Student Economic Review 2026

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Prize-Winning Essays of the Student Economic Review, 2026

Best Overall Essay: Dermot McAleese Medal:

THE MISPRICING OF CLIMATE RISK IN FINANCIAL MARKETS

Grace Carthy

Best Applied Economics Essay: John O'Hagan Medal

WHO ALIGNS WITH THE LIBERAL INTERNATIONAL ORDER? EVIDENCE FROM UN GENERAL ASSEMBLY VOTING

Jiwoo Kim

Best Fresh Essay Prize:

THE VALUE OF A DEGREE: RETHINKING EDUCATION AMID AI AUTOMATION AND LABOUR MARKET CHANGES

Neva Bakshi

Editors and General Managers of the Student Economic Review, 1987-2026

Year	Editor	General Manager
1987 (Vol. I)	John Fingleton	Paddy Waldron
1988 (Vol. II)	Kevin Carey	Finbar McDonnell
1989 (Vol. III)	Johnathan Wright	Joe Denehy
1990 (Vol. IV)	Philip Lane	C. J. O'Neill
1991 (Vol. V)	Paul O'Connell	Billy Stamp
1992 (Vol. VI)	Alan White	Addo C. Barrows III
1993 (Vol. VII)	Gareth Davis	David Butler
1994 (Vol. VIII)	Alan Dunne	Donagh Lynch
1995 (Vol. IX)	Fergal Shorthall	Myles H. Clarke
1996 (Vol. X)	Geoffrey Gill	Suzanne O'Neill
1997 (Vol. XI)	Sarah Rowell	Carol Newman
1998 (Vol. XII)	Richard Doyle	Charlotte Hess
1999 (Vol. XIII)	Michael McMahon	Niamh McDonagh
2000 (Vol. XIV)	Ana Carrie	Collette Murphy
2001 (Vol. XV)	Ronan Lyons	Charles Larkin
2002 (Vol. XVI)	Ivan McAdam	Janine Boyd O'Carroll
2003 (Vol. XVII)	Rowena Gray	Elaine Doyle
2004 (Vol. XVIII)	Denis Tkatchenko	Tara McInhoe
2005 (Vol. XIX)	Cormac O'Dea	Paul Sammon
2006 (Vol. XX)	Deirdre Reilly	Melinda Simonffy
2007 (Vol. XXI)	Niamh Crilly	Charlie Nolan
2008 (Vol. XXII)	Nathalie Ennis	Kieran Curtis
2009 (Vol. XIII)	Jean Acheson	James Walsh
2010 (Vol. XXIV)	Jason Somerville	Amandine Lobellett

Year	Editor	General Manager
2011 (Vol. XXV)	Robert Farhat	Áine Ní Shúilleabháin
2012 (Vol. XXVI)	Tony O'Connor	Debbie Blair
2013 (Vol. XXVII)	Brian Higgins	Marielle Grigsby-Rocca
2014 (Vol. XXVIII)	Féidhlim Mc Gowan	Cián Mc Leod
2015 (Vol. XXIX)	Gearóid Gibbs	Michael Mahony
2016 (Vol. XXX)	Gillian O'Connell	Kate Hayes
2017 (Vol. XXXI)	Míde Ní Ghríofa	Alexandru Radu Puiu
2018 (Vol. XXXII)	Keelan Beirne	Aditya Garg
2019 (Vol. XXXIII)	John (Charlie) Walsh	Luisa Mostarda
2020 (Vol. XXXIV)	Harry Humes	Kevin Loftus
2021 (Vol. XXXV)	Ronan Dunne	Yvonne O'Kiersey
2022 (Vol. XXXVI)	Sarah Clavin	Cian Brennan
2023 (Vol. XXXVII)	Rachel Kane	Constantine Iordanov
2024 (Vol. XXXVIII)	Saloni Khosla	Grace Kirwan
2025 (Vol. XXXIX)	Piotr Górecki	Aoife O'Connor
2026 (Vol. XL)	Nour Samarah	Isabelle Janssen

GUEST SPEAKERS AT THE LAUNCH OF THE STUDENT ECONOMIC REVIEW, 1990-2026

Year	Speaker	Organisation
1990 (Vol. IV)	Richard Lipsey	Simon Fraser University
1991 (Vol. V)	Charles Goodhart	London School of Economics
1992 (Vol. VI)	Peter Sinclair	Brasenose College, Oxford
1993 (Vol. VII)	David Greenway	Nottingham University
1994 (Vol. VIII)	Hamish Mc Rae	The Independent, London
1995 (Vol. IX)	John Sutton	London School of Economics
1996 (Vol. X)	John Martin	OECD
1997 (Vol. XI)	Alan Tait	IMF
1998 (Vol. XII)	David O'Sullivan	European Commission
1999 (Vol. XIII)	Paula Donovan	World Bank
2000 (Vol.XIV)	Dermot McCarthy	Department of an Taoiseach
2001 (Vol. XV)	Donal Donovan	IMF
2002 (Vol.XVI)	Margaret Doyle	The Economist
2003 (Vol. XVII)	Tom Healy	Irish Stock Exchange
2004 (Vol. XVIII)	Gerry Foley	ITV PLC.
2005 (Vol.XIX)	John Fingleton	Competition Authority
2006 (Vol. XX)	Marius Brülhart	HEC University of Lausanne
2007 (Vol.XXI)	Cliff Taylor	Sunday Business Post
2008 (Vol. XXII)	Alan Barrett	ESRI
2009 (Vol. XXIII)	Patricia Callan	Small Firms Association
2010 (Vol. XXIV)	Jane Williams	Forfás
2011 (Vol. XXV)	Tom O'Mahony	Department of Transport
2012 (Vol. XXVI)	Kyran McStay	Key Capital Limited
2013 (Vol. XXVII)	Alan Gray	Indecon Economic Group

Year	Speaker	Organisation
2014 (Vol. XXVIII)	Anke Heydenreich	Attestor Capital LLP
2015 (Vol. XXIX)	Declan Sheehan	JP Morgan
2016 (Vol. XXX)	Various Speakers	Past Committee Members
2017 (Vol. XXXI)	Kevin O'Rourke	All Souls College, Oxford
2018 (Vol. XXXII)	Liam Delaney	U.C.D.
2019 (Vol. XXXIII)	Carmel Crimmins	Reuters
2019 (Vol. XXXIII)	Seán Barrett	Dáil Éireann
2020 (Vol. XXXIV)	Eithne Fitzgerald	Former Minister of State
2021 (Vol. XXXV)	John Fitzgerald	ESRI
2021 (Vol. XXXV)	David McWilliams	Irish Economist
2022 (Vol. XXXVI)	Andrea Linehan	Currency Fair
2023 (Vol. XXXVII)	Ivan Pastine	U.C.D.
2023 (Vol. XXXVII)	Sarah Parlane	U.C.D.
2023 (Vol. XXXVII)	Edel Doherty	N.U.I.G.
2024 (Vol. XXXVIII)	Philip Lane	ECB
2024 (Vol. XXXVIII)	Felicia Odamtten	Black Economist Network
2024 (Vol. XXXVIII)	Margaret Doyle	Deloitte UK
2025 (Vol. XXXIX)	Frances Ruane	ESRI
2026 (Vol. XL)	Panel of Speakers	ESRI, ECB

Student Economic Review Debates, 1990-2026

Year	Opposition	Topic	Victor
1996	U.C.D.	Third Level Fees	Trinity
1998	U.C.D.	EMU Without Britain	Trinity
1999	Oxford	The Euro: The Way Forward	Oxford
2002	Oxford	Boston or Berlin?	Trinity
2003	Cambridge	The Euro is a Success	Cambridge
2004	U.C.D.	Free Trade and Development	U.C.D.
2005	Oxford	Third World Debt	Trinity
2006	Cambridge	Common Agricultural Policy	Trinity
2007	Oxford	Environmental Responsibility	Trinity
2007	Yale	Boston or Berlin?	Trinity
2008	Harvard	Mass Emigration and Labour	Trinity
2018	Cambridge	Britain's Place in Europe	Cambridge
2009	Yale	Boston or Berlin?	Yale
2009	Oxford	Bank Nationalisation	Trinity
2010	Cambridge	Should Ireland have Joined the Euro?	Trinity
2010	Harvard	The Decline of US Economic Dominance	Harvard
2011	Oxford	Ireland Owes a Debt of Gratitude to Britain	Oxford
2011	Yale	It's all America's Fault	Trinity
2012	Cambridge	Ireland Should Rejoin the Sterling	Trinity
2012	Harvard	The US State Does Not Care for it's Sick	Harvard
2013	Oxford	Deserting the Euro	Trinity
2013	Yale	Tax is Theft	Trinity
2014	Cambridge	United States of Europe?	Cambridge
2014	Harvard	US Education System	Trinity

Year	Opposition	Topic	Victor
2015	Oxford	100% Inheritance Tax	Trinity
2015	Yale	Opening the Mexican Border	Yale
2016	Cambridge	Will the EU Benefit from Brexit?	Cambridge
2016	Harvard	Should we be afraid of Cheap Oil?	Harvard
2017	Oxford	The EU is Unsustainable	Oxford
2017	Yale	Globalisation is Doomed	Yale
2018	Cambridge	Britiain Should Pay Reperation to Former Colonies	Cambridge
2018	Harvard	The American Dream is Dead	Trinity
2018	Oxford	Unite Ireland post-Brexit	Oxford
2019	Yale	Protectionsim is Failing America	Cambridge
2019	Cambridge	Open All Borders	Cambridge
2021	Oxford	Break-up the UK	Oxford
2021	Yale	Implement Universal Basic Income	Trinity
2022	Cambridge	Derelict Properties Should be Surrenderd	Cambridge
2022	Harvard	Economic Warfare Does More Harm than Good	Harvard
2023	Oxford	Tax Cuts Create Economic Growth	Oxford
2023	Yale	Break Up Big Tech	Trinity
2024	Oxford	Abolish All Borders	Oxford
2024	Harvard	Capitalism Cannot Solve the Climate Crisis	Trinity
2025	Cambridge	Tax Havens Hurt the Working Class	Cambridge
2025	Harvard	Decouple from the U.S. Economy	Harvard
2026	Cambridge	Give Communism Another Shot	Cambridge
2026	Harvard	Abolish the Billionaire Class	Trinity

ENDORSEMENTS

"The Student Economic Review gives many students their first opportunity to publish a piece of academic written work. It thus supports and promotes the rigorous analysis, excellence in learning and persuasion that are essential building blocks for future careers and broader intellectual contribution. The collected contributions, now reaching into a third decade, constitute an elegant contribution to scholarship and erudition of which Trinity College can be proud."

John Fingleton
Trading London,
Editor, SER 1987.

"My involvement in the SER was an important defining point in my undergraduate experience at Trinity. It introduced me to the world of academia, the role and importance of academic publishing and the range of questions and depth of research possibilities in the discipline of economics. It has stood the test of time and grows stronger every year attracting the highest calibre of students."

Carol Newman
PhD TCD, Associate Professor TCD
General Manager, SER 1997.

"Ever since leafing through a copy of the SER in my JF year, my ambition to become involved in this prestigious student society could not be curbed. Leading the committee through the year, from the first workshop to the launch, was an experience dotted along the way with enduring memories. From a three-day discussion about which tablecloth should be used for the workshop, to finally holding a copy of the review at the launch evening. I'm sure our friendships will last as long as the memory of my scrupulous organization!

Cián McLeod
Strategic Operations Specialist, Google Ireland
General Manager, SER 2014.

Foreword

It is a pleasure to write the foreword for this, the 40th edition of the Student Economic Review.

Forty editions is a remarkable milestone for any publication — all the more so for one founded and sustained by students. It is a testament to the dedication of the many successive cohorts who have given so freely of their time to the Review since the first issue was edited by John Fingleton in 1987.

Those efforts were encouraged over almost three decades by Prof. John O'Hagan, who was such a strong champion of the Review from its early days. John selected and mentored successive committees and ensured the Review became a fixture in the life of the Department and indeed Trinity. The Review's reach and reputation today owes a great deal to his commitment and energy over that period.

As one of the many students John selected and involved in the Review over the years, I have a particular appreciation for what it offers those who take part. For contributors, it is often a first encounter with having their work edited and be subject to peer review. For committee members, it is an introduction to the leadership and organisational skills that it takes to see a project of this kind through to completion.

That these experiences stand to students is borne out by the record of former participants: a remarkable proportion of past contributors and committee members have gone on to prominent positions in industry, the public sector and — of course — academia.

The journal itself remains at the heart of the Review, but as readers will see, the scale of the Review has grown. Workshops, talks, and debates are organised throughout the year, reflecting the committee's ambition to engage with the broader questions that economics can help illuminate: a tradition the Review has maintained since the early debates with UCD and later — thanks to Vinay Nair — with Oxford, Cambridge, Harvard and Yale.

None of this would be possible without the continued generosity of past committee members and alumni of the Department, whose support sustains the programme year after year. Among those to whom the Review owes a particular debt are CJ O'Neill, who served as managing editor of the 1990 edition, and Harry Hartford, who — although not a former committee member — has been a steadfast supporter of the Review for many years.

Above all, this year's committee deserves great credit. As well as overseeing another edition of the journal, they have put together a wonderful event to mark the 40th anniversary — and they should be proud of both.

Dr. Barra Roantree
Department of Economics, Trinity College Dublin

Student Economic Review Welcomes

WELCOME FROM THE GENERAL MANAGER

Anniversaries provide an inviting and unique opportunity for reflection. Since the establishment of the Student Economic Review 40 years ago, the generations of students managing and contributing to it have shaped the SER into the entity it is today. For 40 years, the Student Economic Review has ignited a passion in students for economics, critical thinking, and independent research.

My role as General Manager this year has been an opportunity for which I am deeply grateful, and I am extraordinarily proud of our tenure as a team serving as stewards of the SER. Working together with this talented group of colleagues has been a unique opportunity to learn from and interact with a team equally invested in the SER and economics as I am. It has been an honour.

Since the beginning of the academic year, the passion of everyone involved in the Student Economic Review has been evident and awe-inspiring. A lunch with the Patrons learning about academic research set the bar in our heads not just for our future careers, but for the standard we aspired to with the SER. We are likewise most grateful to the committee of last year (Volume XXXIX) who generously guided us and helped to ensure our work continued their legacy.

Throughout Michaelmas Term, we laid a solid foundation for the rush that we knew to expect in subsequent months. In November, we hosted our annual Foundation Scholarship Workshop, connecting Senior Fresh students with Scholars in the Department of Economics to provide them with guidance and support. Our Events Coordinator, Dominic, diligently organised both this workshop and our upcoming Energy Trading Workshop in collaboration with ESB. I am most grateful for his efforts.

Hilary Term greeted our committee with a wave of deadlines, tasks, and meetings. Throughout these cold winter days, our editorial team worked tirelessly to read and edit a staggering number of submissions. Despite the high quality of submissions, only 11 could be accepted. These essays selected by the editorial team showcase the vast breadth of the field of economics and students' engagement with it, featuring both work from modules and independent research. For their dedication and unflinching enthusiasm in the face of such a monumental task, I would like to offer my heartfelt thanks to our Editor, Nour, and Deputy

Editors, Aditi and Jack.

This year we also had the privilege of hosting the two debates that have become tradition for the Student Economic Review. In Michaelmas Term, in collaboration with the University Philosophical Society, we welcomed guest debaters from the University of Cambridge, while in Hilary Term, we collaborated with the College Historical Society to go toe to toe with Harvard University. With several organisational surprises along the way, our Debates Manager, Kacper, met every challenge with adaptability and a velvet tuxedo. It is thanks to his efforts this year that we have continued to demonstrate economic discourse in this environment together with some of the world's most prestigious universities.

With the launch imminent, I would like to extend a special thanks to Pauric, our Workshop and Launch Manager. As an anniversary year, this volume's launch represents an even more behemoth undertaking than usual. In the face of this daunting task, Pauric remained unflinchingly calm and creative in his problem-solving. It is thanks to his dedication that this launch will be as grand as expected.

My sincere thanks as well to Ben, our Finance Manager, who smoothly navigated the SER towards additional funding, ensuring the ongoing health of the journal and enabling all of our activities. No facet of the Student Economic Review would go forward without his expertise and dedication.

Assembling the finished journal was no less demanding a task, and one our Production Manager, Hezamary, met with grit and determination. Over countless days of formatting and designing, she guided us through the task whilst going above and beyond to also manage our social media presence. I am both grateful and impressed by her skill and dedication.

Last, but certainly not least, I would like to extend heartfelt thanks to our Patrons in the Department of Economics for their invaluable guidance and support throughout this year. Thank you to Dr Barra Roantree, Dr Agustín Bénétrix, Dr Martina Kirchberger, and Dr Carol Newman, as well as our Honorary Patron, Dr John O'Hagan. Without their expertise, the Student Economic Review would not be what it is today.

I hope you find Volume XL of the Student Economic Review as enlightening, entertaining, and worthy of discussion as we have in creating it. The diverse, dedicated, and unique writings contained within this volume demonstrate the very best of Trinity undergraduate research. As we close out the first 40 years of the Student Economic Review we treasure its legacy and look to its future with anticipation and hope.

Isabelle Janssen
General Manager,
Student Economic Review XL

Letter from the Editor

It is a privilege to welcome you to the 40th edition of the Student Economic Review (SER). Since 1987, the Review has served as a defining fixture of the Trinity economic tradition, bridging the gap between lecture-hall theory and published scholarship. This anniversary edition presents a synthesis of the critical perspectives defining today's undergraduate discourse, reflecting a generation's response to an increasingly volatile global economy.

Arriving at this final selection was no small feat. With the invaluable assistance of my Deputy Editors, Aditi Pradeep and Jack Doran, we evaluated a pool of forty high-calibre submissions, spending weeks debating borderline cases and interrogating methodological rigour. However, the true work began after the initial selection. We challenged our authors to push their insights further, overseeing a cycle of robust edits and structural overhauls. This collaborative back-and-forth has ensured that the featured essays are as polished as they are provocative. These eleven pieces, representing the highest standard of undergraduate scholarship, are grouped into the following sections:

The volume opens with Economic Theory, in which James Carey questions whether the "Economic Man" remains a useful abstraction or a "perversion of reality," arguing that its value is decisively context-dependent. This is followed by a dual exploration of digital markets: Piotr Górecki introduces a nuanced model of the attention economy, distinguishing between 'flow' and 'calcified' attention, while Alan King employs game theory to show how platforms are locked into socially inefficient, engagement-maximising equilibria that no single firm can escape alone.

Our Financial Economics section features the recipient of the Dermot McAleese Medal for Best Overall Essay, Grace Carthy. Her sophisticated analysis argues that the apparent mispricing of climate risk is not merely an informational failure, but a rational response to the political uncertainty and weak credibility of global climate policy. Alongside this, Aaron Clarke Tighe provides a forensic examination of the 2022 UK LDI crisis, identifying how macroprudential 'blind spots' allowed leverage to accumulate in the non-bank financial sector, and drawing vital lessons for central banks navigating an increasingly NBFI-dominated system.

In the field of International Political Economy, we are proud to feature Jiwoo Kim, winner of the John O'Hagan Medal for Best Applied Economics Essay. Leveraging an expansive dataset of UN General Assembly voting from 2006 to 2023, Kim provides a compelling argument that alignment with the U.S.-led liberal order is not merely a matter of wealth but is deeply contingent on a nation's internal institutional stability and social cohesion.

Turning to Labour Economics, Neva Bakshi, awarded the Best Fresh Essay Prize, offers a timely perspective on the value of higher education in the age of AI. Focusing on the computer science sector, the analysis contends that as automation consumes routine technical tasks, the labour market is rapidly revaluing 'adaptive skills' such as system oversight and high-level design.

Finally, the Development Economics section showcases an especially diverse range of inquiries. Shayna Arbab investigates the 'brain chain,' arguing that while skilled emigration may not directly curb corruption, it strengthens governance indirectly through remittance flows. Shifting to trade dynamics, Marlene Auer presents a fascinating case study on cadmium regulation in cocoa, demonstrating how threshold-based rules push compliance burdens upstream. Isabelle Janssen then provides a multi-scalar study of maternal mortality in Nigeria, linking 'first delay' care barriers to the long-term legacies of structural adjustment. Closing the section, Tasleem Aleem critiques the 'what works' heuristic, offering a 'pre-check' framework designed to align interventions with locally binding constraints.

Reaching this 40th edition would not have been possible without the tireless dedication of the many committees that have contributed to the Review's legacy since 1987. On a personal note, I would like to extend my deepest thanks to the Deputy Editors, Aditi Pradeep and Jack Doran, for their unwavering commitment and collaborative spirit throughout this year's intensive editorial cycle. I am also immensely grateful to our General Manager, Isabelle Janssen, whose organizational brilliance was the bedrock of this year's success, and our Production Manager, Hezamary Paul, for her meticulous commitment to the final publication.

Last but not least, I wish to express my gratitude to the Economics Department and our patrons—Drs. Barra Roantree, Agustin Benetrix, Carol Newman, and Martina Kirchberger—for their indispensable support and for the opportunity to serve in this role. I also wish to thank Prof. John O'Hagan, former President of the SER, for his continued encouragement and motivation throughout the year.

To our readers: we invite you to engage with these essays, challenge their conclusions, and appreciate the immense effort behind every page.

Nour Samarah
Editor,
Student Economic Review Vol. XL

SER Debates

2025-26

The SER Debate series, introduced in 1996 by Mr Vinay Nair, has long been a crucial forum for economic discourse for students at Trinity College Dublin. It provides a platform through which complex economic ideas can be discussed in a manner that remains engaging and accessible to a wider audience without a background in the field. Given the rise of anti-intellectualism, populism, and polarisation, such discussions are perhaps more important now than ever. Each year, we invite teams from some of the most prestigious universities across the U.S. and U.K. to debate against Trinity students on relevant economic issues. This year, we had the pleasure of welcoming Cambridge and Harvard.

In recent years, debates surrounding communism and its historical legacy have re-emerged in public discourse, particularly among younger generations who did not directly experience the political and economic systems of the twentieth century. Accordingly, we chose to place the question of revisiting communism at the centre of our first debate of the year. Meanwhile, the prominence and influence of extremely wealthy individuals across the world - often highlighted through figures such as the President of the United States - and the growing criticism directed toward such concentrations of wealth led us to examine the merits of extreme wealth in our debate against Harvard.

These debates could not have taken place without the support of the University Philosophical Society and the College Historical Society. Particular thanks are due to Matilda Brewe, Hon. Secretary of the former, and Ben Kieran-Glennon, Correspondence Secretary of the latter. I would also like to thank the Chargé d'Affaires ad interim of the Polish Embassy in Ireland, Mr. Artur Michalski, for chairing the debate against Cambridge, and Dr. Adele Whelan, Dr. Kate Hynes, and Dr. Matthias Dilling for judging. Correspondingly, I thank Mr. Alexander White SC, Director General of the IIEA, as well as Dr. Dora Tuda, Prof. Robert Gillanders, and Dr. Yota Deli for judging the debate against Harvard. Furthermore, I thank the patrons of the SER, without whose support, experience, and expertise these debates would not have been possible.

Cambridge Debate - November 6th, 2025

This House Would Give Communism Another Shot

The first intervarsity debate of the year, between Cambridge and Trinity, was held in collaboration with the University Philosophical Society at the end of Michaelmas term. From Cambridge, we had the former President of the Cambridge Union, Sammy McDonald; Cecilia Ávila; and Ed Parker. On the Trinity side were Shane Burke, Ziyad Anwer, and Adrianna Mazur. The Head of Mission, Mr. Artur Michalski, Chargé d'Affaires ad interim of the Republic of Poland to Ireland, chaired the debate. Dr. Adele Whelan, Senior

Research Officer in the Economic Analysis Division at the Economic and Social Research Institute; Dr Kate Hynes, Assistant Professor of Economics at Dublin City University; and Dr. Matthias Dilling, Assistant Professor of Political Science and Qualitative Methods at Trinity College Dublin, constituted the judging panel.

Trinity proposed the motion by presenting a moral critique of capitalism and describing how a communist system could potentially be effective today, while distancing their argument from historical associations with totalitarianism. They began by stating that capitalism is a contradictory system in which workers who add value to raw materials through their labour cannot afford the finished products because of wage suppression, while the mechanisms used to alleviate this paradox often rely upon the exploitation of the Global South. They argued that capitalism is detrimental not only because of the inequality it generates but also because of the political power imbalances it creates. It was further suggested that recent technological advances could allow for a digitised allocation of resources, something not possible in the twentieth century, potentially enabling a command economy to operate more efficiently. Finally, Trinity highlighted instances in which capitalism had historically been imposed through violence, such as during the Vietnam War, and contrasted claims that capitalism alleviates poverty with the example of Dublin's ongoing homelessness crisis.

Cambridge began by characterising communism as an ideology that views itself as historically inevitable, achieved through class struggle and culminating in the seizure of industry. They argued that such a system would therefore rely inherently on violence, citing Marx's reference to the "bloody birth throes" of revolution. They then outlined what they considered systemic flaws within communism: that universal ownership may weaken incentives to contribute to the public good, and that the inherently creative nature of the human mind is incompatible with rigid central planning, leading to inefficiency. Examples such as economic conditions in Cuba and the construction of the Berlin Wall were used to illustrate the contradictions of communist systems, particularly the need to prevent citizens from leaving them. Finally, Cambridge emphasised the importance of individual rights and referenced the role of trade unions in Eastern Europe in opposing imposed communist regimes.

Following the debate, Mr Michalski addressed the audience, praising open discourse as an essential means of searching for truth. Regardless of whether such truths are ultimately found, he noted that dialogue itself is valuable, allowing both sides to better understand one another. He reflected that such discussions would not have been permitted during his own studies in communist Poland in the 1980s. He also described the corruption of the Soviet system, which prioritised collective outcomes over individual rights rather than seeking a balance between the two. He concluded by warning that, when striving to improve the conditions of future generations, we must remain mindful of the experiences of those who lived through earlier systems. The judges then returned with their verdict, naming the Cambridge team as the winners.

Harvard Debate - February 25th, 2026

This House Would Ban Billionaires

The second intervarsity debate of the year, between Harvard and Trinity, was held in collaboration with the College Historical Society at the end of Hilary term. From Harvard, we had Haotian Pan, Molly Callaghan, and Devan Tatlow speaking. On the Trinity side were the Auditor of the College Historical Society, Hazel Mulkeen; Prachi Agrawal, who won the Dermot McAleese Medal for Best Overall Essay and the Best Fresh Essay Prize in last year's Review; and Ziyad Anwer, a SER debate veteran. The Director General of the Institute of International and European Affairs, Mr. Alexander White SC, chaired the debate. A former minister and member of both houses of the Oireachtas, he previously chaired the Committee on Finance, Public Expenditure and Reform. The judging panel was composed of Dr. Dora Tuda, Research Officer at the Economic and Social Research Institute; Prof. Robert Gillanders, Professor of Economics at Dublin City University and Co-Director of their Anti-Corruption Research Centre; and Dr. Yota Deli, Assistant Professor in the School of Economics at University College Dublin.

Trinity, again speaking on proposition, began by arguing that when billionaires invest their wealth, it reduces the effectiveness of the money multiplier and may slow economic growth, as consumer spending declines. They argued that the proposal disincentivised extreme wealth accumulation rather than investment itself, which they claimed would remain possible under both sides of the argument. Trinity further suggested that billionaires increase the risk of financial instability by engaging in speculative behaviour and borrowing against volatile assets. Finally, they argued that banning billionaires could have positive democratic effects. The redistribution of assets to a wider group of wealthy investors could increase diversity in ownership and investment, potentially leading to more varied industry structures. They suggested that the liquidation of concentrated holdings could inject liquidity into the broader economy.

Harvard, by contrast, began by arguing that Trinity had effectively shifted the goalposts from billionaires to multi-millionaires, contending that anti-trust policies would be more effective than imposing a wealth cap. They argued that a forced liquidation of assets could destabilise financial markets and raise borrowing costs. Redistribution of shares to existing shareholders, they suggested, would simply reproduce the status quo, while those with low incomes would be unlikely to benefit directly from redistributed equity. They further noted that billionaires tend to engage in less luxury consumption than those slightly below them in the wealth distribution, given diminishing marginal utility. Finally, they argued that lobbying and corruption would not disappear simply through banning billionaires, and they pointed to examples of philanthropic activities by billionaires in developing countries.

