

Editorial

Matteo G Richiardi^{1*}

¹University of Essex, Colchester, United Kingdom


Welcome to the Spring 2026 issue of the *International Journal of Microsimulation*. The five articles collected here illustrate the breadth that microsimulation has come to occupy: from tax–benefit redistribution in a low–income economy and validation of an open–source tax–benefit model against linked administrative data, to a discrete–event and agent–based simulator for healthcare operations, and two systematic reviews that take stock of how microsimulation is being used (and could be used more) in food security and in pasture–based agriculture. Read together, the issue underlines a recurring concern: as microsimulation extends into new domains and policy questions, the credibility of its outputs depends on transparent validation, careful methodological choice, and dialogue with adjacent traditions of unit–level modelling.

The issue opens with Mwale and Robinson, *The redistribution effect of taxation in emerging economies: Evidence from a microsimulation exercise in Zambia*. Using MicroZAMOD, the Zambian module of the SOUTHMOD/EUROMOD family, the authors decompose the contribution of personal income tax (PIT), value–added tax (VAT), turnover tax (TOT) and excise duties to poverty and inequality between 2010 and 2019, and complement standard incidence analysis with a cost–effectiveness framework that asks how much each instrument contributes per Kwacha raised. The headline result is sobering: VAT, the dominant revenue source in Zambia as in many Sub–Saharan African economies, accounts for some three quarters of the poverty–increasing impact of taxation, while PIT — small in revenue terms — does most of the work in compressing the income distribution. Building on this diagnosis, the authors design and simulate four reform packages, including a revenue–neutral combination that channels savings from a redesigned PAYE schedule and adjusted excise duties towards expanding the Social Cash Transfer programme. The added value is twofold: extending high–quality tax–benefit microsimulation to a low–income context where the working assumption that VAT is a relatively neutral revenue instrument deserves to be tested empirically, and showing that the prevalence of informal and self–employment makes the question of *which* tax to raise at least as important as *how much* to raise.

Al–Masbhi, O’Donoghue and Sologon (*Bridging Affordability, Nutrition, and Sustainability: A Systematic Review of Microsimulation Approaches in Food Security Research*) then take a step back and ask what microsimulation has — and has not — contributed to food security research. Combining a qualitative thematic synthesis with a bibliometric analysis, the review covers applications ranging from sugar–sweetened beverage and “sin” taxes to fertiliser subsidies, food assistance programmes and shocks such as COVID–19 and the war in Ukraine. The take–home message is that affordability and nutrition have attracted the bulk of microsimulation attention, while environmental sustainability remains the missing leg of the food–security stool. The authors call for integrated, systems–based frameworks that link micro–level behavioural responses to broader environmental and equity outcomes — an agenda the journal will follow with interest.

The third contribution, Bruckmeier’s research note *Evaluating the results of a social benefit simulation using individual administrative data on benefit receipt*, confronts a problem that lurks behind every applied microsimulation paper: how well do simulated entitlements actually match the benefits that recipients receive? Using two samples of recipients of Germany’s Unemployment Benefit II (UBII, since 2023 the Bürgergeld) drawn from the IAB’s administrative biographies, the author tests four variants of GETTSIM — the open–source German tax–benefit model — against recorded entitlements at the individual level. The exercise yields very low beta–error rates and a high match between simulated and recorded amounts once the model is adjusted to reflect how local authorities treat housing

***For correspondence:**
matteo.richiardi@essex.ac.uk

 <http://creativecommons.org/licenses/by/4.0/> This article is distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use and redistribution provided that the original author and source are credited.

© 2026, Richiardi.

costs, but it also exposes design-related sources of inaccuracy that survive even when measurement error in the input data is minimised: discretion in the means test, interactions between UBII and Housing Benefit and means-tested Child Benefit, and individual circumstances that the model's syntax cannot represent. The paper is, on the face of it, a quiet validation exercise; in practice, it is a salutary reminder for the non-take-up literature that what looks like a behavioural phenomenon may, in part, reflect simulation noise.

In *SNFsim: A Discrete Event Simulator for Multi-Level Decision Support in Skilled Nursing Facilities*, Strickland, Wagner, Wang and Lizotte push the journal's scope further from its tax-benefit core. SNFsim is an open-source, agent-based discrete-event simulator that combines real-world post-acute care data with a representation of two interlocking decision processes — patient referrals (admit or decline) and staffing — within US skilled nursing facilities. The authors situate their work explicitly between microsimulation, agent-based modelling and discrete-event simulation, and use the resulting environment to train and test reinforcement-learning agents on multi-level, multi-objective decisions under resource constraints. The contribution to readers of this journal is less about nursing homes per se than about how a microsimulation-style representation of heterogeneous individuals can serve as the test bed on which modern reinforcement-learning methods are evaluated before they are let loose on real operational decisions: a methodological bridge that we expect to see crossed more often in coming years.

