The heat is on: Heat stress, productivity and adaptation among firms

Category: Climate,Uncategorized
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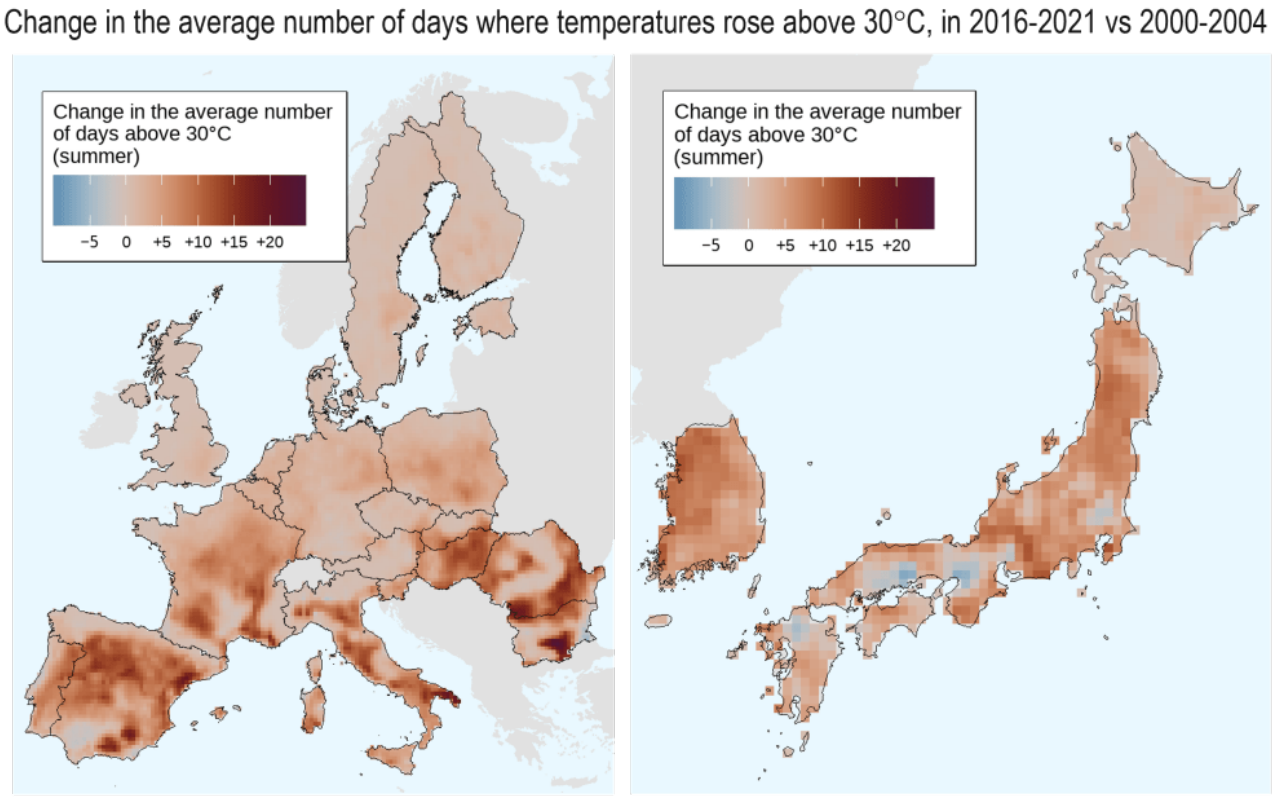
The pace of temperature increase has been steadily accelerating over the past decades (IPCC, 2021). The increasing frequency and intensity of heat stress episodes due to climate change poses significant threats to the global economy, including through its effects on productivity. Despite recent more stringent mitigation efforts and the expectation that climate targets will be met, temperatures are still projected to rise, raising concerns about the economic costs associated with climate change.

One key channel through which temperature affects economic outcomes is labour productivity. As temperatures increase, both the cognitive and physical capacity of workers decrease, and extreme temperatures can also increase absenteeism due to heightened health issues and transport disturbances. Beyond its direct effect, heat stress can further impact productivity through disruptions to infrastructure (such as energy), increased production costs, or disruptions to supply.

Against this backdrop, our new paper (Costa et al., 2024) presents novel cross-country firm-level evidence on the effect

of heat stress – both slow onset events (gradual temperature increases) and extreme weather events (heatwaves) – on labour productivity. The analysis builds on a unique dataset gathering detailed weather and financial information for more than 2.7 million manufacturing and services firms across 23 advanced economies between 2000 and 2021, complemented with country-level information on adaptation investment. The newly constructed dataset reveals that the number of warm days and the incidence of heatwaves present an increasing pattern in the period of analysis in most locations (Figure 1).

Figure 1. The number of warm days increased in most locations in the sample period

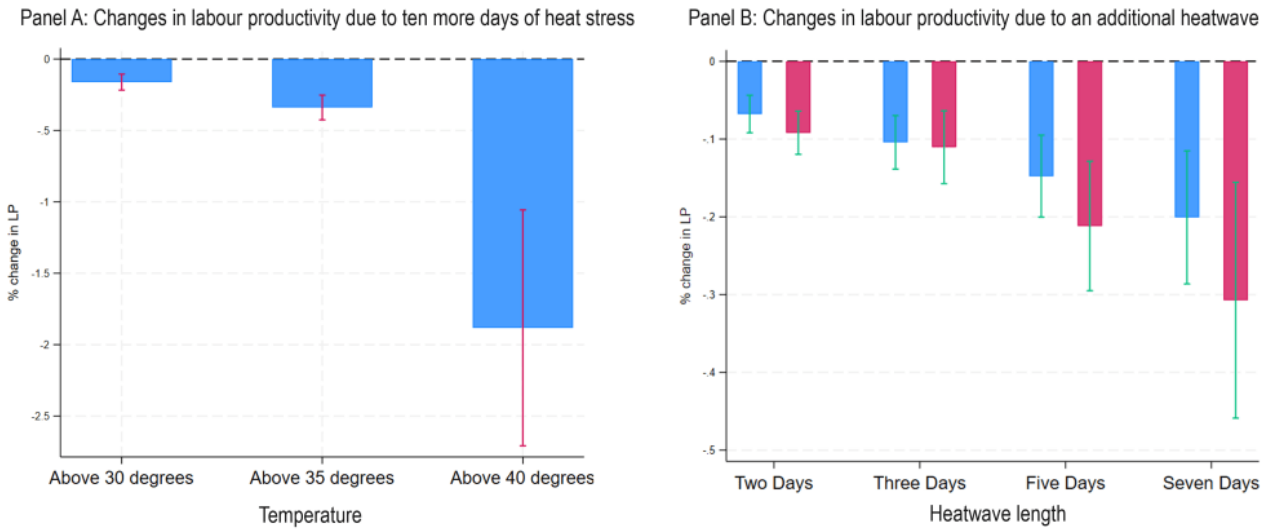


Note: The maps show the change in the average number of days in the year where the daily maximum temperature rose above 30°C, in the last five years of the analysis period (2016-2021) relative to the first five years (2000-2004).
Source: Costa et al. (2024) based on data from Orbis and ERA-5 reanalysis data (Copernicus Climate Change Service).

How do extreme temperatures affect firm productivity?

We find that both more frequent high-temperature days and the occurrence of heatwaves lead to substantially reduced labour productivity (Figure 2). Ten extra days above a temperature of 35 degrees Celsius in a year result in a 0.3% reduction in firms' annual labour productivity. This effect is comparable, for example, to the decrease in productivity following a 5% rise in energy prices (André et al., 2023). One additional heat wave lasting at least five days, in turn, causes a 0.2% reduction in firms' annual labour productivity.

Figure 2. Higher temperature negatively affects productivity



Note: Bars represent estimated coefficients and vertical lines the respective confidence intervals. Each bar is a different estimation. In Panel A each estimation differs with respect to the definition of the temperature variable, which is either the number of days above 30ºC, or above 35ºC or above 40ºC. In Panel B, each estimation differs with respect to the definition of heat wave, varying both the temperature threshold above which temperature has to rise for a heat wave to have occurred (90th and 95th percentile of the local historic mean) and the minimum number of consecutive days this temperature needs to have occurred.
Source: Costa et al. (2024)

This effect is more pronounced in less productive and smaller firms, and exacerbated by longer heat waves, high humidity,

and low wind speeds. We also find that the negative productivity impacts exhibit a non-linear relationship with rising temperatures and persist for two years before fading. The heterogeneity of the impact across firms suggests differences in not only exposure but also vulnerability to heat stress. Larger firms, for instance, may have greater resilience to rising temperatures thanks to better financial resources, access to advanced technology, and knowledge of behavioural adaptation practices.

The analysis suggests some degree of adaptation may have already taken place. Firms in warmer locations and those more used to experiencing heatwaves exhibit lower productivity losses under similar temperature extremes. Additionally, both the implementation of National Adaptation Plans and firm-level investment in adaptation are also linked to reduced adverse effects of heat stress on productivity. However, the extent of current adaptation remains limited: higher temperatures relative to an already warm average result in more significant productivity losses, and there is no evidence of adaptation to severe extreme temperatures.

Directions for policy

In highlighting the substantial economic impacts of temperature-related changes, our analysis underscores important productivity and growth challenges posed by both gradual and disaster-driven climate impacts, providing valuable insights for policy making. First, sustained efforts in climate change mitigation are key to attenuating the increase in temperatures and the intensity and frequency of heat waves. This is particularly important given the non-linearity of costs to extreme temperatures and the limits to the effectiveness of adaptation suggested by our analysis.

Second, our results stress the urgent need to limit the economic impacts of heat stress through enhanced adaptation measures, tailored to different national and regional contexts

to account for relevant heterogeneities in impacts and capacity. Where barriers to effective private sector engagement exist, like information and knowledge gaps, financial constraints, or coordination failures, policy efforts could prioritise promoting private sector adaptation. For example, while more than 60% of firms in the European Union report being impacted by the physical risks of climate change, only slightly over one-third have taken concrete steps to build resilience (EIB, 2023).

Policymakers can support firms, particularly small and medium-sized enterprises, through targeted economic incentives such as subsidies or tax breaks to encourage investments in heat-resilient infrastructure and technical measures, like green roofs or advanced cooling systems. Additionally, providing information to firms can drive behavioural changes, such as adjusting work schedules to avoid peak heat periods. Complementary direct public investment may be necessary, for example in changing urban structure, climate-proofing transport systems, or investing in adaptation technology R&D.

Lastly, heat stress is just one of many climate-related challenges confronting economies. Other slow onset and extreme weather events can pose significant risks for firm-level performance and broader macroeconomic outcomes. Our upcoming research dives into these risks from two angles: we explore how flooding impacts firm performance – focusing on output, capital, and investment – and how regional macroeconomic results are impacted by extreme weather events. Together, these efforts aim to provide a more comprehensive understanding of the economic risks posed by climate change and inform the development of robust macroeconomic structural models.

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A heated issue: The unequal impacts of climate change and climate change mitigation

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by Jule Hodok.

