

Redistribution in the Digital Age: Assessing Universal Basic Income and Data Dividends as Tools for Reducing Technological Inequality

The 21st century faces an impending paradox: soaring productivity, stagnant wages. Economic Inequality continues to pose a major challenge worldwide, with rising wealth and income gaps eroding social mobility, long-term growth, and economic stability.

To quote the Stanford Basic Income Lab, “Despite decades of economic growth … large swaths of the population have been left behind, and inequalities have deepened” (Hasdell, 2020). Contrary to this depiction, two policy ideas have gained traction:

- First, **Universal Basic Income (UBI)**, which provides currency payments to all citizens, regardless of condition.
- Second, **Data Dividends**, which consist of the redistribution of economic value generated from large-scale data to those who provide or enable said data.

This paper examines Universal Basic Income (UBI) and data dividends as policy responses to technological inequality, focusing on the economic trade-offs created by decoupling income from labor and their significance for long-term growth, innovation, and social cohesion across different income brackets and levels of development. Their effectiveness ultimately hinges on policy design, fiscal capacity, and countries’ levels of economic and technological development.

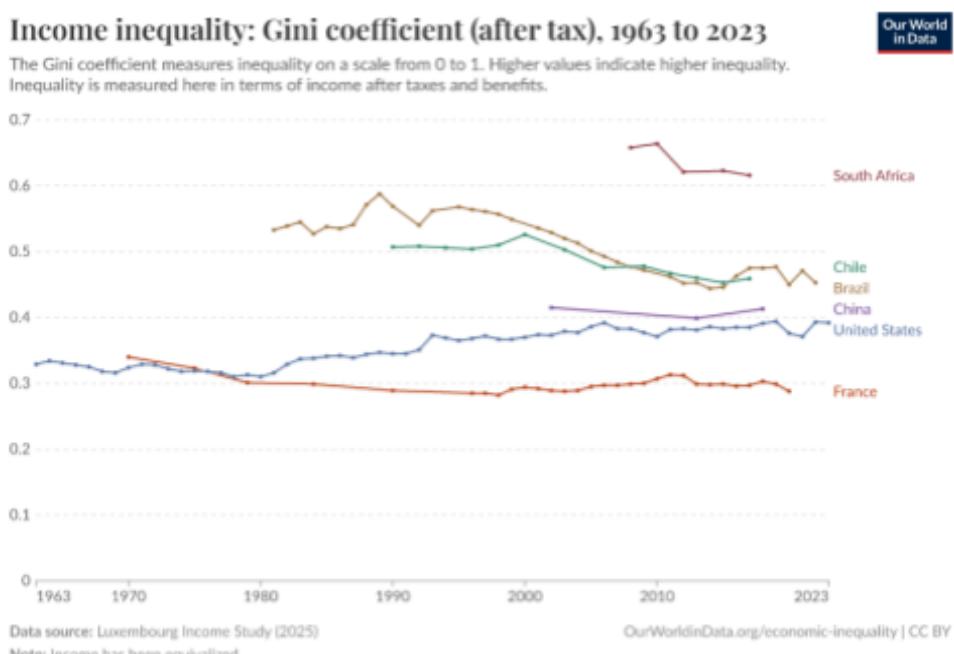


Figure 1. Post-tax income inequality across countries (Gini coefficient).
Income inequality remains high across countries even after taxes and transfers, indicating the limits of existing redistributive systems, and need for refined ones.
Luxembourg Income Study; Our World in Data.

Literature Review & Theoretical Mechanisms

Universal Basic Income

By decoupling income from labor, UBI reduces poverty and nurtures workers' negotiating power, while helping overall skills development, but initiates exchanges between income security, work incentives, and long-term productivity. By weakening the link between labor and income, UBI may reduce work incentives, posing trade-offs for long-term productivity.

Macroeconomic modelling finds that a 'neutral' UBI (financed without a reduction of other transfers) **increases aggregate output and lowers inequality** in general equilibrium situations (Luduvic, 2024). Microsimulation studies in Brazil furthermore suggest that thoughtfully designed UBI schemes could hypothetically compress income distributions if funded progressively through wealth or high-income taxation (Bezerra de Siquiera & Nogueira, 2021).