Following the debate, Mr. White SC reflected on the ethical dimensions of inequality. While some degree of inequality may be tolerable, he noted that its recent increase has been particularly pronounced. He also challenged the notion that billionaires necessarily represent exceptional individual merit, observing that many inherit substantial wealth. Although banning billionaires outright may be impractical, he suggested that governments could instead penalise extreme wealth accumulation through taxation, referencing proposals for a billionaire tax in California. He concluded by emphasising the importance of prioritising the welfare of the broader population. Shortly thereafter, the judges returned with their verdict, declaring Trinity the winners of the debate and awarding Prachi Agrawal the John O'Hagan Medal for Best Speaker, bringing this year's debate series to a successful close for Trinity.

Kacper Maj,
Debates Manager,
Student Economic Review XL

SER Workshops
2025-26

Each year, the Student Economic Review hosts various workshops to encourage students to engage with economics beyond their coursework, interact with professionals, and develop a broader interest in economic issues. This year's workshops covered areas including academic achievement, gender diversity, and the economics of energy trading.

SER Foundation Scholarship Workshop

November 4th, 2025

The first workshop of the year was the annual Foundation Scholarship Workshop, held in the Robert Emmett Theatre on 4 November 2025. The workshop provided Senior Freshman students with the opportunity to hear from recent Foundation Scholars about the Scholarship examinations, including study strategies, preparation techniques, and an overview of the examination structure.

This was followed by a Q&A session, which allowed attendees to receive personalised advice. The workshop helped to ease the concerns of students intending to sit the examinations by clarifying what the process entails. Students left the session with a range of useful resources and with contacts among scholars whom they could approach with further questions. The workshop remains an important part of the SER calendar, both as a way of promoting the Review and as a means of supporting students preparing for the Foundation Scholarship examinations.

Women in Economics Workshop

At the time of writing, the SER is in the process of organising a Women in Economics workshop. This event will feature a female economist who will discuss her professional experiences and reflect on gender disparities within the field. Attendees will hear about the speaker's career path, the challenges and opportunities faced by women in economics, and her perspective on how the profession can evolve in the future.

The workshop will also include a Q&A session, allowing attendees to ask questions and gain further insight into the speaker's experiences. It will provide students with the opportunity to engage directly with a practising economist while also connecting with their peers, helping to promote greater gender balance and representation within the profession.

ESB Workshop

March 24th, 2025

The final workshop of the year, scheduled for 24 March, will be a session run by ESB focusing on the economics of energy trading. The workshop will provide a detailed overview of how electricity markets function, how they are structured in Ireland, and the types of career paths available within the sector.

Speakers from ESB's trading team will discuss electricity as a commodity and explain why it behaves differently from conventional traded goods. They will also explore how trading operates in practice, where it fits within ESB as an organisation, and the commercial and strategic role it plays within the company. The session will further consider how the Irish electricity market compares with wider European markets.

The energy sector is currently undergoing significant change, driven by the expansion of renewable energy and evolving regulatory frameworks. These developments are reshaping how electricity markets operate. This workshop will therefore provide valuable insight into a sector that is widely discussed but not always examined in depth, and it should be particularly relevant for students interested in careers in energy, commodities, or economic policy.
We would like to thank Rachel Kane (Editor of the 2023 issue of the SER) and her colleagues at ESB, whose willingness to engage with academic audiences reflects the kind of industry connection the SER has always sought to foster.

Pauric McBride, Workshops and Launch Manager
Dominic Corley, Events Coordinator,
Student Economic Review XL

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NEVA BAKSHI

Economic Theory

THE ECONOMIC MAN: USEFUL ABSTRACTION OR PERVERSION OF REALITY?

JAMES CAREY
SENIOR SOPHISTER

"This essay evaluates whether the Economic Man serves as a useful abstraction or a perversion of reality. Drawing on Mill, Jevons, and Edgeworth it shows that the model was intentionally constructed to isolate economic motive through simplification. Evidence from competitive markets, aggregated behaviour, and general equilibrium theory demonstrates that the model can yield strong explanatory power when its assumptions approximate real conditions. However, psychological findings and social critiques reveal contexts where the model distorts behaviour and loses accuracy. The essay concludes that the Economic Man is a powerful but highly context-dependent tool."

Introduction

Economists have long debated the legitimacy of making simplifying assumptions. This question goes right to the core of that debate. Mill (1844) argued that reasoning by assumption was central to the science of economics. Friedman (1953) supposed that the value of an economic model is determined by its ability to make accurate predictions, rather than the realism of its assumptions. More recently, Hausman (2023) upholds the argument that economics is an 'inexact' science, where assumptions and simplification are unavoidable.

The Economic Man (or Homo Economicus, as it was later termed) is a model of human behaviour that identifies self-interest as the primary motivator in decision-making (Urbina and Ruiz Villaverde, 2019). In defining the concept, Mill (1836) describes the Economic Man as an individual whose goal is to accumulate wealth using rational decision-making. The core assumptions made by the model can be outlined as rational choice, utility maximisation, unbounded rationality, and self-interest (Persky, 1995).

The model is the subject of much criticism. Veblen (1898) disagreed with the pleasure-maximising notion of the economic man. Marx's critique was that the model was a product of capitalism and that the behaviour it assumed corresponded to social constructions under the capitalist mode of production (Marx, 1859).

Kahneman and Tversky (1979) contradict the notion of perfect processing of information by showing how biases such as loss aversion and the certainty effect cause real human decision-making to deviate from utility maximisation. In a feminist critique, Folbre (1994) argues that mainstream economic models, such as the Economic Man, neglect relationships of dependency and assume that individuals are autonomous and independent.

To answer this question precisely, it is necessary to define each of its key terms. Beginning with 'useful abstraction', an abstraction may be defined as useful if it allows for simplification and isolates relevant causal mechanisms without eroding explanatory power. This definition can be reached by returning to Friedman's assessment of whether or not an economic theory is realistic. The predictions of a useful abstraction match observable phenomena reasonably well, regardless of how unrealistic its assumptions may appear. Friedman also asserts that assumptions should be chosen for 'economy, clarity, and precision' (Friedman, 1953: 171). In order for an abstraction to be considered valuable, it needs to make analysable a system which is otherwise complex, while isolating relevant causal mechanisms. These specifications jointly form the basis for the definition of a 'useful abstraction'.

A model may be defined as a 'perversion of reality' if it distorts the concept it sets out to explain, either by inaccurately representing observable human behaviour, or by a loss of explanatory accuracy. An inaccurate representation occurs when a model fails to highlight the relevant causal mechanisms, or mischaracterises the driving factors of human decision-making in an attempt to simplify. For example, Veblen (1898) asserted that the pleasure-maximising view of human behaviour obscured other forces at work. A loss of explanatory accuracy occurs when a model repeatedly fails to yield predictions that align with observed phenomena.

Having defined the concept of the Economic Man, and the terms 'useful abstraction' and 'perversion of reality' with respect to economic theories, the original question can now be reformulated to reflect the newly established criteria. This essay sets out to answer the following refined question:

> 'To what extent does the model of the Economic Man meet the criteria for a useful abstraction, namely, maintaining explanatory accuracy and isolating relevant causal mechanisms, and to what extent does it instead meet the criteria for a perversion of reality by misrepresenting behaviour or undermining explanatory power?'

This essay will first outline the origins and intended use of the Economic Man, then evaluate its performance under the criteria for a useful abstraction and a perversion of reality. Bringing these evaluations together, it argues that the model is neither universally valid nor wholly misleading, but a powerful context-dependent tool whose usefulness is determined by the conditions in which it is applied.

Part I: Origins and Purpose of the Economic Man

The classical origins of the Economic Man begin when Smith (1776) argued that economic behaviour was motivated by self-interest. The notion of the Economic Man was first formulated by Mill (1836) in an attempt to use assumptions to isolate economic motive. Mill's methodology was grounded in the principle that, given the limitations around controlled experiments in economics, abstraction was the only way to make progress in the discipline. By suppressing the many non-economic motives that influence real human behaviour, Mill aimed to isolate the specific causal mechanism relevant to economic analysis. This established the Economic Man as a deliberate simplification, allowing economic analysis to focus on the consequences of self-interested behaviour.

In the Neoclassical era, the Economic Man becomes formalised in a mathematical sense, beginning with Jevons (1871), who proposed that economic behaviour was utility-maximising and could be understood using mathematical language. From Jevons's perspective, economics itself was a mathematical discipline, and so it would only make sense for the Economic Man to be understood in this way too (Morgan, 2006). Edgeworth (1881) viewed the behaviour of economic agents as driven by the maximisation of pleasure and the minimisation of pain, and pushed the abstraction of the Economic Man further, towards a mathematically realised agent whose preferences are represented by utility functions and differential calculus (Morgan, 2006). Despite defining the motivations and actions of the Economic Man in psychological language, Jevons and Edgeworth were not attempting to accurately describe human psychology, but to construct a framework of consistent economic laws. The objective was to create an economic agent that simplified complex behaviour rather than one that reflected reality (Morgan, 2006).

In the Neoclassical conception of the Economic Man, economists such as Edgeworth (1881) and (to a lesser extent) Marshall (1890) sought to develop economic theories with the law-like structure of the natural sciences. Their scientific ambitions led them to emulate the methodological standards of physics, aiming for universal and generalisable principles. To achieve this level of universality, and unwilling to be restricted by what they could control for, they were prepared to accept unrealistic assumptions (Schumpeter, 1941). For these thinkers, assumptions were seen as strengths rather than weaknesses. Mathematical idealisations were chosen not for realism, but for ease of depiction (Morgan, 2006). Hausman (2023) highlights that idealisations are successful in allowing the noise of reality to be set aside, allowing the effects of phenomena that are otherwise interconnected to be isolated.

The Neoclassical adoption of idealisation demonstrates that the Economic Man was intentionally constructed to meet the core functions of a useful abstraction: to provide simplification and causal isolation with explanatory adequacy.

Part II: Is the Economic Man a Useful Abstraction?

It has been shown that under specific conditions, the Economic Man does function as a useful abstraction. By examining competitive markets, aggregate rationality, and the 'as-if' defence, this section will evaluate the Economic Man under criteria previously defined for a useful abstraction: one that allows for simplification and isolates relevant causal mechanisms without eroding explanatory power.

In competitive markets, individuals face strong incentives to behave in ways that approximate the rational, self-interested Economic Man. There is compelling empirical evidence, such as that provided by Smith (1962), to show that competitive institutions lead to predictable, equilibrium-convergent behaviour. Smith notes that even with a small number of traders, these equilibria emerge as long as collusion is prevented and bids and offers are publicly observable. Smith further demonstrates that changes in supply and demand result in corresponding price adjustments that are theoretically consistent. These results suggest that the restrictions of competitive markets lead individuals to behave as if they are in fact perfectly rational, self-in terested agents. Under such competitive pressure, the Economic Man functions effectively without eroding explanatory power.

Exploring where the model succeeds as a simplification, Kluger and Wyatt (2004) have shown that, under strategic substitutability, only a minority of individuals are required to be self-interested to create aggregate outcomes that are predicted by a model that is fully self-interested (Camerer and Fehr, 2006). This occurs because, under strategic substitutability, rational individuals are incentivised to act in the opposite direction to those who are less rational. The result is that rational individuals offset the impact of the actions of less rational individuals, and aggregate behaviour converges towards that of the Economic Man (Camerer and Fehr, 2006). The qualification of strategic substitutability is crucial, as Part III will show that the same behaviour does not hold under strategic complementarity.

Friedman (1953) asserted that the value of an economic model is determined not by the realism of the assumptions underpinning it, but by the accuracy of the predictions it makes. He further details the usefulness of the Economic Man in what has become known as the as-if justification. To illustrate this, he compares firms to expert billiard players. Although such players do not consciously compute the complex geometry required for an optimal shot, it seems reasonable that treating the billiard player as if they did would provide accurate predictions. Likewise, firms need not possess full information or consciously optimise in the way models describe. Instead, competitive pressures ensure that their decisions approximate those of perfectly rational, self-interested agents (Friedman, 1953). Under these circumstances, firms behave as if they satisfy the assumptions of the Economic Man, reinforcing the abstraction's usefulness even when its psychological realism is limited. These cases show that Economic Man can operate as a powerful abstraction in environments where incentives, competition, or aggregation push behaviour toward rationality.

A key part of the given definition for a useful abstraction is that it isolates the relevant causal mechanism. In the case of the Economic Man, it seeks to isolate the economic motive. As Mill (1836) set about defining the boundaries of political economy, he argued that the discipline must concentrate on man's constant desire for wealth, acknowledging that this economic psychology is distinct from the complexity of real human behaviour. The Economic Man was consciously constructed by abstraction to support Mill's vision of economics as an abstract science. By intentionally stripping away the parts of human behaviour which are non-economic, the model allows for a pure focus on the causal mechanism it seeks to explain (Morgan, 2006). It would later be argued that abstractions do not merely allow for causal mechanisms to be isolated, but are in fact necessary for their isolation.

Hausman (2023) asserts that because causal factors in economic systems are deeply intertwined, abstraction is necessary to isolate the mechanisms of interest. He describes idealisation as a process of 'exaggerating some actual property towards some limit' with the goal of eliminating the influences of secondary causes (Hausman, 2023: 243). Samuelson's reconstruction of consumer theory provides a clear example of this strategy. Rejecting utility as a psychological construct, he reconstructed consumer theory based on observable choice behaviour. His consistency result demonstrated that economic behaviour could be modelled without reference to underlying psychology (Samuelson, 1938). By showing that choice-based models can isolate the economic mechanism, Samuelson's work illustrates how the Economic Man functions as a useful abstraction rather than a claim about actual human psychology.

Taken together, these claims demonstrate that in certain circumstances, the Economic Man succeeds as an abstraction designed to isolate the economic motive. The revealed-preference approach demonstrated that rationality can be understood as consistency in choices. The usefulness of the Economic Man is further supported by modern general equilibrium theory, as proven by Arrow and Debreu (1954). The general equilibrium framework showed that if individuals optimise with respect to prices, economies respond predictably (Duffie and Sonnenschein, 1989). This mathematical formalisation revealed that strong explanatory results follow from highly simplified behavioural assumptions. Maayan Yeshoron (2025) argues that this framework symbolised a shift towards models where simplification was seen not as a weakness but as a necessity to identify causal mechanisms. Abstracting away from psychological complexity, the Economic Man represents the type of isolation that allows theories such as Arrow's to function. When used in this way, abstraction does not distort behaviour, but instead enables the creation of explanatory laws that would be otherwise beyond reach.

Part III: Is the Economic Man a Perversion of Reality?

While it has been demonstrated that the Economic Man works under certain circumstances, the model fails in contexts where real behaviour diverges from that of its assumptions, and where explanatory accuracy is reduced by these divergences. This section evaluates the Economic Man under criteria previously defined for a perversion of reality: a model that distorts the concept it sets out to explain, either by inaccurately representing observable human behaviour or by a loss of explanatory accuracy.

One of the strongest critiques of the Economic Man comes from Kahneman and Tversky (1979) and their criticism of utility theory. They demonstrate the presence of cognitive biases in real human behaviour and propose an alternative model, prospect theory. Whereas the Economic Man evaluates prospects according to utility theory, Kahneman and Tversky show that real decisions regularly violate these assumptions through biases such as loss aversion and the certainty effect. They argue that individuals disproportionately weigh outcomes that appear certain relative to those that are merely probable. The driving factor in decision-making can become fear of loss, rather than an assessment of likelihood (Kahneman and Tversky, 1979).

Further, the concept of bounded rationality as proposed by Simon (1955) reveals cognitive limits that prevent the calculus the Economic Man requires. By examining human behaviour, Simon understood that the human mind's capacity for finding solutions to problems is smaller than that which would be required to exhibit behaviour that is completely rational. Together, these findings demonstrate contexts in which the Economic Man misrepresents observable human behaviour in ways that cannot be dismissed as secondary or irrelevant. In these domains, the model becomes a distortion rather than a simplification.

In some environments, small deviations from completely rational behaviour are not cancelled out in aggregate. Part II demonstrates how, under strategic substitution, the behaviour of less rational individuals is offset by those who behave in a more rational, self-interested manner (Camerer and Fehr, 2006). However, this does not hold in strategic complementary environments. In such circumstances, rational actors are incentivised to imitate the actions of those who are less rational. In turn, this augments the behaviour of less rational individuals on aggregate outcomes. Empirical evidence demonstrates that under strategic complementarity, even a small minority of irrational agents are required to generate outcomes that 'are completely at odds with the rational model' (Camerer and Fehr, 2006: 49). In these instances, the Economic Man fails to isolate the causal mechanism, resulting in a substantive loss of explanatory accuracy.

Another critique of the Economic Man is that it fails to account for social and institutional determinants of behaviour that exert their own causal force. Veblen (1898) criticised the quantita tive approach to Neoclassical economics, arguing that the utility-maximising view of behaviour obscured significant causal mechanisms such as habituation and social norms. When applied to the Economic Man, this suggests that it isolates the incorrect drivers of behaviour. Marx (1859) contends that self-interested behaviour is not simply innate, but rather is a product of capitalist institutions. If behaviour motives are dependent on social context, then a model that treats them as universal is one that misrepresents the behaviour it aims to describe. The feminist critique of the Economic Man extends this argument by demonstrating that the assumption of autonomous, independent individuals overlooks relation ships of dependency and unpaid care work (Folbre, 1994). These omissions reflect a failure to acknowledge that humans do not exist independently and in isolation (Urbina and Ruiz Villaverde, 2019). Because these factors exert independent causal force, excluding them means the model no longer isolates the correct mechanism, in line with the definition of perversion set out in this essay.

Together, these critiques demonstrate that the Economic Man fails as an abstraction in instances where its assumptions misrepresent rather than simplify behaviour, and the model's explanatory power breaks down. These failures demonstrate the conditions under which the Economic Man meets the definition of a perversion of reality established in the introduction.

Conclusion

The analysis in this essay demonstrates that the Economic Man is neither a universally reliable depiction of behaviour nor a total distortion. The model holds value, but that value is decisively context-dependent. This is observed in competitive markets, capitalist systems, and strategic substitutability environments. In such cases, the forces at play drive behaviour towards the rational, self-interested motives assumed by the model. Here, the model meets both criteria for a useful abstraction.It simplifies complex behaviour without significant loss of explanatory accuracy, and it isolates the economic motives relevant for understanding market outcomes.

It must be stated that the usefulness is limited. When behaviour is driven by cognitive bias or bounded rationality, in environments with strategic complementarity, or when social and institutional structures influence decision-making, behaviour departs from rationality and the model performs poorly. It obscures the causal mechanisms that matter, and behaviour deviates significantly from the model's predictions. Under such conditions, the model meets the criteria for a perversion of reality as defined earlier.

The conclusion that follows is that the Economic Man is a useful abstraction when used appropriately. It is a powerful model when applied within circumstances that approximate its assump tions. Beyond such circumstances, the model risks misrepresenting behaviour and losing explanatory power. The Economic Man should therefore be treated not as a universal account of human motivation, but as a conditional tool. Highly effective in the environments that support it, but misleading behaviour when applied beyond them. Further research could examine more precisely which institutional or market conditions reliably generate behaviour consistent with the Economic Man. Identifying these conditions would help clarify when the model can be safely applied.

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A NEW MODEL OF THE ATTENTION ECONOMY

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SENIOR SOPHISTER

"This paper addresses a gap in economic research by developing a new model of the attention economy, with particular relevance for large digital markets mediated by social media platforms. It traces the origins of the term 'attention economy' in economic literature and links its emergence to the abundance of freely available information. Drawing on interdisciplinary literature, the paper defines attention, highlighting its market characteristics and its distinctive features, which render traditional economic theory ill-equipped to analyse these markets. The core contribution is a synthesized framework combining Heitmayer's individual-centric model with Wu's concept of the 'attention broker', applied to social media. The model distinguishes between 'flow attention' (momentary cognitive allocation) and 'calcified attention' (accumulated digital traces such as likes, views, and followers). Social media platforms act as mediating structures: they attract users' 'flow attention' through the provision of 'free' services, sell it to advertisers, and facilitate the formation of calcified attention. The framework clarifies issues of market measurement, capital formation, and monetization. It also identifies four sources of market failure: involuntary attention capture, externalities, perverse platform incentives, and opportunity costs. Finally, it outlines future research directions in attention property rights and digital regulation."

Introduction

Could I have your attention, please? If you are reading this passage, it is quite likely that you have already made your decision to allocate at least the amount of focus required to engage with this essay – one of the countless attention-centred decisions we make daily (Goldhaber, 1997). These allocations carry deep personal and social consequences, as human attention has become one of the most scarce and valuable resources in the modern economy. This premise serves as the theoretical basis of the attention economy – a concept dating back at least to the 1970s (UN, 2024; Sims, 1971) that has grown in significance with each passing year.

The emergence of 'the economy of attention' as an analytical term should not be surprising, as at its core, attention exhibits the characteristics of the classic economic problem: it is scarce, constrained by biological factors, and consumed to satisfy limitless human needs and wants (Crogan and Kinsley, 2012).

However, its other characteristics – being immaterial, difficult to measure, and inherently multidisciplinary (Loewenstein and Wojtowicz, 2025) – have contributed to economic theory lagging behind the rapidly developing market, with policy and regulation proving inadequate as a result

This essay addresses the theoretical lag by presenting a new model of attention economy, synthesizing the frameworks of Heitmayer (2025) and Wu(2019). It begins with a review of the role of attention in economic thought and establishes its conceptual foundations. It then develops the model and outlines its key characteristics. Subsequent sections apply this framework to examine central issues in attention markets. Finally, the paper outlines two directions for future policy research and discourse where the new model may prove useful.

The Rise of the Attention Economy

Rapid technological progress in the late 20th century, marked particularly by the information revolution, contributed to an exponential growth in the quantity of information available to individuals (Davenport and Beck, 2021). Today, the amount of freely available information far exceeds human mental capacities. This phenomenon gave rise to the focus on attention in the 1970s (UN, 2024). In an oft-quoted passage, Herbert Simon (1971), a Nobel prize-winning economist, states:

> 'What information consumes is rather obvious: it consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention (...)' (p. 40)

This dynamic was further exacerbated in the 1990s by the widespread adoption of the web. Goldhaber (1997) theorized that 'a full-fledged' attention economy would emerge as a result of an abundance of information on the internet, rapid growth in living standards, and the inherent power derived from receiving attention.

In the contemporary landscape, social media platforms represent some of the most significant actors in the attention economy, as identified both in academia (Bhargava and Velasquez, 2021) and specialized economic commentary (The Economist, 2025). These platforms not only establish the institutional environment for specific attention markets but also utilize a business model premised on the extraction of user attention for subsequent sale to advertisers (Wu, 2019).

While the precise size of such markets remains difficult to measure, the available figures are significant regardless of the methodology. Indicative of this scale, current estimates place the valuation of the attention economy between billions and trillions of dollars yearly (Brynjolfsson et al, 2024; UN, 2024; Wu, 2019).

Definition Of Attention

One of the principal reasons for the relative theoretical underdevelopment of the economics of attention is the lack of analytical clarity regarding the construct itself. Recent scholarship in economics has attempted to incorporate knowledge from psychology and biology to define attention and characterize its economically relevant attributes (Loewenstein and Wojtowicz, 2025). Such interdisciplinary micro-foundations represent the most promising approach to building models capable of elucidating the complexities of this unique market.

Heitmayer (2025) points out that most definitions share three core commonalities: attention is a mental state or a mental faculty, it requires readiness and receptivity of the mind, and it is an act of selection of something, or of something taking possession of the mind. For example, the American Psychological Association defines attention as 'a state in which cognitive resources are focused on certain aspects of the environment rather than on others and the central nervous system is in a state of readiness to respond to stimuli', and differentiates between voluntary attention, arising from conscious participation and involuntary attention that is captured by environmental stimuli (APA, 2018). Loewenstein and Wojtowicz (2025) attempt to 'translate' psychological findings into economic paradigms. They identify four essential features of 'an attentional resource': it is scarce (finite supply), rivalrous (committed to one activity at a time), cognitive (directly acquires or processes information), and volitional (the agent retains the potential, although not always the ability to modulate its allocation).

These definitions and their associated characteristics carry significant analytical implications. Specifically, scarcity and rivalrousness are essential prerequisites for market emergence. Since attention functions as both a direct and indirect source of utility, pecuniary gain, and capital — and because agents have the potential to impact its allocation (Loewenstein and Wojtowicz, 2025) — attention markets have evolved as an organic necessity. The neurobiological foundations of attention further justify the requirement for a robust, interdisciplinary approach. Finally, the non-zero impact of factors external to an agent on the allocation of their attention gives rise to numerous welfare concerns.

The Attention Market Model

This section will present a simplified model of an attention market, utilizing social media as the primary contextual environment. The framework synthesizes the individual-centric model presented by Heitmayer (2025) and a simple business model of an 'attention broker' presented in Wu (2019). Heitmayer (2025) distinguishes between two distinct forms of attention: flow attention (the finite, momentary cognitive resource expended by an agent) and calcified attention (digital traces of past attention, which can be stored and subsequently mobilized, e.g. views, likes, followers). Crucially, calcified attention functions as a form of symbolic capital; it can be used to attract more flow attention (akin to interest accruing on capital) and converted into tangible economic or political returns. Within this mediating structure of a social media platform, agents expend their flow attention while simultaneously competing to capture the attention of others.

Wu (2019) outlines a simple business model for the 'attention broker', which can be applied to a social media company, and therefore to Heitmayer's (2025) mediating structure. Such a broker trades 'free' services (e.g. access to content and entertainment) for the flow of attention of its users – 'attention providers'. This attention gained by the platform is then sold to advertisers – 'attention seekers' – in exchange for money.

The resulting model therefore incorporates three actors: attention seekers (advertisers), an attention broker (a digital platform), and attention providers (individual agents). The latter engage with the 'free' services of the platform, transferring their flow attention to the broker. It is then allocated between other users (engagement with posts, messages), contributing to the formation of the calcified variety and attention seekers, in the form of exposure to advertising content. In turn, attention seekers compensate the attention broker for access to flow attention through the purchase of advertising space. The model is presented in Figure 1.

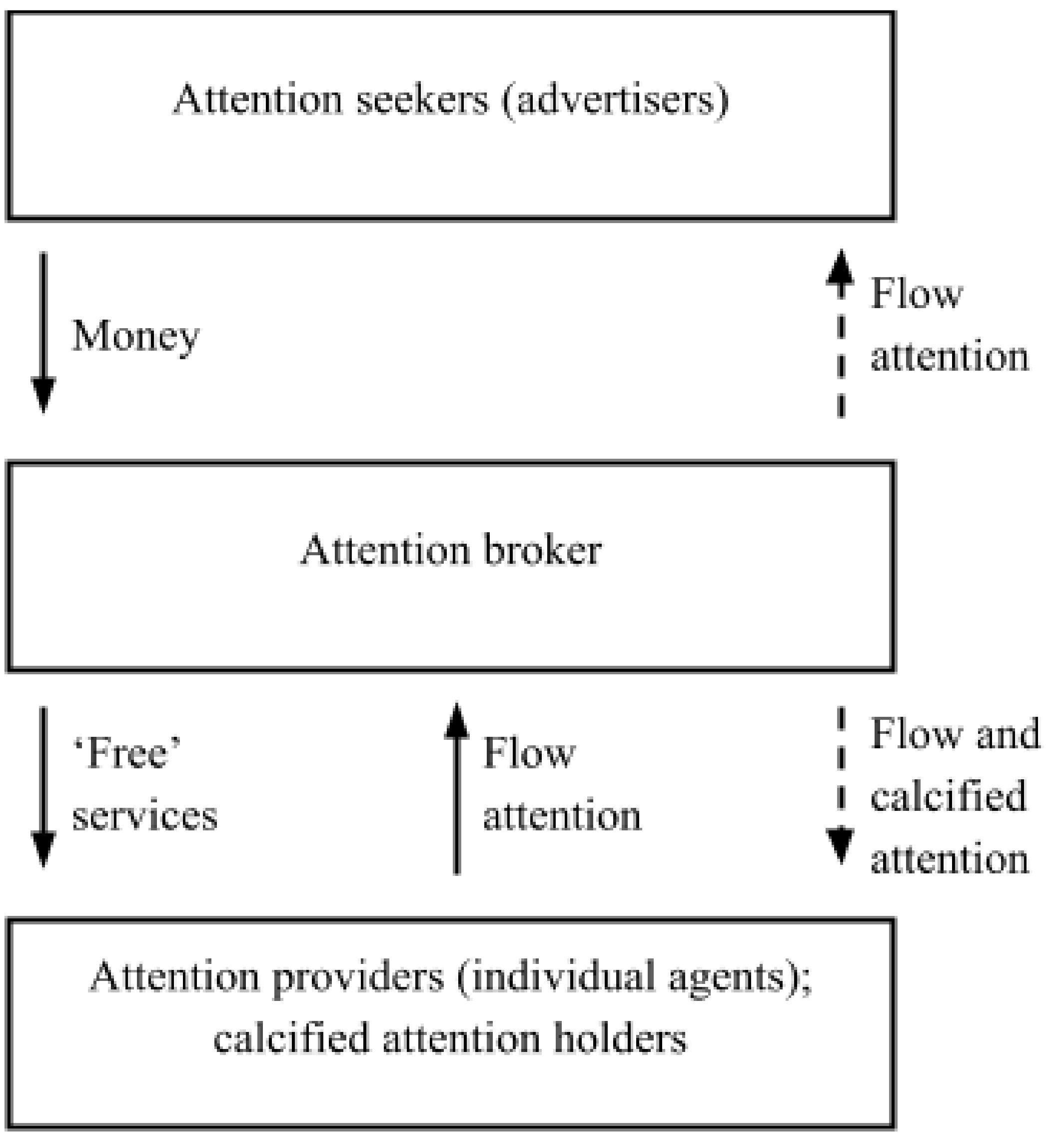

Figure 1. Attention economy model

This model provides a framework for analysing several key features of the attention economy. First, it contextualizes attempts to measure the scale of the attention economy based on observed flows. Within this framework, advertisement spending is equivalent to the flow attention moving through the attention broker to attention seekers. Conversely, the other side of the market is notoriously difficult to quantify, as standard economic tools often fail to estimate the value of 'free' services, which move in opposition to the flow attention of attention providers. Consequently, the opportunity cost of time has been utilized as a proxy in recent literature (Brynjolfsson et al., 2024). However, according to the model presented here, users are also partial recipients of the attention of other users. It follows that the value of their flow attention should be approximately equal to the sum of the 'value' of the 'free' services they receive and the attention they receive from other users, although these aspects may be difficult to untangle.

