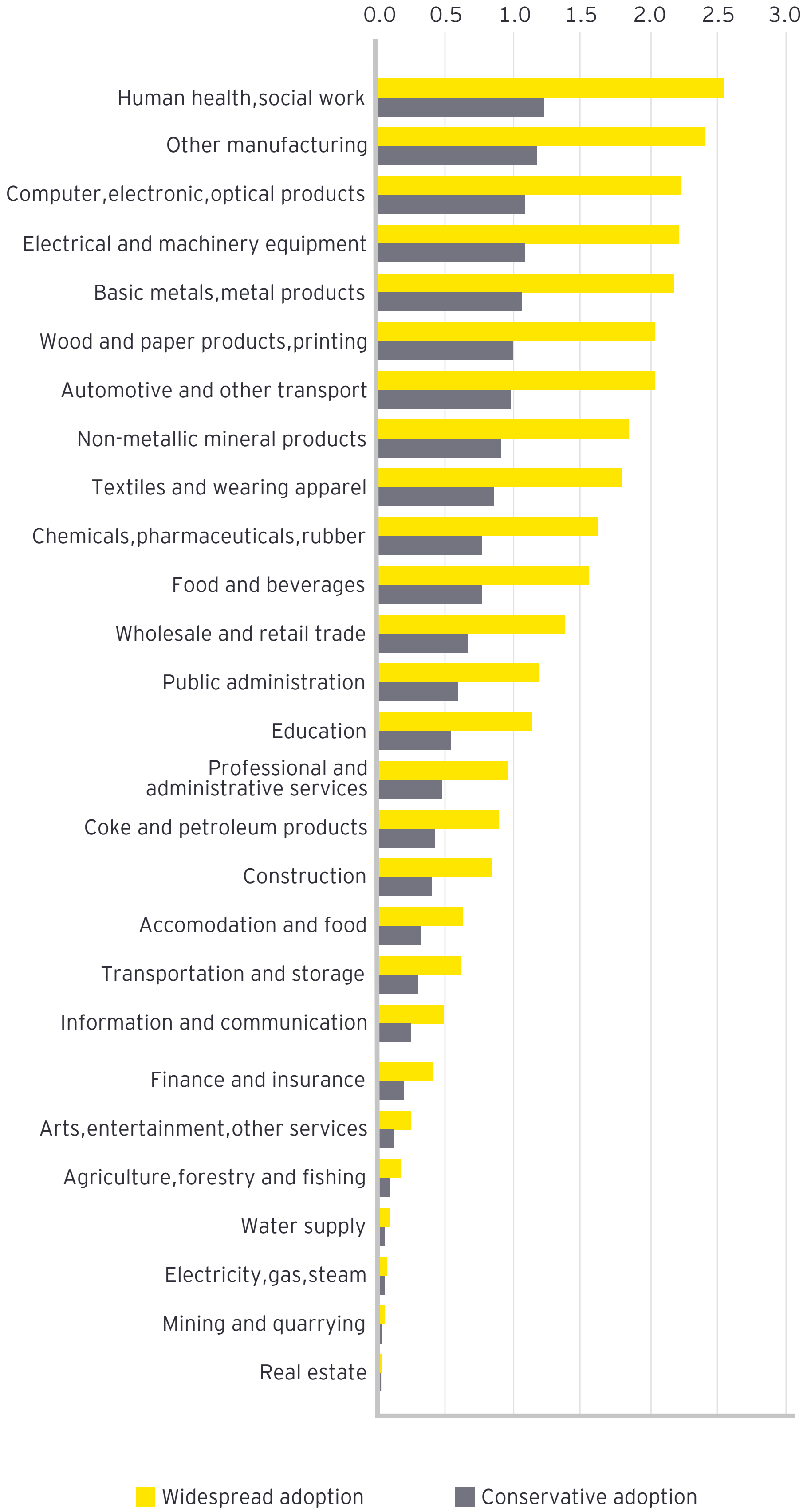
AI's transformative potential in health care extends to improving diagnostic accuracy and enhancing the quality of patient-caregiver interactions. A 2023 study found that an AI chatbot not only delivered higher-quality responses but also demonstrated greater empathy than human physicians. Additionally, there is growing evidence that AI can improve clinical workflows by facilitating better patient risk stratification. For instance, a 2024 study published in Nature demonstrated an AI model's ability to detect early stages of breast tumors with a high likelihood of becoming invasive, potentially years in advance.

