Global (Dis)Order
international policy programme

Can we sustain progress and convergence in an ageing world?

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Abstract

Globally, we are past 'peak baby', and many countries are past peak working-age population. Richer economies are seeing plateauing education rates and rising demand for services. All these factors suggest slower growth in richer countries, combined with fewer export opportunities for poorer countries. We could still sustain global growth and convergence over the next 50 years through greater movement of people, but that makes the political economy of migration of central importance to the prospects of global prosperity over the next half century.

The demographic challenge

We are past 'peak baby'. In 2012, 144 million children were born worldwide. By 2020, that figure had dropped to 134 million. Richer countries are already shrinking and ageing (Spencer, Warner & Bastian 2019; United Nations 2022). The knock-on effects, in terms of economic dynamism and global progress, could be considerable but are far from inevitable (at least for the next few decades). The most powerful tool to mitigate and delay the effects of global demographic change is migration.

Peak baby hit in the United States around 2007, with just over 4 million children born that year, and it occurred far earlier in most other richer economies – as early as 1959 in Europe as a whole, for example.[1] While the global population continues to increase thanks to rising life expectancy, in many high-income economies total populations are starting to fall. The United Nations estimates that European population peaked in 2020.[2]

Most significant for economic outcomes, the UN suggests that peak working-age population (20–64) for high-income countries as a whole was reached in 2023, at 740 million people. For Europe, the percentage decline in workers over the next few decades will be similar to that which occurred in the aftermath of the Black Death (Kenny 2023). By 2050, there will be 209 million fewer working-age people in high- and middle-income countries than at the 2027 peak, a decline of more than 9% in just 23 years (United Nations 2022).

But the number of retirees will continue to climb for many decades to come. By 2050, there will be one retirement age person for every two people of working age in high-income countries, compared with one for every five as recently as 1990. That means not only will there be fewer workers, but they will be a smaller part of the overall population. In 2050, in countries such as Italy, Japan, and South Korea, there will be fewer workers than old and young dependents combined (National Institute on Aging et al. 2007; United Nations 2022).

There are partial domestic solutions to the looming shortage of workers, but they face challenges. The differential between female and male labour force participation in high-income countries could be closed – although, because the gender differential is already considerably smaller than it was in the past, this would be insufficient to fill the worker gap (Toossi, & Morisi,

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1　　Our World in Data using UN World Population Prospects (2024) https://ourworldindata.org/grapher/births-and-deaths-projected-to-2100?country=~Europe+%28UN%29

2　　Our World in Data using UN World Population Prospects (2024) https://ourworldindata.org/grapher/population-with-un-projections?country=~Europe+%28UN%29

2017).[3] While rising longevity and healthy years of life might call for longer working lives, official attempts to increase retirement ages are immensely politically unpopular (Kalenkoski & Oumtrakool 2017).

The limits to automation

As a cautionary tale regarding current forecasts of robots and AI taking over jobs, US data on automation trends between 2000 and 2020 has ill matched prior expert predictions of automation risk. Furthermore, there is little evidence of an acceleration or change in the number or types of jobs being automated, nor in the pay or number of employees in jobs seeing more automation (Deming, Ong & Summers 2025; Scholl and Hanson 2020). To date, there is also little evidence that this time is different with AI, for all of the plausible reasons as to why it might be. In Europe between 2011 and 2019, occupations such as finance and software development, most exposed to AI, saw rising employment shares (Albanesi et al. 2023).

It is not hard to see why a smaller workforce could be a drag on growth. Between 1989 and 2019, Japan and the US saw a very similar increase in GDP per hour worked – but, thanks to Japan's far more rapidly ageing and retiring population, GDP per person increased 35% in Japan compared with 56% in the US, for example. High-income countries where the working-age population was expanding saw 2% GDP per capita growth in the last few decades. During periods when the working-age population was shrinking, however, that declined to 0.9% (Cooley, Henriksen & Nusbaum 2024; Kenny & Yang 2021, 2024).

The plateauing of human capital

Meanwhile, plateauing education rates mean the stock of human capital in richer countries is increasing more slowly than in the past. We are still in a period of massive global growth in educated workers: in 1980, more than 70% of the working-age population of the world had only primary school education or less; by 2020, 70% of the world's working-age population had secondary education or more.[4] University enrolments worldwide have climbed from 10% to 40% over the past half century.[5] Once again, however, high-income countries are ahead on a flattening curve. We appear to be approaching peak years of education across rich countries (Barro &Lee 2013; Kenny &Gehan 2023).

