Navigating the influence of AI on inflation and interest rates

Building a better working world

Content

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Join us on an exploration of the dynamic world of artificial intelligence (AI) and its effects on inflation and interest rate trends across Europe, the Middle East, and Africa. Our goal is to determine AI's impact on aggregate supply and demand, and structural drivers of interest rates to discover the consequences of AI implementation for prices and the cost of capital.

In brief:

- We expect AI to have a modest positive impact on inflation.
- We anticipate that AI will exert a stronger upward influence on interest rates than on inflation, with the impact varying significantly across different regions.

In this article, we aim to merge two fascinating topics: (1) the economic ramifications of AI and (2) the outlook for inflation and interest rates. Will employing AI help inflation stabilize at central bank target levels or make life more difficult for central bankers? Will it push up interest rates?[1]

1 In our analysis, we consider five regions: Western Europe, Southern Europe, Central and Eastern Europe (CEE), the Middle East and North Africa (MENA), and Sub-Saharan Africa. Western Europe includes Germany, France, the UK, Ireland, Switzerland, Austria, Benelux and Nordic countries. Southern Europe covers Portugal, Spain, Italy, Cyprus, Malta, and Greece. Central and Eastern Europe includes the Baltic countries, Poland, Czechia, Slovakia, Hungary, Romania, Bulgaria, Albania, and the countries of the former Yugoslavia. Middle East and North Africa covers Gulf Cooperation Council countries, Iraq, Lebanon, Egypt, Tunisia, Algeria, and Morocco. Sub-Saharan Africa includes the majority of the remaining African countries.

Key findings:

- **AI will have a modest positive effect on inflation:** The interplay between AI's influence on demand, spurred by increased investment and its impact on supply, via productivity enhancements, will be critical in shaping inflation. Over the coming decade, we anticipate that AI's demand-side effects will marginally surpass its supply-side benefits, leading to a slight uptick in prices. At the same time, increased global economic activity will boost demand for commodities, pushing up the prices of energy, food and metals. However, in most cases the resulting lift to inflation will be modest, in the range of 0.1–0.25 percentage points (pp) depending on the region and the AI adoption scenario. Central and Eastern Europe (CEE) is an outlier, potentially experiencing a more pronounced inflation increase of up to 0.8 pp.
- **AI's impact on interest rates will be positive and larger than that on inflation:** AI will exert its influence on interest rates through the two primary channels: (1) the cyclical effects of central banks' responses to price and demand pressures, (2) the structural impact stemming from the increase in productivity growth, demand for investment and inflation expectations. We anticipate these forces collectively pushing interest rates upward, with the magnitude of this effect differing by region and depending on the AI adoption scenario. We predict that CEE will experience the most significant increases of between 0.5 and 1.1 pp, mainly due to cyclical economic factors. Western and Southern Europe may experience more substantial rises ranging from 0.3 to 0.8 pp, while we expect interest rates in Sub-Saharan Africa to climb slightly by 0.1 to 0.2 pp.

Chapter 1

What drives inflation and interest rates and how can AI affect these processes?

Inflation

Prices are fundamentally determined by the balance between aggregate demand and aggregate supply. If aggregate demand is greater than aggregate supply, prices rise.

The total profitable production of goods and services at a given set of prices in the economy forms aggregate supply. Factors such as energy prices, productivity growth, shipping costs, pandemic-era containment measures and weather conditions that affect agricultural output all influence aggregate supply. On the other hand, demand-side factors influence the ability or willingness of households and businesses to spend at a given set of prices. These include consumer and business sentiment, fiscal policy, monetary policy and access to credit, among others.

As we have discussed in previous articles, while AI is likely to affect both demand and supply, its supply-side impact is more intuitive and easier to grasp. Automating certain tasks will allow businesses to produce more goods and services at the same cost, thereby enhancing supply and easing price pressures. However, such automation will require investment in both software and hardware which will increase demand for them and their prices.

Greater business investment, in turn, can also drive demand for commodities such as energy, food, metals and other raw materials. This will increase their prices, especially given that the AI technology itself is highly energy intensive. AI enhancement of commodity production processes may partially mitigate this effect, for example by increasing efficiency of agricultural production, facilitating the search for new raw material deposits, or accelerating the development of renewable energy sources.