Following health care, manufacturing sectors, particularly high-tech industries concentrated in western economies, such as computer equipment and health devices (categorized under "other manufacturing"), are set to see considerable TFP gains of between 1.0% and 2.4%. In contrast, sectors such as textile production, more prevalent in less developed regions, are likely to experience more modest AI-driven TFP improvements.

MIT Technology Review Insights provides empirical evidence of a strong push for AI integration in manufacturing. The main goal of this integration is to establish highly automated, smart production systems. AI is set to enhance robotics, optimize production monitoring, and improve predictive maintenance and quality control. It will also increase supply chain efficiency and accelerate product development through design optimization.

Trade-related sectors, already at the forefront of automation and large-scale data processing, are well-positioned to capitalize on the latest advancements in GenAI. The integration of AI is expected to further refine market forecasting and strengthen sales strategies by identifying opportunities for upselling and cross-selling, as well as optimizing pricing. Notably, automated document processing and procurement stand out as particularly promising applications where AI can drive transformative improvements.

Figure 1: Productivity gains due to AI in 2033 by sector, comparing conservative and widespread AI adoption scenarios, global perspective



Source: EY EAT.

Navigating the AI landscape: a global competitive shift

Our projections suggest that while all regions are expected to experience productivity gains from AI, advanced economies are poised to capture most of these benefits, as detailed in the full report accompanying this article. The uneven distribution of these gains across sectors and regions is likely to alter global competitive dynamics, with investment flows increasingly directed toward economies harnessing the greatest productivity enhancements from AI.

Chapter 2

Bringing innovation to economies: the macroeconomic impact of GenAI across regions

By 2033, GenAI is set to ignite an economic upswing across global regions, reshaping trade, investment and employment patterns.

EY approach

To assess the macroeconomic impact of GenAI on sectoral competitiveness, international trade and cross-border capital flows, we utilized the EY UPGRADE CGE model. EY analysis accounts for the following factors:

1. Increases in total factor productivity (TFP) resulting from GenAI adoption, differentiated by sectors and regions, as detailed in Section 1
2. Boosts in ICT investment spending relative to real GDP for each region, which are necessary for GenAI deployment, as described in the previous EY research

The first factor illustrates the role of AI in reducing production costs through enhanced efficiency. The second captures the necessity for firms to invest in sophisticated ICT infrastructure, including cloud services, GPUs, and robust security systems, to facilitate GenAI deployment. Such investments stimulate demand for ICT hardware, and consequently, the inputs required for hardware production, such as electrical equipment, metal products, glass, rubber and plastic.

Additionally, our CGE model examines the potential shifts in international capital flows due to the uneven adoption of GenAI. Regions that rapidly embrace GenAI and achieve productivity improvements will attract more capital, offering higher returns and investment prospects. However, capital movements may be restricted by regulatory measures, investor domestic market preferences, and government incentives for GenAI. To explore these dynamics, we analyzed two scenarios of cross-regional capital mobility:

1. **High international capital mobility,** where capital flows to regions with the highest capital costs
2. **Low international capital mobility,** where investors are not responsive to changes in rates of return across regions (e.g., due to home bias, significant domestic public support)

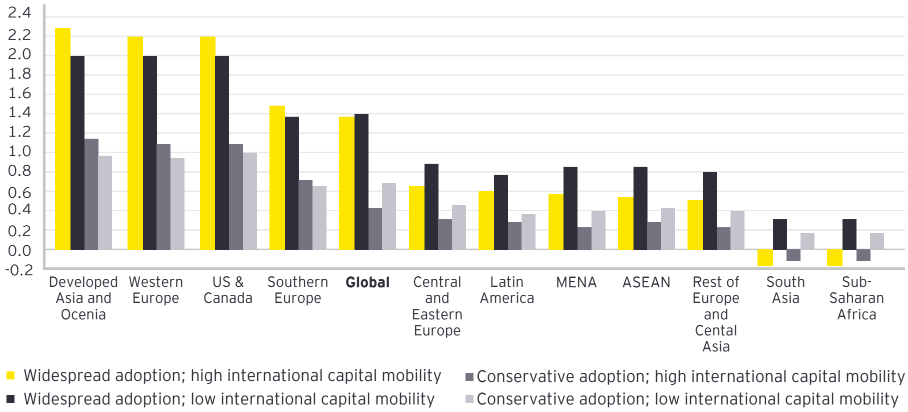
Therefore, in the next section of this article, we examine four distinct scenarios characterized by varying levels of AI adoption (conservative or widespread) and degrees of international capital mobility (high or low).