US undergraduate enrolment fell from 18 million in 2010 to 16 million in 2020, and the number of Ph.D. degrees awarded has flatlined.[6] The stock of education as a whole (measured as years of schooling in the adult population) was rising at an annualised rate of 2.7% between 1950 and 1980 and 1.4% between 1980 and 2010. This is a widespread phenomenon: for China the same numbers are 6.0% for the earlier period and 3.1% for the later period.[7] Education efficiency is also flatlining: the literacy scores of adults with more than a high school education in the US actually fell between 1994 and 2014 (Helland & Tabarrok 2019). Analysis of standardised tests

over the last two decades in the OECD club of rich countries suggests no significant trend in average performance.[8]

Reaching the peak in human capital stocks will be a second drag on growth in wealthy countries. Differences in average years of education among and within countries can explain a considerable proportion of income differences (Deming 2022). 'Growth accounting' estimates suggest that rising education rates may be responsible for as much as half of global growth over the past few decades (Gethin 2023). This suggests that the stagnation of human capital stocks will be a significant cause of broader economic stagnation.

The service economy challenge

A further concern is that the combination of past income gains and continued ageing are pushing the world economy further toward the production of services. In the US, households headed by those over 80 years old have a 27 percentage points higher share of services spending than households headed by someone in their early 30s, as expenditure on things like cars gives way to spending on care. Across countries, an increase of one percentage point in the share of the population aged 65 and over is linked to a 1.3–1.5 percentage point increase in the service share of value-added and employment (Cravino, Levchenko & Rojas 2019). In 1970, agriculture and industry accounted for 46% of the global economy. Today, that figure is down to 30%, with the other 70% accounted for by services, reaching toward 80% in the US (Herrendorf, Rogerson & Valentinyi 2021).

The problem with that change is that services see lower productivity growth than manufacturing or agriculture. Over time, we have not proven nearly as good at improving learning per teacher as we have at improving car production per factory worker or corn production per farmer. Innovation is concentrated in material production: for example, more than 70% of US corporate patents are in manufacturing, a sector that accounts for just 10% of GDP (Jones 2022). The sectoral shift to services can account for more than half a percentage point of the recent slowdown in GDP growth in rich countries (Cravino, Levchenko & Rojas 2022).

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Innovation and entrepreneurship in decline

The greater complexity of productivity growth in services illustrates a broader problem: that global innovation and entrepreneurship are declining, in part (once again) thanks to ageing and shrinking populations in the countries where innovation is concentrated.

Between 1980 and 2010, ageing accounted for a 0.3 percentage point decrease in the annual rate of growth across US states. But only a third of that decline was due to reduced labour force growth. The rest reflected lower labour productivity growth (Maestas, Mullen & Powell 2023). The main impact of ageing was not fewer workers but less productive ones. That may be linked in part to declining entrepreneurship and innovation as populations age. Looking at the share of

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8   OECD 'PISA 2018 Results' https://www.oecd.org/en/publications/2019/12/pisa-2018-results-volume-i_947e3529.html

the population that runs a wage-paying business across countries, a 3.5 year rise in the median age leads to a 2.5 percentage point decline in this entrepreneurship rate countries (Liang, Wang & Lazear 2018, 31).

Or look at the rate of invention: in 2020, China, the US, Japan, South Korea, and Germany accounted for 93% of resident patent applications worldwide.[9] The scope for greater research effort in these countries is limited, given their combined population aged 20–64 will be 184 million smaller in 2050 than it was in 2020.[10] But there is already a problem: despite rising numbers of researchers in these countries previously, it is taking ever larger teams to deliver innovation (Ahmadpoor & Jones 2019; Boeing, P., & Hünermund 2020;Miyagawa and Ilshikawa 2019).

There are numerous examples of more researchers producing less in the way of productivity gains, from computing to agriculture to pharmaceuticals. R&D budgets of US pharmaceutical firms increased ninefold 1970–2014, but the return on that spending fell by a factor of five, as measured by the return in new molecular entities approved as drugs (Bloom et al. 2020:1123). More broadly, long-term patterns of total factor productivity change suggest slower growth rates over time (Philippon 2022).