Second, the model places attention at the centre of the attention economy, while delineating its key dynamics through the distinction between the flow attention and calcified attention. While calcified attention depends on past flows and facili tates future accumulation — governed by the institutional environment of the mediating structure — it is worth noting that only flow attention constitutes the 'true', psychological attention as previously defined. The calcified variant serves as a highly correlated and analytically useful term.

Lastly, the model formalizes the potential returns for individual agents in the attention economy, including private individuals, corporate accounts, and political actors. The struggle for flow attention results in an ever-changing distribution of calcified attention, which effectively functions as a liquid asset. This asset can be converted into money, political influence or the dissemination of one's ideas, and may even serve as a form of collateral (Heitmayer, 2025). This framework elucidates the rise of social media influencers, as well as the increasingly sophisticated marketing strategies employed by firms and political entities.

Problems within the Attention Market

Having modelled the attention market, the resulting framework can be utilized to analyze its inherent systemic issues. I have identified four main sources of market failure: incomplete control of agents over their attention (non-voluntary attribution), externalities and distributional characteristics of the market, opportunity cost of attention, and perverse incentives of the attention brokers.

Non-voluntary attribution

Individuals possess the potential, but not always the ability, to determine the allocation of their attention – environmental factors, which can be influenced by other actors, also play a role (Loewenstein and Wojtowicz, 2025). Given that attention is the main currency in our market of interest, its involuntary nature relaxes the core neo-classical economic assumption of exchanges between agents being rational, mutually beneficial, and voluntary (Roncaglia, 2005, ch. 12-13). This aspect enables agents to 'extract' attention from others without explicit consent, either through intrusive environmental stimuli (someone loudly talking next to you while you are actively trying to read this paper) or passive exposure (a billboard ad you notice while driving). Such actions, especially if deliberate, may be considered attention theft[1] (The Economist, 2025). However, given that attention is not protected by property rights, these practices are generally legal and regulated mostly by institutions of varying formality and generality, such as social norms (The Economist, 2025). This is problematic for a further reason beyond the loss of attention: individuals can derive utility, both positive or negative, from the subject of their focus, as described by the attention-based utility theory (Loewenstein and Wojtowicz, 2025). If they derive negative utility from the subject at the centre of attention theft, not only do they lose their flow attention, but their welfare also decreases.

Externalities and distributional characteristics of the markets

Information, which flows in opposition to attention, and 'consumes it' (Simon, 1971), entails significant consequences for individuals and the wider society, exacerbated by self-reinforcing dynamics of calcified attention. Even assuming that all exchanges in the attention market are voluntary, they usually impact agents not involved in the exchange, primarily through aggravating wider societal phenomena. For example, if attention providers consume factually incorrect information about current events, or 'fake news', they contribute to a diminution of the aggregate quality of knowledge in society (Diaz Ruiz, 2025). If they consume content which is radicalising, encouraging violence, or undermining democratic institutions (Munn, 2020), it can contribute to social divisions, polarisation, erosion of public trust, and even outbursts of physical violence (UN, 2024). This problem is particularly acute due to the human attention being drawn to content that is incendiary, emotional, or controversial (UN, 2024). Agents distributing such content can therefore utilise the involuntary attribution of attention discussed in the previous point to dramatically increase their stock of calcified attention (views, likes), further amplifying attention flows and the impact of these externalities.

Perverse incentives of the attention brokers

Due to the nature of flow attention and attention markets, attention brokers have an incentive to

1 In most cases, one receives some information or knowledge in return for their attention. The attention loss, however, is not conditional on what is received. A theft of a wallet would be no less of a theft depending on whether one found a twig or a watch in its place.

create addictive structures and engage in systemic attention theft (Bhargava and Velasquez, 2021). They provide the mediating structure for a market where the supply (flow attention) that enters the market is correlated approximately linearly with time spent on the platform and is otherwise not dependent on monetary consumption decisions. Mediating structures in all markets, e.g. physical stores, generally attempt to increase consumption utilising behavioural biases (Mohan et al., 2013). However, even though their sales are usually correlated with aggregate time spent in them, their revenue directly depends solely on actual consumptiondecisions and transactions and is constrained by the disposable income of the consumers. Attention brokers, however, only require users to remain engaged for as long as possible and whenever possible. Given the previously mentioned lack of property rights regarding attention, it is predictable that such brokers develop addictive business models derived from the gambling industry, raise barriers to exit, and engage in attention theft, e.g. through push notifications (Bhargava and Velasquez, 2021). This is particularly problematic given the involuntary aspect of attention exchanges being possible and the centrality of the internet in society (Bhargava and Velasquez, 2021), making these platforms difficult to avoid even for 'sophisticated' individuals (O'donoghue and Rabin, 1999).

Opportunity costs and competition

Lastly, this section considers two aspects of the wider attention economy not coered by the preceding model: the opportunity cost of attention and competition between attention brokers. In our model, all flow attention of attention providers is mediated through a single attention broker and is distributed either to attention seekers or other attention providers. It can, however, be attributed to two other economically significant actors: individuals themselves or other attention brokers.

The opportunity cost of attention is the value of the next best possible use of the flow attention of an individual. This may entail utilising it differently in the context of the given mediating structure (attention broker), allocating it to a different attention broker, or consuming it for one's own use. Individuals can consume their attention for leisure (e.g. by reading a book) or invest it in their human, social, or financial capital (e.g., education or labor), each with their own externalities. The model does not include the decision (or otherwise involuntary process) regarding the allocation of attention between these ends, but they must be considered when debating policy solutions for attention market failures.

Lastly, one must consider that the attention market is neither a monopoly nor characterized by perfect competition – multiple attention brokers are competing for the supply of attention providers, with varying degrees of overlap between these groups. It is indeed the similarity between these groups and substitutability between the brokers that should be taken into account when considering the subdivisions of the attention market and competition dynamics between brokers within these subdivisions (Wu, 2019). This remains a fertile ground for research in competition policy, due to the structure of the market, the prevalence of large M&A deals, the monopolistic incentives described above, and the nascent state of research on the attention economy.

Next Steps

The main contribution of this paper is to advance the modelling of the attention economy, facilitating the formalization and contextualization of its inherent issues from an economic perspective. This section outlines two avenues for future research and discussion arising from the model and the wider literature: attention property rights and digital regulation.

Property rights

Attention is not currently protected by property rights, which renders business models based on various forms of attention theft valid and legal. Although altering the status quo in this matter is difficult due to the unique, immaterial and largely immeasurable nature of attention— as well as the fact that individuals lack complete control over it (Loewenstein and Wojtowicz, 2025)— it represents a potential step toward a more equitable market outcome. While it may be impossible to create an institutional environment in which attention is controlled exclusively by the individuals, the extent to which involuntary attribution is exploited by attention brokers could be tempered through the implementation of lighter property right frameworks.

For example, the Digital Services Act (DSA) introduced in the European Union requires all platforms with over 45 million monthly users in the bloc to provide an option to opt for non-personalised feeds, which do not rely on behavioural profiling (European Parliament and Council, 2022). Such a solution, while imperfect, enables 'sophisticated' individuals to retain more control over their attention. There have also been more ambitious, private initiatives to measure the attention users spend on advertisements and compensate them accordingly with blockchain-based Basic Attention Tokens (Brave Software, 2021).

Digital regulation

The negative externalities of the market for attention are hard to address using traditional tools, such as Pigou taxes or Coasean bargaining, due to the 'free' nature of services for which attention is traded, the diffuse, non-monetary nature of the externalities, and the aforementioned lack of property rights. Therefore, digital regulation is the most viable policy option. Its potential scope is broad and can include enforcing mechanisms for deleting hate speech, an example of incendiary content (European Parliament and Council, 2022), as well as limiting the access of of attention brokers to the most vulnerable members of the public, such as children (Reuters, 2026). Although normative arguments regarding freedom of speech and information remain central to public discourse, framing regulatory interventions as a response to attention market failure could meaningfully contribute to the debate regarding the appropriate scope of such regulation.

Conclusion

It is noteworthy that the discipline of economics has not yet established a comprehensive model of the attention economy, more than fifty years after the concept was initially formulated. This theoretical gap is particularly salient given the contemporary digital landscape, defined by Big Tech and social media. This essay has attempted to address this gap in economic theory by creating a simple model of the attention economy in the context of social media, building upon Heitmayer's (2025) and Wu's (2019) contributions. In the future, this framework may be generalised and extended to other types of attention markets or markets with an attention component. The hope is that such formalisation will enable economic theory to contribute more effectively to policy formulation regarding the economics of attention – an immeasurable, and yet scarce and rivalrous resource, of immense economic value and growing importance. Thank you for allocating some of yours to read this work.

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MARKET FAILURE IN THE ATTENTION ECONOMY

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Junior Freshman

"This essay examines whether the social media business model results in market failure and evaluates policy interventions to reduce social costs. Drawing on game theory, behavioural economics, and recent empirical data, it suggests that profit-maximising incentives—reinforced by network effects and strategic competition—encourage platforms to maximise user engagement despite negative externalities. The essay evaluates two interventions: behavioural regulatory tools designed to restructure choice architecture, and Pigouvian taxation aimed at aligning financial incentives with socially beneficial outcomes.While behavioural tools like nudges are more politically feasible, Pigouvian taxes represent a theoretically superior solution despite significant implementation challenges."

Introduction

The percentage of papers in economics that study social media has increased fourfold between 2015 and 2022, demonstrating a significant increase in the discipline's relevance for academics and policymakers (Aridor et al., 2024). Unlike traditional markets, social media services are offered at a zero-monetary price, with firms instead monetising users' time and attention through targeted advertising (Lefouili and Madio, 2022). This dynamic incentivises firms to design engagement-maximising algorithms that encourage prolonged or even compulsive use (Belgroun et al., 2025). Facebook's former President, Sean Parker, spoke honestly about how the social network intentionally hooks its users: "The thought process that went into building these applications, Facebook being the first of them, … was all about: 'How do we consume as much of your time and conscious attention as possible'" (Allen, 2017).

Prolonged engagement with social media has been linked to a range of issues, including diminished individual agency, adverse mental health outcomes, 'fear of missing out' (FOMO), privacy breaches, and increased political polarisation (Aridor et al., 2024; Belgroun et al., 2025; Cao et al., 2018). The extraction of users' attention generates significant social costs that are not internalised by social media firms and points to a clear case of market failure. This essay, therefore, examines why the social media market fails to internalise these costs, positing that profit-maximising incentives—compounded by network effects and strategic com petition—lock platforms into a socially inefficient equilibrium. This gives rise to an evaluation of the economic feasibility of proposed corrective policies, specifically behavioural regulatory tools and Pigouvian taxation as mechanisms to mitigate the harmful effects of excessive attention-extraction.

Market Structure & Sources of Market Failure

In their early stages, platforms such as Facebook and Instagram primarily displayed user-generated content from individuals' 'real lives' (Aridor et al., 2024). Facebook's early appeal stemmed from network effects, but although these network effects attracted early users, social media platforms only generate revenue when users view advertisements (Aridor et al., 2024). As a result, social media platforms developed more sophisticated algorithms designed to maximise profits by offering a highly personalised experience. The underlying economics of these algorithms is straightforward. Because engagement and time-on-platform correlate positively with advertising revenue, firms are incentivised to erode users' natural 'stopping points' through features like autoplay and infinite scrolling systems (Nie, 2025). Additionally, social approval features such as Facebook's "Like" button serve not only to increase user engagement but also provide platforms with detailed information regarding users' preferences, thereby enabling more targeted advertisements (Newport, 2019)

Prominent social media platforms frequently enjoy natural monopoly power, presenting an additional source of market failure in the attention economy; for example, "the more users a platform has, the more lucrative it is for advertisers to pay for the platform's services" (Khan, 2021). These platforms are characterised by strong positive network effects: as the number of users increases, the marginal value of participation increases, leading to higher overall consumption (Aridor et al., 2024). Large social media platforms may lock users into their platforms due to high switching costs. Consequently, the incentives for dominant platforms to protect their users with effective content regulation are diminished because the probability of users moving cross-platform is low (Lefouili and Madio, 2022).

The convergence of these structural failures—amplified by strategic platform interactions—establishes a clear economic imperative for regulatory intervention. The resulting equilibrium, as detailed in the following section, is a byproduct of rational profit-maximisation rather than individual willpower deficits.

Strategic Competition & the Persistence of a Harmful Equilibrium

Despite awareness of the social harms associated with excessive social media use, competitive pressures may disincentivise well-intentioned firms from voluntarily reforming their content distribution systems. This dynamic can be illustrated using a simple game-theoretic framework. Consider two fictitious yet competitive social media platforms, A and B, each choosing between two content distribution strategies: utilising high-engagement content that maximises attention-capture but generates negative externalities (H) or implementing reduced-harm content that yields lower profits but generates fewer social costs (R). Figure 1 models a highly simplified two-by-two payoff matrix for competitive social media platforms, A and B:

	Platform B: H	Platform B: R
Platform A: H	(80, 80)	(70, 20)
Platform A: R	(20, 70)	(50, 50)

Figure 1: Payoff Matrix for Competing Social Media Platforms

In this framework, high-engagement content (H) is a dominant strategy for both social media firms. Any unilateral shift toward reduced-harm content risks a significant erosion of market share and advertising revenue, as users gravitate toward more 'addictive' competitors. The resulting Nash equilibrium is therefore (H, H), and it is socially inefficient; both firms continue to maximise engagement despite the associated social costs. The outcome (R, R) would improve overall welfare by reducing addiction, online polarization and mental health harms, but it is not privately feasible in the absence of coordination or coercion. A weakness of the model is the implicit assumption that users would move cross-platform depending on their preference for more regulated versus unregulated social media content. In practice, users may be reluctant to do this because switching costs would likely outweigh the perceived utility of switching platforms due to network effects.

Importantly, the persistence of this harmful Nash equilibrium does not stem from malice or consumer moral failure, but from rational profit-maximising behaviour under strategic competition. For example, one study showed that the time users spent on Facebook decreased by 26% when participants switched from an algorithmically curated feed to a reverse-chronological-order feed (Aridor et al., 2024). Since engagement and user retention positively correlate with profits, such a switch would reflect negatively on Facebook's bottom line–advertising accounted for 98% of Facebook's $86 billion revenue in 2020 (Aridor et al., 2024; Khan, 2021). Altruism or voluntary deviation from the default algorithmic feeds is therefore unlikely. Instead, this essay posits that policy interventions that positively nudge users' behaviour or alter firms' payoff structures may shift the equilibrium toward a more socially desirable outcome.

Policy Intervention I: Behavioural & Regulatory Design Tools

This section examines three behavioural regulatory interventions that aim to address user engagement at the individual level. Following Belgroun et al. (2025) these measures can be categorised as Informing, Restricting and Guiding user behaviour. Each target the underlying mechanisms of attention-capture, disinformation and peer-disclosure externalities.

The primary goal of informing measures is to educate users about attention over-extraction. Salient Informing measures include mandatory time-expenditure disclosures, unskippable 'friction' alerts, and veracity-labels for disputed content (Aridor et al., 2024, Cao et al., 2018). For example, implementing unskippable "cooling-off" periods introduces friction that functions as a non-monetary Pigouvian tax, reducing the marginal utility of posting or sharing misinformation by increasing the opportunity cost of time and effort required (Cao et al., 2018, Thaler and Sunstein, 2021). Yet, warning labels may generate a so-called "implied truth effect, whereby adding tags can reduce the willingness to share tagged false news but increase the willingness to share untagged false news, if users interpret the absence of a tag as a signal of veracity" (Aridor et al., 2024: 10).

As the name suggests, 'Restrict' measures would limit or ban social media features that are viewed to be particularly harmful. For example, adolescents and children are more likely to impose internalities on themselves due to information asymmetries and self-control failures, therefore outright bans on alcohol or gambling are justifiable (Aridor et al., 2024, Thaler and Sunstein, 2021). Examples in the attention economy include banning infinite scrolling and autoplay, imposing content-filtering or removing AI-powered algorithms for certain vulnerable groups (Aridor et al., 2024, Nie, 2025). Outright social media bans have recently gained traction, with Australia's under-sixteen ban imposing fines of up to AUD$50 million for non-compliant platforms (Aridor et al., 2024, Fardouly, 2025). Thus far, the success of the ban has been measured by the 4.7 million underage accounts that have been deleted since 10 December (Taylor, 2026). However, one cannot say whether account deletion represents a tangible decrease in adolescent social media use due to the ban's novelty and lack of relevant data (Taylor, 2026). Similar social media bans for U.S. adults would raise significant concerns regarding individual liberty (Belgroun et al., 2025). Policymakers must therefore consider the economic trade-off between welfare-enhancing paternalistic measures and autonomy loss due to regulation, providing the justification for the approach Thaler and Sunstein (2021) call "libertarian paternalism."

Guiding measures, and libertarian paternalism, seek to restructure choice architecture such that non-vulnerable users have meaningful control over their digital environments. They would nudge users toward welfare-enhancing outcomes by restructuring choice architecture without excessively restricting user autonomy (Thaler and Sunstein, 2021). During the COVID-19 pandemic, for example, text-based reminders designed to overcome scheduling barriers boosted vaccination rates by 25.7% compared to a control group (Dai et al., 2021). Social media's algorithmic feeds are not "neutral" content curation systems; they function as behavioural nudges whose aim is to maximise engagement and screen-time (Aridor et al., 2024). In this sense, platforms are powerful choice architects who deliberately structure default options to exploit inertia and the Status

Quo Bias (Thaler and Sunstein, 2021). One proposed intervention is to allow users to opt out of algorithmic feeds in favour of a reverse-chronological feed, thereby reducing social costs (Nie, 2025). However, due to inertia and the Status Quo Bias, many individuals rarely switch from default settings and sometimes implicitly interpret them as recommendations (Thaler and Sunstein, 2021). Because platforms have strong profit-maximising incentives, they are unlikely to voluntarily set less-addictive defaults. As a result, mandating lower-risk default settings could reduce excessive engagement while preserving users' ability to choose algorithmic feeds if they wish.

Synthesised, these behavioural interventions target the specific cognitive biases that the attention economy has systematically monetised. While Informing and Restricting measures address information asymmetries, Guiding measures appear most robust because they preserve user autonomy while raising the friction of harmful consumption. Guiding measures, therefore, seem "most favourable" because they (1) seek to set less-harmful default options, (2) increase friction for harmful overuse, and (3) are politically feasible (Belgroun et al., 2025). Informing and Restricting mea sures partially correct information asymmetries and protect vulnerable groups, but are ineffective as standalone solutions (Belgroun et al., 2025).

Policy Intervention II: Pigouvian Taxation of the Attention Economy

Behavioural nudges seek to address decision-making at the individual level, whereas Pigouvian taxation aims to change platforms' financial incentives to achieve a more socially optimal outcome. Research has shown that Pigouvian taxation on attention-harvesting companies is one of the most promising Guiding measures; it recognises the need for governments to focus on policy that alters firms' payoff structures while preserving user autonomy (Belgroun et al., 2025).

Evidence from other markets demonstrates the efficacy of Pigouvian taxation in correcting negative externalities. For example, a $1 increase in tax per millilitre of vaping liquid can reduce the probability of daily vaping by 14.2% and the dual-use of vapes and traditional cigarettes by 24.4% (Pesko et al., 2020). Similarly, surcharges on plastic bags have significantly reduced pollution in both the U.S. and Ireland, while minimum unit pricing on alcohol in the UK is estimated to reduce consumption and lead to 16,000 fewer alcohol-related crimes annually (Masur and Posner, 2015; Donohoe, 2014; Yeomans, 2019). In the context of social media, a Pigouvian tax could involve taxing the average time spent on platforms, engagement metrics, such as Likes or Comments or advertising intensity (Aridor et al., 2024).

Although it shows theoretical promise, no such Pigouvian tax currently exists in the attention economy. Existing policies fail to address social costs: Uganda's 2018 social media tax targets users rather than platforms, while European Digital Services Taxes in Spain and the United Kingdom focus primarily on corporate revenues as opposed to the social costs generated by attention extraction (Belgroun et al., 2025; Lowry, 2019).The social costs associated with excessive digital engagement are clear–individuals spending more than seven hours online are twice as likely to engage in self-harm behaviours, for example–yet quantifying these psychological harms remains difficult (Twenge et al., 2020, Belgroun et al., 2025). As well as information requirements, transaction costs and incentive problems raise significant implementation challenges (Edenhofer et al., 2021).

Nevertheless, imperfect measurement has not prevented policymakers from introducing Pigouvian taxes in other domains. For instance, many countries have intro- duced carbon taxes to remedy negative externalities caused by carbon emissions despite not having exact qualifications of harms or benefits (Belgroun et al., 2025). Therefore, while information asymmetries and measurement difficulties have prevented the introduction of a Pigouvian tax on the attention economy thus far, empirical evidence in similar markets suggests that a carefully designed tax could meaningfully align platform incentives with social welfare.

Conclusion

The attention economy exhibits market failure when advertising-based revenue models incentivise firms to maximise user engagement despite negative externalities. Due to network effects, high switching costs, and strategic competition, social media platforms are locked into a socially inefficient Nash equilibrium in which engagement is prioritised over user welfare. These outcomes arise from rational profit-maximising behaviour rather than malice.

This essay has argued that policy intervention is therefore necessary to reduce social costs at both the individual and platform levels. Behavioural regulatory tools—particularly those that restructure digital choice architecture—are the most feasible means of reducing harm without significantly constraining user autonomy. Pigouvian taxation offers a complementary approach by altering firms' incentives, though implementation challenges remain significant. Overall, a dual-layered policy framework combining behavioural design interventions with targeted economic incentives represents the most viable approach to internalising the social costs of the attention economy.

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Financial Economics

THE MISPRICING OF CLIMATE RISK IN FINANCIAL MARKETS

Grace Carthy

Senior Sophister

"This paper examines why financial markets continue to allocate substantial capital to carbon-intensive activities despite mounting evidence of climate-related economic and financial risk. It asks whether this pattern reflects a genuine mispricing of climate risk or a rational response to expectations of weak and politically uncertain climate policy. Drawing on the literature in climate finance and asset pricing, the paper develops a conceptual analysis of how climate risk affects asset valuations through physical, transition, and liability channels. It argues that apparent mispricing arises less from informational failure than from asset prices formed conditional on expectations of delayed or reversible climate policy. In this framework, investors rationally discount transition risks when policy credibility is weak, even as systemic physical risks intensify. The analysis highlights the limitations of ESG investing and disclosure-based approaches and suggests that effective financial policy must strengthen the credibility and enforceability of climate commitments in order to reshape market expectations and capital allocation."

Introduction

Climate change poses a severe threat not only to ecosystems and human welfare but also to the stability of modern financial systems (Bolton et al., 2020). Under prevailing operating assumptions, cumulative carbon dioxide emissions embedded in existing fossil-fuel infrastructure alone are projected to exceed the remaining carbon budget consistent with a 50% per cent probability of limiting global warming to 1.5°C (IPCC, 2023). Despite this binding carbon constraint, global capital markets continue to allocate substantial funding toward fossil fuel extraction, carbon-intensive infrastructure, and environmentally harmful production (Lundberg, 2025). From a financial perspective, this misalignment indicates a profound mispricing of climate-related risks. Physical destruction from extreme weather, abrupt shifts in climate policy, and rapid technological change all have the potential to generate large and correlated losses across asset classes. As a result, a substantial share of today's productive capital may ultimately lose its economic value, becoming what are known as "stranded assets" (Bebbington et al., 2020).

The Mispricing Puzzle

The persistence of high valuations in carbon-intensive sectors presents an apparent puzzle. If climate change and climate policy represent material threats to future profitability, why do financial markets continue to allocate substantial capital to activities that appear incompatible with stated climate objectives? Much of the existing literature interprets this pattern as evidence of market failure, driven by short-termism, inadequate disclosure, or the inability of standard asset-pricing models to incorporate long-horizon and deeply uncertain risks (Bolton and Kacperczyk, 2021; Hong, Karolyi and Scheinkman, 2020; Pankratz, Bauer and Derwall, 2019). From this perspective, financial markets underprice climate risk, allowing carbon-intensive firms to maintain valuations that are inconsistent with the scale of expected climate damages and policy responses.

While these explanations offer important insights, they do not fully account for the persistence of carbon-intensive investment in the presence of mounting climate risk. In particular, they assume that markets systematically fail to recognise or incorporate climate-related risks into asset prices. Yet financial markets routinely price long-horizon risks when credible policy frameworks or institutional commitments determine how those risks will affect future cash flows. This raises the possibility that the persistence of carbon-intensive investment reflects not purely informational or behavioural failures, but the expectations investors form about the political and institutional environment governing future climate policy. In this sense, climate risk may appear mispriced relative to global climate objectives, yet remain consistent with investors' expectations of weak or delayed policy intervention.

A Policy-Conditional Interpretation of Climate Risk

This paper advances a different interpretation. It argues that the apparent mispricing identified above may instead reflect asset prices formed conditional on expectations of weak, delayed, and politically contingent climate policy responses. Under such expectations, transition risks remain limited even as physical risks intensify, consistent with a "hot-house world" scenario (European Central Bank, 2022). Although physical climate risks may be substantial at the macroeconomic level, they are only partially borne by individual firms. As a result, investors may rationally discount these damages when forming asset prices, generating a collective action problem in which continued investment in carbon-intensive assets remains privately rational despite being socially catastrophic.

Framed in this way, climate mispricing reflects a failure of institutional commitment rather than a failure of information or foresight. Financial markets are capable of pricing long-horizon risks when future states are governed by credible and enforceable rules. However, when the realisation of those risks depends on future collective action, such as stringent climate policy that investors neither control nor trust, those risks are endogenously discounted or excluded from valuation (Schoenmaker and Schramade, 2019).

This interpretation is consistent with the Adaptive Markets Hypothesis, which emphasises that market outcomes reflect investors' adaptive responses to their institutional and policy environment, rather than a static adherence to the Efficient Market Hypothesis (Lo, 2004). When climate policy is perceived as politically constrained or vulnerable to reversal, investors rationally assign low probabilities to disruptive transition pathways. Consequently, asset prices come to reflect anticipated policy inaction, allowing capital to continue flowing toward carbon-intensive activities, despite the accumulation of systemic physical risks.