Closing the issue, Afeku, O'Donoghue and Kilcline offer a second systematic review — *Economic and Environmental Impact Analysis of pasture-based agriculture: A Review of Economic Modelling Approaches* — covering 173 peer-reviewed studies published between 2000 and 2024. The review maps how farm-level simulation, optimisation, microsimulation, bioeconomic and macro-scale models have been applied to pasture systems, where most studies are concentrated in Europe, conventional production dominates, and environmental outcomes are typically reduced to land use and greenhouse-gas emissions. The most striking finding — and the one most relevant for our community — is the persistent disconnect between models that handle farm-level heterogeneity and those designed for sectoral or economy-wide aggregation. The authors argue, persuasively, that closing that gap requires integrated frameworks coupling farm-scale microsimulation with sectoral or general-equilibrium models. Together with the food-security review, this paper stakes out adjacent agendas in which microsimulation has a contribution to make but whose methodological gaps it has yet to close on its own.

Across the five contributions, what recurs is an engagement with the boundaries of microsimulation: with the administrative data that feed it, with adjacent simulation traditions, and with the policy debates its outputs are meant to inform. The further-reading items below extend each of these threads.

Suggestions for further reading

Lastunen et al. (2024) provide a comparative assessment of tax-benefit systems across the full SOUTHMOD country set, offering a useful cross-country backdrop against which to read the Zambian application of MicroZAMOD presented in this issue.

Richiardi and van de Ven (2025), in a chapter for the Santa Fe Institute Press volume *The Economy as an Evolving Complex System IV*, trace the long-standing convergence between agent-based modelling and dynamic microsimulation and set out what each tradition has to learn from the other — useful methodological context for the hybrid approach taken by Strickland and colleagues in this issue. A working paper version is also available via the Centre for Microsimulation and Policy Analysis (<https://www.microsimulation.ac.uk/publications/publication-568039/>).

Wu et al. (2025) survey the methodological framework and recent advances of reinforcement learning in healthcare operations management, situating SNFsim and similar facility-level decision-support efforts within a broader and rapidly developing literature.

Lehtimäki and Martikainen (2026) offer a step-by-step tutorial for building individual-level microsimulation models in C++, complementing the established R-based tradition and giving readers a practical entry point for performance-sensitive health-decision applications.

Also of relevance, despite not being very recent, is **Kolkman et al. (2016)**, *Policy Sciences*, who draw on fieldwork in eight policy-modelling projects in the Netherlands and the UK to identify the model characteristics, supporting infrastructure and organisational factors that drive — or prevent

— acceptance of models by the ministries that commission them; their conclusions speak directly to the validation, documentation and design questions raised by contributions in this issue.

References

- Kolkman DA**, Campo P, Balke-Visser T, Gilbert N. 2016. How to build models for government: criteria driving model acceptance in policymaking. *Policy Sciences* **49**: 489–504. DOI: <https://doi.org/10.1007/s11077-016-9250-4>
- Lastunen J**, Mahieu A, Gasior K, Jara HX, Pirttilä J. 2024. Microsimulation of tax–benefit systems in the Global South: A comparative assessment (WIDER Working Paper no.2024/35). UNU–WIDER. <https://www.wider.unu.edu/publication/microsimulation-tax-benefit-systems-global-south-comparative-assessment>
- Lehtimäki AV**, Martikainen J. 2026. Microsimulation Modeling for Health Decision Sciences Using C++: A Tutorial. *PharmacoEconomics* **44**: 379–387. DOI: <https://doi.org/10.1007/s40273-025-01526-8>
- Richiardi M**, van de Ven J. 2025. Back to the future: Agent–based modelling and dynamic microsimulation. Pangallo M, Bednar J, Beinhocker E, Kaszowska–Mojsa J, Lafond F, Mealy P, Pichler A, Farmer JD (Eds). *The Economy as an Evolving Complex System IV*. <https://www.sifipress.org/eecs-iv-08>
- Wu Q**, Han J, Yan Y, Kuo Y-H, Shen Z-J. 2025. Reinforcement learning for healthcare operations management: methodological framework, recent developments, and future research directions. *Health Care Management Science* **28**: 298–333. DOI: <https://doi.org/10.1007/s10729-025-09699-6>