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CHIEF EDITOR'S FOREWORD



MESSAGE FROM THE NEP CHIEF EDITOR

Dear all,

Welcome to the 32nd volume of the Norwich Economic Publications (NEP), the final publication of the 2025–26 academic year, and a fitting moment to reflect on another year of growth.

Our themes of Economic Systems, Innovation and ESG have framed some of the most pressing economic challenges of today, encouraging students to explore how economics shapes policy, technology and everyday life. This volume continues those conversations through the coursework, book reviews and original essays of our student community and editorial board.

It has also been a landmark year for NEP itself. Our podcast series expanded with new episodes covering different aspects of economics and student life, our publications grew longer and more ambitious, and, most significantly, NEP successfully registered an International Standard Serial Number (ISSN), a major step in its recognition as an academic publication.

None of this would have been possible without our editorial board, whose commitment and professionalism produced two publications this year while building a team where ideas were shared openly and challenges met together. My thanks also go to our Academic Editor, Liliana Harding, for her invaluable guidance, and to every student who submitted their work. Your willingness to share your ideas is what gives NEP its purpose.

This is also my final foreword as Chief Editor, closing out two years with NEP. I joined as an Associate Editor, never imagining I would one day lead the publication. What I will remember most are not the issues themselves, but the people and teamwork behind them. As I hand NEP over to the next editorial team, I do so with confidence in its future and hope it continues to grow, inspiring new generations of students to share their ideas.

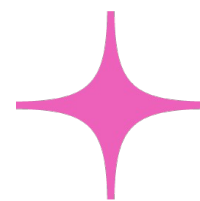
Thank you to everyone who has been part of this journey. It has been one of the most rewarding experiences of my time at the University of East Anglia.

Violeta Bollano – NEP Chief Editor 2025 - 2026



EDITORS' CONTRIBUTIONS

NEP 32



Economic Systems Innovation Environmental, Social and Governance

In this section, we have our editors' contributions to the publication.

From policy to media and international perspectives, this section presents a mixture of essays incorporating our priority themes to reflections on UEA student experiences, all from an economic lens.

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Economic Systems

The Market for Minds: Evaluating the Attention Economy Through Economic and Psychological Lenses

Lucie Mackintosh

In an age of endless notifications, personalised feeds, and algorithmic recommendations, attention has become one of the most valuable resources in the modern economy. Companies no longer compete solely for our money; increasingly, they compete for our time and focus. Yet understanding this competition depends greatly on whether we approach human behaviour through the lens of economics or psychology. This essay will

provide a comparative analysis of the differences between the economic and psychological perspectives, whilst discussing ways in which they intersect in the realm of the attention economy.

Consider an individual faced with the choice between scrolling through a personalised social media feed such as TikTok or making the decision to stop scrolling. Beginning with the economic perspective, rational choice theory (Burns & Roszkowska, 2016) can be employed to understand the individual's decision. This framework models people as consistently logical actors who navigate the world by maximising their personal utility or overall satisfaction. In this situation, time is considered the scarce currency (Davenport & Beck, 2001), the allocation of the individual's attention is treated as a continuous optimisation problem. When faced with the choice between continuing to scroll through the personalised social media feed, or stopping, the individual is assumed to weigh the immediate benefits against the opportunity cost – the value of the next best alternative foregone. From the rational choice theory perspective (Burns & Roszkowska, 2016), the individual is assumed to be acting rationally to maximise their utility within their temporal budget. If the individual chooses to continue scrolling through the social media feed, classical economic theory relies on the principle of revealed preference to explain this, a concept pioneered by Paul Samuelson (1938) which posits that an individual's true desires are accurately reflected through their actual market behaviour.

However, with so much information so readily available, it is exponentially more laborious to evaluate all available information and weigh pros and cons (Bruineberg, 2025). Therefore, a person's capacity for information and capability to attend to information (i.e. attention) have become the scarce resource (Simon, 1971), leading businesses to compete over the control of an individual's attention (Williams, 2018) creating a system in which attention is the scarce resource (Davenport & Beck, 2001); the attention economy. This is especially apparent in how social media companies design their platforms to be addictive through personalisation algorithms and notifications encouraging users to log back in (Bhargava & Velasquez, 2020).