Timing is a key factor — demand and supply may react with varying degrees of delay, creating temporary imbalances that will affect prices.

Interest rates

If AI creates temporary imbalances between aggregate demand and supply, impacting inflation, this will affect central bank decisions on interest rate movements.

What may be more interesting is the potential structural impact of AI on interest rates. Economists use the concept of a natural interest rate, i.e., the level of short-term interest rate that would stabilize an economy absent of shocks. Analogous to inflation, a natural interest rate is determined by the balance between the supply of savings and the demand for investment, as if the interest rate were a price in the market for financing.

AI's primary impact on the natural interest rate is likely to run through higher productivity growth and investment. Enhanced productivity raises the natural rate of interest by diminishing the propensity to save and yielding a greater return on capital, which encourages greater business investment. In turn, an increased propensity of businesses to invest in ICT due to AI boosts overall investment demand and consequently, the natural interest rate.

Chapter 2

Assessing AI's cyclical impact on inflation and interest rates

The approach

To assess AI's influence on inflation, we draw on our prior estimates of AI's effects on investment and productivity, incorporating them into an EY-modified version of the Oxford Global Economic Model (OE GEM). We examine both conservative and widespread AI adoption scenarios.

The OE GEM enables us to analyze both the direct and indirect impacts of investment and productivity on supply and demand. An uptick in investment not only adds to demand, but also gradually bolsters the stock of capital — machinery and infrastructure which influence the economy's productive capacity. In addition to boosting supply, a rise in productivity also increases profits and wages. This, in turn, empowers firms and workers to increase their spending on investment and consumption, stimulating demand.

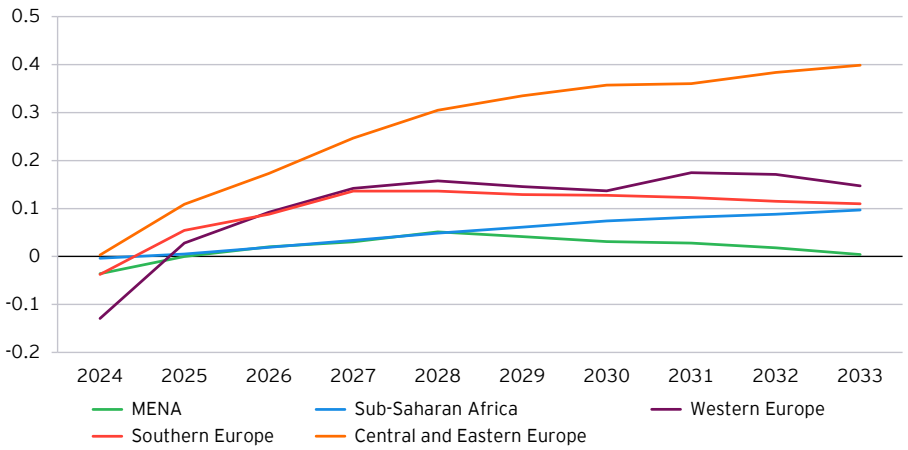
When demand surpasses supply, price pressures mount, leading to inflation. In our model, central banks respond to these demand-supply imbalances and inflation by adjusting interest rates to return to inflation targets. Consequently, if inflation rises due to excess demand, interest rates will also climb to cool down both demand and inflation.

Crucially, the model is dynamic, allowing us to account for variances in demand-supply imbalances, inflation and interest rates at quarterly frequency. At this stage, we assume that natural interest rates remain unchanged, meaning the results reflect only the cyclical effects of AI on interest rates. We explore the influence of AI on natural rates in Chapter 3.

Demand, supply, and commodity prices

As discussed in our previous articles, AI boosts GDP by raising productivity and investment, with variable effects on the demand and supply sides of the economy. The output gap is the difference between aggregate demand (GDP) and aggregate supply (potential output). Figure 1 illustrates the impact of AI on the output gap assuming the conservative adoption scenario. At first, supply exceeds demand in most regions, due to the concentration of early adoption of generative AI (GenAI) in "easy-to-learn" tasks. This leads to a swift increase in productivity that significantly surpasses the initial investment. Subsequently, as AI investment extends to less profitable areas of "hard-to-learn" tasks, the situation evolves with demand outpacing supply. This results in a positive output gap that puts upward pressure on prices. In the widespread AI adoption scenario, the effects on the output gap are twice as large as in the conservative scenario.