The direct impacts of climate change are unevenly distributed across countries, regions, and socioeconomic groups. Inaction will not only result in significant macroeconomic costs but also deepen existing inequalities (Intergovernmental Panel on Climate Change (IPCC), 2023). However, climate mitigation policies designed to reduce the emission of greenhouse gases (GHGs) also have distributional effects. A new report by the OECD Economics department reviews the distributional consequences of climate change and climate change mitigation as well as illustrates the trade-offs between equity, efficiency, and effectiveness in the design of climate policies.

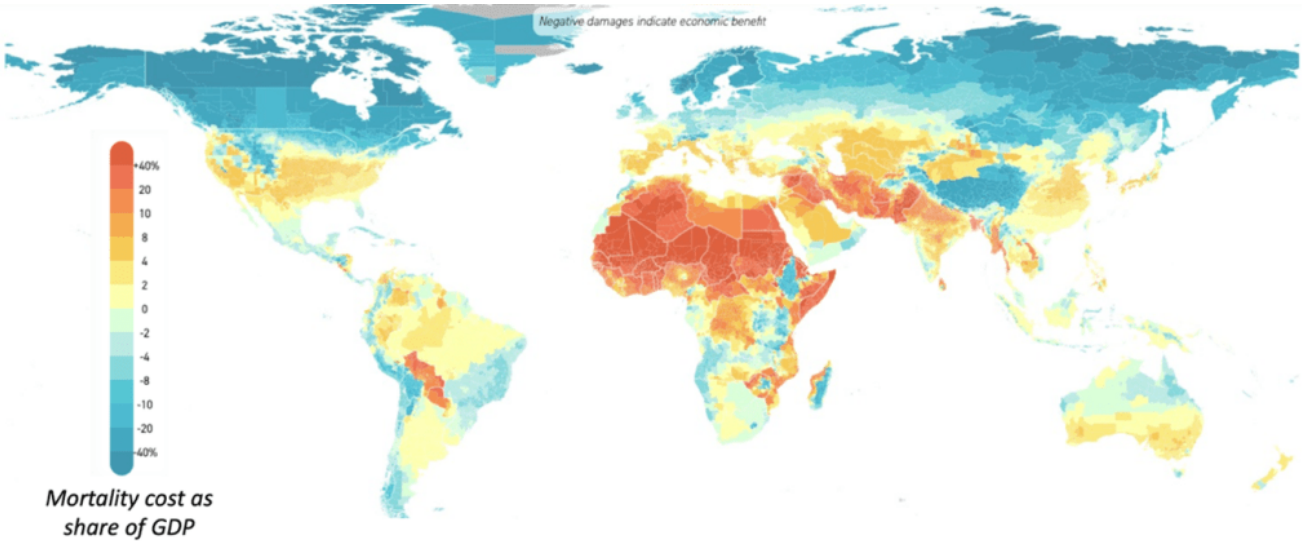
Unequal impacts of climate change

The extent to which a specific group of people, regions and countries are affected by climate change is determined by their exposure and vulnerability:

- "Exposure" is the presence of people, livelihoods, species, or ecosystems in places and settings that could be adversely affected by environmental degradation.
- "Vulnerability" is the tendency to suffer from the adverse effects and/or the lack of capacity to cope or adapt after exposure to climate change (Intergovernmental Panel on Climate Change (IPCC), 2023).

Developing countries are on average more exposed to climate change due to a combination of factors, such as often higher baseline temperatures, higher likelihood of droughts, and the reliance on climate-sensitive sectors, such as agriculture which is highly affected by temperature and precipitation levels (IPCC, 2023). They are also more vulnerable due to lower levels of adaptive capacity and resilience (Bilal & Känzig, 2024; Frankhauser, 2017) (Figure 1).

Figure 1. Predicted mortality cost as a share of GDP under a high emissions scenario



Notes: Estimates are based on a high emission scenario (RCP 8.5) for the end of the century (2080-2099). The methodology for estimating the mortality costs of climate change (temperature-related) derived from (Carleton, et al., 2022). Mortality costs are just one part of health-related impacts of climate change and account for an even smaller share of the overall costs of climate change.
Source: (Climate impact Lab, 2024)

Within countries, drawing clear, general conclusions of the impact of climate change is more difficult. Still, for example, urban areas often face higher risks of extreme temperatures and flooding (Frankhauser & McDermott, 2016), while rural communities tend to be more vulnerable due to a stronger reliance on resource-based industries (OECD, 2021). Evidence also suggests that lower-income households tend to be disproportionately affected, as they often lack the resources to adapt to climate change, e.g. by not being able to afford adaptive technologies, or lower access to quality healthcare and insurance (Bijnens, et al., 2024; Islam & Winkel, 2017).

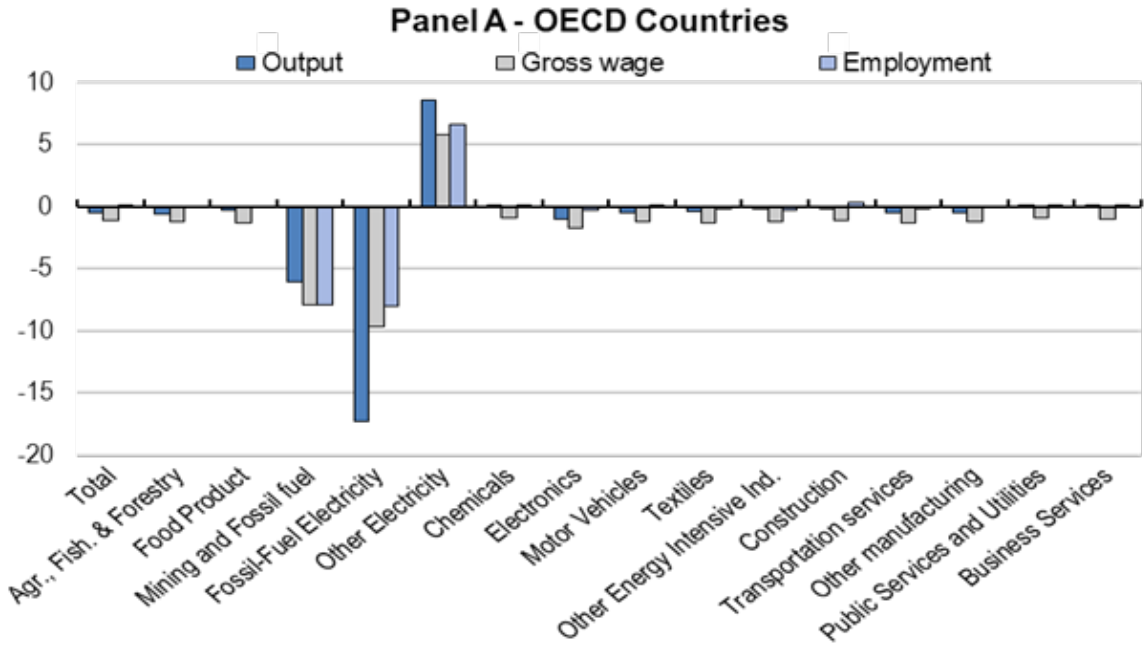
The distributional impacts of climate change mitigation

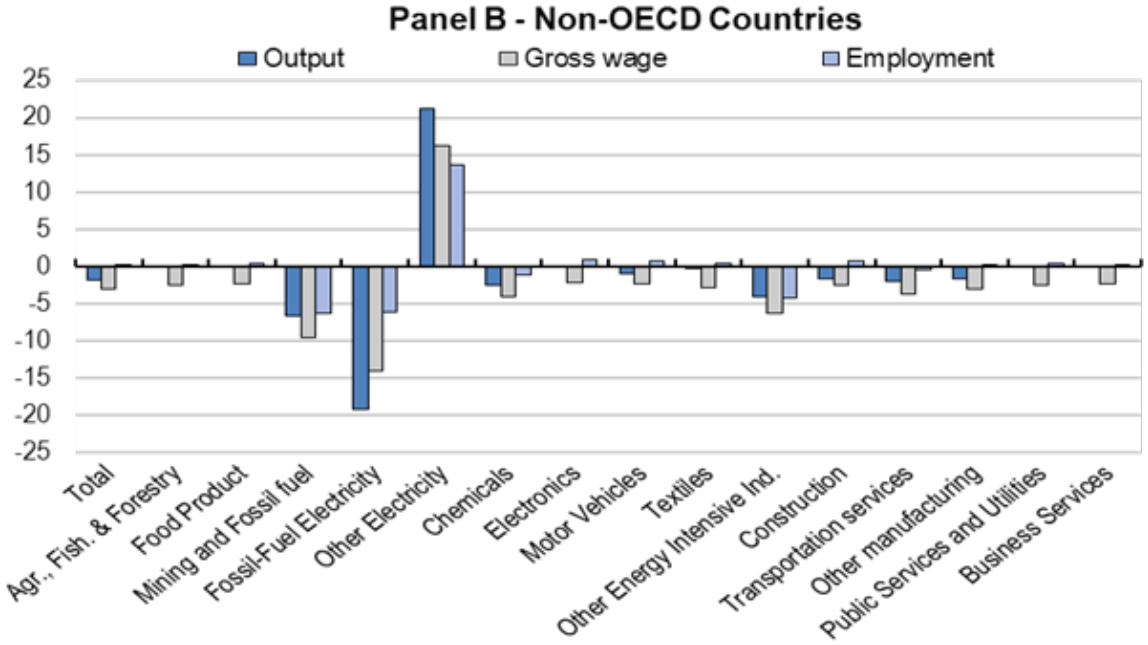
While mitigating climate change can, over the longer term,

help alleviate some of the distributional concerns related to the direct impacts of climate change, climate policies themselves have distributional consequences, from both an income and consumption perspective.

From an **employment and income perspective**, the climate transition will trigger a reallocation of labour and capital, from "high-emission" sectors, firms, and activities to low carbon emitters. For example, research estimates that in response to a global tax of USD 50/tCO_2, fossil fuel industries – which tend not to be large employers overall – would experience a decrease in employment and output, while the largest job gains would occur in low-carbon power generation (Chateau, Bibas & Lanzi, 2018) (see Figure 2 for an overview of sector-specific effects). However, as high-emission industries tend to be regionally clustered, such labour market effects are likely geographically concentrated, potentially widening regional inequalities within countries (OECD, 2021; OECD, 2023). Additionally, low-skilled workers and those with lower educational attainment are often most negatively affected as they tend to face higher barriers to reskilling and job mobility (OECD, 2023; Chateau, Bibas, & Lanzi, 2018).