Central to the psychological refutation of rational choice is the concept of variable reinforcement, as pioneered by Skinner (Lindström et al., 2021). This mechanism suggests that behaviour is most deeply habituated when the delivery of a reward is unpredictable, such as scrolling until you encounter a video you enjoy. Social media manipulates this through features such as infinite scroll and 'pull to refresh' gestures. When an individual engages with these features, the brain experiences a surge of dopamine, a neurotransmitter critical to the reward system, by determining the reward value of experiences (De et al., 2025). As the individual does not know if the next swipe will yield a high-value video, dopamine pathways fire continuously, compelling further scrolling. The over-activation of dopamine pathways can increase the risk of addictive behaviours or pathological changes that lead to habituation to natural rewards; also known as reduced reward sensitivity which is a hallmark of addiction (De et al., 2025). Through this lens,

continuing to scroll on social media for extended periods does not represent a calculated maximisation of utility, but rather a state of neurochemical capture, wherein the individual is trapped in a loop of perpetual anticipation engineered by algorithmic design.

Comparing these two distinct perspectives reveals that understanding the attention economy requires consideration of not just what people choose but how those choices are structurally manipulated. From the economic perspective, time can be considered a scarce resource with individuals actively trying to allocate it best to maximise their satisfaction. From the psychological perspective, cognitive limits and dopamine pathways make individuals highly vulnerable to short term impulses. When an individual continues to scroll through social media, contemplating both perspectives provides a clearer picture of behaviour. For example, whilst individuals might aim to make rational choices, their ability to do so is constrained by factors such as limited information, time or cognitive limitations, individuals use heuristics or short cuts to arrive at satisfactory solutions that meet acceptable criteria (Simon, 1990). This boundary is aggressively exploited on social media through a bias known as hyperbolic discounting (Ainslie & Haslam, 1992), which represents the point at which psychological factors override a rational calculation. For example, when an individual continues to scroll through a feed, they are caught in a systemic breakdown of rational choice; objectively, the long-term utility of a good night's sleep vastly outweighs the minor value of another video. Yet, because the dopamine loop provides a micro-reward within milliseconds, the user's present-bias exponentially discounts the future value of tomorrow's well-being.

Ultimately, understanding consumer behaviour under the attention economy requires a synthesis of both disciplines. While classical economics views the decision to keep scrolling as a conscious maximisation of utility, psychology reveals a more complex reality of neurochemical capture and variable reinforcement. The assumption of the entirely rational actor becomes untenable when algorithmic design utilises principles like hyperbolic discounting, dopamine exploitation and variable reinforcement. Agency in the attention economy necessitates the realisation that our time is a scarce economic resource, and our cognitive and neurological limits dictate how we choose to spend it.

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Photo taken by Ruby,
Mutianyu Great Wall of China, Beijing

Environmental, Social and Governance

A World Where We Must Become More Sustainable: An International Perspective From China

Ruby Howard

**Sustainability in Practice: Comparing the UK and China through
Industrial Transition, Green Technology and Local Development
Direct Experience From Study Tour China Exchange 1st—14th June**

Sustainability has become a central policy priority in both the United Kingdom and China, yet the two countries approach it from different economic and political positions. The UK is a post-industrial, service-based economy with legally embedded climate targets and a strong policy emphasis on decarbonisation, renewable energy and consumer behaviour change. China, by contrast, is still both a developing country and the world's largest manufacturing base, meaning that its sustainability challenge must balance with industrial growth, urbanisation and energy demand. This essay highlights China's sustainability model as the country attempts to pursue a green transition. Drawing on my 'UEA Study Tour China Scheme' to Beijing at UIBE and Jinan at Shandong University, including lectures on dual carbon goals and net-zero technologies, a visit to the BYD factory, herb-stamp eco-bag making and a trip to the sustainable village of Laiwu, I reflect on how China's sustainable development strategy is being implemented in practice and how it compares with the UK.