Real GDP: projecting the economic upswing

Globally, GenAI is projected to raise real GDP by between 0.4% and 1.4% above the baseline by 2033, with variations stemming from different adoption scenarios and levels of international capital mobility. The most substantial increases in real GDP are forecasted for regions with the most pronounced productivity gains, specifically Developed Asia and Oceania (1.0%–2.3%), Western Europe (1.0%–2.2%), and the USA and Canada (1.0%–2.2%), as illustrated in Figure 2.

The EY UPGRADE CGE model accounts for the impact of shifting capital flows — spurred by variations in capital returns — on investment spending and, consequently, on real GDP. These dynamics could accentuate the regional disparities in real GDP outcomes beyond productivity shifts, as shown in Figure 2. In certain areas, such as South Asia and Sub-Saharan Africa, high capital mobility might result in decreased investment, contributing to a reduction in real GDP. The subsequent sections provide a comprehensive analysis of how capital flow adjustments can influence investment spending and trade patterns.

Figure 2: Impact of GenAI on real GDP, percentage change from the baseline level in 2033

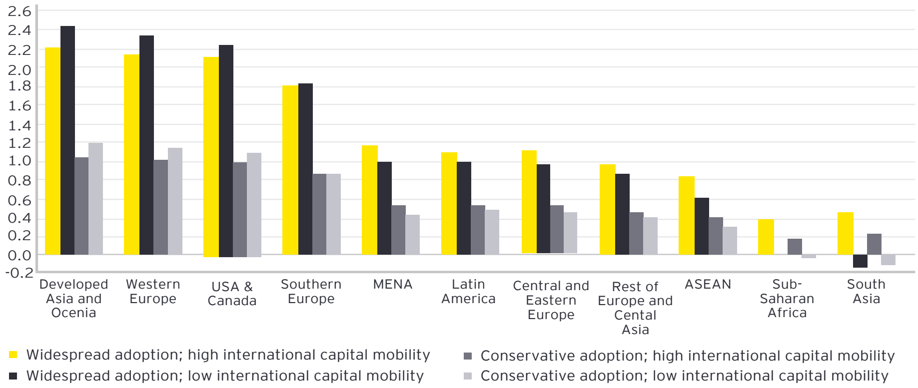


Source: EY analysis based on EY UPGRADE CGE model.

Investment shifts: an interplay between investment demand and international capital mobility

In regions that rapidly adopt GenAI, the surge in economic activity is expected to increase the demand for capital, leading to higher cost of capital. Consequently, regions poised to benefit substantially from GenAI – such as Developed Asia and Oceania, the USA and Canada, and Western Europe – are likely to see more significant increases in the rate of return on capital, as shown in Figure 3.

Figure 3: Impact of GenAI on the cost of capital, percentage change from the baseline level in 2033

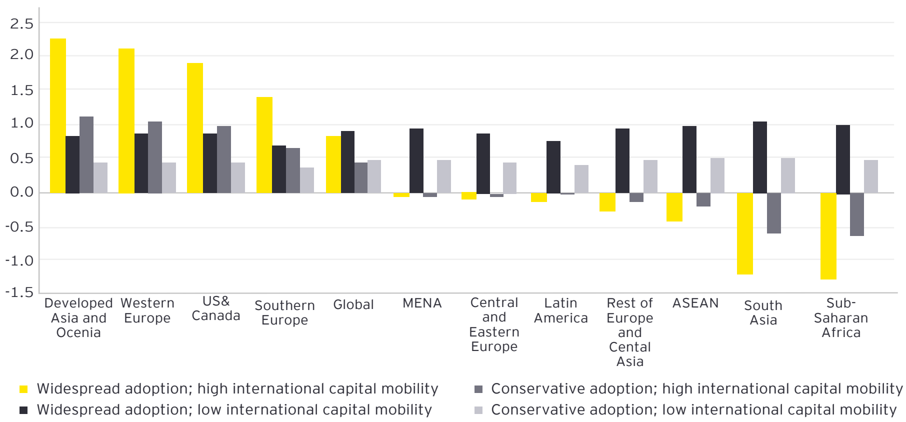


Source: EY analysis based on EY UPGRADE CGE model.

With high capital mobility, these differences in relative rates of return will result in a marked inflow of capital to these fast-adopting regions, while slow-adopting regions may experience capital outflows. In contrast, under low capital mobility, such extensive capital movements would be curtailed by various restrictions.