In part this may be simply that ideas are becoming harder to find, requiring teams of researchers and all the associated costs of large-scale collaboration. But it may also reflect that research is increasingly dominated by older, less productive researchers. Studies of research and innovation output point to productivity peaks in the 30s and 40s. For example, a dataset of the ages of 1.2 million US resident inventors patenting between 1976 and 2017 suggests that patenting rates peak around the early 40s (Jones, Reedy & Weinberg 2014). And yet, looking at the US National Institutes of Health research grants budget of about $30 billion annually, the average age at first grant award increased from 34 to 44 years old between 1970 and 2014 (Faherty 2022).

There are certainly domestic fixes that can improve levels of both entrepreneurship and innovation – not least equalising the opportunities to participate. The proportion of US patents including at least one woman inventor was still only 19% in 2020 (Toole et. al. 2020). Race and class are also very significant factors. Children from high-income (top 1%) families are 10 times as likely to become inventors as those from below median income families, and the gap is not explained by test scores (Bell et al. 2019; Cook 2019). But with stagnating populations and human capital, these fixes will be temporary in terms of extending productivity growth.

Implications for global trade and development

The trends in relation to ageing, peak education, services, and declining innovation are all most advanced in richer countries, but they have significant implications for global trade and development, perhaps especially in relation to the dominant historical model for rapid income convergence with industrialised countries. Across developing countries, manufacturing

9   World Bank World Development Indicators Patent Applications, Residents (IP.PAT.RESD) https://data.worldbank.org/indicator/IP.PAT. RESD. Patenting is a problematic measure of innovation activity, especially because it is easier to patent in manufacturing than in services, as a rule. However, as noted in the text, other measures, including total factor productivity, point in a similar direction.
10   Author's calculation from 2022 UN population projections, medium variant, accessed 19 July 2022 https://population.un.org/wpp/ Download/Standard/Population/

employment climbed from below 10% to closer to 15% between 1970 and 2020, recently driven by employment growth in China. And manufacturing export–led growth was the secret to many 'East Asian miracle' countries reaching high-income status. But even in China, manufacturing employment has peaked. Although automation is not associated with job losses in rich countries, it may be acting as a substitute for labour-intensive offshored production in lower-wage economies (Artuc, Christiaensen & Winkler 2019). And declining demand for manufactures in ageing countries will exacerbate that impact. If current trends continue in the forces determining manufacturing employment, there might be about 65 million fewer people working in manufacturing worldwide in 2050 than today (Webster, Kenny & Dissanayake 2023).

Meanwhile, services trade is growing worldwide, climbing from 10% to 14% of global GDP in the years 2003–23.[11] Furthermore, the population of developing countries is far more educated than in the past (and far more educated than was the population of now-rich countries when they had a similar income per capita), suggesting a considerable stock of human capital to fuel services exports. And there are cases where this has translated into significant trade flows: Bangalore is a major centre for IT services exports, for example.

But while services' exports are growing, the sector remains significantly less traded than agriculture and industry, and we should be cautious in expecting revolutionary change. A widely cited 2007 estimate suggested that more than a quarter of US jobs could be offshored. Ten years later, there was no relationship between estimated offshoring risk at the occupation level and US domestic job growth in those occupations. Although more jobs were done at a distance, they were still overwhelmingly done within the US (Ozimek 2019). In addition, forecasts for job growth in rich countries are in sectors such as healthcare, home care, education, construction, cleaning, and food preparation. These jobs are very difficult to outsource.[12] As much to the point, the trade balance in services sees rich countries in surplus: developing countries are net importers.[13]

Future scenarios and the role of migration

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Overall, there are considerable headwinds for global growth and development over the next 30 years. Using demographic, climate, and education forecasts to predict economic growth, based on the past relationship between these variables, suggests slowing growth especially in rich countries (potentially below 1% a year for the US) and potentially weakened rates of convergence worldwide to 2050 (Kenny & Gehan 2023).