China's sustainability is shaped by its "dual carbon" goals, to peak carbon emissions before 2030 and achieve carbon neutrality before 2060. These targets are especially significant because they are being pursued alongside continued economic development and global manufacturing leadership. Unlike the UK, which has already undergone deindustrialisation and now promotes sustainability change largely through regulation, energy transition and consumer change, China must decarbonise while still producing at a global scale. My trip made this visible by showing that China's green transition is just a policy, but it is shaped in factories, universities and local practices.

The clearest example of this was my visit to the BYD factory. This experience showed that sustainability in China is strongly linked to industrial transformation, particularly through the development of new energy vehicles (NEVs). In the UK, electric vehicles are often discussed in terms of consumer transition, charging infrastructure and emissions targets. With BYD being an affordable car in the Chinese regions, the shift to NEVs supports China's decarbonisation goals by reducing reliance on petrol vehicles. In this sense, green development in China is not about moving away from manufacturing products, it is about greening the products and manufacturing itself.



My lectures at UIBE and Shandong University reinforced this impression by showing how sustainability in China is closely connected to national planning, education and technological development. Sessions on dual carbon goals, net-zero technologies and

new energy vehicles demonstrated that sustainability is treated as a strategic issue that is implemented across business, policy and national development strategy. For example, cities offer affordable public transport to their citizens. A popular method of travel for us visiting students were 'Alipay Hello bikes'. For as little as 10p we were able to hire these bikes and travel around the Shandong University campus and city of Jinan. Furthermore taxis (DiDis) and transportation via bus are as accessible as 2 Yuan, or 20p per trip, with electric cars and buses being very common. This meant that many locals we spoke to decide to travel via public transport on a daily basis rather than owning a private vehicle. This was a clear example of sustainable development within cities.

Another important aspect of the trip was the focus on every day and local sustainability practices, particularly through herb-stamp eco-bag making and our visit to Laiwu sustainable village. The eco-bag activity may seem small compared with a BYD factory, but it represented a different angle of sustainability, reusing and recycling. It highlighted the importance of reducing waste, reusing materials and placing environmental values into consumption practices. Through this activity we were able to create custom bags with beautiful designs, all from nature. In the UK, sustainability is often communicated through recycling, reusable products and consumer responsibility and the eco-bag workshop showed that these ideas are also on China's sustainability agenda.

The village of Laiwu demonstrated that China's sustainability strategy is not just urban or industrial but expands to rural regions. Sustainable villages suggest an attempt to integrate low carbon practices, environmental management and community development into wider national goals. For a country as large and regionally uneven as China, this is especially important. Sustainability cannot be achieved only through major cities or high-tech factories, it must also address rural spaces and resources.

Laiwu has historically been an important steel and coal base in Shandong, with local development closely tied to iron extraction, coal use and steel manufacturing. This makes it a significant case for understanding sustainability in China, rather than beginning from a low-carbon economic structure, places such as Laiwu must attempt to transition away from environmentally damaging, resource dependent growth models while still preserving industrial output and local development. In this sense, Laiwu reflects the wider challenge China faces as a developing and manufacturing economy. Laiwu's sustainability agenda connects to renewable energy development, including wind power projects in the area. This suggests that sustainability in China is often pursued through the greening of existing industrial regions.

Overall, my experience in Beijing, Jinan and Laiwu showed that China's sustainability transition is shaped by its position as both a developing country and a manufacturing powerhouse. The UK and China share the goal of net zero and green transition, but the practical emphasis is different. The UK's sustainability agenda is more strongly associated with regulation, services, finance and consumption, while China's is more tied to factories,

industrial policy and infrastructure. This gives China significant strengths in scale and speed, particularly in areas such as electric vehicles and green manufacturing.

In conclusion, my trip to China demonstrated that sustainability is not a single policy area but a broad development strategy. Through the BYD factory, university lectures, eco-bag workshop and Laiwu village visit, I saw how China is attempting to align environmental goals with manufacturing, education, technological innovation and local development. Compared with the UK, China's sustainability pathway is more industrial, and integrated into national economic transformation. This makes it especially significant as a case study of how a developing manufacturing country can pursue sustainability at scale.