Figure 1: AI's impact on output gap under the conservative scenario (percentage points)

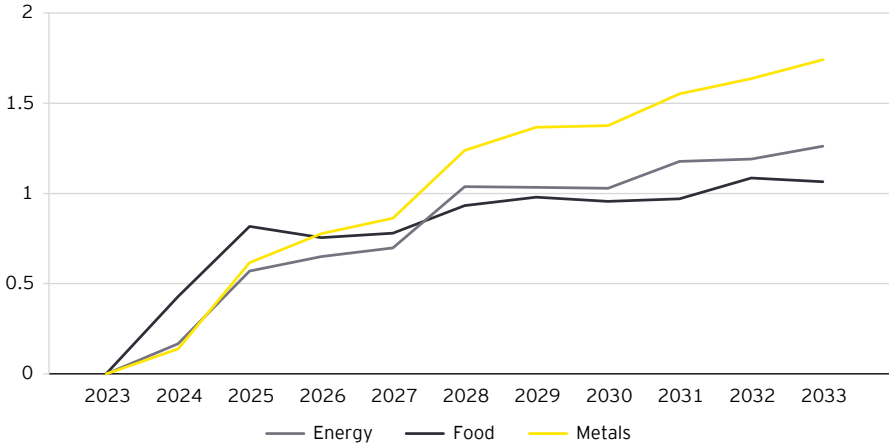


Notes: Estimates obtained by inputting previously estimated effects of AI on investment and productivity as shocks into a modified version of the Oxford Global Economic Model.

Source: EY.

Alongside the output gap, global aggregate demand plays a role as it affects demand for commodities. Demand fluctuations in commodity markets often have a marked impact on prices due to the limited potential for supply to rapidly adjust. Consequently, we estimate that in the conservative scenario, commodity prices may rise by between 1% and 2% by 2033 due to an AI-induced increase in demand, as illustrated in Figure 2. In the widespread adoption scenario, the projected effects are twice as great.

Figure 2: AI's impact on commodity prices under the conservative scenario (%)



Notes: Estimates obtained by inputting previously estimated effects of AI on investment and productivity as shocks into a modified version of the Oxford Global Economic Model.

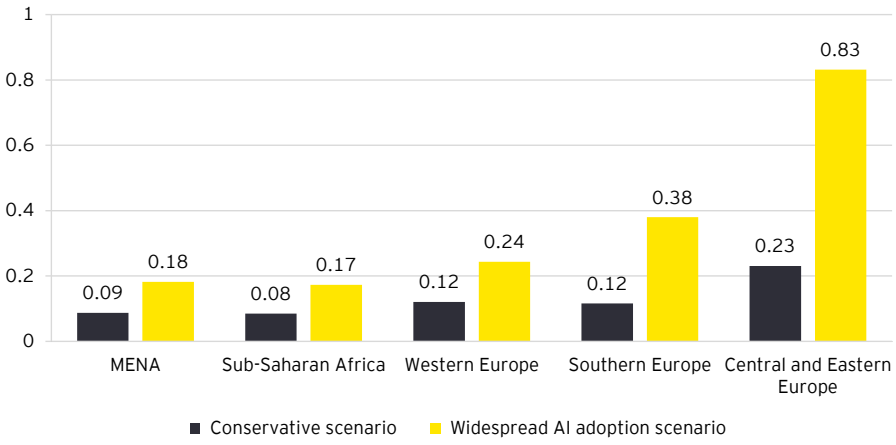
Source: EY.

Inflation

How do these shifts in the output gap and commodity prices affect inflation? In most cases, the impact is modest and similar across regions (Figure 3). In the conservative scenario, annual inflation experiences a maximum increase of 0.1 pp in most areas, with the price level rising by a cumulative 0.6%–0.8% over the decade. The uniformity across regions indicates that the primary inflationary force is the uptick in commodity prices. Central and Eastern Europe stands out with a more significant price increase, which can be attributed to the greater imbalance between demand and supply in this region.