The extent of cross-border capital flows is a critical determinant of investment changes due to GenAI, as illustrated in Figure 4. In a scenario of high international capital mobility, GenAI adoption is projected to boost total investment in fast-adopting regions, with increases of between 1.1% and 2.2% in Developed Asia and Oceania, 1.0% and 2.1% in Western Europe, and between 1.0% and 1.9% in the USA and Canada. Conversely, regions such as South Asia and Sub-Saharan Africa may see investment reductions of between 0.6% and 1.2% and between 0.6% and 1.3%, respectively, due to significant capital outflows in a high mobility context.

Figure 4: Impact of GenAI on investment, percentage change from the baseline level in 2033



Source: EY analysis based on EY UPGRADE CGE model.

In scenarios of low capital mobility, we expect investment impacts to be more evenly distributed across countries, as cross-border capital shifts would be minimal. As a result, regions such as South Asia and Sub-Saharan Africa, which might face investment declines in a high mobility context, could instead see investment increases of between 0.5% and 1.0% under low mobility.

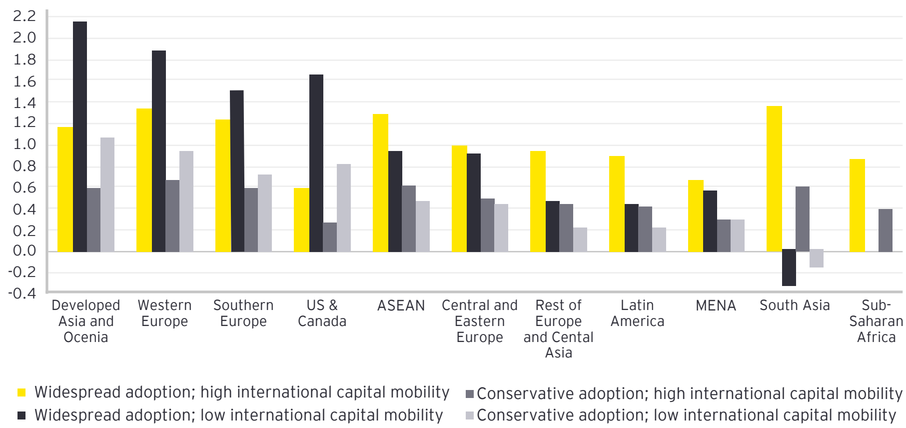
Given that investment is an important component of real GDP, the expected changes in investment patterns under each international capital mobility variant will affect real GDP outcomes. Consequently, while real GDP in South Asia and Sub-Saharan Africa might decrease slightly due to capital outflows in a high mobility scenario, the presence of capital controls or the influence of factors like home bias could mitigate this effect. Under such conditions, GenAI could have a net positive impact on real GDP in these regions.

GenAI and international trade: the interplay of changes in TFP, investment demand and international competitiveness

The impact of GenAI deployment on trade is a result of multiple simultaneous economic effects in the global economy. To unpack them, we first describe the low capital mobility variant and then move onto the high mobility setting to explain how changes in investment flows affect international trade outcomes.

Under low international capital mobility, the observed changes in economic activity across regions, represented by real GDP, primarily reflect the divergence in GenAI-driven TFP growth. Under such a setting, high productivity growth in fast-adopting regions such as Developed Asia and Oceania, USA and Canada and Western Europe means that these regions would become more cost efficient than others. This, in turn, will lead to a decline in prices of goods and services offered by these regions relative to others. As a result, fast-adopting countries will increase their exports to other regions. By contrast, slow-adopting regions may even face a decline in exports (as observed in South Asia) due to a decline in price competitiveness against fast-adopting countries, see Figure 5.

Figure 5: Impact of GenAI on total exports, percentage change from the baseline level in 2033



Source: EY analysis based on EY UPGRADE CGE model.

High cross-border capital mobility adds a new layer to the previously described effects. While GenAI-driven productivity gains in rapidly adopting countries are expected to reduce production costs and prices, the increased investment spending in these regions — referenced in Figure 4 — may boost aggregate demand, potentially leading to higher prices. As a result, the pronounced advantage in price competitiveness that fast-adopting regions would have enjoyed becomes less significant. Consequently, the export growth across regions will be more evenly distributed, and the correlation between GenAI adoption and export increases becomes less apparent under conditions of high mobility.