But these are forecasts based on business as usual, and global policy change could significantly alter these outcomes. This is because still-expanding working-age populations in low-income and lower middle-income countries where education rates are rising could fill the jobs that need doing in richer countries. In South Korea, for example, the forecast decline in the working-age population could reduce per capita income growth over the next half century by 1% per annum, suggesting negative rates of GDP growth by 2050. Yet an increase in the migrant worker population from about 3% of workers to about 15% over the next 40 years would offset most of that growth impact (Clemens 2024). In addition, young, increasingly

11   Our World in Data 'Trade in Services' https://ourworldindata.org/grapher/service-exports-and-imports-gdp
12   US BLS Occupational Outlook Handbook https://www.bls.gov/ooh/ (2020 edition).
13   World Bank 'Databank' https://data.worldbank.org/indicator/TG.VAL.TOTL.GD.ZS, BG.GSR.NFSV.GD.ZS

educated immigrants could sustain growth in the stock of human capital, as well as leading on continued innovation and entrepreneurship. In the 2000s, a 35-year-old educated Nigerian with a job in the US was paid 15 times as much as a similarly educated Nigerian working in Nigeria (Clemens 2011). There could be as many as 30 million additional working-age migrants from sub-Saharan Africa to high-income countries between now and 2050 under a business-as-usual scenario, with opportunities for as many as three times that number in a world seeking more migration (Kenny & Yang 2021). Remittances to sub-Saharan Africa under that second scenario might equal nearly half a trillion dollars per year (Budiman & Connor 2019).

Global remittances were already worth US$839 billion in 2023, and remittance payments doubled their share of global GDP in the first two decades of the 21st century.[14] But evidence from sending countries suggests this is a significant undercount of the total benefit of emigration for those left behind – perhaps as little as a fifth of the total. Much of the rest is accounted for by the increases in education that migration options encourage and support (Khanna et al. 2022). Migration, then, will help ensure the continued increase of global human capital stocks – and it is also associated with significantly stronger trade, investment, and knowledge flows between countries.[15]

In addition, reducing inequality in the opportunity to innovate across countries could help sustain productivity growth. Poor children from low-income countries are many orders of magnitude less likely to become inventors or global entrepreneurs than rich children in high-income countries, and emigration can help reduce that gap (Kenny & O'Donnell 2017). Migrant inventors account for more than 10% of inventors worldwide, and they are about a third more productive after migrating. Immigrants represent less than 14 per cent of the US population, 16 per cent of all US inventors, and 23 per cent of innovation output as measured by patents and patent citations (Bernstein et al. 2022). Between 1995 and 2005, more than half of Silicon Valley's technology and engineering companies were founded by immigrants (Azoulay et al. 2022; Kerr & Kerr 2020).

Estimates of the global efficiency gains of removing barriers to the international movement of people range from 67% to 148% of global GDP (Clemens 2011). This alone would be significant enough to sustain strong global growth and convergence for decades, and that does not account for impacts on innovation.

The migration challenge

This makes support for ramping up the movement of people an important global priority. But under UN business-as-usual scenarios, there is insufficient movement. Immigration is predicted to add about 27 million to the working-age population of the US between 2020 and 2050 – compared with the need for 42 million more workers to keep the dependency ratio in the US the same as it is today. For the European Union, the numbers are 17 million working-age migrants compared with a need for 61 million (Kenny & Yang 2021).

This is not simply a case of opening borders. Free movement of people within the EU, for example, increased the stock of migrants in the region by only 0.5% of the total population. It

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14   World Bank 'Databank' https://data.worldbank.org/indicator/BX.TRF.PWKR.CD.DT; https://data.worldbank.org/indicator/BX.TRF.PWKR.DT.GD.ZS

15   Migration may be a force for greater global equality, but what about within countries? The evidence is mixed, but the usual short-term impact on wages for those born in destination countries is around zero. The impact on inequality in origin countries tends to be negative in the case of small emigration flows and positive in the case of larger emigration flows (Koczan et al. 2021).

appears that movers needed an average of about US$30,000 more a year in pay to make it worthwhile (Rodrıguez-Puello et al. 2024).

Worldwide, the relationship between emigrants as a percentage of sending country populations and GNI per capita is positive at low incomes but reverses at about US$10,000. Well over half the world's population lives in countries with a GDP per capita over $10,000 – and that may exceed three quarters in the next 20 years. In the absence of active pro-migration policies, we may be approaching the global peak emigration rate (Kenny & Yang 2021).