Nonetheless, long-term evidence remains scarce. Dariuch (2019) **highlights that no large-scale, long-term experiments exist to analyze UBI's long-term effects.**

Reviews of existing studies include positive outcomes in the reduction of poverty and well-being, but **inconclusive evidence regarding overall income inequality** (dePaz-Banez et al., 2020; Hasdell, 2020). While UBI typically raises bottom incomes, its finite effect on wealth concentration highlights a systemic trade-off: redistribution of income without changes to asset ownership may, instead of reversing, stabilize inequality over time.

Data Dividends

The 'Data Dividend' mechanism addresses technological inequality by decoupling income from traditional labor, redistributing profits from digital platforms generated by data production rather than traditional employment. If the policy design for these dividends were too loose, they risk concentrating benefits to dominant tech firms that control data collection. At the same time, excessive redistribution could reduce the incentive for tech firms to innovate or make data-driven investments, potentially slowing economic output. Both loose and excessive redistribution have different economic consequences.

For example, in "Mapping the Potential and Pitfalls of 'Data Dividends'..." Vincent et al simulate how design choices affect distribution: "**Badly designed, dividends tend to become highly concentrated**".

From a policy perspective, the OECD examines how the expansion of digital options can lead to a 'Digital Dividend,' but raises concerns about widening gaps as the most productive firms gain an increasing advantage.

Furthermore, recent work in China shows that harnessing big-data products by e-commerce companies significantly reduces income inequality among that group, **by narrowing gaps in capabilities and entrepreneurial learning.**

Hence, data dividends function as an income not tied to traditional labor whose effectiveness depends on policy design, digital access, and regulation policing.

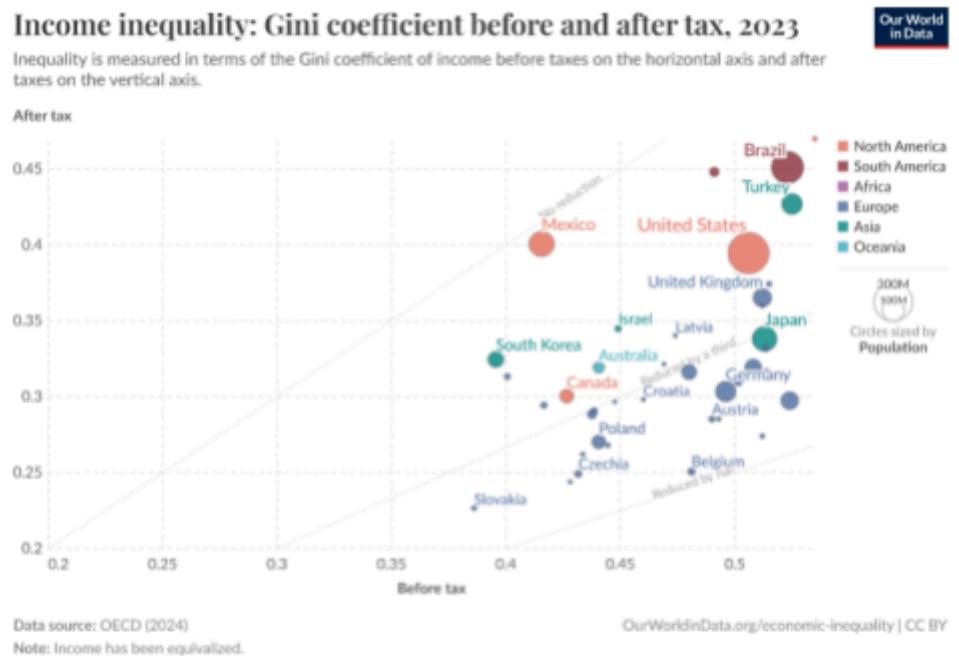


Figure 2. *Income inequality before and after taxes and transfers.*
 Government redistribution significantly reduces inequality, but substantial income gaps remain.
 OECD; Our World in Data.