Baotu Spring Park, Jinan



Thousand Buddha Mountain, Jinan, Shandong (foot of the mountain)



Hero Mountain (Yingxiongshan)
Jinan, Shandong



Thousand Buddha Mountain, Jinan, Shandong (top of the mountain)

Photos taken by Ruby



Economic Systems

How Policy Innovation Shapes Behaviour Across Generations: The Case of US Pension Contributions

Lia Alsayed

Economic opportunity is not a fixed inheritance. It is built, generation by generation, from three moving parts: the technology available at the moment a person enters adulthood, the behavioural design of the financial systems they rely on, and the public policy choices made around them. Baby boomers, Gen X, millennials, and Gen Z have each come of age

inside a different configuration of these forces. And that configuration, more than individual effort alone, has shaped who gets ahead.

Technology has changed how young people begin building wealth. Digital investing platforms have made investing cheaper, easier, and more accessible than ever before. As a result, millennials started investing at a median age of 25, around 10 years earlier than baby boomers. Starting earlier gives investments more time to grow, making a big difference over a lifetime. This may help explain why the Federal Reserve Bank of St. Louis found that millennials and Gen Z now hold about \$1.23 in wealth for every \$1 held by Gen X at the same age. Just a decade ago, younger generations were behind their predecessors, suggesting that technology has helped narrow the gap (Federal Reserve Bank of St. Louis, 2025).

However, technology has not benefited every aspect of working life. While innovations such as remote work, the gig economy, and digital platforms have created new job opportunities and greater flexibility, they have also made work less predictable. Many younger workers now face short-term contracts, freelance work, and uncertain incomes, unlike earlier generations who were more likely to have stable, long-term jobs. In this way, innovation creates both opportunities and challenges. It removes some barriers but introduces new risks, meaning that every generation has had to adapt to a different world of work.

While technology has transformed many aspects of life, some of the biggest changes in generational opportunity have come from how policies use human psychology. In the past, retirement systems expected people to make active decisions about saving. Behavioural economics has shown that this often does not happen. Even when people know they should save, many put it off or never get started.

In 2022, the United States passed the SECURE 2.0 Act, a law that introduced new rules to make saving for retirement easier. One of its biggest changes was requiring most new employer-sponsored retirement plans to automatically enrol eligible employees, while still allowing them to opt out. The biggest gains were seen among younger, lower-income, and historically underserved workers. For example, one study found that participation among newly hired Latino employees increased from 19% to 75% after automatic enrolment was introduced (U.S. Senate Committee on Finance, 2022).

Building on this evidence, the SECURE 2.0 Act requires most new employer-sponsored retirement savings plans to automatically enrol eligible employees starting in 2025. Employees begin by contributing at least 3% of their salary, with contributions increasing automatically each year until they reach at least 10%, unless they choose to opt out. The US Department of the Treasury and Internal Revenue Service proposed new regulations, as published in the Federal Register (U.S. Department of the Treasury and Internal Revenue Service, 2025).

This is a direct, codified application of behavioural economics to public policy: rather than relying on willpower or financial literacy, the system now uses defaults to nudge younger workers who are disproportionately the ones starting jobs at newly formed to save earlier than prior generations. This is very different from the retirement system many Baby Boomers experienced. In the 1980s, around 80% of full-time employees at medium and large private companies in the United States were covered by defined-benefit pension plans, according to the U.S. Bureau of Labor Statistics. These plans guaranteed workers a set income in retirement, so employees did not have to decide how much to save or invest (U.S. Bureau of Labor Statistics, 2001).

By 2025, that figure had fallen to just 14% of private industry workers. Instead, most younger workers now rely on retirement savings plans that require them to decide whether to join, how much to contribute, and how to invest their money. This shift means that responsibility for building a secure retirement has moved away from employers and increasingly onto individuals. As a result, behavioural tools such as automatic enrolment have become more important in helping people save for the future (U.S. Bureau of Labor Statistics, 2025).