In the widespread AI adoption scenario, the impact on inflation is more pronounced, peaking at 0.4 pp in Southern Europe and 0.8 pp in Central and Eastern Europe. This points to significant non-linearities in the influence of the output gap and commodity prices on inflation. Despite only a doubling of these underlying economic variables in the widespread scenario compared to the conservative one, their effect on inflation is nearly fourfold.

Figure 3: Peak impact of AI on annual inflation during 2024–33 (percentage points)



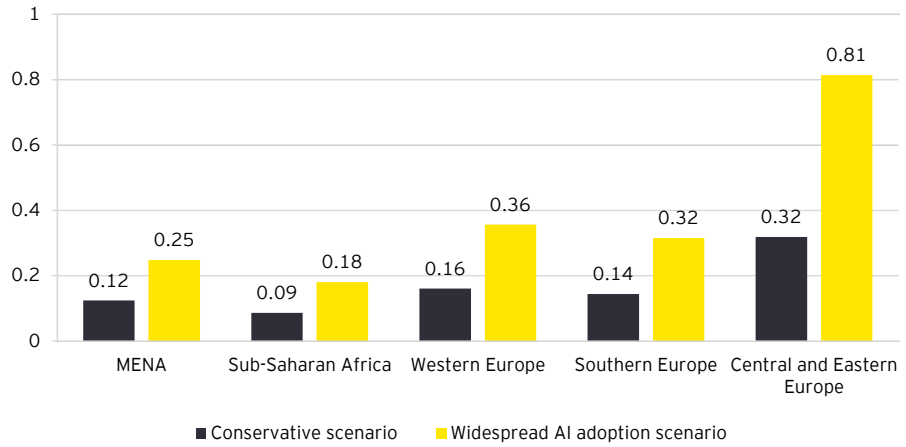
Notes: Estimates obtained by inputting previously estimated effects of AI on investment and productivity as shocks into a modified version of the Oxford Global Economic Model.

Source: EY.

Interest rates

With marginally stronger demand and slightly higher inflation, central banks respond with a modest tightening of monetary policy, culminating in a peak increase in rates by between 0.05 and 0.15 pp in the conservative AI adoption scenario, as shown in Figure 4. The policy response is more pronounced in Central and Eastern Europe. In the widespread AI adoption scenario, the monetary policy tightening is double the magnitude of that in the conservative variant.

Figure 4: Peak cyclical impact of AI on interest rates during 2024–33 (percentage points)



Notes: Estimates obtained by inputting previously estimated effects of AI on investment and productivity as shocks into a modified version of the Oxford Global Economic Model.

Source: EY.

It is important to note that these findings relate solely to cyclical variations in interest rates, with the assumption that the natural interest rate remains constant. In the next chapter, we consider the extent to which AI can influence structural factors driving the natural interest rate and how this will influence the natural rate itself.

Chapter 3

Unveiling AI's influence on the natural rate of interest

Having explored the cyclical effects of AI on interest rates, we now turn our attention to estimating the influence of AI on the natural interest rate over the next decade. To achieve this, we quantify the effects of structural factors most often cited in academic literature on the natural interest rate using a panel error correction model. We then combine these insights with our findings on AI's influence on GDP growth, investment and inflation.

Identifying the drivers of the natural interest rate

Using a panel error correction model with quarterly changes in central bank interest rates as a dependent variable, we attempt to distinguish short-term and long-term drivers of the interest rates. Here, we interpret short-term fluctuations as cyclical deviations from the natural interest rate, while long-term changes indicate shifts in the natural rate itself. Details of our approach are in the methodology annex.

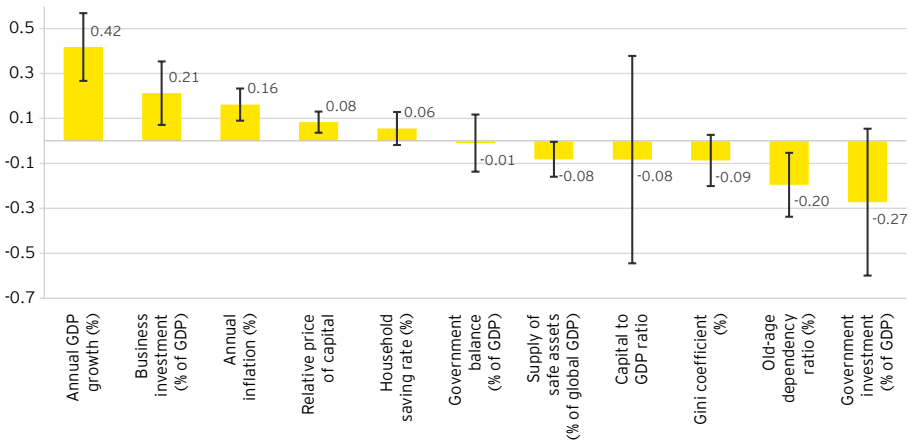
Our analysis reveals that six factors consistently correlate[2] with natural interest rates: GDP growth, business investment, old-age dependency ratio (proxying for demographic developments), the relative price of capital, inflation and the supply of safe assets (Figure 5).