Empirical Evidence & Data Points

UBI Evidence -

- A cross-synthesis review, “What We Know About Universal Basic Income,” (Hasdell, 2020) finds hybrid but mainly positive research for UBI on social outcomes and poverty, but less concrete evidence on **narrowing income inequality**.
 - Smaller simulation studies of hypothetical UBI in Brazil (Bezerra de Siqueira & Nogueira) talk about how alternative UBI schemes could be “**extremely effective in reducing poverty and inequality**,” and financially possible under assumptions of certain tax-transfer mixes.

- A 2024 paper on "Short-term impacts of UBI on population health in the UK" finds an increase in wellbeing from the introduction of UBI, but **can't provide concrete evidence** on long-term social inequality statistics.

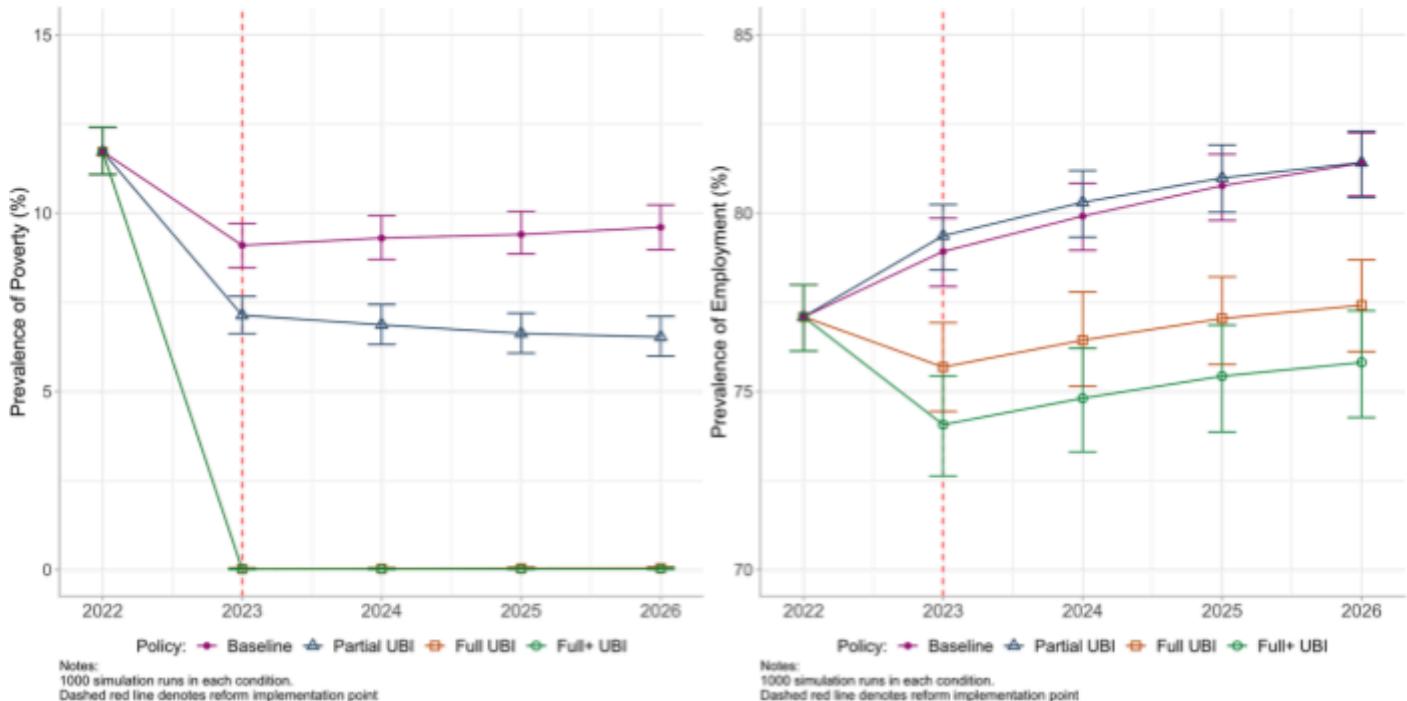


Figure 1. Simulated short-term effects of Universal Basic Income on poverty and employment in the United Kingdom.
Microsimulation results showing changes in poverty prevalence (left panel) and employment rates (right panel) under baseline, partial UBI, full UBI, and enhanced full UBI scenarios. The dashed vertical line denotes the point of policy implementation. Estimates are based on 1,000 simulation runs per scenario.