Retirement is just one example of how public policy shapes economic opportunities. Housing tells a similar story. While the overall homeownership rate in the United States has stayed fairly stable over the past 20 years, the experience is very different for different generations. (U.S. Census Bureau, 2025) Recent data from the U.S. Census Bureau show that only around 36–37% of people under 35 own a home, compared with nearly 79% of those aged 65 and over. (U.S. Census Bureau, 2023) This gap is not simply about how much people save. Rising housing costs, limited housing supply, zoning policies, and borrowing conditions have all made it harder for younger generations to get onto the property ladder than it was for many of their parents.

Wealth is another area where generations have had very different experiences. Although baby boomers make up around one-fifth of the U.S. adult population, they own about half of all household wealth, according to data from the U.S. Federal Reserve. This gap has developed over many years. Policies affecting capital gains, inheritance, and interest rates have increased the value of assets such as homes and investments. As a result, people who were able to buy these assets earlier have seen their wealth grow much faster than younger generations who are only now trying to enter the market. While these policies were not designed to favour one generation over another, they have contributed to today's generational wealth divide (Board of Governors of the Federal Reserve System, 2025).

Together, innovation, behavioural economics, and public policy show that opportunities across generations are shaped more by the systems we create than by individual effort alone. Boomers benefited from an economy built around guaranteed institutions: pensions that required no decisions, housing markets with lower entry costs, and steady long-term employment. Younger generations are navigating a redesigned economy. One with more

individual choice, more behavioural scaffolding like automatic enrollment to compensate for that choice, and more technological tools, but also thinner institutional guarantees and a steeper cost of entry into housing and wealth-building. The evidence from SECURE 2.0 shows that policy can deliberately use behavioural insight to close generational gaps rather than widen them. Whether future policies on housing, retirement savings, and gig work can do the same will play a major role in determining who has access to opportunities in the years ahead.

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Innovation

From Cinema Screens to Streaming Platforms: How Innovation has Transformed the Economics of Film

Pemma Lama

Innovation is often linked with new technology, but the way it changes markets is usually seen as its biggest impact. The film industry is a clear example. For most of the twentieth century, the process of making and selling films changed very little. Production studios made films, distributors arranged where they would be shown, and cinemas sold tickets to

audiences. If people wanted to watch the latest release, they had to visit a cinema. Today, that is no longer the only option. Many viewers simply wait for a notification telling them that a new film has arrived on Netflix, Disney+, or Prime Video. These streaming platforms have changed much more than where people watch films. They have altered the way films are produced, distributed, marketed and paid for. As a result, the economics of the industry have changed as well (Vogel, 2020; Netflix, 2026).

One of the earliest changes came through improvements in production technology. In the past, making films required expensive cameras, film stock and editing equipment. These costs limited who could produce high-quality films. Digital cameras, computer-generated imagery (CGI), and advanced editing software have made filmmaking much more affordable. Equipment that once cost hundreds of thousands of pounds has become far more accessible, allowing smaller studios and independent filmmakers to enter the market (Vogel, 2020).

Lower production costs reduce barriers to entry, a key concept in economics. When it becomes cheaper to enter an industry, more firms can compete. Increased competition can encourage firms to become more efficient and produce more varied content. Independent filmmakers are also more willing to experiment with different ideas because the financial risk is lower than it once was. While major studios still dominate blockbuster productions, technological innovation has created opportunities for smaller producers that would have struggled to compete only a few decades ago.

The biggest economic change, however, has taken place in distribution. Before streaming became popular, cinemas were the main way that films reached audiences. Studios had to produce physical copies of films and transport them around the world. Cinema screens were also limited in number. Since each screen could show only one film at a time, studios competed for valuable release dates and screening space. An unfavoured release date could have a significant impact on box office revenue.

Streaming services have removed many of these limits. Once a film has been uploaded, millions of subscribers can watch it anytime from almost anywhere in the world. The cost of allowing one extra customer to stream a film is extremely low compared with selling another cinema ticket. Economists describe this as a low marginal cost. Most of the spending occurs before release, through production, licensing and platform maintenance. After that, serving additional viewers adds very little extra cost (Belleflamme and Peitz, 2021).