Transmission Channels and Limits of Conventional Asset Pricing

Climate change affects asset valuations through several interrelated channels, commonly categorised as physical, transition, and liability risks (US EPA, 2022). Physical risks arise from the direct impacts of climate change on economic activity, including damage to infrastructure, supply-chain disruptions, and reduced labour productivity. These risks are already materialising. Empirical evidence shows that firms exposed to extreme weather events experience persistent negative abnormal returns, indicating that climate shocks affect both expected cash flows and firm valuations (Pankratz, Bauer and Derwall, 2019). Transition risks stem from the economic and regulatory adjustments required to reduce greenhouse gas emissions, including carbon pricing, emissions standards, and shifts in technology and consumer demand. Carbon pricing, emissions standards, bans on internal combustion engines and shifts in consumer demand can all undermine the profitability of carbon-intensive firms. Although recent evidence suggests that highly polluting firms face a rising cost of capital (Bolton and Kacperczyk, 2021), the magnitude and unevenness of this adjustment suggest that markets price transition risk only insofar as policy responses are perceived to be credible and binding. Liability risks may further affect firm valuations as companies face increasing exposure to climate-related litigation and claims of misleading environmental disclosures (Murray, 2025). Taken together, these channels suggest that climate change is becoming an increasingly important determinant of long-run asset values rather than an externality operating outside financial markets.

Standard asset-pricing frameworks help clarify why these risks may nevertheless remain imperfectly reflected in market valuations. Conventional models discount future cash flows exponentially, sharply reducing the present value of losses that materialise decades ahead. This feature is often criticised for mechanically understating the importance of climate damages (Pindyck, 2013). Yet discounting alone does not fully explain why markets appear relatively unresponsive even to nearer-term transition risks. A more fundamental mechanism lies in the political conditionality of valuations. The expected impact of climate risk on firm cash flows depends not only on the underlying physical damages but also on investors' expectations regarding the implementation, stringency, and durability of future climate policy. When investors assign a low probability to the introduction or persistence of stringent regulation, the expected financial consequences of transition risk remain limited even where the underlying economic risks are substantial. In this sense, asset prices reflect not only climate risks themselves, but also beliefs about the institutional environment in which those risks will ultimately be realised.

This challenge is further complicated by the presence of Knightian uncertainty rather than quantifiable risk. Climate change involves the possibility of abrupt and irreversible tipping points whose probabilities cannot be reliably inferred from historical data (Weitzman, 2009). In such contexts, investors cannot rely on stable probability distributions when forming expectations about future outcomes. As a result, they may rationally place greater weight on shorter horizons and historically grounded expectations when forming valuations. Importantly, this behaviour does not necessarily reflect irrationality or myopia. Rather, it reflects a rational response to institutional uncertainty surrounding the credibility and enforceability of future climate policy. When the financial realisation of climate risk depends on policy actions that investors do not expect to occur with sufficient force, those risks may be conditionally excluded from valuation. Asset prices may therefore remain internally consistent with investors' expectations even as systemic climate risks continue to accumulate.

Implications for ESG, Capital Allocation, and Financial Policy

In response to growing concern about climate-related financial risk, environmental, social, and governance (ESG) investing has expanded rapidly (Hartzmark and Sussman, 2019). However, ESG mechanisms remain ill-equipped to rectify the fundamental mispricing of climate risk. ESG ratings vary widely across providers and often fail to capture firms' true exposure to physical and transition risks, limiting their usefulness as risk-assessment tools (Berg, Kölbel and Rigobon, 2022). Improvements in ESG scores can frequently be achieved through changes in disclosure, reporting practices, or firm classification rather than through substantive adjustments to production or investment behaviour. More fundamentally, ESG operates primarily through portfolio tilts rather than binding constraints on corporate activity. As long as investors expect climate policy to remain weak or politically contested, risk-adjusted returns on carbon-intensive assets may continue to appear attractive, allowing capital to flow toward such activities despite their exposure to long-run climate risk. In this sense, ESG functions as a partial and fragile complement to risk pricing rather than a corrective mechanism capable of disciplining systemic climate-related financial risk.

The consequences of this conditional mispricing for capital allocation are substantial. By pricing assets under expectations of limited policy intervention, financial markets effectively subsidise the cost of capital for carbon-intensive firms, encouraging continued investment in fossil fuels and polluting infrastructure. This locks economies into carbon-intensive development paths not because markets fail to recognise climate risk, but because they anticipate that the burden of adjustment will be delayed or redistributed rather than borne by incumbent firms (Aghion et al.,2016). Simultaneously, low-carbon technologies face a relative disadvantage; even socially optimal projects may appear financially unviable if the policy environment required to support them is perceived as time-inconsistent or reversible (Acemoglu et al., 2012). Corporate behaviour is similarly shaped by this institutional environment. Managers operating under short-term performance metrics are incentivised to prioritise near-term earnings over long-term climate resilience, particularly when equity markets reward immediate profitability (Deng et al., 2024). These incentives do not arise from managerial myopia alone, but from rational responses to capital markets that discount climate risk conditional on political uncertainty. Consequently, climate-related externalities persist not because markets are irrational, but because private incentives remain misaligned with social welfare under weak institutional commitment.

Policy Implications: From Disclosure to Institutional Commitment

If the apparent mispricing of climate risk reflects the fact that its financial materialisation is politically contingent, then effective financial policy must move beyond transparency toward institutional enforceability. From an institutional perspective, markets respond not simply to information, but to the credibility, durability, and enforceability of the rules that govern future payoffs. Mandatory and standardised climate disclosure can reduce information asymmetries and improve comparability (TCFD, 2021), but disclosure alone is insufficient if the policy pathways embedded in reported scenarios lack credible institutional commitment. Effective carbon pricing can internalise the external cost of emissions, yet its impact on asset valuations depends critically on whether it is perceived as durable and resistant to political reversal (Schoenmaker and Schramade, 2019). Similarly, climate stress tests and macroprudential regulation can compel banks and insurers to recognise climate-related losses, but only if supervisory frameworks translate hypothetical scenarios into binding capital or balance-sheet constraints (European Central Bank, 2021). In the absence of such institutional enforcement, financial regulation may acknowledge climate risk without reliably altering market incentives.

As argued earlier, the Adaptive Markets Hypothesis suggests that investors adapt their behaviour to the institutional and policy environment in which they operate rather than responding solely to stated policy ambitions (Lo, 2004). If climate policy is perceived as politically constrained or vulnerable to reversal, markets will rationally assign a low probability to disruptive transition pathways. Under such conditions, improved disclosure or voluntary sustainability initiatives may increase awareness of climate risk without fundamentally altering capital allocation. Effective financial policy must therefore focus not only on improving information but also on strengthening the credibility and durability of the institutional frameworks that govern climate policy.

Limitations

While this analysis emphasises the role of institutional credibility in shaping how climate risk is reflected in financial markets, several limitations remain. First, distinguishing empirically between genuine market mispricing and pricing that is conditional on expectations of weak climate policy is inherently difficult. Asset prices reflect investors' beliefs about future policy, and these expectations are not directly observable, making it challenging to determine whether climate risks are systematically underpriced or rationally discounted. Second, institutional expectations are unlikely to be the only factor shaping climate risk pricing. Behavioural biases, short-term investment horizons, and information frictions may also contribute to the limited incorporation of long-horizon climate risks in asset valuations. Finally, the economic consequences of climate change involve deep uncertainty regarding the timing, magnitude, and distribution of future damages. These uncertainties make it difficult to identify precisely how and when climate risks should appear in asset prices. Nevertheless, recognising the importance of institutional credibility remains essential for understanding why financial markets may continue to allocate capital toward carbon-intensive activities despite growing awareness of climate-related risks.

Conclusion

Climate change confronts global financial markets with a challenge that is as much institutional as it is environmental. The persistent valuation of carbon-intensive assets should not be read as solely a failure of awareness or rationality, but as the outcome of pricing decisions formed under expectations of delayed, contested, and reversible climate policy. In an environment where systemic damages materialise over long horizons and their financial consequences depend on future collective action, standard valuation practices tend to underweight those risks in ways that are privately defensible yet socially destabilising. Addressing climate-related financial risk thus necessitates more than incremental improvements in measurement and transparency. It requires surement and disclosure, but a fundamental restructuring of the institutional conditions under which markets form expectations about the future.

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THREADING THE NEEDLE: LESSONS FOR CENTRAL BANKING FROM THE 2022 LDI CRISIS

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"The 2022 UK Liability-Driven Investment (LDI) crisis was triggered by a sharp spike in long-dated gilt yields following the Truss government's "mini-budget", which exposed structural vulnerabilities in leveraged pension fund strategies and generated a self-reinforcing cycle of margin calls and forced deleveraging through asset sales. The ensuing gilt market dysfunction in gilt markets required temporary Bank of England intervention to restore market functioning. This essay advances a three-part argument. First, it situates the crisis within the risk-taking channel of prolonged post-Global Financial Crisis monetary accommodation. Second, it identifies macroprudential blind spots that allowed leverage and liquidity mismatches to accumulate in the non-bank financial sector. Third, it evaluates the design and consequences of the Bank's temporary and targeted gilt purchase programme. The key lessons for central banks are to internalise the effects of monetary policy on financial stability in its monetary decision-making, strengthen oversight of non-bank leverage, and anchor crisis interventions in clear and credibility-preserving operational principles to avoid monetary spillover."

Introduction

In the autumn of 2022, the UK financial system faced a moment of profound market turmoil. Following the 'mini-budget' announcement on the 23rd of September, concerns over the fiscal rectitude of the British government triggered a sharp sell-off in gilt markets (Aramonte & Rungcharoenkitkul, 2022). This shock was amplified by the forced deleveraging of funds employing leveraged Liability-Driven Investment (LDI) strategies, which undertook fire-sales of index-linked and long-maturity gilts in response to substantial margin calls (Pinter, 2023). This dynamic led to £36bn of net gilt sales (Pinter, 2023) and a 130 basis-point spike in 30-year bond yields (Alexander et al., 2023). The intervention of the Bank of England, through large gilt purchases, was ultimately required to calm the situation and normalise gilt market functioning (Chen & Kemp, 2023). While conventional accounts of the crisis have rightly emphasised the role of the Truss government's fiscal decisions, comparatively less attention has been paid to the role of the Bank of England in the origination, failed prevention, and ultimate resolution of the episode (Alasad, 2025). This essay focuses on the role of the Bank of England during the saga and asks what lessons can be drawn for central banks in the prevention of, and response to, moments of financial instability.

The argument of this essay is threefold. It first argues that the prolonged period of loose monetary policy following the Global Financial Crisis contributed to the build-up of LDI risk. Quantitative Easing (QE) and low interest rates fostered a search for yield and rising leverage across the non-bank financial sector, with LDI strategies in defined-benefit pension schemes becoming a particularly fragile point of stress. Second, the essay shows how weaknesses in the UK's macroprudential framework allowed these vulnerabilities to build up largely outside the regulatory perimeter, leaving the scale and speed of potential liquidity demands poorly understood. Finally, it examines why the Bank's gilt market intervention was effective in restoring market functioning, while emphasising the longer-term moral hazard risks created by such backstops. The core contribution of the essay is to draw out the lessons this episode holds for central banking: the need for more robust macroprudential oversight of non-bank leverage, clearer principles governing financial-stability-driven market interventions, and a greater recognition of the risk-taking channel when assessing the long-run consequences of monetary policy.

Understanding the Crisis

The primary market actors in the events of Autumn 2022 were pension funds adopting leveraged LDI strategies (Baker McKenzie, 2023). LDI strategies allow pension schemes to hedge the interest rate sensitivity of their long-term liabilities without having to hold large amounts of capital-demanding, long-dated government bonds. Instead, these schemes use derivatives such as interest rate and inflation swaps, often financed through repo markets, to achieve this exposure (Chen & Kemp, 2023). In a low-interest-rate environment, this approach allowed pension funds to match their liabilities while using the remaining capital to invest in higher-yielding assets. However, because these strategies rely on leverage and derivatives, sudden increases in gilt yields can quickly generate large collateral demands, forcing funds to sell assets to raise cash (Patel & Sordo Palacios, 2023). The size and structure of the UK LDI sector significantly magnified the systemic risk posed by these strategies. The value of liabilities hedged using LDI expanded from approximately £400bn in 2011 to around £1.5tn by 2020, reflecting the prolonged low-interest rate environment (Chen & Kemp, 2023). Around 10–15% of these LDI assets were held in highly leveraged pooled funds shared by multiple pension schemes (Patel & Sordo Palacios, 2023). These pooled structures are particularly slow to recapitalise during periods of market stress, as coordination across multiple participants is required to raise cash to meet collateral calls (Aramonte & Rungcharoenkitkul, 2022). As a result, pooled LDI funds are more likely to engage in forced deleveraging through the rapid sale of gilts, amplifying market stress.

Following the initiation of Quantitative Tightening by the Bank of England on the 22nd of September (Aramonte & Rungcharoenkitkul, 2022), and more significantly, the announcement of the £45bn unfunded mini-budget fiscal package (Chen & Kemp, 2023), the "unpredictable and merciless" forces of the gilt markets were unleashed (Wilkins, 2024). Market concerns regarding the inflationary and fiscal implications of the package drove a sharp increase in gilt yields (Chen & Kemp, 2023). The resulting decline in gilt prices generated an "adverse feedback loop" among LDI funds: falling net asset values triggered margin calls, which in turn forced funds to sell gilts to raise cash, further depressing prices (Alexander et al., 2023). This produced a severe spiral in long-dated gilt markets, with daily volatility during the most acute phase of the crisis reaching levels two to five times greater than those observed during the COVID-19 shock and the GFC (Patel & Sordo Palacios, 2023). As fears grew that some LDI funds were approaching negative net asset values and that instability could spread to the banking sector via repo counterparties, the Bank of England intervened with temporary asset purchases (Chen & Kemp, 2023). Between 28 September and 14 October, the Bank purchased £19.3bn of long-dated gilts, restoring market liquidity and providing LDI funds with a longer window to raise cash through alternative asset sales, stabilising gilt market functioning (Chen & Kemp, 2023) (Alexander et al., 2023).

LDI Strategies and the Risk-Taking Channel of Monetary Policy

The growth in UK LDI strategies' scale and fragility can be understood as a manifestation of the risk-taking channel of monetary policy. The risk-taking channel refers to the mechanism through which prolonged accommodative monetary policy encourages financial institutions to assume greater risk by altering the relative returns and perceived safety of different asset classes (Abbate & Thaler, 2023). In the period following the GFC, low interest rates and QE programmes compressed yields on traditionally 'safe' assets, particularly long-dated sovereign debt (Patel & Sordo Palacios, 2023). As a consequence, financial institutions engaged in a pronounced 'search for yield', reallocating portfolios towards riskier assets to meet return targets (Rajan, 2006).

Expansionary monetary policy also operated through balance-sheet and collateral channels. By raising asset valuations, accommodative policy increased the value of collateral available to market participants, thereby facilitating greater use of leverage (Adrian & Shin, 2011). While early academic literature focused primarily on the operation of this channel through banks' lending activities, more recent studies of eurozone non-bank financial institutions (NBFIs), including pension funds, show that QE and persistently low policy rates increased both their leverage exposure and asset risk-profile (Wischnewsky & Neuenkirch, 2018). This pattern unfolded amongst UK pension schemes. With lower interest rates, the liabilities of these schemes had higher net present values while fixed-income assets (including gilts) offered lower rates of return (Patel & Sordo Palacios, 2023). The trustees of these funds utilised

LDI to inexpensively match their liabilities and reallocate freed capital to higher-yielding assets (Chen & Kemp, 2023). This desire to "juice returns" (Alasad, 2025) in an accommodative monetary environment drove a build-up of risk and leverage in the UK financial system.

The Bank's loose monetary environment incentivised these practices, which were extremely vulnerable to 'snapbacks' in interest rates (CGFS, 2018). The Bank for International Settlements warned in 2018 that the 'low-for-long' interest rate environment was leading to a buildup of pension fund exposure to adverse interest rate or yield shocks, noting in particular the risk of liquidity issues stemming from "additional collateral demands" (CGFS, 2018). This precise dynamic played out in the UK financial markets, with contractionary monetary policy and fiscal shocks combining to cause sharp rises in yields, leading to major risks emerging out of vulnerabilities in these LDI funds.

The central lesson is that monetary policy, by reshaping the risk-reward landscape over long horizons, alters the architecture of systemic vulnerabilities. Monetary authorities cannot treat inflation control and financial stability as wholly separable; prolonged accommodative policy can sow vulnerabilities that make later normalisation disruptive. The LDI crisis provides a sharp exemplar of the risk-taking channel and the dangers to financial stability that can emerge out of rapid changes in the macro-environment.

Macroprudential Blind Spots

While the risk-taking channel is well documented in the academic literature, the scale and structure of risk accumulation within the UK LDI sector were not successfully captured by existing macroprudential frameworks. Macroprudential policies are designed to minimise and mitigate systemic financial stability risk (Breeden, 2023). While the responsibility for this lies with the Bank's Financial Policy Committee, the plethora of regulators with independent mandates hampers the observation of systemic risk emerging from NBFIs (Chen & Kemp, 2023). UK pension schemes are regulated by The Pension Regulator, while their LDI managers fall under the Financial Conduct Authority's purview (Chen & Kemp, 2023). Furthermore, many of the LDI funds were domiciled outside the UK, primarily in Ireland and Luxembourg (Chen & Kemp, 2023). The Bank's lack of cross-mandate regulatory cooperation meant it lacked clear visibility of the build-up of risk in the LDI sector.

The stress testing and liquidity requirements imposed by the Bank were also insufficient to understand and reduce the risk to the financial sector posed by LDI funds. While 2018 Bank stress tests showed margin calls being met at yield spikes of 100 basis-points, the scale of the spike in September 2022 was 140 basis-points (Wilkins, 2024). The relative weakness of the stress tests compared to the reality of the shock represented a "failure of imagination" by the Bank in considering how the financial arrangements emerging in the pension sector could quickly be eroded by fiscal and monetary shocks (Alasad, 2025). Given the scale of leverage and the interconnectedness of LDI funds with the rest of the financial sector, the liquidity standards faced by these funds were too low (Chen & Kemp, 2023). Bandera and Stevens' model of the crisis demonstrated that a modest 2.75% liquidity buffer would have averted 50% of the "LDI effect" on the 2022 gilt crisis (Bandera & Stevens, 2024). Had the Bank responded to warnings emerging throughout the change in the monetary environment (Alasad, 2025; Nangle, 2022) with the implementation of stricter standards, the scale of the crisis could have been substantially averted.

The lack of resilience of LDI funds in the face of the changing monetary and fiscal environment stands in contrast to the solidity of the banking sector during this period. This is a predictable consequence of the differential macroprudential approaches taken by the Bank. The Bank's Deputy Governor noted the resilience of the UK housing market during the prolonged low-interest rate environment (Breeden, 2023), crediting it to stronger lending standards and stress testing adopted by the Bank. Similarly, the UK's strict liquidity and capital regulations for banks supported a stable financial system as interest rates rose (Wilkins, 2024). The lack of risk emerging out of the banking sector is noted globally; the Bank for International Settlements found little systemic correlation between bank risk-taking and interest rates in the aftermath of the GFC (CGFS, 2018). The lack of interest rate risk emerging from the traditional banking sector is a testament to the success of stronger post-GFC macroprudential policy.

These successes are firmly contrasted with the NBFI sector. Scholars have noted the persistent thread between crises emerging from these institutions is a lack of systemic oversight, information gaps, and overly lax macroprudential standards (Chen & Kemp, 2023). NBFI risk is not limited to pension funds operating LDI strategies; Aramonte and Rungcharoenkitkul note that leverage, liquidity, and interest rate risks extend to a variety of NBFIs such as private equity funds (Aramonte & Rungcharoenkitkul, 2022). The LDI crisis highlights the need for central banks and macroprudential authorities to raise standards and manage systemic risk from non-traditional segments of the financial sector; macroprudential regulation must be focused on scanning the horizon rather than fighting the last war to observe and tackle novel systemic risks.

The Principles and Risks of Financial Stability Interventions

These macroprudential blind spots left the Bank with little choice but to intervene once mar ket dysfunction became acute. Beginning on the 28th of September, the Bank initiated targeted temporary purchases of long-dated gilts (Alexander et al., 2023). This was expanded to include index-linked gilts ('linkers') on the 11th of October, reflecting the Bank's response to data showing difficulties in this market (Chen & Kemp, 2023). From the 28th of September to the 11th of October, the Bank purchased £19.3bn worth of gilts (Alexander et al., 2023). The Bank's intervention saw UK 30-year bond yields fall in line with German and US equivalents (Wilkins, 2024); however, prolonged price normalisation was not achieved until the revocation of the mini-budget. The Bank unwound its gilt holdings from this intervention during a series of sales beginning at the end of November and concluding in January of 2023 (Alexander et al., 2023).

The Bank's gilt purchases exposed a sharp conflict between financial stability objectives and the stance of monetary policy. While central banks, including the Bank of England, had previously used asset purchases to stabilise markets during the COVID-19 'dash for cash' episode (Chen & Kemp, 2023), the macroeconomic context in 2022 was markedly different. Monetary conditions called for policy tightening, and the Bank had already signalled the initiation of Quantitative Tightening in March 2022 (Breeden, 2023).

This apparent contradiction between the needs of financial and monetary policy required the Bank to take care to minimise monetary spillovers in the form of heightened inflation (Bandera & Stevens, 2024). In order to achieve these goals, the financial stability intervention had to be temporary, targeted, and price-driven (Alexander et al., 2023). The Bank's clear delineation of the dates of their gilt purchasing period and their focus on the purchase of the assets facing market dysfunction (long-dated and index-linked gilts) ensured their intervention was both temporary and targeted (Chen & Kemp, 2023). Furthermore, the backstop pricing approach of their intervention, which saw gilt purchase amounts determined by the achievement of a return to a goal price, ensured the intervention was only as large as was needed to ensure a return to orderly market functioning (Bandera & Stevens, 2024).

The Bank's intervention was broadly successful. The total value of gilt purchases was smaller than initially expected (Alexander et al., 2023) and was successful in short-circuiting the 'doom loop' engulfing the UK gilt market, providing an opportunity for LDI funds to recapitalise and deleverage (Wilkins, 2024). The successful application of the temporary, targeted, and price-driven principles ensured the intervention had minimal adverse monetary consequences; despite the scale of the gilt purchases being nearly 1% of GDP, the effects on inflation were "trivial" (Wilkins, 2024). The success of the Bank in stabilising the gilt markets without compromising their monetary policy responsibilities provides a model for future central bank responses to financial crises amidst unfavourable monetary conditions.

However, such central bank interventions are not without costs. Central bank market backstops create moral hazard risks. Liquidity interventions may create expectations that leveraged positions will be protected again in future, encouraging grea ter risk-taking. Ferguson et al.'s research on central bank balance sheet operations suggests that central bank liquidity support is associated with a 3.7 – 15.8% higher probability of a fragile credit boom in the subsequent two decades (Ferguson et al., 2023). Research from both the IMF and BIS notes that without strong macroprudential policy, these interventions risk moral hazard and raise the likelihood of central banks once again being forced to act as market-makers of last resort (Chen & Kemp, 2023) (Aramonte & Rungcharoenkitkul, 2022). While the Bank's response was successful and offers guidance for future crises, these interventions must be paired with strong macroprudential policy.

Conclusion

The 2022 LDI crisis may represent a harbinger of future financial shocks that central banks will face. As the NBFI sector grows both in scale and interconnectedness globally (Chen & Kemp, 2023), similar crises of leverage and liquidity may emerge that threaten financial stability. It is therefore vital that central banks internalise the practical lessons arising from the Bank's role in, and response to, the LDI crisis.

First, central banks must embed an understanding of the risk-taking channel and its interactions with the NBFI sector in their policy deliberations. While institutions like the Bank of England appear to have recognised the role of interest rate risk for the traditional banking sector (Wilkins, 2024), academic evidence suggests that NBFIs may be the most exposed segments of the financial ecosystem to the risk-taking channel (CGFS, 2018). Monitoring how metrics like duration mismatches, aggregate leverage, and liquidity timelines evolve with the monetary environment can allow central banks anticipate and prepare for the additional risks generated by their monetary stances.

Efforts to mitigate risk through macroprudential policy must be robust, forward-looking, and imaginative in anticipating the scale and nature of future shocks. The relative resilience of the banking sector testifies both to the effectiveness of post-GFC macroprudential policies and the tendency of regulators to look backwards to focus on risks revealed by past crises. Given the global build-up of NBFI risk (Aramonte & Rungcharoenkitkul, 2022), tighter leverage and liquidity requirements and stress tests that allow for extreme and unprecedented volatility are essential to prevent the recurrence of UK-style crises.

Finally, asset purchase interventions aimed at restoring financial stability should adhere to strict operational principles and be deployed only as a last resort. Clear communication of time limits, asset scope, and pricing objectives, as demonstrated by the Bank, can minimise monetary spillovers and preserve policy credibility. Nevertheless, such interventions are not a substitute for effective macroprudential regulation; without it, they risk fostering moral hazard and entrenching a cycle of repeated central bank backstops.

This essay aimed to provide a balanced analysis of the 2022 UK financial crisis and the Bank's role in its resolution, highlighting an often-neglected dimension of the LDI episode. In doing so, it has drawn broader lessons for central banks tasked with safeguarding financial stability in an increasingly interconnected financial system. As novel risks continue to emerge, further research will be crucial in identifying new LDI-style vulnerabilities, understanding the operation of the risk-taking channel beyond traditional banking, and assessing how financial stability tools interact with monetary policy mandates.

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INTERNATIONAL POLITICAL ECONOMY

WHO ALIGNS WITH THE LIBERAL INTERNATIONAL ORDER? EVIDENCE FROM UN GENERAL ASSEMBLY VOTING

Jiwoo Kim

Junior Sophister

"This paper examines patterns of alignment with the US in the UN General Assembly (UNGA) as an indicator of participation in the liberal international order (LIO). Moving beyond interpretations that frame UN voting primarily through strategic alliance or emerging great-power rivalry, the paper argues that alignment reflects how states experience and negotiate identity and power within a stratified international system. Using UNGA ideal-point voting data from 2006 to 2023, the analysis links long-run alignment with three domestic structural indicators: GDP per capita, income inequality, and state fragility. Employing both ordinary least squares regression and a Random Forest model, the paper finds that lower inequality and stronger institutional stability are consistently associated with higher levels of alignment, while economic wealth exerts a conditional and non-linear effect. Wealthier and more stable states tend to cluster as highly aligned, whereas fragile and unequal states display more ambivalent voting behaviour. These findings suggest that alignment with the US is shaped not only by external incentives, but by domestic capacities to benefit from and internalise the institutions and norms of the liberal order. UNGA voting thus emerges as an expression of negotiated belonging within a contested and uneven LIO."

Introduction

Since the end of the Cold War and the consolidation of the Washington Consensus, the US has occupied a dominant position within the liberal international order (LIO) (Krauthammer, 1990). This order rested not only on US material power but also on its capacity to shape international institutions and norms. Alignment with the US thus signified more than strategic cooperation; it functioned as an expression of political belonging within a US-centred LIO. In recent decades, this configuration has become increasingly unsettled (Ikenberry, 2024; Womack, 2016). Rather than a clear return to bipolarity, the contemporary international system is characterised by overlapping hierarchies, shifting alliances, and growing uncertainty about the authority and coherence of the LIO (Tourangbam, 2019).

This shift in the international order raises a central question: who aligns with the LIO, and why? Alignment is increasingly shaped not only by external pressures but by how states internalise power and construct their identity within global structures. Liberal theories of state preferences emphasise that foreign policy positions are rooted in domestic economic conditions, social cohesion, and institutional capacity (Moravcsik, 1997). As the LIO becomes more contested, these domestic economic foundations play a decisive role in conditioning whether states perceive US leadership as a source of opportunity, security, and legitimacy, or as a structure that reproduces inequality and vulnerability.

This study examines UN General Assembly (UNGA) voting alignment with the US from 2006 to 2023, a period marked by the erosion of post-Cold War certainties and increasing ambiguity about the future of US-led multilateralism. While UNGA voting has long been used to assess geopolitical alignment (Kim and Russett, 1996; Voeten, 2013), it also reflects how states symbolically position themselves within the international order. The analysis examines voting patterns alongside three key economic domestic structural indicators, GDP per capita, the Gini coefficient, and the Fragile States Index (FSI), which together capture material capacity, social cohesion, and institutional stability. By doing so, the paper moves beyond zero-sum interpretations of alignment and reframes UN voting as a window into how identity and power shape participation in a changing LIO.