Source: Thomson et al. (2024), PLOS Medicine.

Overall, evidence suggests that decoupling income from labor improves welfare results for low-income brackets; however has vague effects on overall inequality and growth without being supported by secondary structural policy reforms.

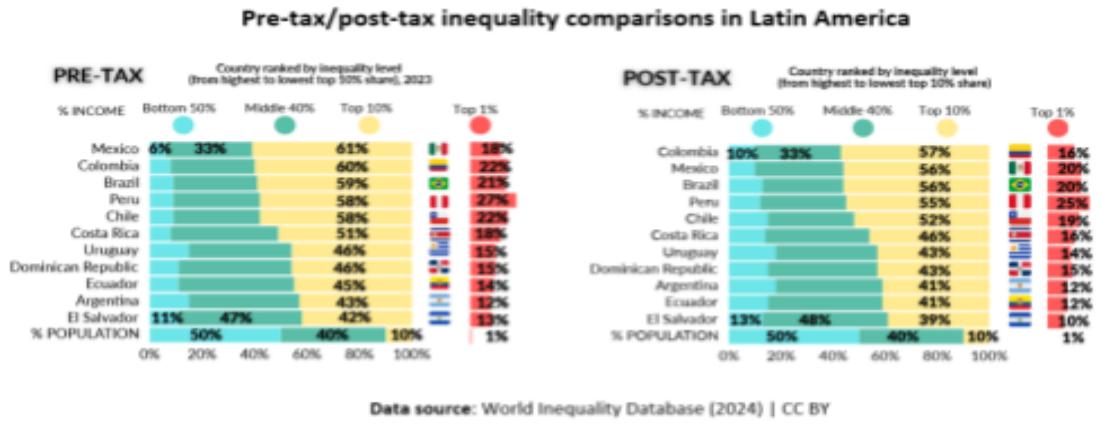


Figure 3. Demonstrates persistent income concentration among the top 10% across regions, indicating structural inequality that existing redistributive mechanisms only partially address.

World Inequality Database (WID), 2024.

Data-Dividend Evidence -

- The 2023 article “Digital Dividend or Digital Divide? Digital economy and income inequality” (Peng et al) uses analytical data on 194 cities and deduces that digital economic developments have diverse effects: while some places are narrowing gaps, others are widening gaps.
- The 2024 study “Does the digital economy promote or inhibit income inequality?” (Tian et al) discovers that digital economic growth tends to relate to an increase in income inequality unless bundled together with progressive policies.
- Another more focused Chinese study (Cui et al, 2025) of 418 e-commerce farmers discovers how harnessing big-data products significantly reduces income inequality among harnessed groups, through closing capability gaps.
- According to an OECD policy brief (Digital Dividend: Policies to Harness...) highlights how while adoption of digital means may increase productivity, firms with the highest metrics of productivity benefit the most, deducing that unless supported by laws or policy, income gaps only widen.

