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Productivity, AI, and Demographic Change

In this briefing we highlight the main findings and recommendations of three external studies requested by the ECON Committee on the future interaction between artificial intelligence (AI) and demographic change, and how those two forces could impact the long-term economic growth assumptions underlying the European Commission's 2024 Ageing Report.

As a first conclusion, all three studies identify the **need to enrich the production-function framework in the Ageing Report** to better capture the structural changes associated with demographic change and AI. **Torben Andersen** discusses how aging can lower productivity growth and how treating generative artificial intelligence (GenAI) simply as higher (potential) total factor productivity (TFP) could miss important structural changes in labour markets. The substitutability between (capital intense) GenAI and labour may differ from historical patterns with potential implications for employment, wages and the labour share. He argues that long-term growth projections should be complemented with transparent sensitivity scenarios that explicitly account for age-related productivity dynamics and changes in public sector efficiency. **Antonin Bergeaud** decomposes the TFP by distinguishing several underlying channels, including labour input and capital deepening, research effort and the idea frontier, market structure and allocative efficiency, as well as AI-related automation, diffusion and domestic value capture. In particular, he shows that an aging, more inertial consumer base reduces firm entry, increases market power, and lowers allocative efficiency. He demonstrates that explicitly modelling these structural channels can lead to substantially different GDP per capita compared to the Ageing Report, even before accounting for revised population paths (see point on fertility). **Klaus Prettner and Alexia Prskawetz** also note that a standard growth accounting approach does not adequately capture changes in the substitutability between capital and labour, advocating for a production model that can distinguish between traditional capital, industrial robots, and AI. They suggest differentiating between technologies that replace routine manual tasks (robots) and those replacing non-routine cognitive tasks (AI).

Second, recent demographic data show that European fertility rates have fallen significantly faster than assumed in earlier official projections, and **realised demographic dynamics are less favourable today compared to what had been expected in the Ageing Report**. The EU fertility rate fell to 1.34 in 2024, compared with the 2024 Ageing Report assumption of an increase from 1.50 in 2022 to 1.62 by 2070. All three studies therefore argue that recent fertility developments warrant greater attention in future Ageing Report exercises. **Andersen** emphasises the importance of healthy ageing. Conventional old-age dependency ratios may overstate the economic burden of ageing when longer lives are accompanied by better health and longer working lives. At the same time, lower fertility creates a delayed, non-linear impact on public finances: it initially reduces younger cohorts but eventually shrinks the working-age population and the tax base. Andersen also cautions that global population declines and international talent retention policies could severely limit Europe's ability to

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offset these labour shortfalls through foreign migration. **Bergeaud** demonstrates the impact of updating fertility rates (1.34 births per woman in 2024 as opposed to 1.5 assumed for 2022 in the Ageing report) leading to a 6.9 percent smaller EU population by 2070 and a 3.2 percentage point loss in GDP per capita relative to the 2024 Ageing Report baseline. His simulations illustrate the non-linear impact of lower fertility rates on economic growth. Importantly, however, demographic change does not translate mechanically into weaker (per capita) growth. Although lower fertility would normally be expected to reduce growth, it initially raises GDP per capita because the smaller younger cohorts reduce the number of dependants before the smaller cohorts affect the workforce, including the number of researchers, in the 2040s and later. **Prettner and Prskawetz** stress that declining fertility is the primary driver of long-term workforce shrinkage and that long generational lags imply that even a future recovery in fertility would take decades to affect labour supply. They stress that economic consequences of aging are not pre-determined but depend on labour-force participation, human capital, innovation and capital deepening. Their analysis suggests that ageing has typically lowered annual GDP growth by around 0.2–0.8 percentage points, mainly through lower labour productivity, while countries that increase participation among women and older workers, invest in education and adapt pension systems experience considerably smaller effects.

Third, all three studies conclude that higher AI-led productivity does not automatically improve fiscal sustainability. Although AI adoption can significantly boost worker productivity, these economic gains do not automatically translate into healthier public finances or improved debt sustainability. **Andersen** highlights that rising age-related expenditures are likely to increase public employment at a time when the workforce is shrinking, adding to labour-market adjustment pressures. At the same time productivity growth, although it broadens the tax base, can also raise public sector wages. Moreover, if global productivity growth raises the real rate of return alongside growth, the favourable effect on the interest-growth differential may be limited. The fiscal implications therefore depend not only on productivity per worker, but also on employment, hours worked, the tax base and the evolution of age-related expenditure. **Bergeaud** is the most explicit on this point, proposing a full-fledged simulation framework to build AI-related risk scenarios. Bergeaud shows that lower fertility reduces aggregate population and therefore aggregate GDP, meaning that positive effects of AI on GDP per capita must first compensate for a smaller population before improving the debt-to-GDP denominator, and AI-driven productivity can increase (global) interest rates. Even highly favourable AI configurations can therefore result in debt ratios above the 2024 Ageing Report baseline. **Prettner and Prskawetz** observe that while AI productivity gains can cushion demographic headwinds, they are unlikely to fully compensate mounting pension and healthcare spending pressures.

Fourth, all authors highlight the importance of current policy choices with longer (healthy) working lives having the biggest impact. Policymakers can decisively alter Europe's long-term economic path by aligning fiscal, labour, and technology policies rather than treating demographic trends as unchangeable fate. **Andersen** recommends higher employment among older workers, healthy ageing and institutional adaptation including targeted organizational and budget reforms in public service delivery to overcome "Baumol's cost disease" in healthcare and education, alongside maintaining the intergenerational social contract. **Bergeaud** demonstrates that raising the effective retirement age by two years is the single most effective policy lever available, recovering nearly 2.8 percentage points of GDP per capita relative to the Ageing Report, while directly easing pension spending. **Prettner and Prskawetz** call for linking statutory retirement ages to life expectancy, protecting public investments in education and R&D from fiscal consolidation, expanding affordable childcare and long-term care to support female labour participation.

In sum, all three studies suggest that **demographic developments will increasingly constrain the size of the future workforce**, while **AI could create potentially large but highly uncertain productivity gains**. But **current policy choices will determine to a significant extent how those two forces translate into growth and fiscal sustainability**.

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