LIO, Identity, and Power

The LIO, led primarily by the US, emerged in the aftermath of the Second World War and consolidated its global dominance following the end of the Cold War. The order can be conceptualised as a hybrid system that combines material power, institutional authority, and normative legitimacy (Ikenberry, 2001). Built upon institutions such as the UN, the Bretton Woods system, and an extensive network of multilateral economic and security arrangements, the LIO linked US military and economic primacy to normative claims about liberal democracy and open markets. In the late 1980s and 1990s, this configuration enabled an unprecedented expansion of global economic integration, facilitating cross-border flows of goods, services, capital, and ideas (Ikenberry, 2001).

For many states, participation in the LIO offered economic growth, political stability, and security guarantees. Alignment with US preferences, particularly within interna tional institutions, became a key marker of international legitimacy. US leadership rested not only on its provision of security and market access, but also on its ability to shape rules, norms, and expectations within global governance structures, especially the UN (Colgan and Keohane, 2017). Alignment with the US in the UNGA thus signified more than strategic compliance, functioning as a symbolic affirmation of belonging within the LIO. In recent years, however, the US-led LIO has faced significant challenges both internally and externally (Ikenberry, 2014). Internally, the distributive consequences of globalisation have generated political and social backlash within many liberal democracies, fuelling nationalism and fuelling nationalism and scepticism toward multilateral institutions (Colgan and Keohane, 2017). Externally, the intensification of US-China rivalry and the reassertion of Russia have eroded assumptions of a stable unipolar order (Womack, 2014). While some observers frame these dynamics as a second Cold War, emerging evidence instead suggests a more fragmented and fluid landscape, characterised by shifting alignments rather than rigid ideological blocs (Ikenberry, 2014). States that are formally liberal democracies may at times diverge from LIO norms, while authoritarian or hybrid regimes may selectively align with LIO institutions when it serves their strategic interests.

As the LIO becomes more contested, alignment increasingly reflects negotiated identities rather than fixed ideological positions (Acharya, 2014). From an identity perspective, states are not merely passive recipients of external pressures but active agents that interpret their position in the international system through domestic experiences of inclusion, marginalisation, stability, and vulnerability (Colgan and Keohane, 2017). States that have benefited materially and institutionally from the LIO are more likely to internalise its norms and reproduce them through consistent voting behaviour. Conversely, states that experience the order as unequal, exclusionary, or destabilising may distance themselves from the order (Acharya, 2014). Non-alignment or selective alignment, in this sense, can be understood less as opposition and more as an expression of ambivalence toward the identities and hierarchies embedded in the liberal order.

Power within this framework is understood as both relational and structural (Iken berry, 2014). Relationally, power operates through diplomatic and economic pressure and inducement, as well as security partnerships that encourage alignment with US preferences (Barnett and Duvall, 2005). Structurally, power is embedded in global economic hierarchies that systematically advantage some states while constraining others. Domestic economic capacity, levels of inequality, and state fragility mediate how these power relations are experienced. Wealthier and more stable states are better positioned to absorb the costs of alignment and to benefit from institutional participation, while fragile or highly unequal states may perceive alignment as offering diminishing returns or heightened risks to domestic legitimacy and stability (Barnett and Duvall, 2005; Zarakol, 2017).

This understanding moves beyond realist zero-sum assumptions by recognising that the current fragmentation of the LIO does not map neatly onto a bipolar ideological struggle. Instead, it highlights a complex and evolving field in which states continuously reassess their place and relationship to US power amid uncertainty (Acharya, 2014). Within this context, UNGA voting alignment is best understood as the outcome of interactions between domestic structural conditions, identity formation, and shifting configurations of international power

(Kim and Russett, 1996). UN voting thus becomes not merely an indicator of alliance politics, but a meaningful expression of how states position themselves within a changing LIO.

Methodology

The dependent variable is voting alignment with the US in the UNGA. Alignment is measured using ideal-point estimates developed by Voeten (2024), which position countries along a continuous dimension based on their voting similarity with the US. The measure ranges from 0 to 1, where higher values indicate alignment with US voting behaviour. Compared to simple vote coincidence measures, ideal-point estimates capture underlying patterns of alignment across a broad range of resolutions and provide a more stable measure of long-term orientation. For each country, the median alignment score between 2006 and 2023 is calculated. The focus on the median reflects the aim of capturing structural alignment rather than short-term fluctuations driven by individual resolutions or temporary diplomatic disputes. The US is excluded from the sample, as its own alignment score is mechanically fixed.

Domestic Structural Indicators

Three domestic indicators are used to capture the economic, social, and institutional environments that may condition alignment behaviour. First, economic capacity is measured using GDP per capita (constant USD) from the World Bank's World Development Indicators. GDP per capita is log-transformed to account for non-linearities in the relationship between income and political behaviour (Lütkepohl and Xu, 2012). Rather than assuming that higher income mechanically produces alignment, this variable captures the extent to which states possess the material resources necessary to engage consistently with the institutional architecture of the liberal order. Second, social cohesion is proxied using the Gini coefficient, also drawn from the World Bank. Inequality is theorised to matter because highly unequal societies may experience weaker domestic legitimacy and greater sensitivity to external constraints, reducing the political feasibility of sustained alignment with dominant powers. Third, institutional stability is measured using the Fragile States Index (FSI) from the Fund for Peace. Higher fragility scores indicate weaker state capacity, political instability, and exposure to internal conflict. Such conditions may limit the ability of governments to prioritise symbolic or institutional alignment within multilateral forums. As with the alignment measure, the median value of each domestic indicator over the 2006–2023 period is used. This approach smooths short-term volatility and allows the analysis to focus on long-run structural characteristics rather than episodic shocks.

Empirical Strategy

The analysis proceeds in two stages. First, a cross-sectional ordinary least squares (OLS) regression is used to estimate the linear relationship between domestic structural conditions and long-run US alignment. This provides a transparent baseline model that allows for straightforward interpretation of the direction and magnitude of associations. Second, to account for the possibility that alignment is shaped by non-linear interactions between wealth, inequality, and fragility, a Random Forest regression model is employed. Unlike linear regression, Random Forests can capture complex relationships and latent clustering patterns without imposing strong functional form assumptions. This is particularly relevant given that economic capacity, inequality, and institutional stability are likely to interact in shaping how states experience and respond to the LIO. The use of both methods strengthens the analysis by ensuring that the findings are not driven by the assumptions of a single model. Where results converge across approaches, greater confidence can be placed in the substantive interpretation.

Sample Construction

All datasets are merged at the country level, and only observations with complete information across all variables are retained. Minor inconsistencies in country naming conventions are harmonised prior to aggregation. The final sample consists of 147 countries, each represented by a single observation reflecting its median structural characteristics and alignment behaviour between 2006 and 2023.

Table 1. Summary Statistics of Dataset

	N	Mean	Std. Dev.	Min	P25	Median	P75	Max
fsi_index	147.0	68.577	23.853	18.279	48.775	74.400	85.200	111.476
Gini	147.0	37.555	7.478	24.650	32.325	36.200	42.625	63.000
USAgree	147.0	0.241	0.133	0.075	0.150	0.177	0.369	0.881
GDP_scaled	147.0	9.251	1.130	6.605	8.296	9.355	10.114	11.728

Results

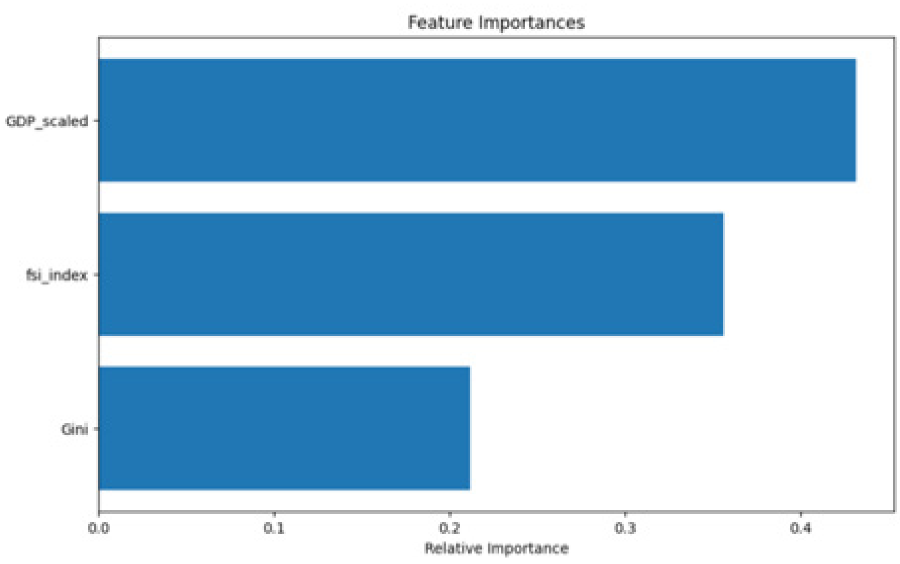
The results indicate a strong association between domestic structural conditions and long-run alignment with the US in the UNGA. Across both modelling approaches, alignment is systematically higher among states characterised by lower inequality and stronger institutional stability, while economic wealth plays a more conditional and non-linear role.

OLS Regression

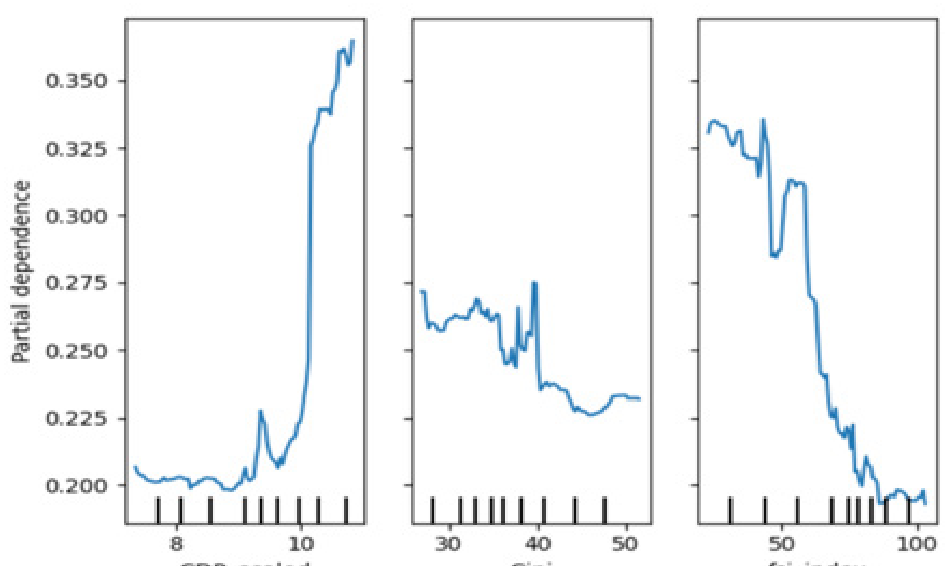
```
                            OLS Regression Results
==============================================================================
Dep. Variable:                USAgree   R-squared:                       0.563
Model:                            OLS   Adj. R-squared:                  0.554
Method:                 Least Squares   F-statistic:                     61.34
Date:                Wed, 03 Dec 2025   Prob (F-statistic):           1.49e-25
Time:                        12:57:37   Log-Likelihood:                 149.71
No. Observations:                 147   AIC:                            -291.4
Df Residuals:                     143   BIC:                            -279.5
Df Model:                           3
Covariance Type:            nonrobust
==============================================================================
                 coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
Intercept      0.6282      0.154      4.068      0.000       0.323       0.933
GDP_scaled    -0.0007      0.012     -0.057      0.955      -0.025       0.023
Gini          -0.0033      0.001     -3.153      0.002      -0.005      -0.001
fsi_index     -0.0037      0.001     -6.497      0.000      -0.005      -0.003
==============================================================================
Omnibus:                       80.233   Durbin-Watson:                   2.153
Prob(Omnibus):                  0.000   Jarque-Bera (JB):              610.168
Skew:                           1.773   Prob(JB):                    3.19e-133
Kurtosis:                      12.330   Cond. No.                     1.73e+03
==============================================================================
```

The ordinary least squares (OLS) regression shows that both the Gini coefficient and the FSI are negatively and statistically significantly associated with US alignment. Substantively, this suggests that societies with lower internal inequality and higher levels of political stability are more likely to support US positions in the UNGA. These findings are consistent with liberal accounts of foreign policy formation, which emphasise that cohesive and institutionally capable states are better positioned to sustain consistent external orientations (Moravcsik, 1997). By contrast, GDP per capita does not exhibit a statistically significant linear relationship with alignment once inequality and fragility are accounted for, indicating that wealth alone does not mechanically translate into support for the liberal order.

Random Forest Regression



Graph 2: Feature (Variable) Importances



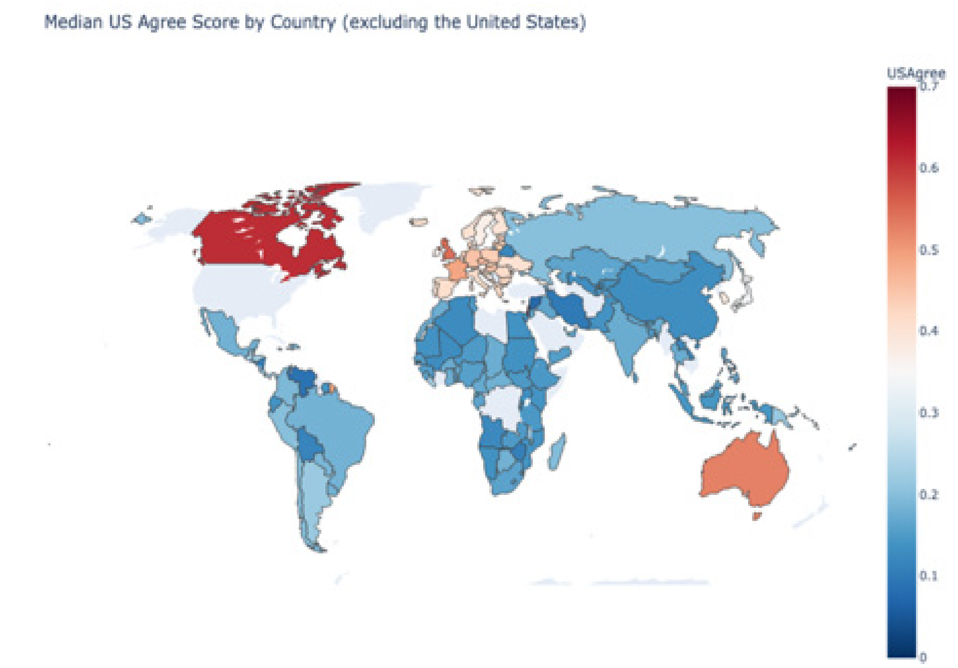
Graph 3: Partial Dependence by Features

The Random Forest analysis complements these findings by revealing important non-linear interactions between domestic characteristics. While GDP per capita appears insignificant in the linear specification, it emerges as a highly influential predictor once interactions with inequality and state fragility are allowed for. In particular, the results point to clustering effects: states that are simultaneously wealthy, institutionally stable, and relatively equal tend to form a group with consistently high levels of alignment, whereas states facing higher fragility or inequality cluster at lower levels of alignment. This pattern suggests that economic capacity matters insofar as it enhances a state's ability to manage vulnerability and benefit from participation in the LIO, rather than as an independent driver of alignment.

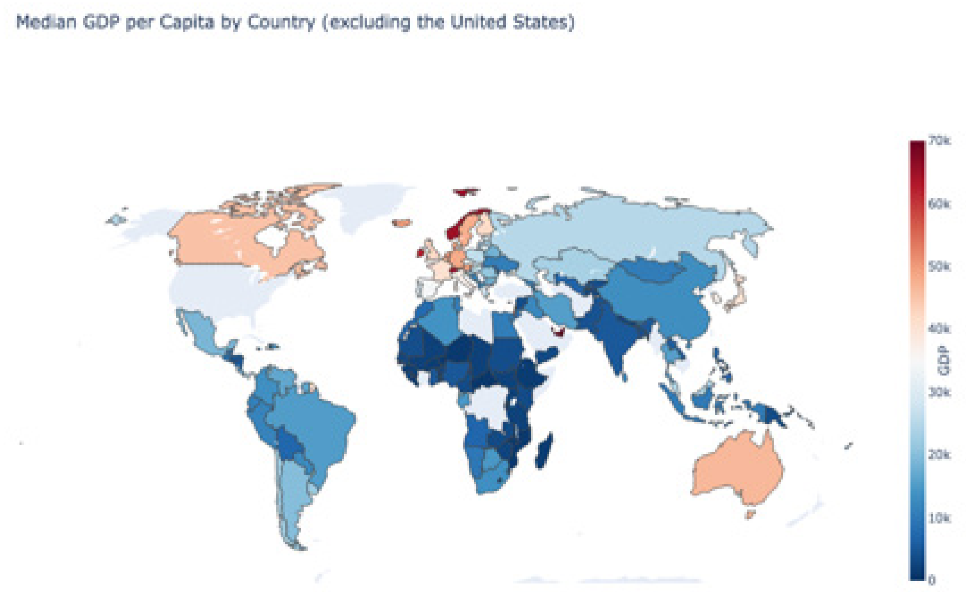
Taken together, the OLS and Random Forest models suggest that foreign policy alignment in the UNGA is shaped not by single domestic characteristics in isolation, but by broader combinations of economic capacity, political stability, and social cohesion. Wealthier and more stable states, which tend to gain more from the institutional arrangements of the LIO, are the most supportive of US positions. Conversely, states with weaker domestic structures tend to be less aligned, reflecting both limited integration into and limited benefits from the global order.

World Maps

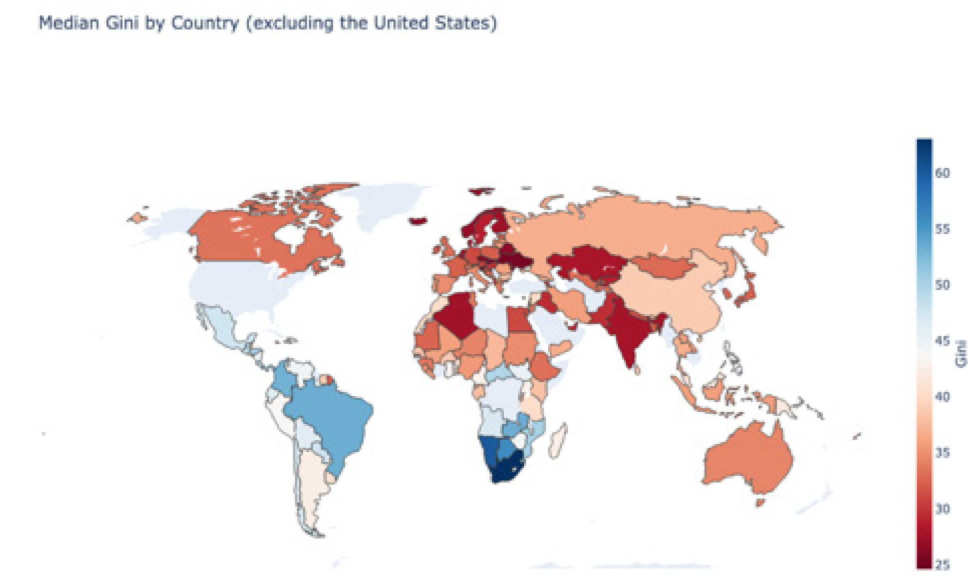
Graph 5: World Maps for Each Variable



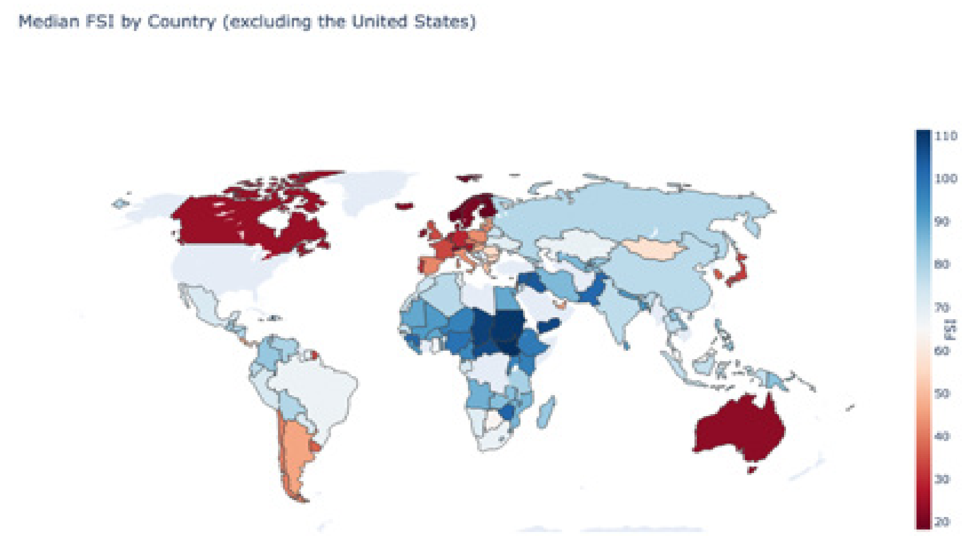
(1) Median US Ideal-Point Agreement



(2) Median GDP



(3) Median Gini Coefficient



(4) Median FSI

The world maps further reinforce the statistical findings by visually illustrating the spatial clustering of states according to both their domestic structural characteristics and their level of US alignment. Countries that vote most consistently with the US, such as the states of Western Europe, North America, Oceania, and parts of East Asia, also exhibit high GDP per capita, low levels of fragility, and comparatively lower inequality. These regions form a coherent bloc of states embedded within the LIO and have historically benefited from its economic and security arrangements (Ikenberry, 2024).

In contrast, states across Sub-Saharan Africa, South Asia, the Middle East, and parts of Latin America display weaker domestic indicators and lower degrees of alignment with the US. The geographic distribution of alignment is therefore not random but appears to reflect broader patterns of integration into the US-led order. The maps provide visual confirmation of the argument that domestic levels of wealth, stability, and institutional capacity are strongly associated with higher levels of alignment, while internal fragility corresponds to lower alignment.

Discussion

The empirical findings of this study take on greater significance when interpreted through the conceptual lens of identity and power in a contested LIO. Rather than reflecting simple strategic alignment or emerging bipolar rivalry, UNGA voting patterns appear to be shaped by how states experience and position themselves within the structures and hierarchies of the US-led order. Long-term alignment with the US is closely associated with domestic structural characteristics, particularly inequality and state fragility, while economic wealth plays a more conditional, non-linear role.

From an identity perspective, states characterised by lower inequality and higher political stability are more likely to perceive themselves as legitimate and secure stakeholders within the LIO. Their alignment with US voting positions reflects not only instrumental calculation but also a sense of institutional and normative belonging. These states have tended to benefit materially from the LIO and to internalise its rules and expectations, reproducing patterns of support even as US dominance becomes less assured (Colgan and Keohane, 2017). In this sense, UNGA alignment functions as an expression of identification with the order itself, rather than mere compliance with US preferences.

By contrast, states marked by higher levels of fragility and inequality display systematically lower levels of alignment. For these countries, the LIO may be experienced as unevenly responsive to their security and development needs. Their voting behaviour suggests not necessarily opposition to liberal norms, nor automatic alignment with rival powers, but a more ambivalent relationship to an order perceived as structurally biased. Non-alignment or selective alignment thus emerges as a form of contested identity, reflecting distance from the symbolic and material core of the LIO rather than a coherent alternative ordering project.

The Random Forest results further illuminate the role of power as structural rather than purely material. While GDP per capita does not exert a strong linear effect in the OLS models, it emerges as highly influential when interacting with inequality and fragility. This finding underscores that wealth matters insofar as it enhances a state's capacity to manage vulnerability, absorb the costs of alignment, and navigate uncertainty. Economically stronger and institutionally stable states are better positioned to sustain alignment without threatening domestic legitimacy, whereas low-income or more fragile states face tighter constraints and fewer viable pathways within the existing order.

Taken together, these patterns point to a stratified and uneven post-Cold War landscape in which alignment reflects differential access to power, security, and recognition within the LIO. As the coherence of the LIO weakens, these structural asymmetries become more salient, particularly for fragile states that must navigate not only shifting alliances but deeper questions of belonging and autonomy in the international system. The geographic clustering observed in the world maps reinforces this interpretation. Wealthy and stable states in Western Europe, North America, Oceania, and parts of East Asia, regions deeply embedded in the institutional and economic foundations of the LIO, exhibit the highest levels of alignment with the US Conversely, many states across Sub-Saharan Africa, South Asia, the Middle East, and parts of Latin America, where fragility and inequality are more pronounced, show lower alignment, reflecting comparatively weaker integration and more ambivalent relationships with the LIO.

Overall, the findings suggest that patterns of UNGA alignment are not merely indicators of shifting great-power competition but expressions of how identity and power operate within a changing international order. Domestic structural conditions mediate how states experience US leadership and the LIO more broadly, thereby shaping whether alignment is perceived as advancing domestic political and economic interests. Understanding these dynamics is essential for analysing state behaviour in an era where the legitimacy of the LIO can no longer be assumed, but is increasingly negotiated and contested.

Conclusion

This study has re-examined UNGA voting alignment with the US through the lens of a LIO under strain. By integrating domestic structural indicators with votting behaviour, it demonstrates that alignment is deeply intertwined with questions of identity and power, rather than being reducible to ideological polarity. The findings suggest that states most aligned with the US tend to be those that have both benefited from and internalised the structures of the LIO. Wealth, stability, and lower inequality enable these states to sustain alignment even as the order fragments. Conversely, states facing fragility and inequality are more likely to distance themselves, not necessarily as a rejection of liberal norms, but as a response to structural exclusion and heightened vulnerability

As the US-led order becomes less predictable and more contested, UNGA voting emerges as a key site where these tensions are expressed. Alignment increasingly reflects ongoing processes of identity negotiation within a shifting power landscape. For fragile and conflict-affected states in particular, uncertainty about the LIO raises not only strategic risks but ontological questions about who they are and how they relate to global authority.

Ultimately, this analysis suggests that the future of the LIO will depend not only on great power competition but also on whether its institutional and normative foundations can accommodate diverse experiences and address structural inequalities. Understanding UN voting through the combined lenses of identity and power provides a more nuanced account of alignment in an era where the contours of international order are no longer taken for granted.

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DEVELOPMENT ECONOMICS

UPSTREAM EFFECTS OF THRESHOLD-BASED REGULATION

Marlene Auer

Junior Sophister

"Using cadmium regulation in cocoa as a case study, this essay shows how such rules move threshold adjustment upstream from processing to sourcing. This is because when compliance is assessed through strict thresholds under biological uncertainty, exporters respond by sourcing more conservatively and maintaining buffers below the legal limit. These responses, however, introduce substantial fixed compliance costs that favour larger suppliers capable of spreading regulatory risk across higher volumes. As a result, contaminant limits function not only as safety standards but also as conditions for market access, reshaping supply chains and concentrating trade among suppliers able to manage associated regulatory risks."

Introduction

Food safety regulations increasingly shape global agricultural markets, as regulators impose strict limits on contaminants such as cadmium to protect consumer health. In products such as cocoa, these limits are typically enforced on finished goods like chocolate or cocoa powder, making regulatory compliance a downstream problem for processors and manufacturers. However, the economic consequences of such regulations often emerge much earlier in the supply chain, because crops such as cocoa are grown across diverse geological environments, which means that cadmium concentrations in cacao beans vary substantially by region, creating an uneven exposure to regulatory thresholds for exporters and producers.

This essay argues that when contaminants are biologically embedded in agricultural products, and the regulation is enforced through strict thresholds, compliance shifts upstream from processing to sourcing. Using cadmium regulation in cocoa as a case study, it shows how threshold-based rules transform contaminant limits into a market-access condition that reshapes supply chains by favouring low-variance inputs, increasing fixed compliance costs, and concentrating trade among suppliers capable of managing regulatory risk.

Biological Embedding and Upstream Constraints

When food safety regulators set contaminant limits such as those for heavy metals, com pliance is usually tested and enforced at the finished-product level, placing regulation at the end of the production chain (European Commission, 2023). This means that compliance is treated as something that can be achieved downstream, since deviations can, in principle, be corrected through tighter controls, additional processing, or further purification. However, this approach implicitly assumes that contamination is separable from the product itself, because it treats the impurity as added to the product rather than embedded in it. Once purity becomes a binding constraint and contamination enters through raw material inputs rather than during manufacturing, this assumption no longer holds, changing regulation from a downstream quality constraint into an upstream condition for market access.