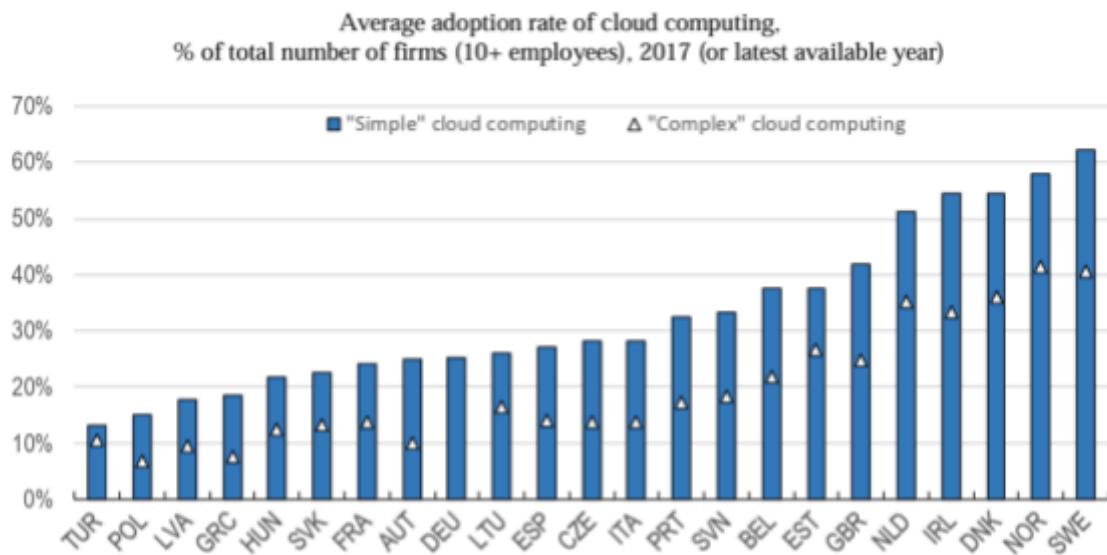


Figure 2. Cross-country adoption of cloud computing technologies among firms.
Average adoption rates of “simple” and “complex” cloud computing technologies among firms with 10 or more employees across OECD countries (2017 or latest available year). The figure highlights substantial variation in digital technology uptake, reflecting differences in digital infrastructure, firm capabilities, and technological readiness.

Source: Sorbe et al. (2019), OECD.

Reduction in income inequality before and after tax



Percentage reduction in the Gini coefficient of income when measured after taxes and benefits, as compared to before taxes and benefits.

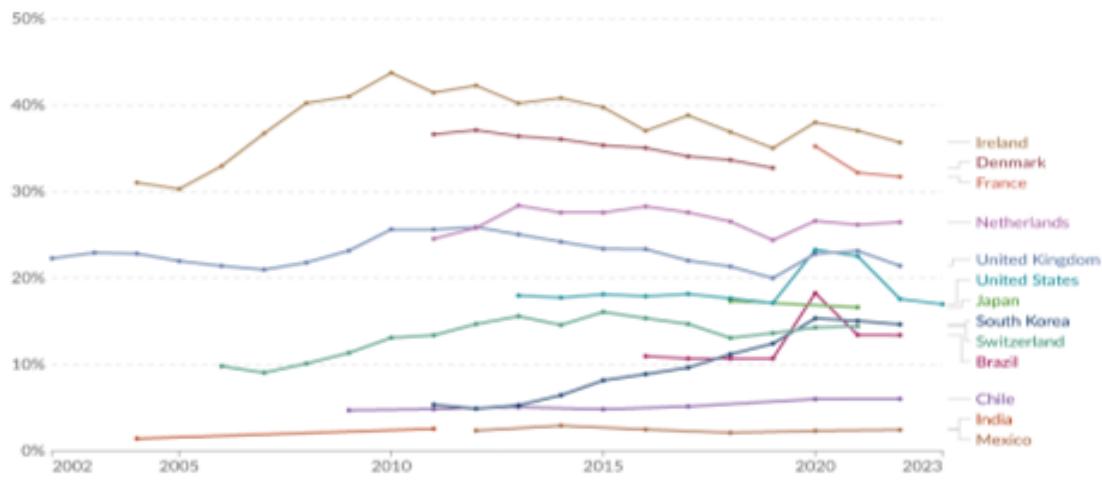


Figure 4. Reduction in income inequality due to taxes and transfers.
Fiscal redistribution reduces inequality across countries but does not eliminate it.
OECD Income Distribution Database.

Analysis: Potential & Limitations

Universal Basic Income (UBI) has significant potential to reduce income inequality, mainly by increasing the incomes of lower earners. Empirical and modeling studies show that unconditional dividend payments enhance financial security and well-being for recipients (Hasdell, 2020; Luduvice, 2024). Small simulated models, such as in Brazil, suggest that carefully designed UBI schemes can narrow income disparities if properly financed (Bezerra de Siqueira & Nogueira, 2021).