This cost structure allows streaming companies to benefit from economies of scale. As subscriber numbers increase, fixed costs are spread across more customers, reducing the average cost per user. A platform with 300 million subscribers can recover the cost of producing an expensive film much more easily than a smaller platform with only a fraction of that audience. Large firms therefore enjoy an important cost advantage over newer competitors trying to enter the market (Netflix, 2026; Statista, 2026).

This transformation of the film industry fits closely with Joseph Schumpeter's idea of 'creative destruction'. Schumpeter argued that economic growth happens because new ideas replace old ways of doing business. Innovation does not simply improve existing products or services. It often creates an entirely new system that makes previous business models less valuable. Streaming services have done exactly that. Rather than making cinemas slightly better, they have introduced a different way of delivering entertainment to consumers (Dalton and Logan, 2020).

Innovation has also changed the structure of the industry itself. Traditionally, production companies, distributors and cinemas each specialised in different parts of the supply chain. Today, many streaming companies combine these roles within a single business. Netflix is perhaps the best-known example. It finances original films and television series, distributes them exclusively through its own platform and delivers them directly to viewers without relying on cinemas.

This form of vertical integration gives streaming companies greater control over both costs and profits. Instead of sharing revenue with distributors and cinema chains, platforms keep more of the value created by their own productions. Regular subscription payments also provide a more predictable source of income than relying only on box office sales, which can vary significantly from one film to another. This stability allows companies to plan future investment more confidently.

Another important advantage comes from data. Every search, pause, rating and completed programme provides information about consumer behaviour. Streaming platforms analyse this data to understand what audiences enjoy watching and how their preferences change over time. In traditional cinema, firms mainly assessed success through ticket sales after a film had already been released. Streaming platforms can monitor viewer behaviour almost instantly.

Recommendation systems are one result of this innovation. By suggesting films based on previous viewing habits, platforms encourage users to spend more time watching content. Higher engagement makes subscribers less likely to cancel their memberships. From an economic perspective, this improves customer retention and increases the lifetime value of each subscriber. Better information also helps firms decide which new projects are worth funding, reducing uncertainty when investing millions of pounds in original productions.

Network effects strengthen the position of the largest streaming platforms even further. A company with more subscribers earns more revenue, allowing it to invest in better exclusive content. High-quality content attracts even more subscribers, generating additional income that can be reinvested. This positive feedback loop helps explain why companies such as Netflix have been able to maintain strong positions despite growing competition. Smaller firms often struggle because they lack both the financial resources and the large customer base needed to compete on the same scale.

Consumers have benefited from many of these changes. A monthly subscription gives access to thousands of films and television programmes for less than the cost of several cinema tickets. Viewers can watch whenever they choose rather than fitting around cinema schedules. Streaming has also increased access to international films and television series that might never have received a cinema release in many countries. As a result, audiences now have a much wider choice of content than before.

Independent filmmakers have gained opportunities as well. Previously, securing distribution depended on convincing cinema chains to show a film, which was difficult for smaller productions with limited marketing budgets. Streaming services have created new routes to audiences by making films available to viewers almost immediately. While competition for attention remains intense, reaching consumers is no longer limited by the number of cinema screens available.

The transition has not benefited everyone equally. Traditional cinemas have experienced growing pressure as consumer habits have changed. Many studios now shorten the period

between the cinema and streaming release, reducing the value of exclusive theatrical screenings. Some films are released directly onto streaming platforms without appearing in cinemas at all. Smaller cinemas have found this particularly challenging because they depend on a steady flow of new releases to attract customers.

Cinema still offers experiences that streaming cannot fully replace, especially for major blockbuster films where audiences value large screens, advanced sound systems and the social experience of watching with others. Even so, cinemas no longer occupy the dominant position they once held in the industry's value chain. Instead, they now compete with the convenience and relatively low cost of home entertainment.

There are also concerns about how much power the largest streaming platforms now possess. Strong economies of scale, extensive consumer data and network effects make it difficult for new firms to challenge established companies. This could reduce competition over time, allowing dominant platforms to increase subscription prices or exercise greater influence over which films receive funding and global exposure. Although innovation has improved efficiency, it has also increased market concentration within parts of the industry.