This distinction matters because contamination that is incorporated into a material instead of deposited onto it is difficult to remove (Krupincová & Sirková , 2025). In synthetic chemistry, unintended by-products can often be separated from the target compound - through recrystallisation or chromatography, for example - as they remain distinct species that can be isolated without altering the compound of interest (Cano, et al., 2005). In biological systems, however, once a contaminant is absorbed by an organism, it becomes distributed across tissues and integrated into its biomass unless it is actively excreted (Blowes, et al., 2014). This means that the contaminant is no longer present as a residue that can be separated during processing but as part of the organism itself. While chemical processing can alter the form, concentration, or distribution of such contaminants, it has limited ability to remove them completely once the assimilation has occurred.

This is especially critical for heavy metal contaminants such as cadmium which are not easily excreted once absorbed and therefore accumulate in organisms over time (Briffa, et al., 2020). In plant-based raw materials, cadmium levels therefore reflect the conditions under which the crop grows rather than anything that happens during subsequent processing. Because uptake occurs during growth rather than manufacture, downstream interventions only have a limited scope to change the underlying contaminant burden. This biological embedding can therefore create systematic heterogeneity in cadmium concentration levels.

Cacao beans provide an illustrative case in this regard, spanning a range from well below 0.1 mg kg-1 to several milligrams per kilogram, with especially high levels reported in parts of Latin America (Vanderschueren, et al., 2021). Since these regional patterns are closely related to soil composition and geology, and largely reflect natural soil conditions rather than fertiliser use or industrial contamination, more than half of the cacao bean samples from some Latin American regions exceed commonly applied export thresholds, such as those relevant for the European

Union of around 0.6 mg kg-1 (European Commission, 2023; Vanderschueren, et al., 2021). Because cadmium is not removed during processing, bean concentrations therefore strongly influence final product cadmium concentrations, whether the output is cocoa liquor, cocoa powder, or chocolate (Vanderschueren, et al., 2021). Consequently, upstream variability remains economically relevant even when the legal limit is defined at the level of the final product.

While mitigation strategies exist, they remain partial and inconsistent. Soil amendments such as lime or biochar, for example, can reduce cadmium uptake in acidic soils, but their effectiveness varies with local conditions and does not scale linearly across regions. Breeding low-cadmium cultivars offers long-term potential, but progress is constrained by an incomplete understanding of cadmium transport into developing cacao beans (Vanderschueren et al., 2021). Post-harvest practices such as fermentation can also slightly reduce cadmium concentrations in the final product, but they do not eliminate contamination and often compromise bean quality (Vanderschueren, et al., 2021). Therefore, in practice, none of these approaches can reliably flatten the underlying geographic gradient at the scale required to eliminate regional differences in contamination.

Threshold Enforcement and Compliance Under Uncertainty

Compliance, a Question of Origin

Since cadmium becomes embedded in the cacao bean during growth, compliance cannot be achieved through later processing, but instead depends on controlling which inputs enter the supply chain, making sourcing a market access filter. Suitability is therefore determined before processing begins, which means that compliance with contaminant limits becomes a question of origin rather than refinement. This matters economically because when the regulatory threshold falls within the normal range of contamination levels, compliance becomes sensitive to natural variability rather than dominated by rare outliers. Under strict regulatory conditions, sourcing thus functions as a filter that determines which cocoa can be traded into certain markets at all.

Agricultural commodities are traded into multiple destination markets with differing regulatory expectations; consequently, effective standards are set by the market with the most restrictive requirements that exporters still want access to (Ferro, et al., 2013). In the case of cocoa, this standard is set by the European Union (EU), which is one of the most commercially relevant destination markets, accounting for about 58 % of global cocoa bean imports (Government of the Netherlands, 2025). Given that the EU also enforces some of the most restrictive cadmium thresholds, exporters cannot easily segment production by destination once beans enter bulk supply chains. This means that meeting the strictest standard often becomes the simplest way to preserve access across markets (CAOBISCO/ECA, 2018). A batch of cocoa beans failing to meet EU limits therefore loses access to a high-value market segment, even if acceptable elsewhere.

Thresholds, Batch Testing, and Risk Minimisation

These thresholds are especially restrictive because contaminant limits differ from conventional trade barriers since they are not mediated through prices, tariffs, or preferences but through product composition (Ferro, et al., 2013). Market access, as a result, depends on clearing a legal threshold, with no scope for compensating non-compliance through discounts, branding, or downstream differentiation. Exposure to regulated markets is consequently governed by underlying product characteristics passing a binary regulatory test, a qualitative difference from barriers that operate through gradual adjustments.

For cocoa exporters, the key consideration is therefore not merely the level of the cadmium limit, but also the method of compliance assessment. In the EU, cadmium limits are defined as strict maxima that vary by product category and are enforced at the batch level rather than on the basis of production averages (European Commission, 2023). Consequently, a shipment is either admissible or rejected, regardless of how close measured concentrations are to the threshold or how consistent past consignments have been. Because rejection blocks the entry for an entire batch, the cost of non-compliance is discrete, making regulatory risk driven more by the inability to rule out exceedances with sufficient confidence than by expected contaminant levels.

The central problem exporters therefore face is the risk of exceedance, especially since processing has a limited effect on contaminant concentrations. This means that compliance adjustments must diverge from standard manufacturing responses such as marginal process improvements or incremental quality upgrades, since improving the mean concentration is no longer sufficient, turning compliance into a value-at-risk problem that forces suppliers to decide where to absorb risk within the chain. Because testing is conducted on sampled lots instead of the full shipment, exporters face both natural within-lot variability and measurement errors, where a single measurement above the limit can invalidate an entire batch (Ramsey & Rostron, 2024). This creates an incentive for both producers and buyers to operate well below the legal maximum, even when average levels would otherwise comply, introducing a buffer driven by sampling uncertainty, biological variability, and the discrete cost of rejection (Shimshack & Ward, 2008).

Suppliers are thus forced to choose a safety margin that minimises the sum of precaution costs and expected rejection losses, a standard threshold-under-uncertainty problem. When non-compliance is binary but costly, the optimal strategy is therefore to reduce the probability of rejection rather than to target the legal limit.

Thresholds and Sourcing Decisions

A natural objection is that exporters might simply divert higher-cadmium cocoa to less-regulated markets. However, this would only work if supply chains could be segmented cleanly and cheaply, and if downstream buyers were confident that cocoa would never re-enter stricter jurisdictions through resale, blending, or further processing. In practice, once beans are pooled into bulk supply chains, the eventual destination of the final product becomes difficult to guarantee. This means that "non-EU" cocoa may still carry regulatory risk if later incorporated into products sold under EU limits. The strictest standard, therefore, continues to shape sourcing decisions upstream, because it is the strictest threshold to meet once the commodity becomes standardised.

As a result, suppliers operate further below the limit, since it does not change the product itself but reduces the probability that measurement noise or natural variability pushes a shipment over the threshold. This shifts the supplier's focus from marginal quality optimisation to risk control via more conservative sourcing, more frequent testing, and tighter input segregation (Shimshack & Ward, 2008).

Fixed Costs, Market Structure, and Supplier Sorting

Treating compliance in this way, therefore, turns contaminant regulation into a fixed-cost problem which requires upfront investment that does not scale linearly with output (Ferro, et al., 2013). This is because these costs are largely incurred per supplier or per supply chain - through laboratory access, traceability systems, and supplier validation, for instance - rather than per tonne of cocoa (Ferro, et al., 2013). Access to regulated markets therefore entails substantial fixed costs without necessarily improving product quality or permitting higher prices. This means that they disproportionately affect smaller suppliers and intermediaries, as larger establishments can spread testing infrastructure and rejection risk across higher volumes (Ferro, et al., 2013). Consequently, what initially appears to be a technical solution is actually an organisational response to a regulatory risk that adds to the significant fixed-costs of compliance.

One way in which firms manage this is through international bean mixing, where risk is reallocated across batches to keep measured cadmium concentrations below the legal cutoff by combining cocoa from different regions without removing the contamination or reducing the biological variability (Vanderschueren, et al., 2021). However, to effectively dilute the cadmium concentration, exporters require access to a low-cadmium supply, which may need separate storage and logistics, as well as reliable, repeated testing and the ability to segregate and track inputs across consignments, which further increases fixed costs.

As a result, these high additional operational costs of up to 20 % translate into structural differences in market participation, since they shift sourcing away from heterogeneous suppliers toward fewer, larger, and more geographically selective ones, even when underlying contaminant distributions overlap (CIAT, 2023; Ferro, et al., 2013). For suppliers unable to absorb such fixed compliance costs, it can become more feasible to exit regulated markets rather than adjust to them, because when variability cannot be reduced sufficiently, and testing cannot be scaled, continued participation becomes too risky relative to expected returns, even if mean contaminant levels are comparable to those of compliant producers (Ferro, et al., 2013). Access to tightly regulated markets is therefore retained by a narrower set of large suppliers, while others are redirected toward less stringent destinations with weaker enforcement or different product requirements, or excluded from export altogether (Ferro, et al., 2013).

This supplier concentration then feeds back into how sourcing decisions are made by importers, where rather than evaluating individual consignments in isolation, large buyers increasingly screen origins using geological mapping, historical test data, and long-term averages to avoid re gions associated with higher cadmium uptake (CIAT, 2023; Vanderschueren, et al., 2021). These filtering practices are then combined with blending to manage uncertainty, and with long-term contracts that reduce spot-market volatility and stabilise supply (CIAT, 2023). Because larger organisations have more substantial economies of scale and bargaining power, these strategies allow them to manage regulatory risk more effectively than smaller organisations (Trebbi, et al., 2023). However, when none of these strategies are feasible, sourcing is avoided by organisations altogether, producing a reconfiguration in which some regions remain integrated into tightly regulated markets while others are screened out (CIAT, 2023).

This supplier segregation is reinforced by downstream industries that operate under even stricter impurity constraints, such as pharmaceuticals and nutraceuticals (Committee for Medicinal Products for Human Use, 2022; Loke, et al., 2024). Although these sectors only account for a small share of total cocoa volumes, they impose contaminant tolerances that are much lower and less tolerant of uncertainty (Committee for Medicinal Products for Human Use, 2022; Government of the Netherlands, 2024). Cocoa-derived inputs that can reliably clear these standards therefore remain eligible for a wider set of higher-margin applications, while raw materials that only narrowly meet the food-grade limits become confined to fewer markets (Ferro, et al., 2013). Because access to these applications requires a separate supplier validation and consistency over time, uncertainty becomes especially costly and may foreclose downstream options that are otherwise more stable and less price volatile, further encouraging conservative sourcing decisions (European Commission Health and Consumers Directorate-General, 2013).

This changes how risk is priced and absorbed across the supply chain, since access to inputs that meet stricter impurity expectations consistently often comes at a premium that reflects the reduced regulatory risk for the final manufacturer instead of higher intrinsic quality (Shapiro, 1983). This helps justify the fixed costs of conservative sourcing and extensive testing for suppliers that can meet these standards. Producers excluded from these segments therefore face a narrower set of buyers, greater exposure to spot-market fluctuations, and weaker bargaining positions, even in food markets where their product would otherwise be acceptable, illustrating how regulatory eligibility translates directly into stability and pricing power (CIAT, 2023; Ferro, et al., 2013; Trebbi, et al., 2023). This, therefore, effectively creates a two-tier market consisting of a low-variance, compliance-credible supply segment with better margins, and a residual segment that is more volatile and more price-discounted.

Broader Implications

Throughout this analysis, the case of cocoa illustrates a broader mechanism that is not crop-specific and applies whenever contamination is biologically embedded, variability cannot be engineered away, and regulation is enforced through hard thresholds rather than continuous targets. In such settings, compliance reshapes markets by sorting suppliers in advance, amplifying differences that originate in geography, soil composition, or environmental exposure rather than in effort or efficiency, which contrasts with the intuition that higher efficiency translates into improved market access or margins.

Rules intended to protect safety do not merely constrain product sales; the way those rules are enforced determines where market adjustment is possible. When enforcement relies on discrete thresholds applied under uncertainty, problems cannot be corrected gradually downstream and must instead be avoided in advance. Consequently, regulation operates upstream by reshaping sourcing decisions before processing or trade commitments are made. This makes compliance a condition for participation in regulated markets rather than a target that firms can approach incrementally. The policy trade-off is therefore not only safety versus cost, but safety versus market structure, where tighter thresholds reduce consumer exposure and potentially ensure their safety, but shift market power toward firms that can finance testing, blending, and rejection risk, while pushing high-variance origins into weaker markets. What appears as a technical contaminant limit can therefore carry distributional and strategic implications that extend much beyond the product it regulates. Threshold-based safety regulations therefore do more than protect consumers; they also reorganize who can participate in global markets in the first place.

Conclusion

This essay has argued that the economic consequences of contaminant regulation depend not only on the level of a regulatory threshold, but also on how contamination enters the production process. When contaminants are biologically embedded in agricultural commodities, they cannot be removed through downstream processing, making compliance with threshold-based regulation a problem of managing the probability of exceedance. Under these conditions, firms respond by relying on more conservative sourcing, extensive testing, and input segregation to reduce regulatory risk.

As the case of cadmium regulation in cocoa demonstrates, this dynamic transforms contaminant limits from a product standard into a condition for market access. Although such regulations are designed to improve product safety, they can also reorganise supply chains by favouring suppliers capable of controlling contaminant variance and absorbing the fixed costs of compliance. Understanding this mechanism is therefore important for evaluating how safety regulations affect not only consumer protection, but also supplier participation in global agricultural markets.

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From Brain Drain to Brain Chain: Migration and Institutional Change in Developing Countries

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"This study investigates the long-term implications of the commonly cited phenomenon of "brain drain" and assesses whether it contributes to lower levels of corruption through channels such as remittance inflows, diaspora engagement, and the diffusion of democratic norms. Employing a fixed-effects regression framework with panel data drawn from the Corruption Perceptions Index and the World Bank, the analysis identifies a positive and statistically significant association between remittance inflows and CPI scores. However, no direct statistically significant relationship is found between the extent of brain drain and corruption levels. These findings suggest that while skilled emigration does not exert a direct effect on corruption, it may generate indirect governance benefits through increased remittance flows. These results carry important governance and development considerations, particularly with regard to strengthening institutional linkages with diaspora communities and expanding formal remittance channels to enhance transparency and developmental impact."

Introduction

This project investigates the long-term institutional consequences of emigration, focusing on how brain drain and remittances influence corruption levels in migrant-sending countries. The main contribution of this study lies in empirically testing whether the emigration of skilled labour, often considered a developmental loss, can indirectly reduce corruption through channels like remittances, exposure to democratic norms, and political engagement from abroad. The central research question is: Does brain drain ultimately reduce corruption in sending countries over time? Specifically, I test the hypothesis that brain drain, through its association with increased remittances and international exposure, contributes to improved governance, as measured by lower corruption levels.

This question is relevant and timely. With global migration on the rise, understanding the political and institutional effects of emigration is crucial for policymakers in both origin and destination countries. While conventional wisdom often frames brain drain as a purely negative phenomenon, a growing body of literature suggests that the diaspora may play a constructive role in improving institutional quality. Yet, empirical evidence remains mixed, and few studies have directly examined the link between brain drain and corruption.

Background, Motivation, and Literature Review

The migration of skilled individuals, commonly referred to as brain drain, has long been a topic of concern for developing countries. As high-skilled workers such as doctors, engineers, and academics leave their home countries in search of better opportunities abroad, concerns arise over lost human capital and weakened public institutions. Yet migration also brings significant potential benefits, notably in the form of remittances, diaspora engagement, and possible norm diffusion from emigrants exposed to better governance systems. In recent years, economists have begun to examine how these opposing forces interact with one of the most persistent barriers to development: corruption. Corruption has been widely documented as a major push factor behind emigration. High levels of corruption erode trust in public institutions, limit economic opportunities, and undermine the rule of law, all of which make emigration a rational choice for skilled individuals. At the same time, the exodus of talent can further hollow out domestic institutions, allowing corruption to become more entrenched. Alternatively, some scholars argue that emigration and its associated remittances might empower reform-minded citizens, weaken patronage networks, or expose governments to external accountability from the diaspora.

Understanding how these dynamics unfold is particularly important for countries experiencing both high brain drain and persistent governance challenges. This research is motivated by the need to better understand the two-way relationship between skilled migration and institutional quality, especially corruption. By focusing on a panel of developing countries, this study explores whether emigration of skilled workers exacerbates corruption or helps reduce it through remittances, diaspora pressure, and changes in the domestic political economy. The project also investigates how exposure to conflict and weak governance may alter the effects of brain drain, using both fixed-effects estimation and instrumental variable strategies. The theoretical foundations of brain drain lie in the work of Bhagwati and Rodriguez (1975), who argued that skilled emigration imposes a welfare loss on source countries, particularly when public investments in education are not recouped. In contrast, more recent models suggest that the prospect of emigration can stimulate educational attainment at home. Beine, Docquier, and Rapoport (2001) propose a "brain gain" mechanism, showing that expected migration can incentivize non-migrants to invest in their human capital. These insights are echoed in Shrestha (2017), who finds that Nepalese youth increased their educational investment in response to anticipated migration opportunities, even if they did not migrate themselves.

A growing body of empirical work links corruption to higher emigration rates, particularly among the educated. Dimant, Krieger, and Meierrieks (2013) show that countries with high corruption levels experience greater emigration of skilled workers. Similarly, Poprawe (2015) uses a gravity model of migration and finds a robust positive relationship between corruption and out-migration.

These studies suggest that corruption can act as a powerful push factor, leading to a drain of talent from institutions that are most in need of reform. Conversely, scholars have explored how migration and remittances can shape institutional outcomes in origin countries. This idea of "norm transmission" suggests that the diaspora may promote better governance indirectly. Mariani (2007) presents an argument, positing that emigration can reduce the political influence of corrupt elites by providing an external escape valve and encouraging reform.

However, the effects of remittances on corruption are more contested. Ahmed (2013) finds that remittances can actually reduce citizen demand for accountability, weakening incentives for governments to govern transparently. By providing an alternative source of income, remittances may decrease reliance on public services and allow governments to avoid necessary reforms. This introduces a potential moral hazard, especially in countries with weak institutions.

Abarcar and Theoharides (2024) provide sector-specific evidence on how migration affects domestic institutions. Studying U.S. visa policies for Filipino health workers, they find that changes in migration opportunities affect not only labour markets but also educational investment and health sector capacity. While not focused specifically on corruption, their results suggest that losing skilled professionals can strain essential services, potentially opening the door to mismanagement or corruption in sectors already vulnerable.

Finally, the intersection of conflict, brain drain, and governance is also relevant. In fragile states, war and political instability often drive both migration and corruption, creating a feedback loop where skilled individuals flee, leaving behind weakened institutions. Introducing a conflict dummy variable can help account for these contextual differences in empirical analysis.

In summary, the literature suggests a complex and often contradictory relationship between skilled migration and corruption. While brain drain can reflect institutional failure, it can also act as a catalyst for reform through remittances, diaspora influence, and norm transmission. The net effect likely depends on country-specific factors such as political institutions, the scale and composition of emigration, and the extent of diaspora engagement. This research seeks to contribute to this growing field by combining cross-country data with policy-relevant empirical strategies.

Data and Empirical Strategy

To answer the research question, I estimate the following fixed-effects panel regression model:

$$CPI_{it} = \beta_1 BrainDrain_{it} + \beta_2 Remittances_{it} + \beta_3 GDPpc_{it} + \beta_4 Democracy_{it} + \beta_5 Education_{it} + \alpha_i + \epsilon_{it}$$

Where:

• **Dependent Variable:** Corruption Perceptions Index (CPI), where higher scores imply lower levels of perceived corruption.

• **Independent Variables:**

  • **BrainDrain:** Emigration rate of skilled workers

  • **Remittances:** Remittances as a percentage of GDP

  • **GDPpc:** GDP per capita (control for economic development).

  • **Democracy:** Democracy index (to capture political institutions).

  • **Education:** Average years of schooling (to control for human capital levels).

A fixed effects panel regression model is used here to control for unobserved, time-invariant country characteristics, such as legal traditions, colonial history, and cultural attitudes towards governance, that could simultaneously influence corruption and migration (Treisman, 2000). This ensures the estimated effects reflect within-country changes over time rather than cross-country differences.

Following Mariani (2007), I hypothesize that both remittance and brain drain reduce corruption by transmitting democratic norms and strengthening social accountability. Diaspora networks can pressure home governments towards reform through remittances, civic engagement, and exposure to better governance abroad (Beine et al. 2001). However, consistent with Ahmed (2013), remittances might also weaken accountability if they reduce citizens' dependence on public services. The effects of GDP per capita and education are therefore expected to vary depending on institutional strength (Mauro, 1995), highlighting the importance of contextual factors in shaping these relationships.

To address potential endogeneity, particularly reverse causality where low corruption might attract more remittances, I use an instrumental variable (IV) approach, instrumenting remittances with the democracy index. This assumes that while democracy affects remittances (via migrant trust and transaction channels), it does not directly affect corruption in the short-run once other controls are included. This assumption is supported by Treisman (2000) and Knutsen (2013), who find that democracy's direct short-term effect on corruption weakens once economic and institutional factors are controlled for, suggesting that democracy primarily influences corruption indirectly, through economic channels like remittances.

The dataset is a balanced panel of 13 countries observed over 78 years, yielding 1,014 total observations

Results and Interpretation

Table 1: Fixed-Effects (Within) IV Regression Results

Variable	Coef.	Std. Err.	z	P> $\|z\|$	95% Conf.	Interval
Remittances	-1.218	0.982	-1.24	0.215	-3.144	0.707
Brain Drain	2.50e-06	4.54e-06	0.55	0.583	-6.41e-06	0.0000114
GDP per capita	-0.0002	0.0000453	-3.69	0.000	-0.0003	-0.0001
Education	0.417	0.423	0.99	0.324	-0.411	1.246
Constant	48.592	5.540	8.77	0.000	37.733	59.450

Number of obs = 1,014 Number of groups = 13
Wald chi2(4) = 3319.45 Prob > chi2 = 0.0000
corr(u_i, Xb) = -0.0641
$\sigma_u = 2.942$ $\sigma_e = 25.548$ $\rho = 0.013$
Instrumented: Remittances
Instruments: Brain Drain, GDP pc, Education, Democracy

The fixed-effects regression results indicate that remittances are positively and significantly associated with the Corruption Perceptions Index (CPI), with a coefficient of 0.80 and a p-value less than 0.01. This suggests that as remittances increase, perceived corruption decreases, supporting the idea that financial flows from abroad can enhance governance. Remittances may exert a disciplinary effect on governments by increasing external scrutiny or by empowering citizens with greater financial independence to demand accountability.

In contrast, the coefficient for brain drain is positive but not statistically significant, suggesting that the emigration of skilled workers does not have a robust direct relationship with corruption. This implies that if brain drain does influence institutional quality, its effects may operate indirectly- perhaps through increased remittances, democratic exposure, or transnational networks rather than through the loss of human capital alone. The insignificant coefficient likely reflects the competing mechanisms identified in the literature. Bhagwati and Rodriguez (1975) predict that skilled emigration worsens institutional quality by depleting human capital, while Mariani (2007) highlights offsetting positive effects via diaspora-driven governance reform. The absence of a clear effect may thus reflect the tension between these opposing forces within different country contexts.

When the analysis shifts to an instrumental variable (IV) approach, using democracy as an instrument for remittances, the results become more ambiguous. The coefficient on remittances turns negative and remains statistically insignificant (–1.22, p = 0.215). The negative, insufficient coefficient on remittances in the IV specification may indicate that the baseline positive relationship was driven by reverse causality, where countries with lower corruption attract more remittances. Alternatively, as Ahmed (2013) suggests, remittances might, under certain conditions, weaken citizens' incentives to demand transparency, leading to divergent effects across model specifications.

Interestingly, GDP per capita becomes significant and negatively associated with corruption in this specification, suggesting that wealthier countries tend to experience lower levels of perceived corruption. These shifts indicate that the relationship between remittances and corruption may be sensitive to model specification, and that endogeneity remains a challenge in identifying clean causal effects.

Policy Implications

Overall, these mixed findings suggest that while diaspora engagement, particularly through remittances, may support improvements in governance, the broader effects of brain drain are more nuanced. Rather than being inherently detrimental, brain drain's impact depends heavily on how migrants remain connected to their home countries. Per Bhagwati and Rodriguez (1975), talent exodus risks entrenching corruption via depleted bureaucracies; yet Mariani (2007) highlight countervailing norm transmission and political pressure when migrants "voice" transnationally, echoing Hirschman's (1970) exit-voice tradeoff where emigration substitutes domestic reform pressure with external accountability.

This duality underscores policy opportunities for migrant-sending governments: actively harness brain drain as "brain circulation" through institutional linkages and formal channels. Diaspora engagement policies have evolved over decades, from early 19th-century consular protection (e.g., Mexico's Secretariat of Foreign Affairs, est. 1821) to post-1980s investment-focused strategies amid globalization. (Gamlen, 2023)

India exemplifies this institutional success: since the 1990s Pravasi Bharatiya Divas conferences and Ministry of Overseas Indian Affairs (2008, now External Affairs integration), policies like Overseas Citizenship of India (OCI, 2005) offer visa-free travel and property rights, boosting FDI by $78B (2019) and technology transfers via skill return programs (Kapur, 2010)(ICMPD,2021). Mexico pioneered 3x1 matching grants (1986), where federal/local funds triple migrant remittances for infrastructure, evolving from 1990s hometown associations to IME (Institute for Mexicans Abroad, 2003) for voting rights abroad, correlating with governance gains in remittance-heavy states.

The Philippines' LINKAPIL (1989) and diaspora bonds channel funds transparently, while Ethiopia's 2013 Diaspora Agency (modeled on India) promotes returnee incentives, yielding skilled repatriation and advocacy amid conflict. Ireland's Global Irish Network (2015) leverages historic emigration waves for economic diplomacy, and Armenia's 1990s Office of Diaspora fosters post-Soviet reintegration via cultural grants. (Gamlen, 2006)

Emerging ideas include tax incentives on repatriated earnings, diaspora voting (e.g., Mexico's absentee ballots since 2005), and digital platforms for norm diffusion. Yet pitfalls loom: weak states risk elite capture of funds (Ahmed, 2013 moral hazard), as in Lebanon's informal networks post-2019 crisis despite remittances at 40% GDP. (ICMPD,2021)

Therefore, policymakers should prioritize capacity-building, formal banking, anti-corruption safeguards, civil society partnerships, to tilt brain drain toward governance dividends, amplifying your results' indirect benefits.

Possible Extensions

There are several promising avenues for extending this research that could help unpack the mechanisms underlying the relationship between emigration, remittances, and corruption. One important direction involves disaggregating the concept of remittances. Existing data often lumps together formal and informal remittance flows, yet these may have very different institutional implications. Formal remittances, which are funneled through banks or licensed money transfer organisations, are more easily monitored, taxed, and incorporated into the formal economy. In contrast, informal channels may bypass state institutions altogether, potentially weakening the governance-enhancing effect of these financial flows. A deeper investigation into how these different remittance channels interact with corruption would allow for more precise policy recommendations, particularly regarding financial regulation and diaspora engagement strategies.

Another valuable extension involves addressing the temporal dynamics of emigration's institutional effects. Migration-related phenomena are rarely instantaneous in their impact; it is plausible that remittances or exposure to democratic norms abroad take time to translate into changes in domestic governance. Employing dynamic panel data techniques, such as Arellano-Bond estimators, would allow future research to explore the possibility of lagged effects. This could reveal whether short-term remittance inflows are merely palliative or whether they gradually help build institutional capacity and reduce opportunities for rent-seeking over time.

A further methodological refinement would be to improve the identification strategy for brain drain by employing stronger instruments. While the current analysis uses democracy as an instrument for remittances, the endogeneity of skilled emigration remains a challenge. Historical colonial ties, linguistic affinities, or geographic proximity to major destination countries could serve as more exogenous sources of var-iation in emigration patterns. These instruments have been fruitfully used in other strands of the migration literature and could help isolate the causal effect of skilled labour loss on corruption outcomes more convincingly.

Additionally, interaction terms offer a means to explore whether the effects of remittances or emigration are conditional on domestic political structures. It is plausible, for example, that remittances are more effective in reducing corruption in countries with democratic institutions, a free press, or a relatively vibrant civil society. These contexts may allow financial inflows from abroad to empower citizens and watchdog organisations, thereby enhancing their ability to hold public officials accountable. Including interaction terms between remittances and political or institutional variables could shed light on these conditional effects and help explain the mixed empirical findings observed across different countries.