However, large-scale implementation faces major practical and fiscal challenges. Without innovative financing, dividends may unfairly benefit wealthier households, reducing their redistributive effect. Pilot data indicate that while UBI improves poverty measures, its impact on broader inequality, especially among the upper class, remains unclear (Kangas et al., 2024; ResearchGate, 2024). Other than economic outcomes, decoupling income from labor affects social unity: UBI may reduce risk and strengthen social trust, while data dividends risk exclusion if digital access and literacy remain unequal.

Therefore, the success of UBI as an economic tool heavily depends on proper design, supportive social policies, and thorough study of structural and intergenerational effects.

Inequality and poverty indices	Current system (2017)	Scheme 1	Scheme 2	Scheme 3
% of individuals in poverty				
Total population	23.5	0.0	8.0	6.8
% reduction	-	100.0	66.0	71.1
Children (< 18)	39.7	0.0	17.6	15.0
% reduction	-	100.0	55.7	62.2
Working age (18 - 64)	20.5	0.0	5.5	4.7
% reduction	-	100.0	73.2	77.1
Old age (>= 65)	3.2	0.0	0.3	0.2
% reduction	-	100.0	90.1	93.7
Gini coefficient of inequality	0.506	0.377	0.408	0.373
% reduction	-	25.5	19.4	26.3

Figure 5. The table reports microsimulation results based on PNADC 2017 household survey data using the BRAHMS tax-benefit model. It compares the current Brazilian system with three alternative UBI schemes, showing substantial reductions in poverty across all demographic groups and significant decreases in the Gini coefficient. Results indicate that UBI can dramatically reduce both poverty and income inequality, with the magnitude of effects varying by scheme design and generosity.

Source: Bezerra de Siqueira & Nogueira (2021).

Data Dividends operate on a complementary principle, reallocating the economic value generated by digital data to the affected populations and contributors. Applied studies show that when implemented properly, digital dividends can reduce income inequality within affected populations. The example of e-commerce farmers in China demonstrates that access to data tools can reduce inequalities in income and capabilities, enabling mobility (Cui et al., 2025).

However, an increase in inequality remains a provided risk. Data Dividends could be captured by prominent firms, and without general access and literacy programs, they may benefit skilled participants more (Tian et al., 2024; Vincent et al., 2019).

Developed economies are more able to implement these policies due to stronger financial and technological institutions, while developing economies face higher risks of exclusion and fiscal strain.

Thus, while Data Dividends are an interesting theory for fixing income inequality, their effectiveness relies heavily on infrastructure investment and inclusive policy design.

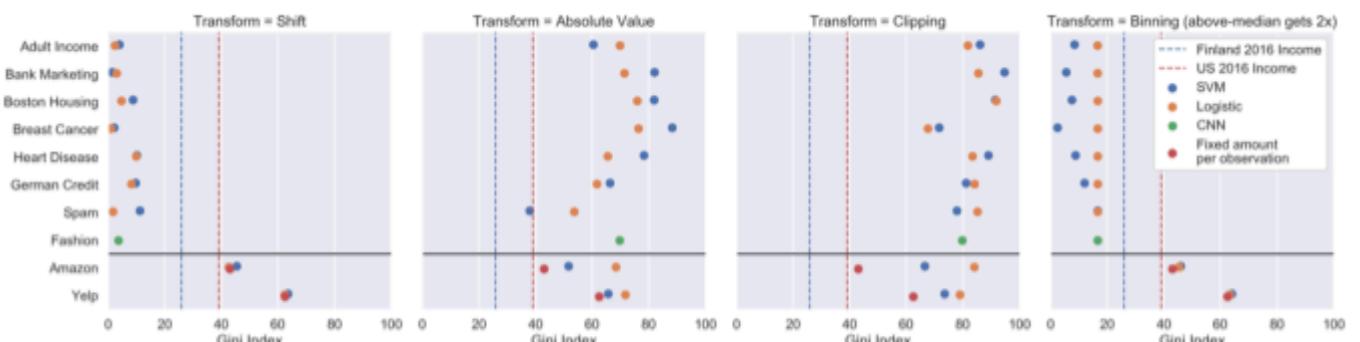


Figure 6. Inequality outcomes of alternative data-dividend allocation mechanisms. Gini indices for simulated data dividends across multiple machine-learning tasks and models under different redistribution designs (shift, absolute value, clipping, and binning). Lower Gini values indicate more equal distributions. Each row corresponds to a different task, and colors represent model types. Dashed vertical lines show national income Gini indices for Finland and the United States (2016), providing a benchmark for comparison. The figure illustrates that seemingly minor design choices can result in dividend distributions that are either more egalitarian than national income or substantially more unequal.