Chapter 3

GenAI’s impact on the global economy through a sectoral lens

By 2033, GenAI is expected to have transformative effects across various sectors, with health care poised for significant growth, while wholesale and retail trade, as well as manufacturing, will experience more complex shifts.

After exploring the macroeconomic implications of varying GenAI adoption rates across regions, we now focus on the sectoral outcomes on a global scale.

Direct and indirect impacts of GenAI on sectoral outcomes

The global sectoral effects quantified in our EY UPGRADE CGE model involve two broad types of effects:

1. **Direct effects:** GenAI adoption enhances sectoral productivity, potentially leading to increased output as production costs decrease.
2. **Indirect effects:** GenAI’s influence on industries through demand and supply shifts, such as variations in downstream demand, regional investment activity, production costs, and relative prices of imported vs. domestic goods drives broader macroeconomic changes.

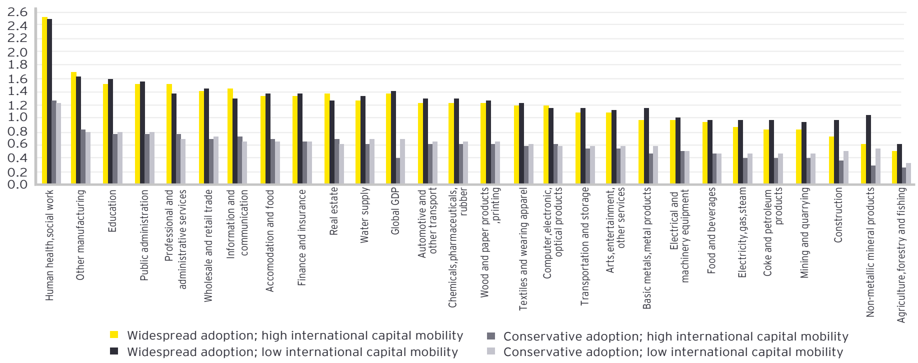
For example, while an industry may benefit from cost reductions through GenAI technologies (direct effect), it may also face challenges if its primary producers are in regions experiencing negative macroeconomic effects, such as capital outflows, which are examples of indirect effects.

Consequently, the global sectoral outcomes we discuss not only reflect the general trends in GenAI adoption across sectors but also account for the wider regional macroeconomic shifts prompted by GenAI. Moreover, since EY UPGRADE CGE model contains a rich representation of global supply chains, some of the sectoral effects described below are also driven by increasing demand from GenAI-augmented downstream industries across the world.

From health to agriculture: predicting GenAI's varied effects

Globally, the health care sector stands to gain the most from the adoption of GenAI technologies. By 2033, depending on how quickly and widely the sector embraces GenAI (as outlined in our conservative vs. widespread diffusion scenarios), we expect its output to grow by between 1.2% and 2.5%, as shown in Figure 6. The main reason for this growth is the substantial boost in productivity that GenAI brings to health care. The connection between GenAI and productivity is clear: the technology's diverse applications, such as improving diagnostic precision through electronic health records, advancing data analytics, refining patient-caregiver communication, and better stratifying patient risk, directly contribute to more efficient and effective health care services, thereby driving the sector's productivity upward.

Figure 6: Impact of GenAI on global sectoral production, percentage change from the baseline level in 2033



Source: EY analysis based on the EY UPGRADE CGE model.

We also expect major impacts of GenAI on output in sectors such as education, public administration, and professional services. For professional services and public administration, GenAI will help cut down on routine tasks, freeing up time for more complex and valuable work. In education, GenAI is set to revolutionize learning by making it more personalized and adaptable, which will improve the quality of education. Furthermore, as GenAI drives up incomes and expenditure, governments will see an increase in tax revenue, leading to more government spending. Education and public administration, which heavily rely on government funding, will likely see a boost in output from this increased expenditure. Additionally, as GenAI becomes more widespread, there will be a growing demand for highly skilled professionals whose work it complements, as well as for research and development. This will further drive the need for educational courses and resources to support such innovation.