Conclusion

This paper set out to answer whether skilled emigration and remittances from abroad mitigate or exacerbate corruption in migrant-sending countries.In sum, this study provides preliminary but suggestive evidence that remittances, more than emigration per se, are associated with reductions in perceived corruption. Using panel data and fixed-effects models, it finds a robust positive relationship between remittance inflows and the Corruption Perceptions Index, suggesting that diaspora engagement can serve as a conduit for improved governance. However, brain drain, as measured by the emigration of skilled workers, does not show a statistically significant effect, raising questions about the direct institutional consequences of talent flight. The instrumental variable analysis adds further nuance, casting some doubt on the causal interpretation of remittances' anti-corruption effects and highlighting the need for better identification strategies.

Despite the contributions of this study, several limitations remain. Endogeneity is an ongoing concern, particularly in the IV framework, where the chosen instruments may not be entirely exogenous. The relatively small number of countries included in the sample also constrains the generalisability of the findings. Moreover, the possibility that unobserved cultural or institutional traits, such as trust in public institutions or the strength of informal networks, confound the observed relationships cannot be ruled out. These factors suggest that while the results are suggestive, they should be interpreted with caution.

Nevertheless, the analysis makes a meaningful contribution to a growing body of literature that reconsiders the role of migration in institutional development. Rather than viewing brain drain as a purely negative phenomenon, it encourages a more differentiated perspective, one that distinguishes between the loss of human capital and the broader patterns of transnational engagement that migration enables. By examining how diaspora resources and influences interact with domestic governance, this study opens up fertile ground for further empirical inquiry into how global mobility shapes political and institutional outcomes in migrant-sending states.

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BEYOND "WHAT WORKS": THE LIMITS OF GENERALISATION IN DEVELOPMENT POLICY

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"This essay examines the limits of generalisation in development policy and argues that policy failure often stems from extending findings derived in specific contexts to dissimilar environments without adequate consideration of contextual differences. Reinterpreting the aid debate, it contends that both pro and anti-aid positions rely on selective empirical cases while overlooking the locally binding constraints that shape outcomes on the ground. Moving beyond this ideological divide, the analysis adopts a diagnostic approach, drawing on clusters of Randomised Control Trials (RCTs) in health, education, and agriculture that test widely accepted policy principles. By comparing how these generalisations perform across diverse contexts, the essay identifies recurring frictions that condition effectiveness. These include information asymmetries, unequal access to inputs, liquidity constraints and behavioural nuance. From these findings, the analysis develops a limited pre-check framework intended to guide policy design prior to large-scale implementation and investment. The central implication is that effective development interventions require systematic assessments of local constraints, rather than reliance on universal models or abstract policy heuristics"

Introduction

Development Policies are frequently formulated at a distance from the environment in which they are implemented, drawing either on empirical findings that promise scalability or on economic models that offer theoretical coherence. This distance encourages abstraction as policymakers are incentivised to optimise certain metrics or to fit diverse contexts into generalised frameworks of poverty. Yet poverty is not experienced in the abstract. It is shaped by locally specific norms, institutional arrangements and behavioural nuances that resist their generalisation into a single model. When policy design substitutes assumed constraints for the nuance that actually applies in specific settings, interventions risk targeting the wrong margin entirely. Consequently, well-intentioned programs can underperform or fail, not due to insufficient investment, but because the generalised assumptions underpinning them misrepresent how poverty is lived and navigated on the ground.

An illustration of this phenomenon can be seen in the distribution of insecticide-treated bed nets in Kenya. A common generalisation in development policy posits that some degree of cost-sharing improves the utilisation of health products by screening out low-valuation recipients and encouraging responsible utilisation. However, evidence from rural Kenya— where prenatal clinics were distributing insecticide-treated bed nets to pregnant women — shows that this logic did not hold in practice, as charging even modest prices substantially reduced overall uptake, while households that received nets for free were just as likely to use them once acquired (Cohen and Dupas, 2010). Crucially, this does not imply that cost-sharing is inherently ineffective as a policy tool. In alternative contexts, such as those with different geographies, cultures or information environments, the same generalisation may plausibly hold. The disconnect in this case arose not from the principle itself, but from its incompatibility with the specific locally binding conditions of the participants in the Randomised Controlled Trial (RCT).

This essay builds on this insight by examining evidence from RCTs across the health, education and agriculture sectors in the developing world. The aim is not to identify universally 'effective' policy recommendations, but to analyse instances where generalised policy ideologies diverge from context-specific experimental findings. This analysis aims to propose practical pre-checks for policymakers, an assessment of whether commonly observed contextual barriers identified in RCTs are present before implementing high-cost, scalable development policies that risk overlooking local nuance. These tensions between generalised policy logic and context-specific realities sit at the core of the long-standing aid debate in development economics, a literature that relies on similarly broad assumptions about how poverty is experienced and alleviated.

Generalisation at Scale: The Aid Debate Revisited

The aid debate in development economics literature is often presented as a disagreement over whether large-scale external investment can meaningfully alleviate long-term poverty or persistent poverty traps. At a deeper level, however, it reflects a fundamental dispute over the external validity of generalising context-specific evidence into broad policy prescriptions. Both proponents and critics of aid draw on empirical outcomes from particular settings to support opposing claims about how poverty traps operate and how they should be addressed across the developing world.

This divergence is evident in the contrast between country-specific successes and aggregate aid outcomes. While targeted interventions supported by aid contributed to substantial post-conflict recovery in contexts such as Rwanda, meta-analyses of cross-country evidence suggest that there is little systematic relationship between aid volumes and long-run prosperity (Banerjee and Duflo, 2011). The coexistence of these findings does not imply that aid is categorically effective or ineffective, but rather that outcomes hinge on locally binding constraints that are obscured when evidence is aggregated or generalised.

The "Big Push" and Its Limits: Sachs and the Millennium Villages

Jeffrey Sachs' contribution to the aid debate is grounded in the argument that extreme poverty persists because households and economies are trapped below critical thresholds of wealth. In his work The End of Poverty, Sachs contends that in environments characterised by poor health, weak infrastructure and low agricultural productivity, marginal interventions are insufficient to generate long-term, self-sustaining growth. Instead, he argues for a coordinated "big push" in external investment. This framework motivated the Millennium Villages Project (MVP), launched in the mid-2000s as a proof-of-concept for development at scale. The MVP aimed to demonstrate that concentrated investments across health, education, agriculture and infrastructure could deliver rapid and measurable improvements in welfare within the timeframe of the Millennium Development Goals. By standardising a multi-sector intervention package across selected rural sites in Sub-Saharan Africa, Sachs sought to show that long-term poverty traps could be permanently alleviated (Sachs, 2005, pp. 228-245).

Later analyses of the Millennium Villages Project highlight the difficulty of drawing consistent inferences even across villages in a single country. In their analysis, Mitchell et al. employ matching techniques to compare MVP sites with non-intervention areas that are similar across a range of baseline characteristics, including various agricultural conditions, climates, access to markets and other key indices. Balance diagnostics reveal differences in key variables, which may well be the determinative factors that decide whether a specific intervention succeeds in a given area. In Senegal, for instance, treatment and control villages differ in baseline asset indices; in Mali, soil composition remains unevenly matched; and in Ghana, systematic differences in elevation exist between the treatment and control villages (Mitchell et al., 2018, pp.14-16). These factors are not insignificant but rather represent core structural constraints which shape agricultural productivity, health outcomes and income-generating capacity. As a result, even when interventions are identical in design, the environments in which they operate differ in ways that fundamentally affect outcomes. This unobserved heterogeneity makes it difficult to interpret observed impacts as transferable policy effects, reinforcing the challenge of generalising development successes across locations with varying structural conditions.

Aid against Pessimism: When Targeted Interventions Succeed

On the other side of the aid debate, William Easterly argues in his 2006 work, The White Man's Burden, that foreign aid often undermines local institutions and fails to generate sustained development. While this critique does hold in many contexts, it is unclear whether it can be applied as a general principle. Evidence from targeted, well-designed interventions demonstrates that aid can produce lasting improvements when it directly addresses binding constraints faced by the poor. For example, six similar randomised control trials conducted across ultra-poor villages in Ethiopia, Ghana, Honduras, Pakistan, India and Peru found significant improvements in eight out of ten welfare indices measured, particularly in income and consumption, with gains persisting at least one year after the intervention ended. (Banerjee et al., 2015). Taken together, the aid debate reveals less a disagreement over evidence than a shared tendency to over-generalise from it. Pro-aid arguments often extrapolate successes achieved under specific local conditions into universal policy prescriptions, overlooking the contextual factors that made those outcomes possible. Conversely, anti-aid critiques frequently elevate failed or poorly designed interventions into sweeping claims about the ineffectiveness of aid as a whole, despite credible evidence of sustained success in targeted settings. The central lesson is therefore that aid's effectiveness is contingent on whether interventions are aligned with locally binding constraints, a nuance obscured when development policy is argued in absolutes rather than contexts.

From Ideological Debate to Empirical Diagnosis

Having established the limits of broad generalisations, the question arises as to how development policy should be reformulated. Heuristics and stylised models remain useful for organised thinking, but the aid debate illustrates the costs of extending them beyond the contexts from which they are born. Rather than asking whether particular interventions 'work' in general, a more productive approach is to examine how and why results vary across settings. Therefore, this section turns to evidence from RCTs across health, education and agriculture, not to extract universal policy prescriptions, but to identify recurring locally binding constraints, both anticipated and unexpected, that significantly shape outcomes. Crucially, the aim is not to elevate these patterns into new generalisations. Instead, they are proposed as a deliberately limited, non-comprehensive pre-check for policymakers. Specifically, it offers a diagnostic tool to assess whether commonly observed contextual frictions are present before committing to large-scale investments that risk underperforming when local nuance is overlooked.

Rather than surveying a wide range of unrelated interventions, this section organises the analysis around a small number of commonly invoked policy generalisations within the sectors of health, agriculture, and education. For each sector, this section examines a set of RCTs that test variations of the same underlying principle, such as cost-sharing versus free provision in health, as referenced in the introduction. This allows the analysis to focus on how a single generalisation performs across different local settings, and to identify which contextual constraints repeatedly influence its efficacy. From these identifications, the analysis aims to derive a limited policy pre-check: not a binding rule for implementation, but a structured way for policymakers to assess whether a given general principle is likely to hold in a specific context.

Health: When Cost-Sharing Helps, and When It Hurts

For health goods whose effectiveness depends on consistent use by recipients, cost-sharing has often been the preferred means of distribution. Standard arguments suggest that prices screen out individuals unlikely to use the product (Oster, 1995) and may signal higher quality, increasing utilisation among purchasers (Riley, 2001). However, evidence from Cohen and Dupas' study of insecticide-treated bed net distribution challenges these assumptions. They found that individuals who received bed nets for free were no less likely to use them than those who paid a positive price, and that cost-sharing did not induce higher take-up among those who stood to benefit most. The failure of cost-sharing to improve use in this context reflects a locally specific constraint, namely, that information asymmetries were largely absent. This was due to the large-scale advertising of the benefits of ITNs carried out by the Kenyan Government in the years leading up to the intervention. In this setting, low prices did not signal low quality, undermining a key mechanism through which cost-sharing is expected to operate. This illustrates how a widely accepted policy generalisation can fail when its underlying assumptions do not align with local informational conditions.

In contrast, evidence from settings with weaker information environments suggests that cost-sharing can improve use. For example, a study investigating the distribution of chlorine for water purification in Zambia found that, while higher prices reduced overall take-up, households that paid for access were more likely to use the product (Ashraf et al., 2010). In this context, prices appear to have functioned as a screening device in an environment where widespread information and salience were less established. Contrasting this outcome with the Kenyan bed-net case highlights a key policy pre-check for health interventions: That, prior to adopting cost-sharing, policymakers should assess whether information asymmetries are present, and if they are, they should push for advertisements highlighting the importance of the intervention before it gets implemented. They should note that where knowledge regarding the intervention is already widespread, cost-sharing risks excluding users without improving utilisation and when it is not, cost-sharing may play a more productive role, provided the option of spreading the knowledge to begin with is unfeasible.

Education: The Textbook Generalisation

Education policy in developing countries is often shaped by the findings which show that large-scale investment in general education inputs has resulted in significant inefficiencies and waste (Hanushek, 1995). Other studies point to evidence that investment in targeted non-teacher inputs, especially textbooks and reading materials, can substantially improve learning outcomes. Research conducted in Brazil, for instance, has found that the provision of textbooks and reading materials increased test scores by between one-third and one-half of a standard deviation, with similar gains observed following the introduction of libraries in Indonesia, Trinidad & Toba go, and Venezuela (Fuller & Clarke, 1994). However, evidence from another context illustrates once again how generalisations can fail when fundamental local issues are ignored. Glewwe, Kremer and Moulin (2009) evaluate a programme providing free textbooks to primary schools in Kenya, finding no improvement in test scores among most students, with gains restricted to those who were already high performing. Rather than stemming from an ambiguous or a hard-to-detect mechanism, the issue here was that the textbooks were written in English, which for most pupils was a third language; by Grade 3, only 15 per cent of students were able to read their new textbooks, increasing to just 29per centt in Grade 4 (Glewwe et al., 2009). Overlooking such a basic constraint, namely the distribution of English-language materials in classrooms where the majority of students could not understand the language, shows a severe misalignment between policy design and local educational reality. In this example, the failure of the intervention was not accidental, but a predictable consequence of abstracting away from how students actually engage with learning materials.

This case highlights a critical limitation of generalising education policy across contexts. Inputs that improve learning in one environment are likely to be ineffective in another when foundational constraints are ignored. The resulting policy pre-check is therefore non-negotiable: before scaling input-heavy education interventions, policymakers must ensure that these inputs are accessible to all students and can be meaningfully appreciated within the local learning environment.

Agriculture: Getting the Details Right - The SAFI Programme

In agricultural development economics, fertiliser is regarded as a key determinant of productivity and yield growth. Differences in fertiliser adoption are cited as an explanation for the rapid increase in agricultural output observed in parts of Asia, in contrast to persistently low yields across much of sub-Saharan Africa (Kelly et al., 2007). As a result, many governments in the developing world have invested heavily in fertiliser subsidy programs, and expenditures have even reached up to 2% of GDP in countries such as Zambia (World Bank, 2007).

Evidence from Western Kenya illustrates the practical difficulties with the actual uptake of fertiliser by rural farmers. Duflo, Kremer and Robinson (2011) find that fertiliser adoption remained low despite high estimated returns. Only 40 per cent of farmers in their sample had ever used fertiliser, yet this was not because they believed it to be ineffective. Rather, farmers cited liquidity constraints, the need to save in advance, and behavioural frictions such as procrastination were also noted. Although 97.7 per cent of farmers participating in demonstration plots expressed an intention to use fertiliser, the following season, only 36.4 per cent ultimately did so. Physical access was also an issue as farmers had to walk an average of 30 minutes to reach the nearest fertiliser market. To address these locally binding constraints, the authors introduced the SAFI programme, which offered free delivery at harvest and required farmers to make an on-the-spot purchase decision. By directly targeting timing, liquidity and procrastination, the intervention increased fertiliser adopt-ion by 11.4 to 14.3 percentage points (Duflo et al., 2011). This case exemplifies how effective development policy should be designed, not by relying on general principles in isolation, but by first identifying and specifically addressing local constraints that prevent otherwise productive investments from being adopted.

Policy Implications:
A Pre-Check Framework For Thoughtful Development Policy

The contribution of this essay has been to move beyond critique and extract a limited set of practical policy pre-checks:

In health, evidence from bed-net and water-treatment interventions suggests that decisions around cost-sharing must be preceded by an assessment of on-the-ground information environments. Where knowledge and salience are already high, prices risk excluding users without improving utilisation, and where they are not, cost-sharing may play a screening role.

In education, the Kenyan textbook case illustrates a non-negotiable pre-check: educational inputs must be equally accessible and usable by all students. Overlooking disparities in language proficiency or foundational skills risks channelling investment towards those already advantaged. In agriculture, evidence from fertiliser adoption highlights the importance of diagnosing behavioural, liquidity and access constraints before resorting to large subsidies. Interventions should first assess whether farmers are constrained by knowledge, cash flow, or physical access, and design around these frictions accordingly.

These pre-checks are, of course, non-comprehensive. A deeper engagement with the RCT literature would undoubtedly reveal many more. Yet even this limited framework demonstrates how grounding policy design in local realities can prevent wasted investment and enable cost-effective, inspiring success, as exemplified by the SAFI programme.

Conclusion: Poverty is Local, Policy Should be Too

This essay has argued that the core weakness in failed development policies lies not in a lack of evidence, but in the persistent tendency to generalise beyond the contexts from which that evidence is drawn. Across the health, education, and agriculture sectors, the analysis has shown that interventions grounded in sound economic reasoning can fail when locally binding constraints are ignored. While the warning against over-generalisation may appear obvious, the cases examined here demonstrate how routinely it is violated in practice. Examples include the distribution of English-language textbooks to children unable to read them, or the im position of cost-sharing in health contexts where information asymmetries were already minimal. These are not minor miscalculations, but fundamental design errors rooted in abstraction. Development policy, therefore, is most effective when it begins with careful attention to how poverty is lived on the ground.

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THE ECONOMICS OF MATERNAL MORTALITY RATES: A FOCUS ON NIGERIA

Isabelle Janseen

Junior Sophister

"Nigeria ranks among the countries responsible for a substantial proportion of global maternal mortalities, with even higher rates of related injury or disability. The economic and humanitarian consequences of these maternal mortality rates, as well as the impact of these figures on Nigeria's future development, necessitate an improved understanding of the factors contributing. This paper unites the microeconomic and macroeconomic factors present, both in Nigeria and in other Less Developed Countries (LDCs), that contribute to the country's high maternal mortality rate, while evaluating current policy moves aimed at reducing fatalities. Macroeconomic restructuring over recent decades in Nigeria, characterised by policies such as their Structural Adjustment Program (SAP), as well as the instability of the national government, has exacerbated failures at the local level, including inadequate medical care and a lack of personal finances. With budget constraints and recent foreign aid volatility limiting public policy options, this analysis evaluates current policy undertakings aimed at reducing fatalities and demonstrates the importance of a combined, comprehensive strategy for the reduction of maternal mortality rates"

Introducing the Economic Significance of Maternal Mortality Rates

The largest country in Africa by population, Nigeria presents worrying maternal mortality statistics. Estimates from national data place Nigeria as having a maternal mortality rate of 993 in 2023, meaning that approximately 74,559 women lost their lives in childbirth over the course of the year (Bonjour, 2025). These concerning contemporary maternal mortality rates can best be understood by contextualising micro-level problems with macroeconomic and political economy factors from Nigeria. Macroeconomic instability, privatisation because of the Structural Adjustment Program (SAP), and country-level politics have fundamentally shaped micro-level maternal mortality. Without structural macro-level reform, any local-level reform would be insufficient and lacking. Using this novel approach, this original analysis is made more comprehensive and provides a better analysis of policy.

While no two countries follow identical development trajectories, historical data demonstrate the significant economic returns of reducing maternal mortality rates. In the mid-eighteenth century, Swedish authorities identified an unacceptably high maternal mortality ratio, noting that at least 61% of those were deaths preventable through the presence of more trained midwives (De Brouwere, Tonglet, and Van Lerberghe, 1998, p. 772). Subsequently, the Swedish government pursued a state-led decentralised healthcare strategy of systematically increasing the supply of midwives to reduce this figure (De Brouwere, Tonglet, and Van Lerberghe, 1998, p. 772). By 1861, certified midwives were present at 40% of births; by 1900, 78% (De Brouwere, Tonglet, and Van Lerberghe, 1998, p. 772). This intervention is significant for Sweden's long-term economic development, as Nnadi et al. (2022) observe that maternal mortality rates exert a negative pressure on GDP; conversely, improving maternal health outcomes serves as a catalyst for GDP growth (Nnadi et al., 2022, p. 163). This historical case study acts as a counterfactual for Nigeria of an outcome when a state pursues a state-led model, increasing medical professionals, in lieu of the privatising Structural Adjustment Program (SAP) Nigeria has pursued, which will be discussed in due course.

There is further evidence of the economic benefits for LDCs in reducing maternal mortality rates. Nnadi et al. (2022) demonstrate the relationship between maternal mortality rates and GDP growth through several mechanisms. Maternal mortality reduces the aggregate current labour force, thereby constraining production output (Nnadi et al., 2022, p. 163). Further, these deaths diminish household productivity and impact the welfare of living members of the family as they may sell off productive assets to afford a lavish funeral (Nnadi et al., 2022, p. 163). Ultimately, "maternal mortality adversely affects future human capital creation, labour force quality and quantity" which all have a distinct and measurable impact on GDP growth (Nnadi et al., 2022, p. 163). From these findings, it is evident that maternal mortality is not only a public health crisis but a structural economic impediment that countries, including the case study of Nigeria, would benefit from addressing.

Microeconomic Contributing Factors of Maternal Mortality

While social, political, and economic factors all contribute to maternal mortality, the economic determinants warrant closer examination. The lack of suitable, i.e. affordable and good-quality, medical care is directly responsible for many avoidable maternal deaths. Preventable yet common causes of maternal mortality due to inadequate medical infrastructure found during a case study in north-central Nigeria include haemorrhage, sepsis, eclampsia, and unsafe abortion (Ujah et al., 2005, p. 34).

As of 1997, approximately 70% of hospital maternal deaths in the case of Nigeria stemmed from unscheduled emergencies (Harrison, 1997, p. 8). Okereke, Aradeon, and Yisa's (2016) 'three delays model' provides a theoretical framework for why these unscheduled emergency visits yield such high mortality rates. Central to the economic discussion around the topic is the 'first delay.'

This 'first delay' encapsulates the time-lag in deciding to seek appropriate medical care in an emergency. This delay is functionally linked to the availability of liquid funds and the socioeconomic status of the household a pregnant woman belongs to (Okereke, Aradeon, and Yisa, 2016, p. 162). As highlighted succinctly by Koblinsky and Campbell: "The high cost of delivery services to families appears to be a major factor hindering use" (Koblinsky and Campbell, 2003, p. 24). In a survey of Nigeria's rural Kano State, Okereke, Aradeon, and Yisa (2016) found that only one rural community surveyed across two states had formalised community savings to fund maternal care (Okereke, Aradeon, and Yisa, 2016, p. 162). In some instances, these funds are means-tested to help the poorest or are facilitated through religious institutions such as the local mosque (Okereke, Aradeon, and Yisa, 2016, p. 162).

The impact of poverty on maternal mortality is especially stark, as it exacerbates the outcomes of any of the other contributing factors mentioned above. Poverty amplifies the other high-risk factors for maternal mortality, including gender inequality, maternal undernutrition, and inadequate medical infrastructure (Harrison, 1997, p. 8).

Macroeconomic Determinants of Maternal Mortality

While local-level conditions are integral to determining maternal mortality rates, as previously discussed, macroeconomic factors experienced at the national level are equally significant. Nowhere is this truer than in the case of Nigeria, one of the six countries in Sub-Saharan Africa that together account for more than 50% of total maternal deaths globally (Okereke, Aradeon, and Yisa, 2016, p. 160). Nigeria faces unique legacies and challenges that contribute to its level of maternal mortality more so than other LDCs.

In 1986, under the guidance of the International Monetary Fund and the World Bank, Nigeria adopted the Structural Adjustment Programme (SAP) to reduce its reliance on oil exports after experiencing an economic boom followed by price slumps (Thompson and Oladele, 2025, p. 14). The programme "aimed to stabilise the economy by encouraging privatisation, cutting government spending, and shifting towards a market-oriented approach" (Thompson and Oladele, 2025, p. 14). As a result of this policy, the Nigerian government was forced to cut public spending, reduce subsidies, and privatise state-run services, such as healthcare (Thompson and Oladele, 2025, p. 14). Subsequently, the cost of medical care for citizens increased drastically as the military administration under General Buhari cancelled the free health services created by the previous (civilian) administration, introducing a fee on services provided by government health institutions (Thompson and Oladele, 2025, p. 27). Expectant and new mothers conse quently relied on over-the-counter medications from pharmacies as public hospitals were no longer feasible, and private hospitals were even costlier (Thompson and Oladele, 2025, p. 27).

These new norms and their impact on public healthcare services have had lasting ramifications. Unlike the success story of Sweden, which was driven by a state-led decentralised healthcare model, this privatised SAP model has had a negative and aggravating impact on both maternal and child health (Ujah et al, 2005, p. 37; Harrison, 1997, p. 7). As previously outlined by Koblinsky and Campbell (2003), it is often the high costs of care to families that limit the use of health services such as labour and delivery (Koblinsky and Campbell, 2003, p. 24). This SAP thus functionally created and exacerbated the 'first delay' of Okereke, Aradeon, and Yisa's (2016) model. As such, it is evident that the strategy of SAP to privatise public utilities, such as healthcare, has had significant repercussions for maternal care and maternal mortality rates.

Specific cases of an unstable and insecure environment have also had an impact on the maternal mortality rates in Nigeria, as in other countries. For instance, the military government under General Muhammadu Buhari in the early 1980s banned both the Nigerian Medical Association and the National Association of Resident Doctors (Thompson and Oladele, 2025, p. 21). These actions, apart from angering medical professionals and introducing uncertainty within the profession, also directly impacted maternal mortality outcomes because the strikes ensuing from Buhari's actions made seeking healthcare unsafe (Thompson and Oladele, 2025, p. 22).

The quality of maternal healthcare and thus mortality rates in Nigeria were further impacted as a consequence of the SAP, as Nigerian doctors left the country en masse in favour of other countries where their skills were appreciated instead of targeted (Thompson and Oladele, 2025, p. 22). Future policy specifically in Nigeria, focusing on the lack of trained medical professionals in the country, will need to address not only the lack of personnel, but also the past administration's damaging policy.

Contemporary aid volatility is a further, more recent explanation for Nigeria's inability to reduce its maternal mortality figures. Their dependency on foreign aid to enable reform has severely hampered progress. In early 2025, for instance, a key donor for Nigeria, the US Agency for International Development (USAID), announced a temporary funding freeze for all programmes (Dogbanya, 2025, p. 2). Programmes, including those in Nigeria, were plunged into uncertainty. The subsequent exemption for life-saving humanitarian assistance, including the medicine and medical services key to improving maternal outcomes, does not detract from Nigeria's reliance on such programmes (Obiezu, 2025). To reduce the country's reliance on volatile international aid, the Nigerian government has convened a multi-ministerial committee to examine how to improve its maternal mortality rate through self-funding rather than foreign aid (Dogbanya, 2025, pp. 1-2).

One such step has been through the Nigerian health service, improving its standard of maternal care to reduce mortality rates. In late 2024, the Nigerian government introduced a policy offering free Caesarean section delivery to the poorest and most vulnerable women, which has been responsible for a "modest" recent reduction in maternal mortality rates (Dogbanya, 2025, p. 2).

Policy Recommendations for Reducing Maternal Mortality

The reduction of maternal mortality rates in Nigeria, as well as other LDCs, will require a mix of short-term interventions and long-term structural reform. One such short-term initiative is to circumvent the issue of Nigeria's lack of strong state political will, which played a key role in reform in the case study of Sweden. In Nigeria, policy progress is often hindered due to unstable or volatile governments, such as the military government of General Buhari (Thompson and Oladele, 2025, p. 21). The disorganisation of public opposition to maternal mortality rates and support for reform in Nigeria contributes to this lack of progress by failing to demand policy reform or progress. Therefore, in the short-term, one policy to improve maternal mortality rates is a policy of the people: the network of people championing a reduction in maternal mortality rates needs to work more cohesively as a collective to push their political systems to change (Schiffman and Okonofua, 2007, p. 10).

To mitigate the 'first delay' previously discussed, local communities may benefit from the implementation of a community savings fund to finance maternal care (Okereke, Aradeon, and Yisa, 2016, p. 162). Evidence from Yunnan, China, demonstrates the efficacy of policy interventions in reducing such delays. Between 1990 and 1999, the implementation of the Emergency Referring System for Pregnant Women (ERS) achieved a 96% survival rate in emergency cases (Institute for Health Science, 2003, p. 47).

In the long term, improving maternal mortality rates in LDCs will require the expansion and improvement of the provision of medical care in these countries. Koblinsky and Campbell (2003) identify the presence of a skilled medical professional at birth as "the most critical intervention for making motherhood safer" (Koblinsky and Campbell, 2003, p. 15). Thus, to improve maternal mortality rates, it is imperative to introduce more medical professionals and ensure access is not contingent upon socioeconomic status. The International Confederation of Midwives and the International Federation of Gynaecologists and Obstetricians together recommend a minimum ra tio of one person acting as midwife to every 5000 inhabitants (Koblinsky and Campbell, 2003, p. 16). To achieve this target, LDCs must invest in domestic human capital by educating and training healthcare workers, simultaneously working to attract the return of healthcare professionals who emigrated to other countries. Furthermore, trained healthcare professionals must be properly enabled to perform their role as needed with sufficient drugs, medical supplies, and functional referral pathways for emergency obstetric care onwards (Koblinsky and Campbell, 2003, p. 15).