Source: Vincent, Li, Zha, & Hecht (2019).

Policy Design

Evidence suggests that proper deployment of UBI and Data-Dividend policies requires a coordinated strategy across multiple domains, addressing both structural and distributive inequality.

For UBI, policy creators must ensure sustainability through taxation and avoid causing cuts to other civic programs that could affect the overall benefit (Bezerra de Siqueira & Nogueira, 2021). Supporting investments in health, technology, and education are important to turn universal income

into a quantifiable long-term social benefit (Hasdell, 2020). Heavy programs should collect data on inequality metrics, including top 1% income shares, Gini coefficients, and generational mobility, to fix policy design before global adoption.

For Data Dividend policies, digital literacy programs, and technological access are critical. Policy designs must not be captured by dominant firms, and mechanism transparency is vital to understand the value of data contributions and to distribute dividends equally (Vincent et al., 2019; OECD, 2023). Investing in digital infrastructure is vital for countries less technologically advanced, where the risk of inequality widening is highest. Data dividends should be introduced with larger strategies fighting wealth gaps and generational inequality to ensure proper long-term social benefit.

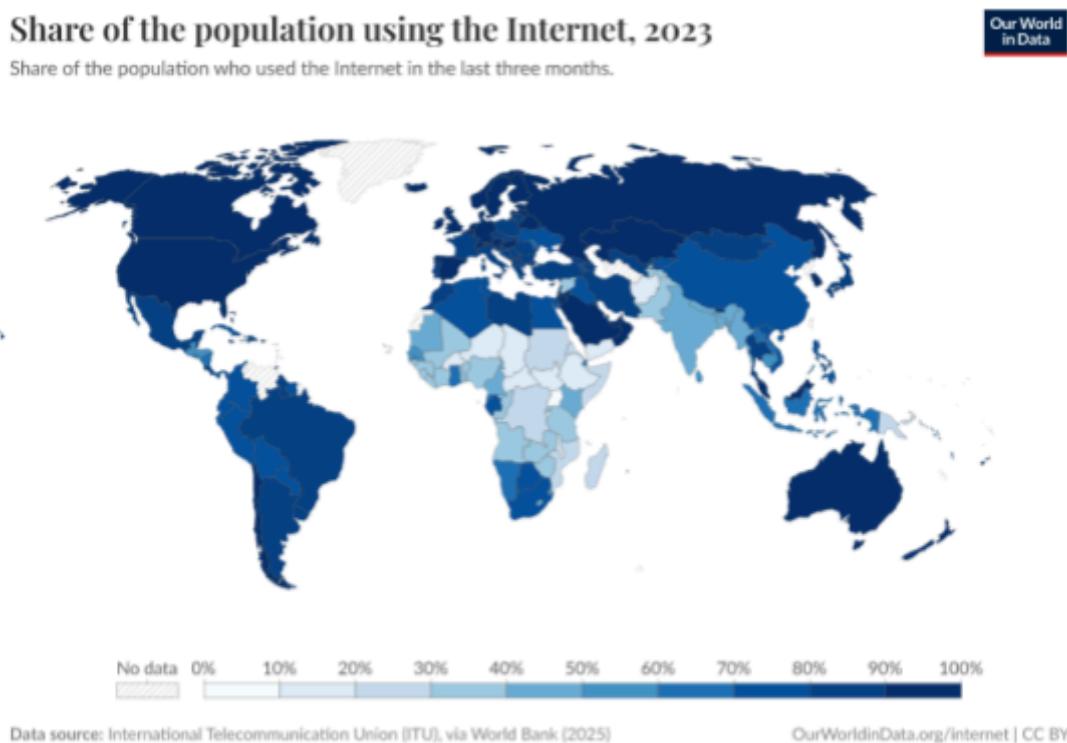


Figure 5. shows that digital access remains highly unequal, implying that data-dividend schemes must be paired with infrastructure investment to achieve equitable outcomes.