This suggests the need for global agreements that ensure a triple win – for sending countries, recipient countries, and migrants themselves. Luckily, this has already begun. There were more than 1,219 separate bilateral labour agreements signed between 1945 and 2020, with about half of these signed since 2000. Germany and Kenya recently signed an agreement around skilled migration in areas including information technology. In 2024, Germany also offered tax breaks to select skilled migrants. Countries are allowing foreign students and family members of visa holders to work, providing more support for language and skills training and help with housing. Some host countries are paying for flights and relocation costs, or simply paying people cash on arrival. The mayor of Helsinki proposed making English the official language of the city to attract immigrants (Chilton & Woda 2022; Kenny 2023).

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The political economy of migration

That said, the last few years have demonstrated that immigration can be used as an issue to rally support behind populists and the far right. Fears of irregular migration – by small boats or smuggling across the Rio Grande, for example – raise demands for 'taking back control' and can delegitimise the concept of 'refugee' or 'asylum seeker' as deserving of assistance (Findor et al. 2021).

Nonetheless, this is not a necessary consequence of increased immigration: indeed, the average relationship across countries suggests the link between local immigration flows and the vote share of anti-immigrant parties is zero (Cools, Finseraas & Rogeberg 2021). Meanwhile, attitudes towards accepting particular classes of migrant workers (e.g., nurses, agricultural workers) tend to be considerably more positive than towards migration in general (Kustov 2025). And immigration reforms towards more open borders (which tend to focus on legal migration to fill recognised gaps in local labour markets) do not create increased support for populist parties (Kustov 2023). There is political space for increased legal migration even in times of populism.

To reduce any risk of backlash and ensure local communities benefit from hosting new arrivals, immigration flows should be accompanied by additional support for housing and services provision, as well as reskilling opportunities. All else being equal, migration arrivals are associated with rental and housing price increases (Gonzalez & Ortega 2013; Saiz 2007). That said, other factors dominate in determining long-term trends in housing costs, including regulation of density and multi-family dwellings (Molloy 2020). Regulatory reform alongside public investment in new housing should allow housing markets to adapt to larger migration inflows, especially in periods of flat or declining demand for housing from those born in the country, related to slow or negative population growth.

With regard to public provision of services, including health and education, if these are provided by local governments there is a role for central government to assist with adaptation to demand – given national demographic and migration trends, as well as the arrival of

international migrants. In the case of health, migrants themselves are an increasingly important part of service provision in many wealthy countries, suggesting that greater flows should reduce supply constraints, all else being equal (Lafortune et al 2019). And, although overall demand for health services continues to rise in richer countries as populations age, the same is not true of demand for education services, which is peaking in line with child populations. In the US, for example, total undergraduate enrolment in degree-granting post-secondary institutions fell from 18.1 million in 2010 to 15.8 million in 2023. At primary and secondary level, enrolments peaked in 2017.[16] Migrant families might help fill this gap, rather than creating competition for places.

Turning to reskilling, while migrants should primarily be filling worker shortages (on a net basis), this does not mean that immigration will not lead to changing employment opportunities for non-migrants. The overall picture tends to be that immigration (especially unskilled immigration) is usually accompanied by non-migrant workers moving into jobs that require less manual labour and more communication, often with better pay (Sebastian & Ulceluse 2019). While this is broadly beneficial, greater support for training programmes that help workers respond to employment shifts caused by technological, demographic, or other trends may additionally ease the transition for workers in areas seeing an immigration inflow.

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On the sending side, fears of brain drain are common, but actual evidence of harm is less so (Clemens 2016). In particular, if education systems can respond to growing opportunities for skilled workers to emigrate, the result can be a greater domestic skills base along with a growing diaspora providing remittances. The Philippines provides a case study in the area of healthcare professionals: there are 300,000 Philippine registered nurses working abroad. But the Philippines still has a lot more nurses working domestically than would be expected given its income. The option to migrate has encouraged more people to go to nursing school (Kenny 2023).

To help ensure the triple win of migration – to migrants, receiving countries, and sending countries – global skills partnerships are designed to increase skills availability in both origin and destination countries, by sharing the costs of training and skills development between governments and firms in receiving countries and sending countries, and by guaranteeing more people are trained by such programmes than ultimately migrate under the scheme. The Philippines has set up such a programme with Germany to cover nursing migration.