Figure 2. Change in output, employment, and gross wage by sector in response to central scenario





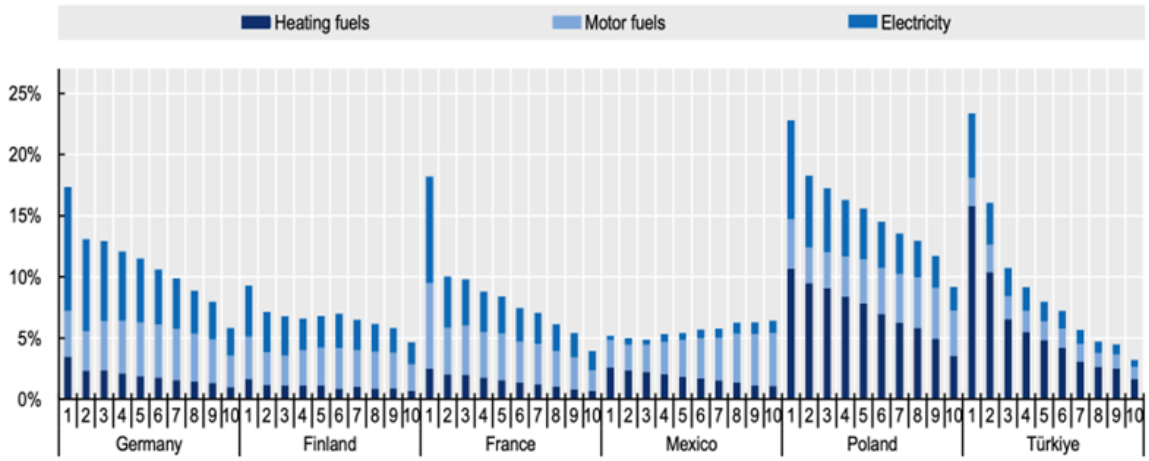
Notes: a carbon tax of USD 50/tCO2 is applied in all regions of the world; percentage change w.r.t reference equilibrium, 2011; OECD ENV-Linkages computable general equilibrium (CGE) is used as a tool for the analysis.
Source: (Chateau, Bibas, & Lanzi, 2018)

From a **consumption perspective**, policies that result in changes in relative prices will affect households differently if they have different consumption patterns. Four key findings emerge based on the review of existing literature:

- In advanced economies, carbon and energy taxation is mostly regressive (Flues & Thomas, 2015; Douenne, 2020; Immervoll et al., 2023). The regressivity often stems from the fact that food and some fuels are a necessity for many households making poorer households unable to reduce their consumption in response to higher prices (Figure 3) (Vandyck et al., 2023; Elgouacem, et al., 2024).
- In developing countries, carbon and energy taxation often are progressive. This stems from the fact that a large subset of the population has low incomes and relatively limited fossil fuel energy use. Developing countries are therefore particularly confronted with the trade-off between energy affordability and addressing climate change as even a small increase in the price of energy may significantly aggravate energy poverty (Dorband et al., 2019; Steckel, et al., 2021).
- The regressivity of policies depends on the specific policy in question and the type of fuel that is targeted. For example, transport fuel taxation is neutral in countries with higher GDP per capita and progressive in countries with lower GDP per capita (Flues & Thomas, 2015; Missbach et al., 2024). Additionally, other factors than income drive distributional effects. For example, most evidence shows that rural households are more vulnerable to carbon taxation, due to limited access to public transport (Causa et al., 2022).
- Non-market-based policies – including bans, standards, and direct regulation – tend to disproportionately affect lower-income households and may result in equity concerns through possibly unaffordable replacement costs of the emission-intensive good (Elgouacem, et al., 2024). Limited research on subsidies and feed-in-tariffs (e.g. for electric vehicles, solar panels, or home insulation) suggests that they tend to primarily benefit higher-income households who have the required capital

to invest in the low-carbon solution (Borenstein & Davis, 2016; Levinson, 2019).

Figure 3. Household expenditures on fuel and other energy, by income decile



Note: Groups 1-10 refer to income deciles. Domestic fuel includes expenditure on gas, liquified hydrocarbons, kerosene, and other liquid fuels, coal, and other solid fuels. Motor fuels includes expenditure on diesel and petrol for transportation.
Source: (Elgouacem, et al., 2024), (Screenshot, Figure 5.5 in paper)

Overall, integrating equity and fairness considerations in the design of climate policies and broader climate strategies can help manage their distributional impacts and improve the social acceptability of a climate transition.

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Derribando barreras al crecimiento en América Latina

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América Latina enfrenta un crecimiento moderado que, aunque resiliente, no es suficiente para mejorar significativamente los niveles de vida y la convergencia en PIB per cápita a países más avanzados. En un contexto donde el crecimiento global se estabiliza apenas por encima del 3% (OECD, 2024), y existen numerosas tensiones globales ¿cómo puede la región reavivar el crecimiento?

El crecimiento económico de la región sigue siendo moderado en 2024, en gran parte debido al efecto de política monetaria para frenar la inflación y a una demanda externa débil. Aunque se proyecta una ligera mejora en el crecimiento en los próximos dos años (Cuadro), gracias a la recuperación de los salarios reales, la resiliencia de los mercados laborales y la relajación de la política monetaria, este crecimiento converge hacia un crecimiento potencial bajo, insuficiente para elevar significativamente los niveles de vida.

Cuadro. Perspectivas económicas para los países de América Latina

	2024	2025	2026
PIB variación, %			
Argentina	−3.8	3.6	3.8
Brasil	3.2	2.3	1.9
Chile	2.4	2.3	2.1
Colombia	1.8	2.7	2.9
Costa Rica	4.0	3.5	3.6
México	1.4	1.2	1.6
Perú	3.1	2.8	2.6
América Latina-7	**1.7**	**2.2**	**2.1**
OCDE	1.7	1.9	1.9
Mundo	3.2	3.3	3.3

	2024	2025	2026
Inflación general, %			
Argentina	120.9	29.8	25.1
Brasil	4.5	4.2	3.6
Chile	4.3	4.2	3.2
Colombia	6.7	4.3	3.1
Costa Rica	−0.4	1.6	2.6
México	4.7	3.3	3.0
Perú	2.4	2.0	2.0
América Latina-6 (sin Argentina)	**3.7**	**3.3**	**2.9**
OCDE	5.2	3.7	2.9

Nota: América Latina 7 es la media ponderada por el PIB a valores de paridad del poder de compra de los 7 países en la tabla para el PIB. América Latina 6 es la media simple de los países incluidos en el cuadro para la inflación excluyendo a Argentina.
Fuente: OCDE Perspectivas Económicas No. 116, diciembre de 2024.

La inflación en América Latina sigue moderándose en la mayoría de los países, acercándose a los rangos meta fijados por los bancos centrales. Sin embargo, persisten desafíos significativos. En Brasil, un repunte inflacionario llevó a su banco central a pausar y, más recientemente, a subir las tasas de política monetaria. Aunque la mayoría de los bancos

centrales han reducido sus tasas de referencia, la velocidad e intensidad varía considerablemente. La relajación monetaria continuará en la mayor parte de los países de la región, pero deberá implementarse con cautela debido a riesgos inflacionarios.

América Latina enfrenta riesgos que podrían frenar su crecimiento. A nivel global, las tensiones comerciales y geopolíticas continúan generando incertidumbre y podrían aumentar la volatilidad de los precios de las materias primas e impactar la actividad económica de la región. Además, la inflación persistente en el sector servicios podría ralentizar la relajación monetaria, tanto global como regional. En el ámbito comercial, un posible aumento de aranceles en EEUU representaría un nuevo desafío, mientras que un crecimiento menor al esperado en China podría impactar a los países más expuestos.

A nivel doméstico, los riesgos incluyen aquellos derivados de elevados déficits fiscales, un creciente nivel de deuda pública y una alta carga de intereses, los cuales se han agravado en casi todos los países. De no abordarse oportunamente, estos factores podrían desencadenar reacciones adversas en los mercados financieros. La mayoría de los países están actualmente rezagados respecto a sus metas fiscales para 2024, lo que hace urgente implementar medidas de consolidación para situar la deuda en una senda descendente y salvaguardar la sostenibilidad fiscal. Por el lado positivo, un mayor crecimiento de los socios comerciales y una coyuntura mundial más benigna podrían impulsar las exportaciones y las entradas de capital, así como un repunte de la inversión podría impulsar el crecimiento.

A pesar de que la región ha afrontado de forma resiliente la coyuntura reciente, el crecimiento proyectado es moderado y aumentar el crecimiento de largo plazo sigue siendo el principal desafío para América Latina. Esto requiere fortalecer la inversión, que permanece débil, y el crecimiento

de la productividad, un reto de larga data en la región.

Impulsar la inversión y la productividad: Reformas clave para un ambiente empresarial competitivo

Mejorar el ambiente empresarial y fomentar la competencia son medidas esenciales para impulsar la inversión y la productividad sin requerir grandes recursos fiscales. Reformar las regulaciones del mercado de productos es clave para eliminar barreras a la competencia, un área donde América Latina está significativamente rezagada, según el reciente indicador de Regulación de Producto de Mercado (PMR) de la OCDE. Por ejemplo, reducir barreras regulatorias en sectores clave, tales como industrias de red (electricidad, transporte, telecomunicaciones) y servicios, podría atraer inversiones más diversificadas y promover la innovación en la región. Además, mejorar la gobernanza de las empresas públicas ayudaría a mejorar el ambiente de negocios.

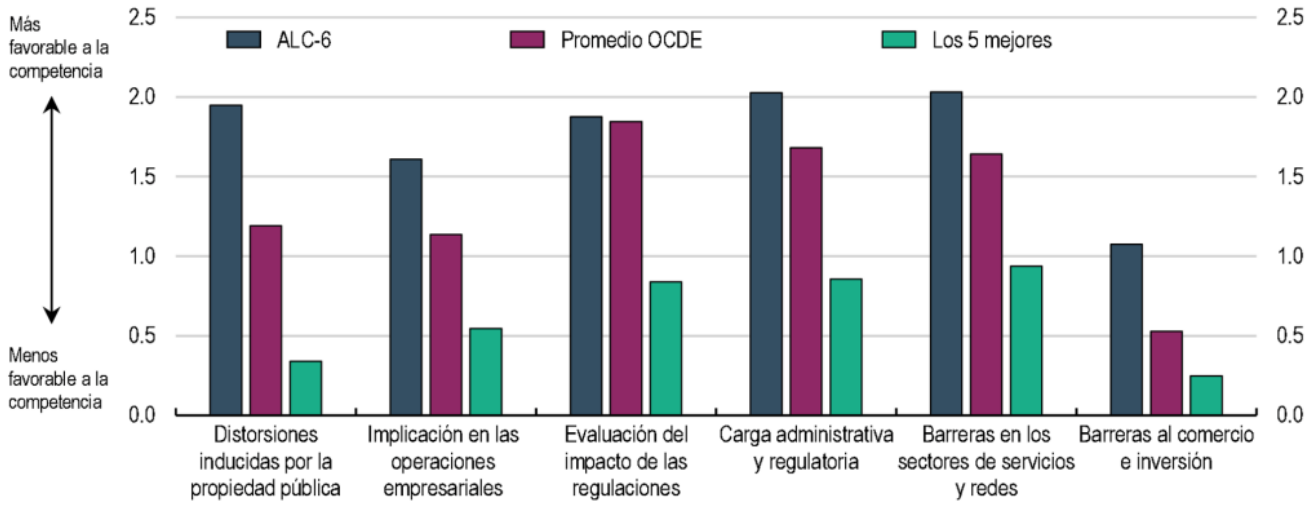
Las reformas prioritarias deben enfocarse en reducir la carga administrativa y los costos de entrada para las empresas, especialmente en el sistema de permisos y licencias, que son altos en la mayoría de los países de la región (Grafico), para impulsar la inversión, la formalidad empresarial y la productividad. Simplificar la creación de empresas mediante ventanillas únicas donde las empresas pueden realizar todos los trámites online y de una sola vez, como en Portugal o Estonia, puede reducir costes y mejorar la eficiencia. Aunque muchos países de América Latina ya cuentan con sistemas similares, es necesario ampliar su cobertura y funcionalidad. Por ejemplo, Chile está discutiendo una reforma para simplificar permisos sectoriales a través de una ventanilla

única, mientras que Argentina creó el Ministerio de Desregulación y Transformación del Estado para simplificar y agilizar trámites, reducir las cargas regulatorias y promover una administración más eficiente.