In our earlier research, we estimated AI's impact on GDP growth, investment and inflation. We assume that AI does not affect the other identified drivers of natural interest rates.[3] This assumption allows us to quantify AI's effect on the natural interest rate across the EMEA regions.

2 i.e., they are statistically significant at a 10% significance level.

3 While for demographics and the supply of safe assets this is uncontroversial, one could argue that AI, by driving investment, may increase the relative price of capital.

Figure 5: Drivers of natural interest rates: estimates from the panel error correction model



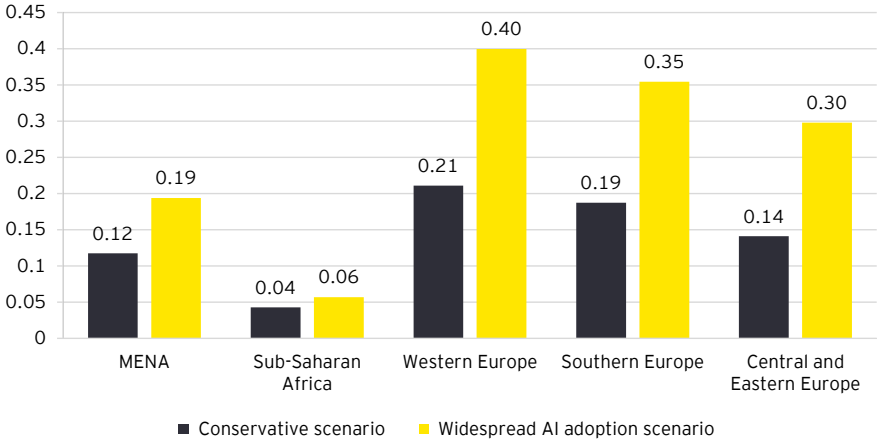
Notes: Columns indicate point estimates, while whiskers show 90% confidence bands. Estimates obtained from a panel error correction model that uses quarterly changes in central bank interest rate as a dependent variable, output gap and inflation as its short-term drivers, includes fixed effects in the cointegrating equation and controls for cross-sectional dependence. The model is estimated on a panel of 50 countries on quarterly data over a period of 1981–2023.

Source: EY.

AI's impact on the natural interest rate and overall interest rates

We find that AI would raise the natural rate of interest by less than 0.1 pp in Sub-Saharan Africa but between 0.2 and 0.4 pp in Western Europe, contingent on the AI adoption scenario. The rising investment-to-GDP ratio is a primary driver of the upward shift in natural interest rates, with GDP growth also contributing significantly, while inflation's impact is minor.

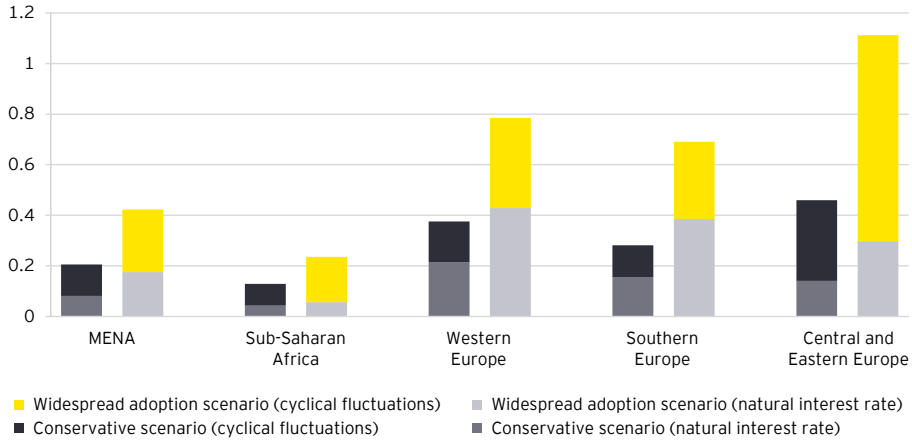
Figure 6: Impact of AI on the natural interest rate in 2033 (percentage points)



Source: EY.