In short, the economic challenges presented by migration to subsets of the population in both receiving and sending countries can be addressed through policies that allow markets, communities, and individuals to respond flexibly to shifting opportunities of whatever kind – including technological and demographic shifts. And the overall economic and fiscal benefits of migration are considerably larger than any costs incurred through those adaptation policies applying to migration-related challenges (Clemens 2022).

Peak education and peak working-age population will likely be global phenomena by century's end. The global shift to services and a declining desire to migrate will slow growth everywhere. But the world can see decades more rapid progress if people continue to move, and move in greater numbers. The real and growing migration crisis is that there are not enough migrants. Fixing the political economy of migration will be the central determinant of the course of the global economy over the next half century.

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16   National Center for Education Statistics Digest of Education Statistics Table 303.70 and Table 105.30 https://nces.ed.gov/fastfacts/
        display.asp?id=98 https://nces.ed.gov/programs/digest/d22/tables/dt22_105.30.asp

References

Ahmadpoor, M., & Jones, B. F. (2019), 'Decoding team and individual impact in science and invention', Proceedings of the National Academy of Sciences, 116 (28):13885–13890.

Aiyar, M.S, Ebeke, C, & Shao, X. (2016), 'The impact of workforce aging on European productivity', International Monetary Fund, Working Paper, 16/238. The Impact of Workforce Aging on European Productivity.

Albanesi, S., Da Silva, A. D., Jimeno, J. F., Lamo, A., & Wabitsch, A. (2023), 'New technologies and jobs in Europe', National Bureau of Economic Research, Working Paper 31357.

Artuc, E., Christiaensen, L., & Winkler, H. (2019), 'Does automation in rich countries hurt developing ones? Evidence from the US and Mexico', World Bank, Jobs Working Paper no 25, https://hdl.handle.net/10986/31425

Azoulay, P., Jones, B. F., Kim, J. D., & Miranda, J. (2022), 'Immigration and entrepreneurship in the United States', American Economic Review: Insights, 4 (1):71-88.

Barro, R. J., & Lee, J. W. (2013), 'A new data set of educational attainment in the world, 1950–2010', Journal of Development Economics, 104:184-198.

Bell, A., Chetty, R., Jaravel, X., Petkova, N., & Van Reenen, J. (2019), 'Who becomes an inventor in America? The importance of exposure to innovation', The Quarterly Journal of Economics, 134 (2):647-713.

Bernstein, S., Diamond, R., Jiranaphawiboon, A., McQuade, T., & Pousada, B. (2022), 'The contribution of high-skilled immigrants to innovation in the United States', National Bureau of Economic Research Working Paper 30797, https://doi.org/10.3386/w30797

Bloom, N., Jones, C. I., Van Reenen, J., & Webb, M. (2020), 'Are ideas getting harder to find?', American Economic Review, 110 (4), 1104-1144.

Boeing, P., & Hünermund, P. (2020), 'A global decline in research productivity? Evidence from China and Germany', Economics Letters, 197, https://doi.org/10.1016/j.econlet.2020.109646.

Budiman, A. and P. Connor (2019), 'Immigrants sent a record amount of money home to sub-Saharan African countries in 2017', Pew Research, https://www.pewresearch.org/short-reads/2019/04/03/immigrants-sent-a-record-amount-of-money-home-to-sub-saharan-african-countries-in-2017/

Chilton, A., & Woda, B. (2022), 'The expanding universe of bilateral labour agreements', Theoretical Inquiries in Law, 23 (2): 1-64.

Clemens, M. A. (2011), 'Economics and emigration: trillion-dollar bills on the sidewalk?', Journal of Economic Perspectives, 25 (3), 83-106.

Clemens, M. A. (2016), 'Losing our minds? New research directions on skilled emigration and development', International Journal of Manpower, 37(7): 1227-1248.

Clemens, M. A. (2022), 'The fiscal effect of immigration: Reducing bias in influential estimates', IZA-Institute of Labor Economics, Discussion Paper no 15592.

Clemens, M. A. (2024), 'Migration or stagnation: aging and economic growth in Korea today, the world tomorrow', Peterson Institute for International Economics Working Paper, 24-18.