América Latina debe superar su bajo potencial de crecimiento implementando reformas audaces que derriben barreras al desarrollo empresarial, desarrollen el talento necesario, atraigan inversión y transformen la región en un terreno fértil para la innovación y el crecimiento sostenible. Los vastos recursos de energía renovable y el crecimiento del *nearshoring* brindan oportunidades únicas para América Latina. Invertir en infraestructura sostenible y atraer industrias verdes puede convertir a la región en un líder de sostenibilidad. El momento de actuar es ahora.

Gráfico. Mejorar el entorno empresarial y fomentar la competencia es necesario

Índice de regulación del mercado de productos, 2023



Nota: América Latina (ALC-6) es el promedio simple de Brasil, Chile, Colombia, Costa Rica, México y Perú.
Fuente: Base de datos PMR OCDE 2023-2024.

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Perspectivas económicas de la OCDE para países de América Latina, Diciembre 2024.

Información detallada por país: Argentina | Brasil | Chile | Colombia | Costa Rica | México | Perú

Miracle or Myth? Assessing the macroeconomic productivity gains from Artificial Intelligence

Category: Digitalisation,Uncategorized
written by oecdecoscope | December 12, 2024

By Francesco Filippucci, Peter Gal and Matthias Schief, OECD Economics Department.

Artificial Intelligence (AI) could unleash productivity gains, boost growth, and raise incomes. Indeed, many firms are

looking to the technology to increase productivity, with large documented gains in workers' performance from using Generative AI tools (e.g. Large Language Models similar to ChatGPT) in business contexts such as customer service, business consulting, or software development. Moreover, given its rapidly expanding capabilities, AI is widely heralded as a new General-Purpose Technology (GPT) that could lift macroeconomic productivity growth, as it was the case with the internet and personal computers or with previous breakthrough innovations like the steam engine and electricity (Agrawal, Gans and Goldfarb, 2019; Lipsey, Carlaw and Bekar, 2005; Filippucci et al, 2024).

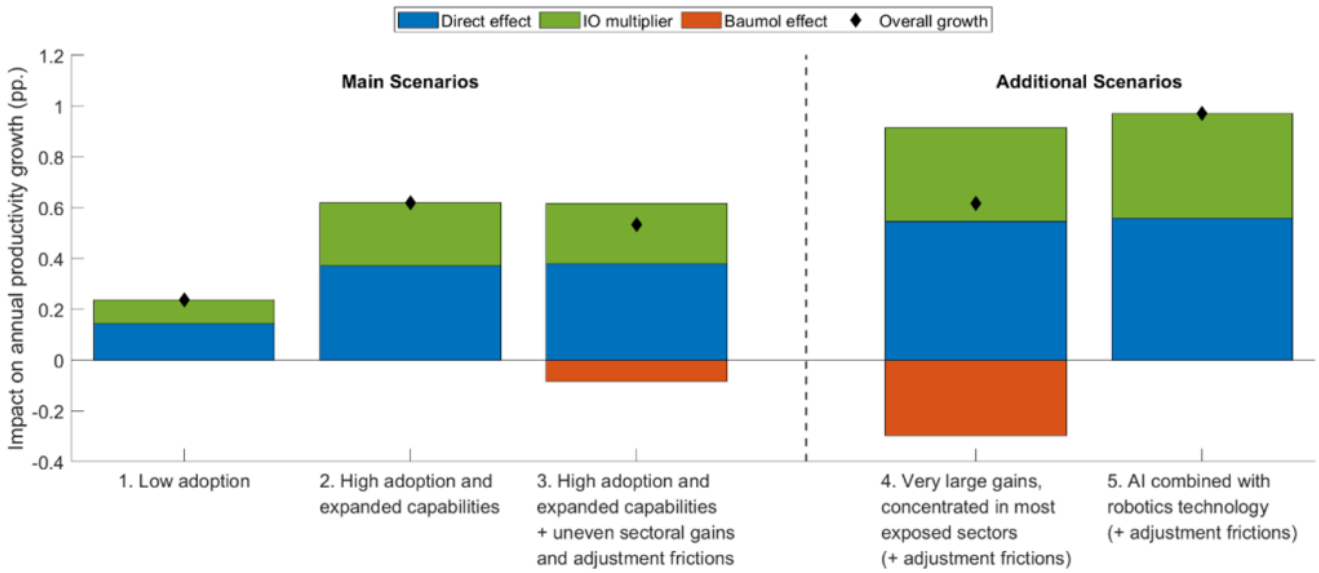
But can current micro-level productivity gains really lead to large productivity gains from AI at the macroeconomic level over the next decade? To answer this question, one needs to consider what share of economic activities would experience productivity gains if AI was adopted ("exposure to AI"), and how quickly firms will adopt AI. Additionally, at the macroeconomic level, one needs to consider that productivity gains can also depend on broader economic factors, such as sectoral linkages, demand responses, or labour and capital market frictions.

A new working paper by the OECD Economics Department (Filippucci, Gal and Schief, 2024) considers these mechanisms and assesses the macroeconomic productivity gains from AI over the coming 10-years. The results suggest that AI could contribute significantly to aggregate productivity growth over the next decade, contributing between 0.25 to 0.6 percentage points to annual Total Factor Productivity (TFP) growth in the United States (or 0.4 to 0.9 percentage points to annual labour productivity growth) in our main scenarios (Figure 1). Estimates for other economies are of similar magnitude, though somewhat lower given that adoption of AI is expected to be slower. These estimates imply a substantial improvement in the context of the weak productivity growth across the OECD over

the past decades, which has been in the range of 1-1.5% per year.

Figure 1: Macro-level productivity gains from AI over

Estimated impact on annual growth rates over a 10-year horizon



Note: The bars correspond to different scenarios regarding the adoption, capabilities, and micro-level gains of AI (as in Figure 1). In scenarios 1 and 2, demand is assumed to be relatively elastic, and the factors of production (labour and capital) can reallocate freely across sectors. In scenarios 3-5 with adjustment frictions, demand is assumed to be very inelastic, and factors cannot reallocate across sectors. See more details in section 3 of Filippucci, Gal and Schief (2024).

The aggregate productivity gain from AI is the sum of three effects: 1) a direct effect of increasing productivity at the sectoral level; 2) an input-output multiplier effect as productivity gains in one sector also benefit other sectors through reduced costs of intermediate inputs; and 3) a negative reallocation effect in the spirit of Baumol's growth disease (Baumol, 1967; Nordhaus, 2008) that arises if the sectors with limited productivity growth increase as a share of GDP.

A key insight that emerges from this analysis is that the macroeconomic impact of AI will depend primarily on the adoption speed and the degree to which AI can benefit economic activities across a wide range of sectors in the economy. Current adoption varies strongly across firms and sectors, with country-level adoption rates being generally low, in the range of 5-15%, as reported by official statistics of businesses and firm-level studies (e.g. Calvino and Fontanelli, 2023). Fast and productive integration of AI in a wider range of economic activities through expanded AI capabilities (e.g. further integration with other digital tools) is necessary for the emergence of large macroeconomic gains (Scenario 2 vs 1).

However, even with high adoption rates and expanded capabilities, general equilibrium effects working through prices could reduce the overall macroeconomic gain if the productivity benefits of AI remain concentrated in a few sectors (knowledge intensive services such as ICT, finance and professional services) (Scenarios 3 and 4). Demand for these services can become saturated, and growth will thus be limited "not by what we do well but rather by what is essential and yet hard to improve" (Aghion, Jones and Jones, 2019). In contrast, macroeconomic gains would be larger if AI gains were more widespread across sectors, for instance in the case of further integration with robotics technology, which would enable not only cognitive but also manual-intensive activities to benefit from AI (Scenario 5).

Overall, AI holds significant promise to revitalise productivity growth in OECD countries and beyond. Governments can also play a role in shaping the macroeconomic gains for AI, for example by resolving legal uncertainties around accountability, which may hold back productive AI adoption by firms (OECD, 2024a). At the same time, governments can foster a competitive environment (both in the AI-using as well as the AI-producing sectors; see Aghion and Bunel, 2024; OECD, 2024b)

which is conducive to innovation and experimentation, while monitoring potential labour market disruptions and supporting workers as they transition into new roles in the AI economy (e.g. Acemoglu, Autor and Johnson; Baily, Brynjolfsson and Korinek, 2023; OECD, 2023).

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Impulsando la prosperidad regional: Cómo Colombia puede cerrar las brechas económicas

Category: Colombia,Posts in Spanish,Uncategorized
written by oecdecoscope | December 12, 2024

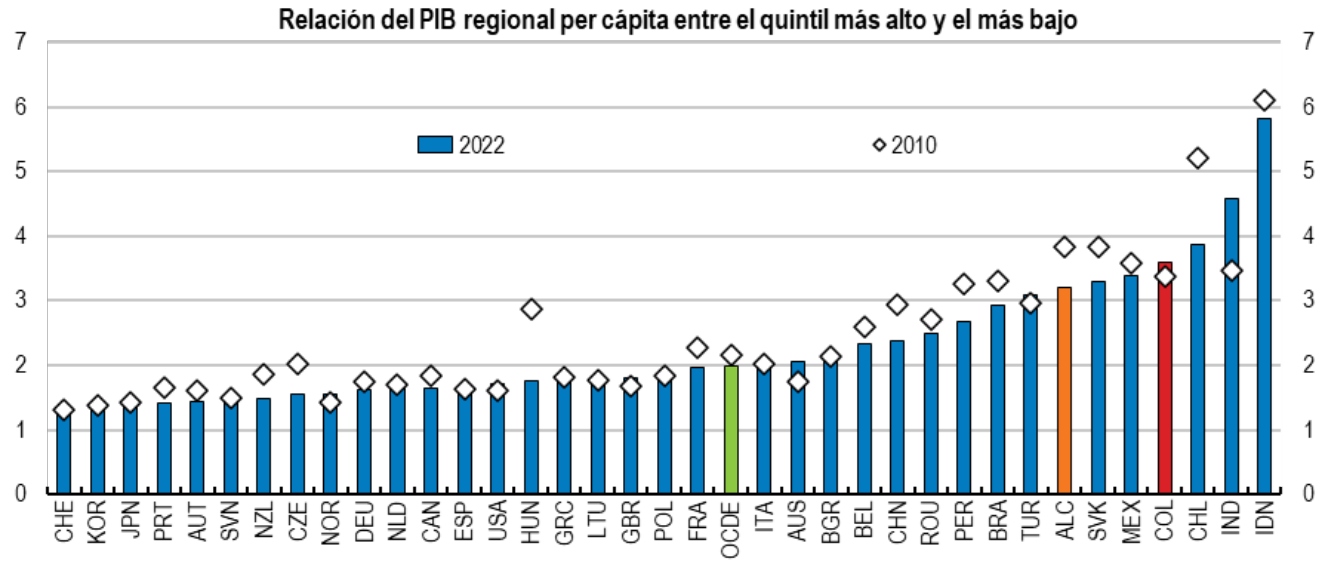
Por Michael Koelle, Aida Caldera Sánchez y Paula Garda, Departamento de Economía de la OCDE

Blog para dar seguimiento al lanzamiento del Estudio Económico Colombia 2024. También disponible en inglés.