Finally, we integrate the effects of AI on the natural interest rate with the cyclical impacts discussed in Chapter 2 to calculate AI's combined influence on interest rates (shown in Figure 7). Although we expect AI to push interest rates higher, the magnitude of this effect varies by region and scenario. Sub-Saharan Africa sees the smallest increase of 0.1–0.2 pp, with MENA following. In Europe, effects are more substantial, particularly under the widespread AI adoption scenario. Central and Eastern Europe experiences the most notable rise, with an increase of 0.5 pp under the conservative scenario and a more substantial rise of 1.1 pp under the widespread adoption scenario, due to the pronounced demand-supply imbalance influencing the cyclical component of interest rates.

Figure 7: Peak impact of AI on interest rates during 2024–33 (percentage points)



Source: EY.

Chapter 4

Implications for policymakers and business leaders

Business leaders must adapt to the changing dynamics of inflation and interest rates influenced by AI. While GenAI could lift productivity and economic growth, businesses must be prepared to address the following challenges that AI may introduce:

- AI's influence on the pricing of specific software and ICT equipment could be significant. Companies should account for this increased price uncertainty in their long-term procurement strategies.
- The anticipated rise in productivity growth and investment demand, coupled with the potential for a cyclical increase in inflation, are likely to sustain elevated interest rates. Businesses should factor in this higher cost of capital when planning strategically.
- Business leaders must be cognizant of the regional variations in the economic impact of AI, particularly when planning for international business activities. They should incorporate these disparities into global strategic planning to ensure informed decision-making.

For central bankers, our findings show that:

- Policymakers must recognize that beyond AI's positive contributions to productivity and growth, it may also precipitate temporary demand-supply imbalances affecting inflation. It is paramount to carefully monitor AI's effects on both demand and supply and be ready to recalibrate policy in response to emerging imbalances.
- We expect the positive effects AI exerts on investment and productivity to elevate the natural interest rate. Central banks should integrate AI's impact on natural rates into their forecasting models, and policymakers ought to consider these heightened natural rates when formulating interest rate expectations and shaping monetary policy.

Summary

In our analysis, we have delved into the influence of AI on inflation and interest rates throughout the EMEA region. Our findings suggest that AI is likely to induce a modest uplift in annual inflation by 0.1–0.25 pp in most areas, with Central and Eastern Europe experiencing a more pronounced effect. We also anticipate interest rates rising due to AI, with the extent of the increase varying widely by region and depending on the level of AI adoption. In Sub-Saharan Africa, the rise could be modest, between 0.1 and 0.2 pp, while Central and Eastern Europe might see a more substantial hike of between 0.5 and 1.1 pp. Central bankers need to consider AI's impact on key economic indicators when formulating monetary policy. Similarly, business leaders should factor in AI's influence on inflation and interest rates into their operational and strategic planning.

Methodology

The panel error correction model assumes that in the short term, movements in output gap and inflation prompt changes in central bank interest rates and that interest rates converge toward their long-term equilibrium, i.e., the natural interest rate. To identify potential drivers of the natural interest rates, we evaluate various factors cited in academic literature: productivity growth, demographics, income inequality, supply of and demand for safe assets, changing propensity of households and businesses to save and invest, government deficit and investment and relative price of capital (see Figure 5). We have estimated the model using quarterly data from a global panel of 50 countries, beginning in 1981 (though for many countries, observations start later) and ending in 2023.

The model includes fixed effects in the cointegrating equation, i.e., it allows the level of natural interest rate to vary across countries for reasons other than variations in included variables. It also includes cross-country averages of quarterly changes in central bank nominal interest rate as one of the drivers of short-term fluctuations in interest rates to control for correlation in interest rates across countries. This addresses the issue of cross-sectional dependence in the spirit of the common correlated effects estimator of Pesaran (2006).

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