Cook, L. D. (2019), 'The innovation gap in pink and black' in Wisnioski, M., Hintz, E. S., & Kleine, M. S. (eds), Does America need more innovators? (Cambridge Mass: MIT Press).

Cooley, T. F., Henriksen, E., & Nusbaum, C. (2024), 'Demographic obstacles to European growth', European Economic Review, 169: 104829. https://doi.org/10.1016/j.euroecorev.2024.104829

Cools, S., Finseraas, H., & Rogeberg, O. (2021), 'Local immigration and support for anti-immigration parties: A meta-analysis', American Journal of Political Science, 65 (4):988-1006.

Cravino, J., Levchenko, A. A., & Rojas, M. (2019), 'Population aging and structural transformation', National Bureau of Economic Research Working Paper no 26327

Cravino, J., Levchenko, A., & Rojas, M. (2022), 'Population aging and structural transformation', American Economic Journal: Macroeconomics, 14 (4):479-498.

Deming, D. J. (2022), 'Four facts about human capital', Journal of Economic Perspectives, 36 (3):75-102.

Deming, D. J., Ong, C., & Summers, L. H. (2025), 'Technological disruption in the labor market', National Bureau of Economic Research, Working Paper no 33323. http://www.nber.org/papers/w33323

Faherty, M. (2022), 'New science's report on the NIH' accessed from https://newscience.org/nih/.

Findor, A., Hruška, M., Jankovská, P., & Pobudová, M. (2021), 'Re-examining public opinion preferences for migrant categorisations: "refugees" are evaluated more negatively than "migrants" and "foreigners" related to participants' direct, extended, and mass-mediated intergroup contact experiences', International Journal of Intercultural Relations, 80:262-273.

Gethin, A. (2023), 'Distributional growth accounting: education and the reduction of global poverty, 1980-2022', World Inequality Lab, Working Paper.

Gonzalez, L., & Ortega, F. (2013), 'Immigration and housing booms: evidence from Spain', Journal of Regional Science, 53(1):37-59.

Helland, E., & Tabarrok, A. T. (2019), Why Are the Prices So Damn High? Health, Education, and the Baumol Effect (Arlington, VA: Mercatus Center, George Mason University).

Herrendorf, B., Rogerson, R., & Valentinyi, A. (2021), 'Structural change in investment and consumption—a unified analysis', The Review of Economic Studies, 88 (3):1311-1346.

Jones, B. F. (2009), 'The burden of knowledge and the "death of the renaissance man": is innovation getting harder?', The Review of Economic Studies, 76 (1): 283–317.

Jones, B. F., Reedy, E. J., & Weinberg, B. A. (2014), 'Age and scientific genius', in Simonton D.K (ed), The Wiley Handbook of Genius (Malden MA: John Wiley and Sons),422-450.

Jones, C. I. (2022), 'The past and future of economic growth: a semi-endogenous perspective', Annual Review of Economics, 14:125–152.

Kalenkoski, C. M., & Oumtrakool, E. (2017), 'The caregiving responsibilities of retirees: what are they and how do they affect retirees' well-being?', Applied Economics, 49 (13): 1298-1310.

Kenny, C. (2021). 'Global Mobility: Confronting a World Workforce Imbalance', Blog. Center for Global Development. Global Mobility: Confronting A World Workforce Imbalance | Center For Global Development

Kenny, C. (2023), 'The Future of Global Development and Implications for Aid', Remarks at the Oxford Martin School (30 October 2023).

Kenny, C., & Gehan, Z. (2023), 'Scenarios for future global growth to 2050', Center for Global Development, Working Paper no. 634. Scenarios for Future Global Growth to 2050

Kenny, C., & Yang, G. (2021), 'Can Africa help Europe avoid its looming aging crisis?', Centre for Global Development, Working Paper no. 584. https://www.cgdev.org/publication/can-africa-help-europe-avoid-looming-aging-crisis

Kenny, C., & Yang, G. (2024), 'The implications of a declining labor force', Centre for Global Development Working Paper no. 693. The Implications of a Declining Labor Force

Kenny, C. and M. O'Donnell (2017), 'Expanding women's role in developing technology: increasing productivity, improving lives', Centre for Global Development Note https://www.cgdev.org/publication/expanding-womens-role-developing-technology accessed 28 October 2022.