Abordar las disparidades regionales en la productividad en Colombia es crucial para mejorar los niveles de vida y garantizar el bienestar económico de todos los colombianos. Las brechas regionales del PIB per cápita de Colombia se encuentran entre las más altas de la OCDE (Figura 1), impulsadas en gran medida por diferencias profundamente arraigadas en productividad, como se destacó en el reciente Estudio Económico de la OCDE sobre Colombia 2024. Estas disparidades se han desarrollado a lo largo de muchos años, exacerbadas por décadas de conflicto, un acceso desigual a la

infraestructura, la educación, la capacitación y las oportunidades del mercado laboral, y también debido a desafíos institucionales.

Figura 1. Las brechas del PIB per cápita entre las regiones colombianas son amplias



Nota: El PIB per cápita es para grandes regiones TL2 (*departamentos* en Colombia) y para 2022 o el último año disponible.

Colombia se encuentra ante una oportunidad única para impulsar su economía y garantizar que todas las regiones se beneficien. Las tendencias globales, como los cambios en los patrones comerciales, el *nearshoring* y la transición ecológica, presentan desafíos, pero también grandes oportunidades. El gobierno colombiano ha hecho del desarrollo regional una parte clave de su plan para revitalizar, diversificar y transformar la economía. Para aprovechar este momento y llevar prosperidad a todas las regiones, el **Estudio Económico de la OCDE sobre Colombia 2024** describe un conjunto de acciones en varias áreas de política:

1. **Mejorar la infraestructura para mejorar la conectividad**: La calidad de la infraestructura de Colombia se ha visto frenada durante mucho tiempo por la falta de inversión,

el conflicto armado, y la geografía del país. Por ejemplo, puede llevar más de ocho horas recorrer los 250 km que separan Bogotá de Medellín. Si bien las carreteras troncales han experimentado algunas mejoras recientes gracias a las asociaciones público-privadas, el siguiente paso es desarrollar y conectar puertos, ríos, ferrocarriles y carreteras de manera más eficiente. Además, la mejora de los caminos rurales es fundamental para conectar a las comunidades remotas con las ciudades y los mercados cercanos.

2. **Reducir la burocracia para las empresas:** Losaltos costos administrativos y las complejas regulaciones hacen difícil que las empresas, sobre todo las pequeñas, prosperen en Colombia. La expansión de las ventanillas únicas empresariales (VUE) digitales para permisos y licencias a más municipios, incluyendo más trámites y soluciones de pago digital, particularmente en áreas remotas, ayudaría a más pequeños negocios a formalizarse, crear empleos y contribuir a las economías locales.
3. **Equipar a los adultos jóvenes con habilidades para el trabajo:** Muchos adultos jóvenes abandonan la escuela sin las habilidades que necesitan para tener éxito en la fuerza laboral, especialmente en áreas rurales donde los colegios están lejos. Los programas de formación profesional de segundo ciclo han sido un salvavidas para muchos, ya que ofrecen competencias valiosas y buenos resultados. La expansión de estos programas en regiones vulnerables donde las opciones educativas son limitadas puede ayudar a cerrar la brecha entre la escuela y el trabajo.
4. **Fortalecer las capacidades y las finanzas de los gobiernos subnacionales:** Muchos gobiernos subnacionales, especialmente los municipios en áreas remotas y rurales, tienen unas capacidades fiscales y administrativas limitadas. Una reforma para fortalecer los mecanismos de igualación de ingresos fiscales y mejorar la recaudación

directa de impuestos mejoraría las capacidades fiscales. La implementación en curso del catastro multipropósito es un paso importante en este camino. El desarrollo de la capacidad administrativa debe ir de la mano con la delegación de autoridad, la clarificación de las responsabilidades de gasto y la mejora de la coordinación intergubernamental. Estas recomendaciones están en línea con las recomendaciones de la Comisión de Descentralización de Colombia.

5. **Luchar contra la corrupción, especialmente en las zonas rurales:** La corrupción afecta más a las regiones más pobres y rurales de Colombia, erosionando la confianza y bloqueando el progreso. El fortalecimiento de las regulaciones sobre el financiamiento privado de las campañas políticas, una mejor protección de los líderes de la sociedad civil y la mejora de la transparencia en las transacciones financieras son pasos fundamentales para garantizar que el progreso beneficie a todos los colombianos.
6. **Implementar el Acuerdo de Paz para impulsar el desarrollo rural:** El Acuerdo de Paz de 2017 abrió la puerta para el crecimiento en zonas afectadas por el conflicto, especialmente en las regiones rurales. Al mejorar la infraestructura y garantizar la paz, estas áreas pueden participar en el comercio y beneficiarse del fuerte turismo de Colombia. Sin embargo, el ritmo de aplicación ha sido lento y se necesitan más recursos para aprovechar plenamente los beneficios de la paz.

Cerrar las brechas de prosperidad entre las regiones de Colombia es esencial no solo para fomentar la equidad, sino también para impulsar la productividad del país. Al mejorar la infraestructura, reducir las barreras a las empresas y empoderar a los gobiernos locales, Colombia puede construir un futuro mejor en el que todos los ciudadanos, sin importar dónde vivan, puedan compartir el crecimiento del país.

Referencia

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Is raising the normal retirement age a good policy? A new OECD model sheds light on employment effects

Category: Ageing,Uncategorized
written by oecdecoscope | December 12, 2024

By Hermes Morgavi, OECD Economics Department

In many developed and ageing countries, pension reforms are crucial yet often controversial. One significant reform, frequently debated, is raising the **normal retirement age** –the age at which workers can claim their full pension benefits. As governments face the dual pressures of ageing populations and growing fiscal burdens, understanding the effects of such policies on employment is essential.

Morgavi (2024) introduced a new model that explores these

effects in detail, addressing key questions: Is raising the normal retirement age worth it? How does it impact employment, particularly for older workers?

A new model for complex realities

While most cross-country empirical studies agree that raising the normal retirement age increases older-age employment, the scale of these effects often seems underwhelming—especially when compared to more detailed, single-country studies. This new OECD model seeks to bridge this gap by accounting for country-specific factors such as demographics, pension systems, and early retirement pathways.

Key findings: More than just small gains

The model introduces four major innovations:

1. **Demographic sensitivity**: Incorporating population structure and retirement patterns improves accuracy, predicting stronger employment effects in countries with lower retirement ages.
2. **Retirement ages**: Distinguishing between minimum and normal retirement ages allows for more precise simulations. Countries with large gaps between these ages could see substantial gains in employment rates by narrowing the gap.
3. **Private pension systems**: In countries where private pensions play a significant role, workers are less sensitive to changes in the public normal retirement age. The model highlights the importance of considering these systems when designing policy.
4. **Early exit pathways**: Many countries offer alternatives to early retirement through disability or unemployment benefits. These alternative early exit pathways dilute the effect of raising the normal retirement age. The model quantifies these undermining effects to give policymakers a clearer idea of the potential impact of

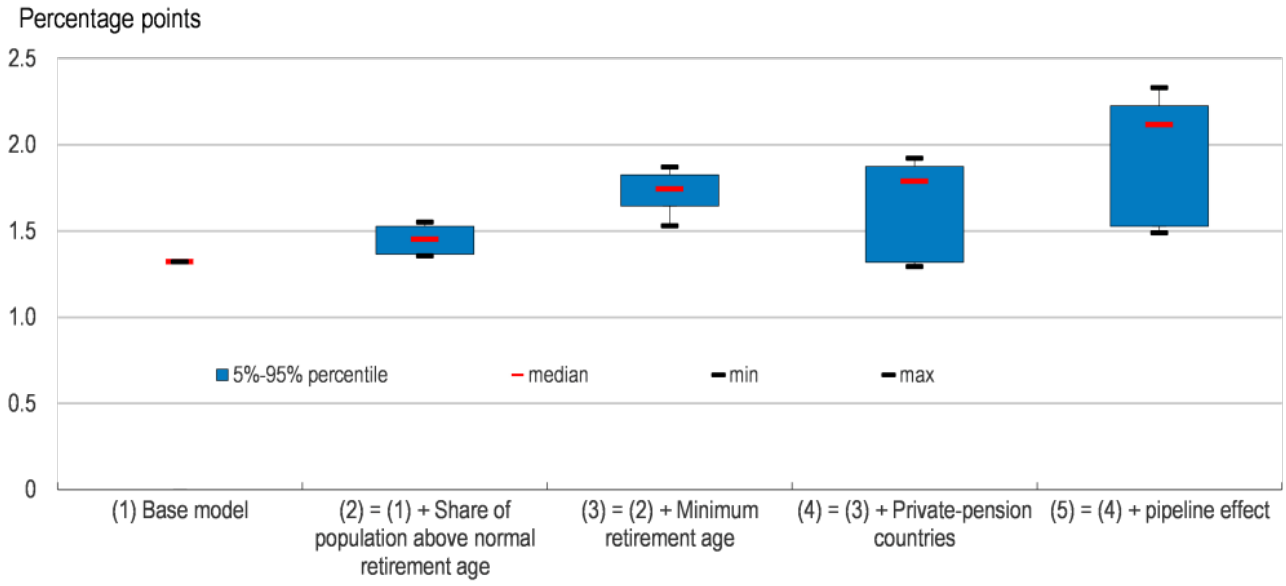
policy changes.

A more worthwhile reform than expected

The model predicts that raising the normal retirement age can lead to much larger employment effects than predicted by previous cross-country macro models and closer to empirical research using microdata from individual countries. For example, a one-year increase in the normal retirement age is projected to raise the employment rate of those aged 55-74 by 1.5 to 2.3 percentage points, depending on the country. This is a significant improvement over earlier estimates from traditional models. Countries with the lowest employment rates, like Greece and France, stand to gain the most.