Challenges for Policy Implementation

Significant barriers to the implementation of such policy recommendations persist. In contemporary LDCs, including Nigeria, unstable governments, such as the military government of General Buhari, pose a challenge to sustained policy execution (Thompson and Oladele, 2025, p. 21). Likewise, the fragmentation of advocacy groups and the lack of a cohesive reform movement in Nigeria undermine the feasibility of systemic improvements. For effective change to occur, the network of people championing the cause must work more cohesively to incentivise political systems towards reform (Schiffman and Okonofua, 2007, p. 10).

Implementing these programs for care and reform requires substantial and sustained financial commitments. As a result of limited domestic revenue mobilisation in LDCs and the volatility of development aid, such as through USAID, Nigeria faces significant hurdles in policy implementation. In the long term, Nigeria must diversify its financing mechanisms, potentially through more stable fiscal instruments. The implementation of new policies, such as offering free Caesarean section deliveries to socioeconomically disadvantaged women or the new committee investigating this cause, represents progress. However, the long-term feasibility of such government policies remains to be seen. The 2026 policy initiative providing Caesarean section delivery for disadvantaged mothers is an example of one such policy.

Conclusion

Mitigating maternal mortality rates is vital for social, moral, and economic development. Economically, maternal mortality rates exert a significant negative impact on GDP by constraining the current and future labour force, reducing production output, and diminishing the productivity and welfare of surviving family members (Nnadi et al., 2022, p. 163). As demonstrated by the Swedish experience, the reduction in maternal mortality rates can serve as a fundamental catalyst for the transition to long-term prosperity.

Nigeria, as the largest country by population in Africa, situated in a region notorious for high maternal mortality rates, provides a critical framework for examining the intersection of microeconomic and macroeconomic determinants of health. Microeconomic factors — including the prohibitive cost of high-quality medical care, liquidity constraints regarding emergency transport, and the exacerbating effects of poverty — collectively drive Nigeria's high maternal mortality rate.

Likewise, Nigeria's macroeconomic present and history provide a distinct structural context for these outcomes. The procyclical negative impact of Nigeria's Structural Adjustment Policy (SAP) in the 1980s, alongside the depletion of skilled medical personnel due to national instability under General Buhari's government, illustrates these systemic challenges. Finally, Nigeria's heavy reliance on international development aid and the increasing volatility of such funding necessitate a transition toward sustainable domestic financing mechanisms for maternal care.

While targeted policy interventions have been proposed to address these market and institutional failures, , the constraints of fiscal capacity and political will remain significant barriers to feasibility. Addressing these structural impediments is essential if Nigeria is to stabilise its healthcare infrastructure and achieve sustainable economic growth.

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LABOUR ECONOMICS

THE VALUE OF A DEGREE: RETHINKING EDUCATION AMID AI AUTOMATION AND LABOUR MARKET CHANGES

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"This paper examines how recent advances in artificial intelligence are affecting the economic returns to higher education. It examines whether technological change is reducing the value of university degrees or altering the conditions under which they generate labour market advantages. Using a task-based framework and focusing on computer science as a case study, the analysis explains how automation is transforming demand for different types of skills within technical occupations. The evidence suggests that AI is reshaping early career labour markets by automating routine cognitive tasks while increasing the importance of skills that involve system design, integration, and oversight of automated processes. As a result, labour market outcomes among graduates are becoming more uneven and entry-level pathways less predictable. The economic value of a degree increasingly depends on the types of skills it cultivates rather than the credential itself."

Introduction

The decision to pursue a four-year college degree represents one of the most significant economic investments individuals make over their lifetime. Beyond its immediate financial implications, higher education performs a broader social and economic function by shaping labour market access, facilitating social mobility, and supporting long-term wellbeing (Lawrence, 2017).

Traditionally, the benefits of higher education have been interpreted through the lens of human capital theory, which views education as an investment that raises worker productivity and earnings (Becker, 1964). Under this framework, higher education has been associated with relatively stable wage premiums and reduced labour market risk (Goldin and Katz, 2020). However, a stable premium assumes a stable relationship between credentials and outcomes. Recent advances in artificial intelligence and automation are fundamentally reconfiguring this relationship. The earnings advantage associated with tertiary education varies substantially by field of study, with some graduates earning little more—and in some cases less—than workers with only upper-secondary qualifications (OECD, 2021).

The confluence of rising tuition costs, expanding graduate supply, and rapid technological change has precipitated greater dispersion in graduate outcomes, particularly in technical fields. Rather than uniformly eroding returns, these developments have rendered educational payoffs more uneven and increasingly dependent on skill composition, adaptive capacity, and institutional quality.

This paper argues that artificial intelligence is not simply devaluing degrees but fundamentally restructuring their economic function. Drawing on a task-based framework and using computer science as a case study, the analysis demonstrates that automation is shifting returns away from credential-based certification for routine work and towards adaptive, complementary skill development. This explains both the growing dispersion in graduate outcomes and the increasing instability of entry-level career pathways. Degrees are evolving from entry tickets to professional employment into platforms for continuous learning, with significant implications for students, universities, and education policy.

Human Capital, Signaling, and the Limits of Traditional Models

Within Becker's human capital framework, education enhances productivity, thereby generating higher lifetime earnings. Under this model, individuals rationally invest in schooling when expected returns exceed alternative uses of time and resources. Complementing this perspective, Spence's (1973) signaling theory suggests that degrees also function as indicators of ability, reducing information asymmetries in hiring processes. Historically[1], these frameworks have accounted for the substantial wage premiums enjoyed by college graduates. They presuppose a stable relationship between credential acquisition and labour market outcomes: increased education yields higher productivity (or signals greater aptitude), which translates into higher compensation.

However, this correlation is increasingly tenuous. Recent empirical evidence indicates that returns to education are increasingly heterogeneous - not just across fields or institutions, but within them. Rather than converging around a stable average premium, graduate outcomes are increasingly polarised, with a minority capturing large gains while many experience weak or delayed returns (OECD, 2021; Rocki, 2025). Figure 1 illustrates this growing dispersion, showing how wage premiums now vary dramatically by field of study and institutional selectivity.

1 Goldin and Katz (2020) on discussions of the historical wage premium associated with higher education.

Figure 1: College wage premium variation by field/institution, adapted from Rocki (2025).

Variation in educational returns is not itself new. Prior to the diffusion of artificial intelligence, wage premiums already differed substantially across disciplines, institutions, and individual characteristics. Degrees in STEM have historically generated higher average returns than those in other fields, while graduates from selective institutions have consistently outperformed peers (National Science Board, 2024).

What distinguishes the current period is not new heterogeneity, but a shift in its determinants. Returns now hinge less on the credential itself and more on task composition and adaptive capacity. As automation targets specific components of professional work, individuals with similar credentials may enter fundamentally different career trajectories, depending on whether their skill sets remain economically relevant. Consequently, entry-level competition intensified, and early career outcomes became more varied.

Aggregate measures conceal the growing dispersion in outcomes among graduates with similar credentials. Returns no longer follow a simple credential-based logic; they increasingly depend on the alignment between acquired skills and the specific tasks that automation has not yet displaced.

Case Study: Computer Science

In the late twentieth century, rapid advances in computing technologies generated strong labour market demand for computer science graduates, driving growth across the technology sector (NASEM, 2018). During this phase, particularly in the United States and other advanced economies with rapidly expanding technology sectors, a computer science degree offered a pathway to lucrative and stable careers, as demand for programmers far surpassed supply (NASEM, 2018) In response, higher education institutions scaled their programmes, leading to a precipitous rise in the volume of graduates entering the workforce (NASEM, 2018). As Figure 2 exhibits, enrolments rose sharply after 2005, peaking around 2015. This surge in undergraduate computer science enrolmentsanddegreeproductionwasdrivenbystudentexpectationsoffavorablelabourmarketoutcomes. and degree production was driven by student expectations of favorable labour market outcomes.

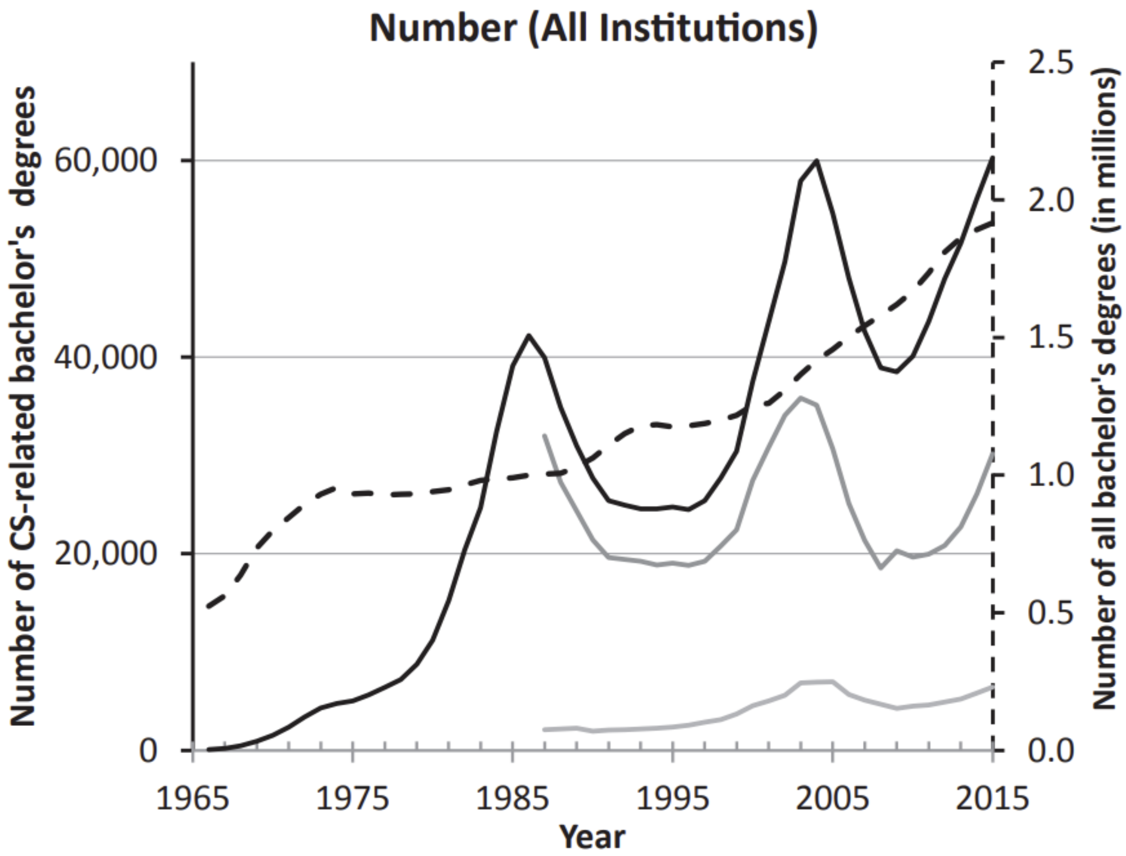

Figure 2:"Number (All Institutions)" panel from National Academies (2018) Fig. 2.1, cropped.

While this expansion democratised technical education, it simultaneously induced a substantial supply-side shock. As neoclassical labour market theory predicts, a rapid influx of skilled labour supply exerts downward pressure on equilibrium wages when demand fails to remain proportional. Consequently, entry-level competition has intensified, compressing starting wages and sorting graduates into unequal early career paths with some securing high paying roles in specialized areas while others face prolonged job searches or underemployment (Bindley, 2025).

More recently, these supply-side pressures have been amplified by the advent of artificial intelligence and automation. Within a standard labour market framework, an outward shift in graduate supply—ceteris paribus—lowers equilibrium wages and increases employment. However, as AI systems increasingly automate routine coding and debugging tasks, the demand for entry-level programming labour may decline. Experimental evidence shows that developers using AI coding assistants can complete programming tasks substantially faster, reducing firms' reliance on junior developers for routine work (Peng et al. 2023), while recent labour market data indicate declining entry-level job postings in AI exposed occupations such as software development. The aggregate result is a sharper downward adjustment in wages and heightened competition for a diminishing pool of junior roles, thereby increasing income volatility and the risk of early-career underemployment (Bindley, 2025).

Importantly, these dynamics alter not only the magnitude of returns to technical education but also their temporal distribution. Unlike earlier cohorts who enjoyed rapid initial wage appreciation, contemporary graduates face delayed and increasingly stochastic payoff trajectories. Returns are no longer concentrated in initial placement, but increasingly contingent on iterative skill accumulation and strategic repositioning (Heller and Kessler, 2022).

Computer science has evolved from a high-demand, low-risk pathway into a discipline characterized by significant variation in early career outcomes. AI-induced shifts reconfigure the timing and distribution of returns as graduates in complementary or specialized roles retain strong premiums, while those performing automatable tasks face heightened volatility. For a growing share of computer science graduates, the degree functions less as a uniform gateway to stable employment and more as a platform for continuous skill differentiation and long-term adaptation.

Task Composition and the Changing Basis of Returns

Recent advancements in artificial intelligence have transformed the organization of technical work by altering the execution of specific tasks within various occupations. AI-powered code generation, automated debugging, and sophisticated data analysis tools now perform tasks formerly reserved for entry-level professionals, particularly within routine and standardized domains (Peng et al., 2023).

These developments are not fully accounted for by traditional models of skill-biased technological change (SBTC), which primarily emphasize complementarities between technology and high-skilled labour (Card and DiNardo, 2002). Instead, they are more accurately captured by the task-based framework developed by Acemoglu and Restrepo (2024). This model conceptualises production as a discrete set of tasks that can be allocated to either labour or capital, depending on relative costs and technical capabilities

Within this framework, automation expands the frontier of tasks performed by machines, generating displacement effects that reduce demand for human labour in certain activities. Conversely, technological innovation can create novel tasks and roles, producing reinstatement effects that reintegrate workers into the production process. Technological progress thus operates through a continuous reallocation of tasks. When reinstatement fails to offset displacement, aggregate labour demand weakens, and wage inequality rises, specifically impacting entry-level and routine-intensive roles (Acemoglu and Restrepo, 2024).

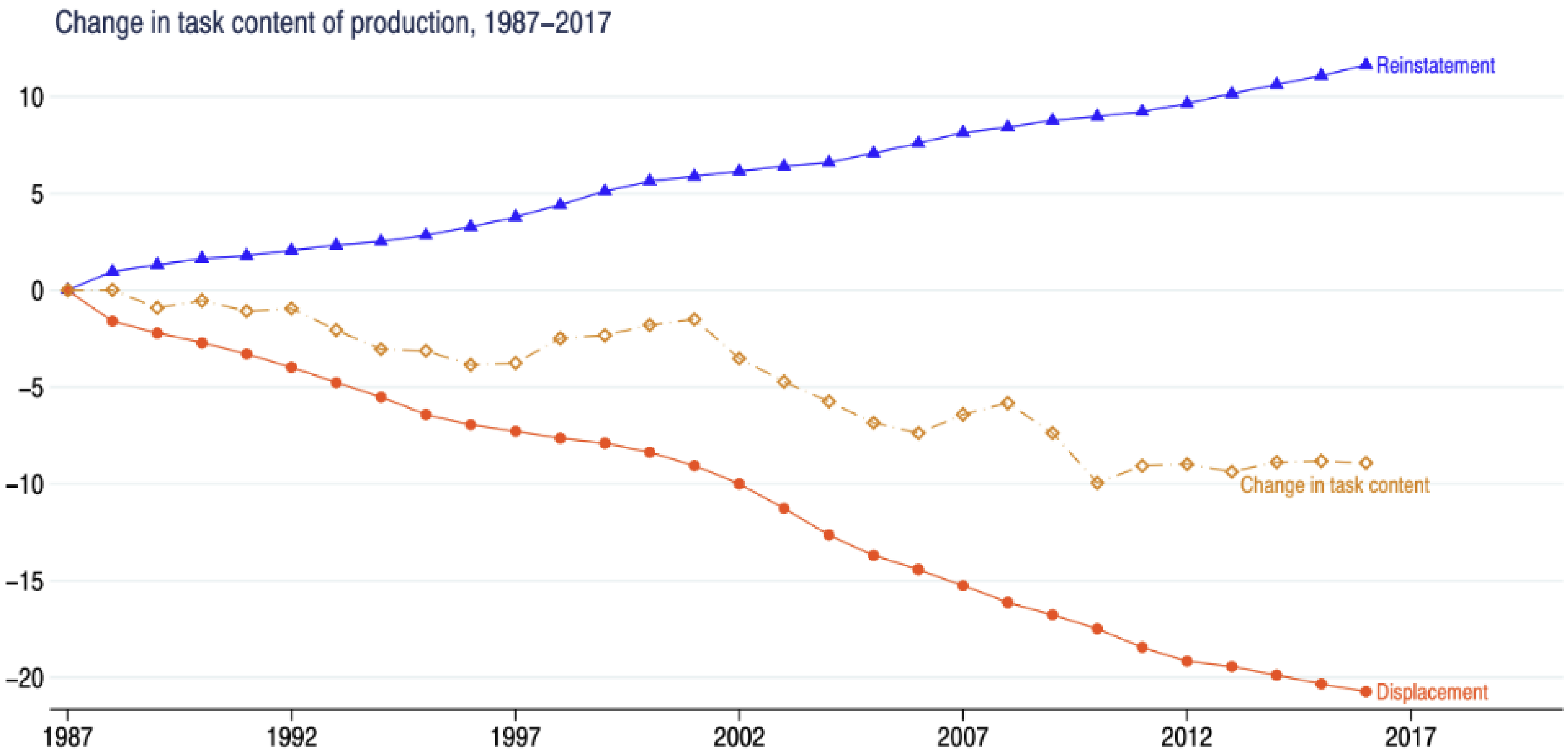

Figure 3: Change in Task Content of Production, 1987–2017, adapted from Acemoglu & Restrepo (2024).

Recent digital technologies have been biased toward automating routine cognitive tasks, while simultaneously augmenting demand for high-level design, integration, and oversight functions (Webb, 2020; Acemoglu et al., 2022). As illustrated in Figure 3, displacement has outpaced reinstatement in several key periods, contributing to shifts in task composition rather than a uniform decline in employment. These patterns clarify why junior positions have become increasingly selective and volatile, while returns have begun to concentrate in specialized and supervisory roles (Acemoglu et al., 2022).

How AI Reshapes the Value of Degrees

In technical fields such as computer science, degrees have traditionally served as both human capital investments and signals of readiness for routine professional tasks. As artificial intelligence substitutes for these routine components, this relationship weakens. When automated systems can perform standardized tasks efficiently, the wage premium associated with degrees that primarily train these functions declines over time. In this environment, credential possession alone no longer guarantees strong or predictable labour market returns.

Accordingly, some technical degrees are becoming economically fragile investments, particularly when they emphasize routine skills that can be cheaply automated. Degrees that cultivate complementary capabilities—system design, domain-specific reasoning, cybersecurity, and the ability to supervise or validate AI output—remain well-positioned to generate sustained returns. The result is a sharp divergence in outcomes: graduates specializing in machine learning or system architecture capture growing premiums, while those concentrated in standardized coding functions face stagnant wages and heightened volatility. Interpreted through signaling theory, this shift also alters what employers infer from degrees. As routine tasks become automated and entry-level work becomes less informative, employers increasingly rely on supplementary indicators—internships, portfolios, research projects, and applied experience. Degrees retain signaling value, but this value is reinforced through demonstrated capabilities rather than credential possession alone. As a result, degrees function less as terminal credentials and more as platforms for continued learning and professional repositioning as technologies evolve.

Why Students Persist: Behavioral Factors and Educational Investment

Standard economic models assume that individuals make educational decisions through fully informed and rational evaluations of expected costs and benefits. In practice, however, behavioral economics highlights systematic cognitive biases and informational constraints that shape choices under uncertainty. Ruthig et al. (2017) identify optimism bias as a factor leading students to overestimate career stability and underestimate labour market risk.

Status quo bias also encourages continued enrolment in established degree pathways despite changing economic conditions and evolving skill requirements. These tendencies are reinforced by social norms, limited labour market information, and uncertainty regarding technological change. Students often continue to concentrate in high-profile fields even when objective labour market signals point to declining expected returns.

Consequently, individual investment decisions may diverge from socially optimal outcomes, generating persistent mismatches between graduate supply and labour market demand. Adjustment to changing returns is therefore gradual rather than immediate, highlighting the importance of improved transparency around graduate outcomes and skill requirements (Autor, 2019).

The Irish Context

The preceding analysis examined the relationship between AI and educational returns at a general theoretical level, using computer science as an illustrative case. However, the effects of AI-driven labour market change are not uniform across countries—they are mediated by national institutions: education systems, training infrastructure, and labour market regulations. This section examines how these dynamics manifest in Ireland, a small open economy with low tuition costs and a large multinational technology sector. Ireland occupies an intermediate position between liberal and coordinated market models, making it a useful case for understanding how institutional context moderates—but does not eliminate—the pressures documented above.

An important component of this context is the cost structure of higher education, which shapes the economic risks associated with pursuing a university degree. Although the Student Contribution Charge and tuition fees have declined in real terms, opportunity costs and foregone earnings continue to constitute substantial implicit investments for Irish students (McQuinn, 2025). Consequently, uncertainty regarding labour market returns remains a salient concern even in publicly subsidized education systems, particularly in sectors where technological obsolescence is rapid.

Institutional context plays a decisive role in shaping reskilling pathways. . In Coordinated Market Economies (CMEs) such as Germany or the Nordic states, robust vocational systems and employer-education partnerships facilitate reskilling and occupational transitions (OECD, 2020). By contrast, Liberal Market Economies (LMEs) such as the United States and the United Kingdom rely more heavily on individualised human capital investment, thereby increasing graduate exposure to short-term labour market volatility.

Ireland's hybrid model, combining accessible higher education with a high concentration of Foreign Direct Investment (FDI), creates a unique risk profile. While the state de-risks the initial financial investment for the student, it cannot insulate graduates from global structural shifts. Employment trajectories within Ireland's technology hub are increasingly shaped by the algorithmic adoption strategies of multinational corporations, rather than domestic policy alone (Wiesinger et al., 2025). As a result, the Irish education system faces a growing challenge: maintaining the "Value of a Degree" when the demand for skills is governed by global, rather than national, technological cycles.

Empirical Evidence of Displacement and Complementarity

Recent empirical research confirms the task-based framework's central prediction: AI simultaneously displaces workers performing routine, intensive tasks while complementing those engaged in specialized, non-routine activities. Evidence from firm-level and occupation-level data shows that these effects are unevenly distributed across workers and skill groups. For Example, Acemoglu et al. (2022) find that industries with greater exposure to automation technologies exhibit slower employment growth and increased wage dispersion, indicating that technological adoption benefits some workers while displacing others. Similarly, Webb (2020) shows that occupations with task profiles closely aligned with machine learning capabilities experience slower wage growth, implying that routine cognitive tasks are particularly vulnerable to automation.

At the micro level, experimental evidence explains the mechanism behind these aggregate patterns. In a controlled study of GitHub Copilot, Peng et al. (2023) found that developers using AI assistance completed coding tasks approximately 56 percent faster than a control group, with the largest gains for less experienced programmers. While this productivity gain enhances individual output, it also reduces firms' reliance on junior labour for standardized coding tasks, reinforcing displacement pressures at the entry level.

Figure 4: AI Exposure by Occupation Wage Percentile, adapted from Acemoglu et al. (2022) and Webb (2020).

As Figure 4 exhibits, exposure to AI varies across the wage distribution, although the three measurement approaches produce somewhat different patterns. The Webb measure shows a strong increase in exposure among high-wage occupations, while the Felten et al. index rises more gradually, and the SML measure remains relatively flat. Despite these differences, the measures collectively indicate that AI is unlikely to affect all occupations uniformly. Instead, technological adaptation seems to reshape task composition, complementing some skill sets while substituting for others, with middle-wage occupations experiencing comparatively lower direct exposure.

For computer science graduates, the implication is that the economic value of a degree is increasingly bifurcated. Returns are contingent on whether a graduate possesses AI-complementary competencies—such as system architecture or cybersecurity—rather than the routine syntax-level coding skills that AI can now execute autonomously. Ultimately, the data suggest that labour market outcomes are dictated by specific skill composition rather than the possession of the credential itself.

Limitations and Uncertainties

The preceding analysis is subject to several critical limitations that warrant caution in interpreting the long-term impact of AI on educational returns.

First, isolating the causal impact of artificial intelligence on labour market outcomes presents significant methodological challenges. Because AI applications are typically embedded within broader digital infrastructures and complex organisational systems, disentangling their independent effects on productivity and wages from other forms of capital deepening is difficult. Consequently, current empirical datasets may suffer from measurement error, potentially understating or misclassifying the true extent of worker exposure to automation.

Second, artificial intelligence remains in a relatively nascent stage of adoption, meaning its long-run equilibrium effects are not yet fully observable. Historical precedents from previous industrial revolutions suggest that substantial adjustment periods often precede stable employment patterns (Brynjolfsson and McAfee, 2014). Current estimates may therefore reflect transitional adjustment dynamics rather than permanent structural shift in the returns to higher education.

Finally, graduate outcomes are highly sensitive to idiosyncratic factors that aggregate models often overlook, including institutional prestige, social capital (networks), and varying access to high-quality training opportunities (Heller and Kessler, 2021). These variables create significant variance within cohorts that "mean" return figures can obscure. Such uncertainties caution against technological determinism: the ultimate impact of AI on the value of a degree will be shaped as much by policy interventions and institutional resilience as by the technology itself.

Policy and Institutional Implications

In the absence of substantive institutional reform, the burden of technological adjustment continues to fall disproportionately onto individual graduates. As the preceding analysis has shown, AI is reshaping the task composition of professional work and increasing the dispersion of educational returns. To mitigate the risks associated with this uncertainty, varied policy responses are needed.

First, higher education institutions must restructure curricula to prioritize complementary and transferable skills. As automation increasingly substitutes for routine cognitive tasks, graduates derive the greatest labour market advantages from capabilities that complement algorithmic systems. These capabilities include system design, interdisciplinary problem solving, and the ability to interpret and supervise automated outputs. Expanding opportunities for applied project-based learning and strengthening links between academic programmes and industry practice can therefore help students develop the adaptive competencies that the emerging labour market rewards.

Second, the national government and regulatory bodies should enhance labour market information systems to address the information frictions identified earlier in the analysis. As graduate outcomes become more heterogeneous, relying on average wage premiums paints a misleading picture of educational returns. Providing prospective students with transparent data on the distribution of graduate outcomes—including variation across institutions, fields of study, and career trajectories—would enable individuals to make more informed educational investments under conditions of heightened technological uncertainty.

Finally, education policy must shift toward a model of iterative human capital accumulation. As technological change accelerates and skill requirements evolve more rapidly, the traditional model of education as a one-time investment early in life becomes less viable. Expanding modular credentials, micro-qualifications, and lifelong learning frameworks would allow workers to periodically update their skills in response to technological change, thereby reducing the risk that degrees become obsolete as task composition shifts.

Conclusion

Artificial intelligence is a general-purpose technology with diverse implications for labour markets and educational returns. While higher education continues to generate substantial social and private externalities, its realized economic value is increasingly contingent upon technological context, specific skill composition, and institutional agility. Rather than producing the uniform wage premiums predicted by earlier models, contemporary labour markets exhibit wider dispersion in graduate outcomes, reflecting a widening gap in how individuals' idiosyncratic competencies align with automated systems.

Through the lens of the computer science case study, this paper has demonstrated how the confluence of expanding graduate supply and AI-driven task automation has restructured entry-level pathways and bifurcated early career trajectories. Evaluated within a task-based framework, these shifts illustrate the precarious balance between displacement and reinstatement effects. As AI increasingly automates routine cognitive tasks, the "value" of a degree is no longer found in the credential itself, but in the graduate's ability to perform functions that complement, rather than substitute, algorithmic output.

The evolving nature of educational returns does not suggest the obsolescence of higher education. On the contrary, it accentuates the growing importance of institutional responsiveness and informed human capital investment. In the age of automation, a degree functions more as a dynamic platform for continuous learning and professional repositioning. Ultimately, the contemporary challenge for the Irish and global education systems is not a question of whether higher education remains worthwhile, but how pedagogical models can be restructured to ensure that educational investments remain resilient amid a landscape of permanent technological flux.

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