Kerr, S. P., & Kerr, W. (2020), 'Immigrant entrepreneurship in America: evidence from the survey of business owners 2007 & 2012', Research Policy, 49 (3): 103918.

Khanna, G., Murathanoglu, E., Theoharides, C. B., & Yang, D. (2022), 'Abundance from Abroad: Migrant Income and Long-run Economic Development', National Bureau of Economic Research, Working Paper no. 29862. http://www.nber.org/papers/w29862

Koczan, Z., Peri, G., Pinat, M., & Rozhkov, D. (2021), 'The Impact of International Migration on Inclusive Growth: A Review', IMF Working Paper, no.88. https://doi.org/10.5089/9781513571966.001

Kustov, A. (2023), 'Testing the backlash argument: voter responses to (pro-) immigration reforms', Journal of European Public Policy, 30 (6):1183-1203.

Kustov, A. (2025), In Our Interest: How Democracies Can Make Immigration Popular (NYC: Columbia University Press).

Lafortune, G., Socha-Dietrich, K., & Vickstrom, E. (2019), Recent trends in international mobility of doctors and nurses. In OECD Recent trends in international migration of doctors, nurses and medical students, 11-34 (Paris: OECD).

Liang, J., Wang, H., & Lazear, E. P. (2018). 'Demographics and entrepreneurship', Journal of Political Economy, 126 (S1): 140-196. https://doi.org/10.1086/698750.

Maestas, N., Mullen, K. J., & Powell, D. (2023), 'The effect of population aging on economic growth, the labor force, and productivity', American Economic Journal: Macroeconomics, 15 (2):306-332. DOI: 10.1257/mac.20190196

Miyagawa, T., & Ishikawa, T., (2019), On the Decline of R & D Efficiency (Tokyo: RIETI)

Molloy, R. (2020), 'The effect of housing supply regulation on housing affordability: A review', Regional science and urban economics, 80(C):1-5. 10.1016/j.regsciurbeco.2018.03.007

National Institute on Aging et al. (2007), Why Population Aging Matters: A Global Perspective, National Institute on Aging. WPAM.pdf

Ozimek, A. (2019), 'Overboard on offshore fears', Upwork. Available at SSRN 3777307. https://dx.doi.org/10.2139/ssrn.3777307

Philippon, T. (2022), 'Additive growth', National Bureau of Economic Research, Working Paper no. 29950 http://www.nber.org/papers/w29950

Rodrıguez-Puello, G., Hernandez, L., Romero-Espinosa, D., & Rowe, F. (2024), 'The disruptive long-term costs of international migration on subjective well-being', Centre for Open Science . https://doi.org/10.31219/osf.io/ydbxu

Saiz, A. (2007), 'Immigration and housing rents in American cities', Journal of urban Economics, 61(2):345-371. https://doi.org/10.1016/j.jue.2006.07.004

Sebastian, R., & Ulceluse, M. (2019), 'The effect of immigration on natives' task specialisation: the case of Germany', International Journal of Manpower, 40(5):939-957. https://doi.org/10.1108/IJM-08-2018-0269

Scholl, K., & Hanson, R. (2020), 'Testing the automation revolution hypothesis', Economics Letters, 193: 109287.

Spencer, M. R., Warner, M., & Bastian, B. A. (2019), 'Drug overdose deaths involving fentanyl, 2011-2016', National Vital Statistics Reports, 68 (3):1-19.

Toole, A., Saksena, M. J., deGrazia, C. A., Black, K. P., Lissoni, F., Miguelez, E., & Tarasconi, G. (2020), Progress and potential: 2020 update on US women inventor-patentees. US Patent and Trademark Office.

Toossi, M., & Morisi, T. L. (2017), 'Women in the workforce before, during, and after the Great Recession', US Bureau of Labour Statistics Spotlight on Statistics. Women in the workforce before, during, and after the Great Recession : Spotlight on Statistics : U.S. Bureau of Labor Statistics

United Nations, Department of Economic and Social Affairs, Population Division, (2022). World Population Prospects 2022, Online Edition. UN. wpp2022_summary_of_results.pdf

Webster, B., Kenny, C., & Dissanayake, R. (2023), 'Is manufacturing destiny? On the dynamics of future sectoral shares and development', Center for Global Development Working Paper 662. Washington, DC: Center for Global Development.

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