Figure 1. Model innovations give larger employment effects from raising the retirement age

Range of effects on employment rate of people aged 55-74, from raising the normal retirement age

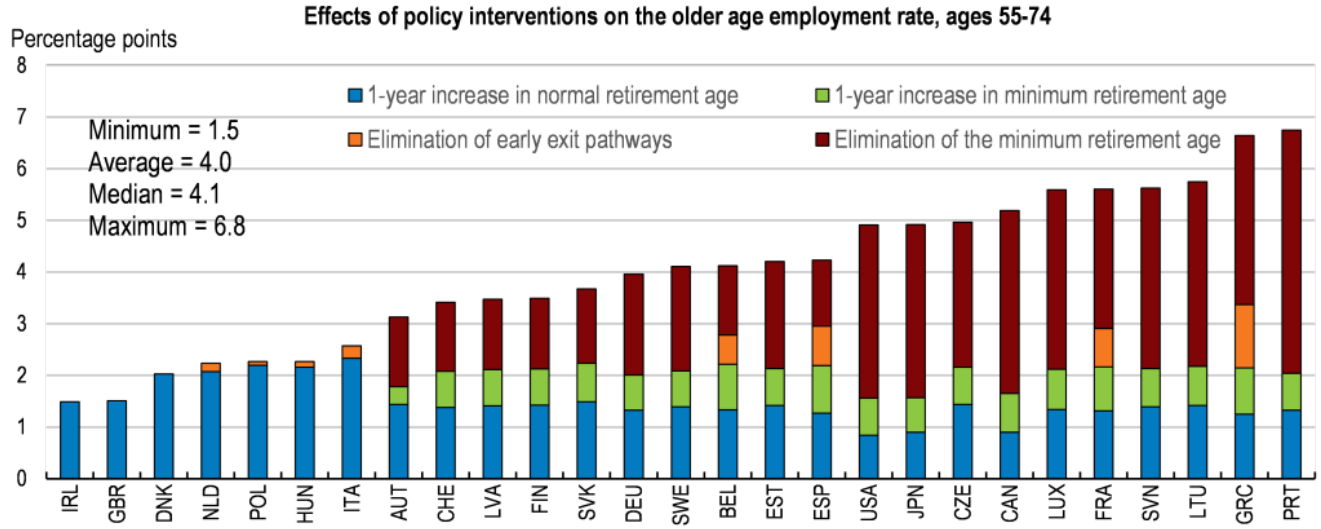


Note: The graph compares the long-term effect on the old age employment rate and on the average age of labour market exit of a raise of the normal retirement age by 1 year among the models expressed in percentage points. On the x-axis, for each model, the main innovation introduced with respect to the

previous model is shown. For the models including the effects of minimum retirement age and of the pipeline effects, these are also assumed to move by 1 year. The red horizontal marks show the median of the distribution of the effects among the countries in the sample; the blue boxes show the distance between the fifth and the ninety-fifth percentile; and the whiskers show the minimum and the maximum values. The effects are calculated using the data for year 2020 or latest year available.
Source: Author's calculations.

Moreover, **closing the gap** between minimum and normal retirement ages, or eliminating early exit pathways, could lead to even greater employment boosts, especially in countries with large discrepancies.

Figure 2. Policy simulations changing the gap between the minimum and normal retirement ages



Note: This graph shows the effects of a set of policy changes by country based on the preferred model using the data for the year 2020: the effects of raising the normal retirement ages by 1 year (without any changes in the minimum retirement ages), raising the minimum retirement ages by 1 year; eliminating the early exit pathways, if present, for all the countries in the sample, based on the estimated model.
Source: Author's calculations.

The right time to policy changes

While the model predicts more substantial long-term benefits of raising the normal retirement age than previously thought, it also emphasizes the importance of timing. Policy changes in retirement ages take time to bear fruit—often decades due to "grandfathering" provisions that protect current workers. Policymakers, therefore, need to act early to mitigate future fiscal challenges.

The OECD's new model offers a fresh perspective on an age-old policy debate, providing countries with a more refined tool to navigate the complexities of pension reforms.

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Unlocking regional prosperity: How Colombia can bridge economic gaps

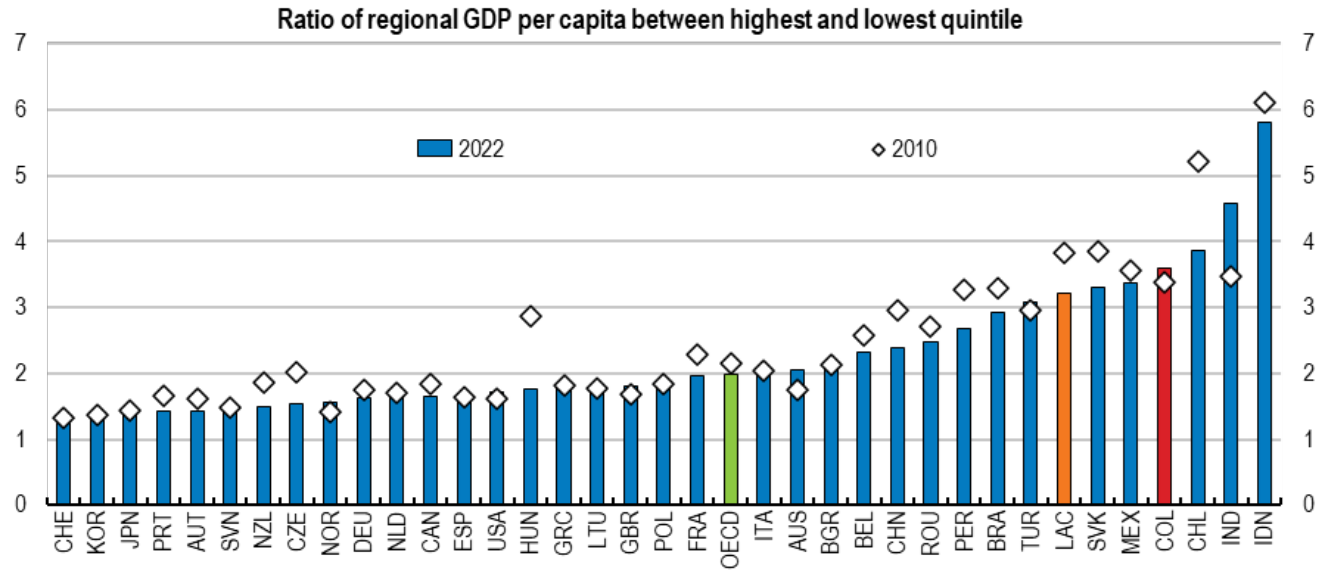
Category: Colombia,Uncategorized
written by oecdecoscope | December 12, 2024

by Michael Koelle, Aida Caldera Sanchez and Paula Garda, OECD Economics Department.

Also available in Spanish.

Tackling regional disparities in productivity in Colombia is crucial to improving living standards and ensuring economic wellbeing for all Colombians. Colombia's regional gaps in GDP per capita are among the highest in the OECD (Figure 1), largely driven by deep-rooted differences in productivity, as highlighted in the recent 2024 OECD Economic Survey of Colombia. These disparities have developed over many years, exacerbated by decades of conflict, unequal access to infrastructure, education, training, labour market opportunities, and institutional weaknesses.

Figure 1. Colombian regions differ widely in their GDP per capita



Note: GDP per capita is for large TL2 regions (*departamentos* in Colombia) and for 2022 or the latest year available.

Colombia faces a unique opportunity to boost its economy and ensure that every region benefits. Global shifts like changing trade patterns, nearshoring, and the green transition present challenges, but also big opportunities. The Colombian government has made regional development a key part of its plan to revitalize, diversify and transform the economy. To seize this moment and bring prosperity to all regions, the **2024 OECD Economic Survey of Colombia** outlines a set of strategic policy actions:

1. **Upgrade infrastructure for better connectivity**: Colombia's infrastructure has long been held back by under-investment, conflict, and its rugged geography. For example, it can take over eight hours to drive the 250 km between Bogotá and Medellín. While national roads have seen some recent improvements thanks to public-private partnerships, the next step is to develop and connect ports, rivers, railways, and roads more efficiently. Additionally, improving rural roads is

critical for linking remote communities to nearby cities and markets.

2. **Cut red tape for businesses**: High administrative costs and complex regulations make it tough for businesses, especially small ones, to thrive in Colombia. Expanding digital one-stop shops for permits and licenses to more municipalities, including more procedures and digital payment options, particularly in remote areas, would help more small businesses formalize, create jobs, and contribute to local economies.
3. **Equip young adults with job-ready skills**: Many young adults leave school without the skills they need to succeed in the workforce, especially in rural areas where schools are far away. Upper-secondary vocational training programmes (VET) have been a lifeline for many, offering valuable skills and good outcomes. Expanding these programs in vulnerable regions where educational options are limited can help bridge the gap between school and work.
4. **Strengthen subnational governments capabilities and finances**: Many subnational governments, especially local authorities in remote and rural areas, struggle with limited fiscal and administrative capacity. A reform to strengthen fiscal equalisation mechanisms and to enhance direct tax collection would improve fiscal capacities. The ongoing implementation of the multipurpose land registry is an important step along this way. Administrative capacity building should go hand in hand with delegation of authority, clarifying spending responsibilities, and improving intergovernmental coordination. These recommendations are in line with recommendations from Colombia’s decentralisation commission.
5. **Fight corruption, especially in rural areas**: Corruption hits Colombia’s poorest and most rural regions hardest, eroding trust and blocking progress. Strengthening regulations on private political campaign funding,

better protecting civil society leaders, and improving transparency in financial transactions are critical steps to ensure that progress benefits all Colombians.

6. **Implement the Peace Agreement to boost rural development**: The 2017 Peace Agreement opened the door for growth in areas long affected by conflict, especially in rural regions. By improving infrastructure and ensuring peace, these areas can participate in trade and benefit from Colombia's strong tourism. However, the pace of implementation has been slow, and more resources are needed to fully realise the benefits of peace.

Closing the prosperity gap between Colombia's regions is essential not only for regional equality but also for boosting the country's overall productivity. By improving infrastructure, reducing barriers to business, and empowering local governments, Colombia can build a brighter future where every citizen—no matter where they live—can share in the country's growth and success.