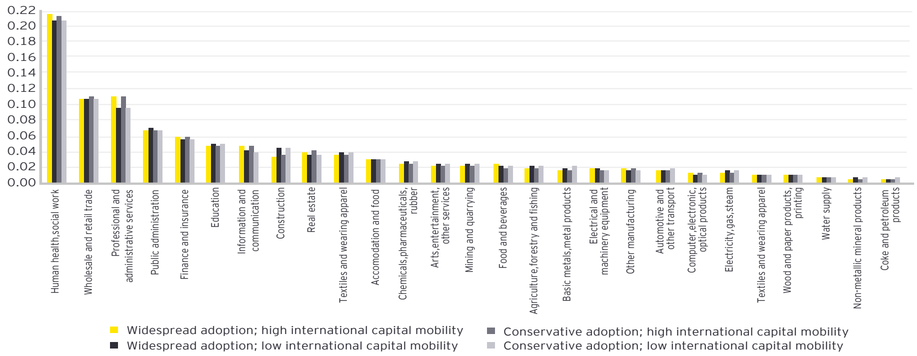
We expect sectors with less exposure to GenAI, such as agriculture, non-metallic mineral products, and construction, to see only modest output increases of between 0.2% and 1.0%. It is worth noting that the outcomes for non-metallic mineral products and construction are closely tied to assumptions about international capital mobility, given their significant share in total investment spending.

Nonetheless, even sectors that do not directly benefit from GenAI productivity enhancements may still experience positive effects from the overall economic changes it brings. For instance, sectors such as real estate or water supply may witness increased demand stemming from downstream industries thatare positively impacted by GenAI

Sectoral contributions to GenAI-driven GDP growth

We also assess how GenAI-induced shifts in global sectoral output contribute to the overall change in global real GDP, considering the share of each industry in GDP. As shown in Figure 7, the rapidly expanding human health sector is expected to account for more than 20% of the GenAI-driven increase in global real GDP. The retail and wholesale trade sector, due to its substantial size, is also anticipated to have a significant impact on the global economy through GenAI integration. In contrast, the "other manufacturing" sector, which encompasses products such as medical devices, may exert a lesser influence on overall real GDP growth, despite experiencing considerable output changes, because of its smaller share of the global economy.

Figure 7: Sectors' contribution to global GenAI-driven real GDP growth (% of additional real GDP growth due to GenAI up to 2033)



Source: EY analysis based on the EY UPGRADE CGE model.

Chapter 4

GenAI and the new economic era: business leaders' insights on the path to transformation

For business leaders aiming to navigate the new economic landscape shaped by GenAI, key strategies include: (1) leveraging GenAI for a competitive advantage, (2) staying informed about potential shifts in investment and related policies, (3) integrating into the GenAI supply chain, and (4) driving innovation with GenAI in services.

Given the significant impact of GenAI on global trade and investment, it is essential for business leaders to consider these insights in their strategic planning:

1. **GenAI and international competitiveness:** Business leaders should be aware that the deployment of GenAI technologies may be essential to maintain international competitiveness and help their businesses grow. In sectors highly active in global trade, such as manufacturing activities, divergences in GenAI adoption across countries may lead to significant changes in exports and production levels. Therefore, it is crucial for businesses operating in the global market to stay up to date with the latest GenAI technologies and incorporate them rapidly.
2. **The role of international capital flows:**They should understand that high GenAI adoption rates in certain regions may create significant investment opportunities, potentially leading to shifts in global capital flows. Watch out for various domestic programs and funding schemes that may support GenAI adoption in your home country.
3. **GenAI supply chain:** They should seek opportunities related to participation in the GenAI supply chain, which will become even more active in upcoming years and involve multiple stakeholders across advanced manufacturing and professional services industries.
4. **GenAI augmentation in services:** Executives across various services sectors, especially health care, should recognize the large scale of potential benefits stemming from GenAI adoption. GenAI engineers should recognize the opportunity to develop innovative solutions for successful application across industries with the greatest potential for GenAI adoption.

Chapter 5

Summary

This study has examined the multifaceted economic impact of GenAI, assessing its influence on global trade, investment flows, international competitiveness, and sectoral dynamics. Our projections indicate that service sectors, notably health care, education, administration, and professional services, stand to benefit significantly from GenAI technology implementation. We also highlight the pivotal role of GenAI in shaping international competitiveness, with sectors deeply involved in global trade, such as metal products and electrical equipment, poised to experience varying degrees of impact based on their GenAI adoption rates.

Furthermore, EY analysis underscores the potential for GenAI to induce substantial shifts in investment patterns worldwide, though these shifts will be influenced by the degree of international capital mobility, which is in turn affected by factors like home bias and regulatory frameworks. By providing a quantitative assessment of GenAI's effects, this article contributes to the ongoing discussion on GenAI by illustrating how productivity enhancements and global sectoral interconnections will drive the economic transformation brought about by GenAI adoption.

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