Source: International Telecommunication Union; Our World in Data.

Both UBI and Data-Dividends gave potential to reduce inequality, but they aren't the sole solutions. Long-term benefit depends heavily on proper policy design, proper governance, and inclusive implementation. Without these broader policies, programs could risk enlarging social inequality and wealth gaps, reinforcing differences instead of alleviating them.

Conclusion

Decoupling income from labor through UBI and data dividends offers an answer to technological inequality, but initiates trade-offs of labor incentives, financial sustainability, innovation, and social unity. UBI provides immediate income security, while data dividends relate income redistribution to digital value creation. Their long-term effects on growth and inequality depend on policy design, institutional capacity, and countries' levels of economic development.

References

- Cui, Y., Li, L., Zeng, Y., Zhang, H., & Li, B. (2025). Big data products and income inequality of e-commerce farmers: evidence from China. *Humanities and Social Sciences Communications*, 12(1).
<https://doi.org/10.1057/s41599-025-05731-w>
- Daruich, D., & Fernández, R. (2020). Universal Basic Income: A Dynamic Assessment. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3626852>
- De Paz-Báñez, M. A., Asensio-Coto, M. J., Sánchez-López, C., & Aceytuno, M.-T. (2020). Is There Empirical Evidence on How the Implementation of a Universal Basic Income (UBI) Affects Labour Supply? A Systematic Review. *Sustainability*, 12(22), 9459. <https://doi.org/10.3390/su12229459>
- Hasdell, R. (2020). *What we know about universal basic income*.
https://basicincome.stanford.edu/uploads/Umbrella%20Review%20BI_final.pdf
- Luduvice, A. V. D. (2024). The macroeconomic effects of universal basic income programs. *Journal of Monetary Economics*, 148, 103615. <https://doi.org/10.1016/j.jmoneco.2024.103615>
- Peng, Z., & Dan, T. (2023). Digital Dividend or Digital divide? Digital Economy and Urban-Rural Income Inequality in China. *Telecommunications Policy*, 47(9), 102616–102616.
<https://doi.org/10.1016/j.telpol.2023.102616>
- Siqueira, R. B. de, & Nogueira, J. R. B. (2023). A UNIVERSAL BASIC INCOME FOR BRAZIL: FISCAL AND DISTRIBUTIONAL EFFECTS OF ALTERNATIVE SCHEMES. *Revista de Economia Contemporânea*, 27. <https://doi.org/10.1590/198055272701>
- Sorbe, S., Gal, P., Nicoletti, G., & Timiliotis, C. (2019). Digital Dividend: Policies to Harness the Productivity Potential of Digital Technologies. *Www.oecd-ilibrary.org*.
<https://doi.org/10.1787/273176bc-en>
- Thomson, R. M., Kopasker, D., Patryk Bronka, Matteo Richiardi, Vladimir Khodygo, Baxter, A. J., Igelström, E., Pearce, A., Leyland, A. H., & S. Vittal Katikireddi. (2024). Short-term impacts of Universal Basic Income on population mental health inequalities in the UK: A microsimulation

modelling study. *PLOS Medicine*, 21(3), e1004358–e1004358.

<https://doi.org/10.1371/journal.pmed.1004358>

Tian, L., & Xiang, Y. (2024). Does the digital economy promote or inhibit income inequality? *Heliyon*,

10(14), e33533–e33533. <https://doi.org/10.1016/j.heliyon.2024.e33533>

Vincent, N., Li, Y., Zha, R., & Hecht, B. (2019). *Mapping the Potential and Pitfalls of “Data Dividends” as*

a Means of Sharing the Profits of Artificial Intelligence. ArXiv.org. <https://arxiv.org/abs/1912.00757>