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A policy framework for reviving productivity growth

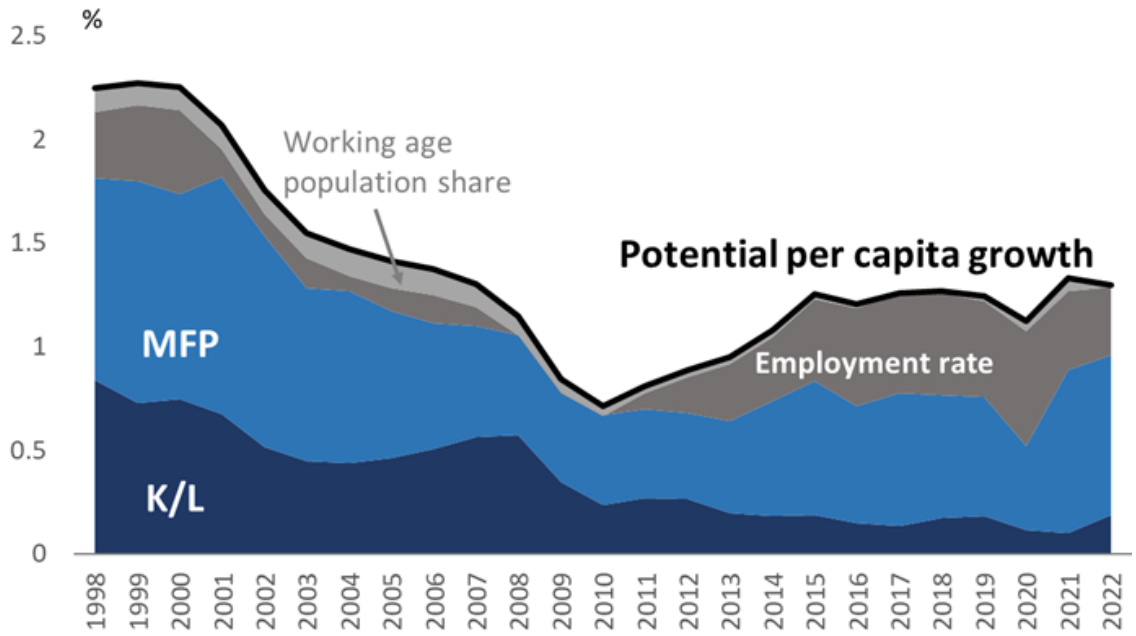
Category: Uncategorized
written by oecdecoscope | December 12, 2024

By Christophe André, Peter Gal and Álvaro Pereira

It is well known that productivity ultimately drives living standards. In the long run, all that matters is productivity. However, productivity growth has been on a declining trend across the OECD for decades (Fernald, Inklaar and Ruzic, 2024; Goldin et al, 2024). Labour productivity – measured by GDP per hours worked or per employee – has been slowing from nearly 2% annual growth to around 0.8% per year over the last decade. This slowdown was driven by lower trend multi-factor productivity growth and, since the global financial crisis, weaker capital accumulation (Figure 1). In a new paper (André and Gal, 2024), we provide an update on the existing macro- and firm-level evidence and on the role of public policies.[1]

Figure 1. MFP and capital accumulation have both contributed to the slowdown in trend per capita potential growth

Decomposition of OECD potential GDP per capita growth (annual change, in %)



Note: All variables are smoothed except capital stock per worker. For more details, see the source.
Source: André and Gal (2024) based on the OECD Economic Outlook 113 Database.

The long-term declining productivity growth trend since the 1970's was interrupted by a roughly decade-long rebound starting in the mid-90s, associated with the diffusion of information and telecommunication technologies (ICTs) in the United States and other countries. Looking at the micro level, firms at the technological frontier have continued to perform more strongly than other firms since the 2000s (Andrews, Criscuolo and Gal, 2016), but the rate of frontier growth also seems to have slowed in the past decade or so. High uncertainty, financial disturbances, low investment, and weak business dynamism may have all played a role in slowing OECD productivity growth to historical lows.

As OECD economies face structural headwinds, including ageing, diminishing gains from education and high debt levels, a productivity revival appears more necessary than ever. But can it be achieved? A debate has been going on for over a decade on the ability of new technologies to boost productivity, with sceptics such as Gordon (2016) considering that recent

inventions are unlikely to foster the same kind of growth as did electricity and the internal combustion engine, against those who believe that digital technologies can boost productivity, provided the right complementary investments are in place (e.g., Brynjolfsson, Rock and Syverson, 2021; Mokyr, 2013). In particular, recent OECD research shows that Artificial Intelligence will provide a significant boost to productivity (e.g. Filippucci et al., 2024; Filippucci, Gal and Schief, 2024).

Indeed, productivity is not only about technology. OECD research has shown that the broader economic environment is key for promoting innovation, diffusion and turning it into productivity benefits (OECD, 2015). Our paper builds on that framework by exploring how incentives and capabilities affect firms at the technology frontier and below, as well as the reallocation of resources across the economy (Table 1).

Table 1. The scope of policies to raise productivity through shaping incentives and capabilities: A stylised framework

<table>
<tr><th rowspan="2">Impacts mostly fall on:</th><th rowspan="2">Incentives</th><th colspan="3">Capabilities</th></tr>
<tr><th>Through MFP</th><th>Through capital</th><th>Through labour</th></tr>
<tr><td>Firm level productivity near or at the frontier</td><td>For innovation through competition among leaders, appropriate intellectual property rights and public procurement</td><td>By expanding the knowledge frontier through basic research and collaboration</td><td>By enabling high risk investments in (mostly) intangible assets</td><td rowspan="2">By raising the quality of human capital through education and adult training</td></tr>
<tr><td>Firm level productivity below the frontier</td><td>For adoption and experimentation through competition (domestic & international) and fiscal incentives</td><td>By diffusing knowledge across firms and workers</td><td rowspan="2">By removing obstacles to private Investments and providing quality infrastructure</td></tr>
<tr><td>Allocation of resources across firms with different productivity levels</td><td>For better resource allocation through healthy business dynamism</td><td></td><td>By improving the matching of workers to jobs through enabling mobility</td></tr>
</table>

Note: MFP stands for multifactor productivity. See more details in the source.
Sources: André and Gal (2024), building on and extending OECD (2015).

Competition is key among incentives: it encourages firms at the technological frontier to innovate and other companies to adopt modern technologies and business practices. Therefore, the rising market concentration in the United States and to a lesser extent in Europe, along with rising markups and the long-term decline in business dynamism is worrying.[2] Moreover, the fragmentation of international trade, due to geopolitical tensions and other barriers, is eroding the productivity benefits from global competition, and also holds back knowledge spillovers across borders in value chains. Regulatory and trade policies should aim to revert or mitigate these tendencies.

Innovation can also be incentivised through intellectual property regimes provided they strike the right balance

between protecting innovation and preserving market competition. Fiscal incentives and public procurement also matter, and can be used in a directed way to serve other policy goals such as greening the economy.

The allocation of resources (such as labour and capital) across firms also plays a key role for aggregate productivity. Flexible labour markets, well designed active labour market policies, and better access to housing are essential for labour reallocation, but can be hampered by excessive use of non-compete and non-poaching clauses as well as burdensome licensing procedures. Efficient insolvency regimes can promote entrepreneurship, by lowering the cost of failure, and facilitate corporate restructuring and the reallocation of resources towards more productive uses.

Crucially, providing the right *incentives* needs to be complemented with measures to improve *capabilities* along various dimensions. First, promoting basic research is key to advance the knowledge frontier. Second, good quality infrastructure and other measures for domestic and international integration help creating innovation networks to *diffuse* knowledge. Third, attracting venture capital and measures addressing the difficulties of financing intangibles could allow start-ups to flourish. Finally, human capital can be developed through higher quality education systems, promoting and enabling lifelong learning, spreading good management practices and fostering a better use of skills through matching of workers to jobs.

In sum, while the impact of new technology on economic growth remains highly uncertain, governments should pull all the available policy levers to strengthen incentives and build capabilities to ensure their economic benefits are maximised and contribute to a revival of productivity growth, and hence boosting living standards.

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[1] For a recent complementary overview of the literature on the structural drivers of productivity with a stronger focus on measurement, see OECD/APO, 2022.

[2] Even though a resurgence in US business creations since the COVID-19 pandemic offers a glimmer of hope.

Doombot versus other machine-learning methods for

evaluating recession risks in OECD countries

Category: Forecast,Uncategorized
written by oecdecoscope | December 12, 2024

by Thomas Chalaux and David Turner

Predicting when a recession will hit is no easy task, and economists have long tried to make sense of a wide variety of financial and business cycle data from both domestic and international sources. The challenge of picking the right variables for each country and time frame, which can take on different functional forms, makes machine-learning methods especially useful.

Recent OECD research has compared traditional machine-learning models, including the popular LASSO (Least Absolute Shrinkage and Selection Operator), with a new algorithm the OECD researchers developed called “Doombot.” LASSO works by simplifying models, helping to improve their accuracy by limiting unnecessary variables. Doombot, however, takes a more

exhaustive approach, testing a wide range of variables and placing restrictions to ensure its predictions better align with an overall economic story.

What data was used?

The OECD research tested several algorithms on data from 20 OECD countries, looking at how well they could predict recessions at different time frames, from immediate quarters to two years ahead. The most frequently picked data were financial indicators, such as credit, house prices, share prices and interest rates (like the yield curve slope). Economic activity data, like GDP and unemployment, were used more often for shorter-term forecasts. Notably, these predictors weren't limited to each country's domestic economy; international aggregations of the same variables played a significant role.

Doombot performs best on predictive accuracy

When predicting rare events like recessions, it's important to test models on data they haven't seen before—this is called "out-of-sample" testing. This helps avoid overfitting, where a model looks good on historical data but performs poorly when making real-time predictions. Doombot outperformed the competition across multiple metrics when tested on OECD countries. In particular, it gave a clearer early warning of the 2008 Global Financial Crisis (GFC) than LASSO and other methods. By rolling forward predictions and comparing across different countries and timeframes, Doombot consistently ranked higher than other models.

Doombot tells a better economic story

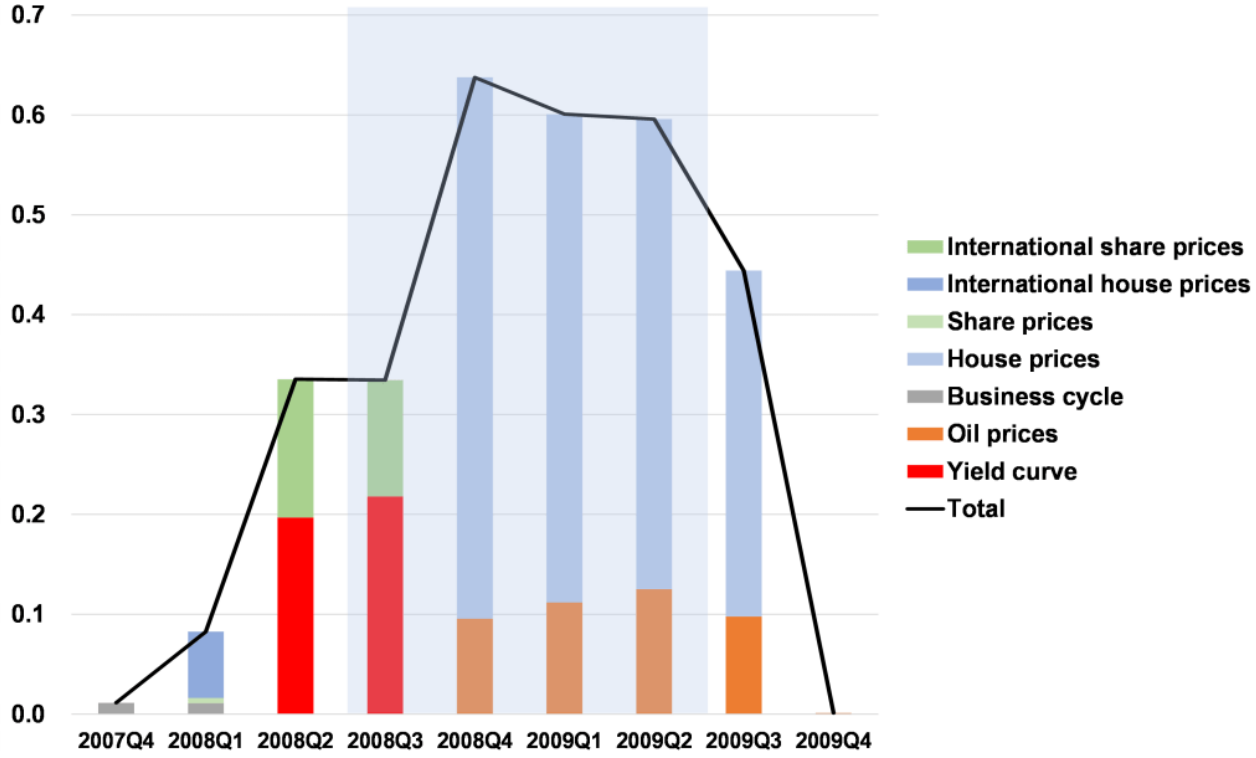
In addition to being more accurate, Doombot's predictions align better with economic narratives. It uses fewer variables—typically less than three per equation—compared to LASSO, and its predictions are more consistent across countries. The signs on the variables (indicating whether a

variable should increase or decrease recession risk) are in line with economic logic, which isn't always the case with other algorithms. Furthermore, Doombot produces smoother recession probability forecasts, avoiding the erratic jumps seen in some other models. These features make it easier for economists to break down the drivers of recession risk and spot trends across different countries.

For example, ahead of the GFC, Doombot predicted a steady rise in recession risk for the United States, primarily driven by an inverted yield curve and falling stock prices (see Figure 1). In the longer term, declining house prices and rising oil prices also played a role. Similar patterns appeared in other countries, with house prices and credit developments standing out as key factors leading up to the GFC.

Figure 1. Contributions to predicted recession probabilities for the United States ahead of the GFC

Out-of-sample projections made with data available in early December 2007



Note: This chart shows an approximate decomposition of the

recession probabilities into the contribution from each explanatory variable. The predictions are made with the Doombot algorithm using data available in early December 2007. The United States was in recession from 2008 Q3 to 2009 Q2, corresponding to the shaded background area.

The benefits of combining accuracy with narrative

The constraints imposed on the Doombot algorithm help to provide a more coherent economic narrative and so mitigate the common 'black box' criticism of machine-learning methods. Perhaps the most interesting and important finding from this work is that there is no trade-off between predictive performance and better story-telling, so that imposing judgmental constraints consistent with economic priors tends to improve rather than hinder the predictive performance of Doombot. This could have important implications for future machine-learning applications in economics.

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Addressing Austria’s growing flood risks

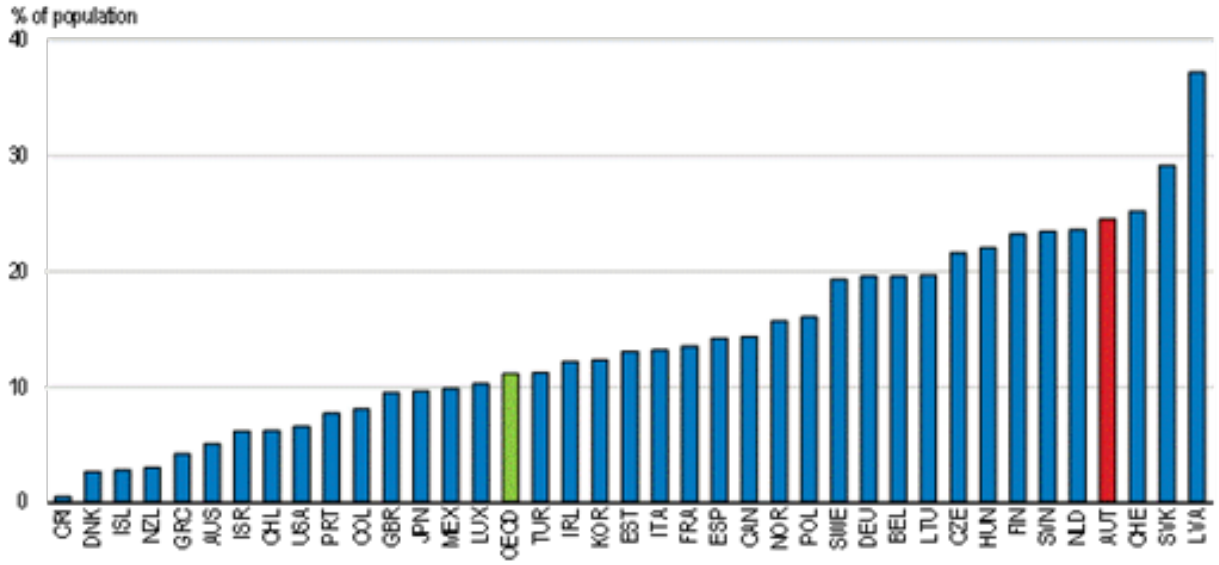
Category: Austria,Uncategorized
written by oecdecoscope | December 12, 2024

by Sébastien Turban

Intense storms have affected central Europe in recent days, causing substantial flooding, including in Austria. Although it is too soon to assess the role of climate change in this particular event, global warming will most likely significantly increase the prevalence of floods in Austria in the future. Austria is particularly exposed to flood risk and its consequences: 15% of built-up land is situated close to a river, the fifth largest percentage in the OECD. Partly in consequence, a larger share of the population is exposed to flood risk than most OECD countries (Maes et al (2022) and Figure 1). Meanwhile a relatively small share of households and businesses take out flood insurance. As discussed in the recent 2024 OECD Economic Survey of Austria (OECD, 2024), reducing the negative impact of frequent and severe floods requires a two-pronged strategy: reducing exposure through better land use and protective investments, and compensating losses through wider insurance coverage.

Figure 1. A large share of the population in Austria is exposed to floods

Share of population exposure to river flooding with a 10-year return period, 2020



Note: A return period is the average or estimated time that a flood event is likely to recur.
Source: IEA/OECD (2023), "Climate-related hazards: River flooding", Environment Statistics (database), https://oe.cd/dx/58w.

One reason for Austria's high exposure to flood risk is that a lot of land has been sealed or artificialised in recent years, so called "land take". Building residential properties on land close to rivers mechanically increases the number of people who can be affected by a flood. Sealing land, for instance through building, can weaken the ground's capacity to absorb rainwater, thus increasing the risk of flooding. Between 2012 and 2018, the rate of land take was higher than the EU average, relative to country size, and higher than population growth (European Commission, 2022). In October 2021, the Austrian Conference on Spatial Planning was mandated to develop the first Soil Strategy for Austria, which aimed to reduce land take from 11.5 hectares per day to 2.5 in 2030 (Schamann, 2022). The strategy was to be presented at the end of 2022 but has been delayed several times. Therefore, our first recommendation is to Finalise the Soil Strategy, to reduce land take based on a quantitative objective.

Increasing the effectiveness of natural flood protection mechanisms, and deploying structural flood mitigation investments, are key levers to reduce the consequences of floods. Evidence from Austria suggests that forests can reduce run-offs into rivers including after heavy rainfall, thus limiting the risk of flooding (Markart et al., 2022). However, many of Austria's forests are not in a good shape to perform this role; and there is room for improving their condition. Other nature-based solutions to building flood resilience can complement infrastructure investment in urban areas, such as the "eco-street" project in the municipality of *Ober-Grafendorf* which provides roadside green spaces to increase water absorption and reduce the run-off of rainwater into the water treatment system. Nature-based solutions are often less costly than infrastructure and can provide additional climate mitigation benefits. However, structural flood mitigation investments, such as dams, levees, and reservoirs, can be particularly cost effective in urban built-up areas. Improvements in drainage systems and the installation of permeable pavement can also improve absorption capacity. One example is the Danube side channel built by Vienna between 1972 and 1988 in order to provide flood relief.

A particular constraint for consistent policy on reducing land take and increasing adaptation investments is that spatial planning, building regulations, and infrastructure investment are typically the responsibility of local authorities. Nationwide regulations on land take could be considered. For instance, Portugal imposes regulations restricting urban development in areas adjacent to rivers. Incentives to reduce land take and foster investment could also be provided through adjustments in fiscal equalisation transfers (a type of transfers made from central to local government). Adjustment could also be made to the coverage provided by the Austria's Catastrophes Fund, a public fund financed by federal taxes which pays for preventive and compensation measures against natural catastrophes. Similarly, private investment by

households and SMEs in adaptation measures can be incentivised by subsidised loans. In France, adapation measures can be financed by the “fonds de prévention des risques naturels majeurs” which is financed by the “Catnat” premium, a mandatory contribution from all property insurance policies (Covéa, 2023).

Even with additional preventive measures, some of Austria’s households will remain vulnerable to the consequences of floods when they occur. Expanding the coverage of flood insurance will then be essential to reduce the socioeconomic costs of floods. Today, take up of private insurance coverage against flooding is relatively low in Austria: it has been estimated that the insurance market penetration (measured by the share of assets’ values that are covered by insurance) against river flooding was 5% in Austria in 2022 against 40% in Germany or 100% in France and Switzerland, where coverage is compulsory (Insurance Europe, 2022). Because Austria is highly exposed to future flood risk, an estimation by the European Commission suggests that it has the largest protection gap in the EU (the protection gap provides an estimation of the share of future climate-related disaster losses which is uninsured today) (Radu, 2022).

Enhancing public awareness of flood risk would help raise the take up of insurance. Recent initiatives by the Austrian government have proven particularly helpful. It has developed an online mapping tool, HORA, in collaboration with the Austrian Insurance Association. The tool enables individuals to make an initial assessment of the flood risk of their dwelling. Other informational materials available to the public include CLIMA-MAP, which maps climate change impacts in Austria’s municipalities and regions.

Greater public awareness needs to be accompanied by fundamental changes to flood insurance. The objective should be broad coverage at an affordable price while being able to cover large losses. Experiences from European and OECD

countries suggest that this could be achieved by mandating the inclusion of flood insurance as part of general housing insurance products, while providing public reinsurance for catastrophic losses (OECD, 2005; Kuik et al., 2017). In France, for example, private insurers must include insurance against flood risk in property insurance policies. Coverage is funded from a fixed share of all premiums. Insurers in turn benefit from government-backed reinsurance through the "Catnat" system. A state guarantee ensures that damages from extreme events can be covered. Austria could consider an approach along these lines; mandating comprehensive flood insurance in homeowners' insurance policies and setting the Catastrophes Fund as a public reinsurer.

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