The changes seen in the film industry demonstrate that innovation is rarely neutral. Some firms expand rapidly while others struggle to survive. Consumers enjoy greater choice and convenience, but traditional cinemas face increasing competitive pressure. New technology has not simply improved the existing market; it has reshaped the entire way films are financed, distributed and consumed.

The move from cinema screens to streaming platforms shows that innovation is about much more than inventing better technology. It changes incentives, alters market structures and creates new sources of economic value. Looking at the film industry through concepts such as creative destruction, economies of scale, network effects and vertical integration helps explain why streaming has transformed the market so quickly. The technology itself is important, but the biggest change lies in the new business model that has emerged. That shift has permanently altered the economics of film and will continue to shape the industry's future.

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Economic Systems

The UK Economy in 2026: Gradual Growth Amid Persistent Economic Challenges

Madeleine Lewis

The UK economy in 2026 is showing signs of modest growth, but several challenges continue to weigh on households, businesses, and policymakers. To combat these systemic issues policymakers can view them through the holistic framework of ESG.

Inflation remains a key concern, with the annual rate standing at 2.8%, above the Bank of England's 2% target. (ONS, 2026) As a result, interest rates have remained relatively high at 3.75%, increasing borrowing costs for consumers and businesses and keeping pressure on mortgage holders. There are also concerns that inflation could rise again, which may strengthen the case for further interest rate increases or delay any future rate cuts. (Greene, 2026) From an ESG perspective, these inflationary pressures have significant social implications, as higher borrowing costs reduce household disposable income and widen financial disparities, placing additional strain on more vulnerable groups.

One of the most significant recent policy announcements is the decision to ease restrictions on the banking system by lowering the leverage ratio requirement for major UK banks by 0.2 percentage points. The Bank of England hopes that reducing capital constraints will encourage banks to increase lending to households and businesses while improving the functioning of UK financial markets. The change is also intended to improve the competitiveness of Britain's financial sector, where capital requirements have often been higher than those imposed on many international competitors. This policy highlights the significance of governance under the ESG framework, as regulators must strive to balance economic growth with responsible risk management. Strong governance is essential in maintaining confidence in financial markets.

The potential economic impact is considerable. Morgan Stanley estimates that the policy could provide the UK's largest banks with approximately £270 billion of additional lending capacity. (Arnold, 2026) Increased access to credit should bolster business investment, encourage entrepreneurship and stimulate consumer spending through higher mortgage and personal lending. In an economy where investment has consistently lagged behind many advanced economies, expanding credit availability could contribute to higher productivity and stronger long-term growth.

However, reducing capital requirements inevitably raises concerns about financial stability. Lowering this requirement increases leverage and therefore reduces the resilience of financial institutions during periods of economic stress. While the adjustment is relatively modest, critics argue that loosening regulation risks repeating some of the vulnerabilities exposed during the global financial crisis. From a governance perspective, policymakers therefore face the challenge of supporting growth without undermining confidence in the banking system.

Debate surrounding fiscal policy has also intensified following criticism of the government's decision to freeze the repayment threshold for Plan 2 student loans. Graduates who began university between 2012 and 2022 currently repay 9% of earnings above £29,385, but by freezing the threshold despite rising wages and inflation, increasing numbers of graduates are being drawn into starting repayments earlier. The Treasury Select Committee has criticised the policy, arguing that many students were effectively mis-sold the finance and urge ministers to reverse the freeze.

While the government argues that raising the repayment threshold would cost around £5 billion, the committee estimates that the impact on the Chancellor's £23.6 billion fiscal headroom would be closer to £355 million in 2029-30. According to the Institute for Fiscal Studies, reversing the freeze would reduce repayments by approximately £260 per year for many graduates, increasing disposable income and potentially boosting consumer spending. (Arnold, 2026) Yet any reduction in loan repayments also reduces government revenues and limits the resources available for other public services or debt reduction. The

debate illustrates the broader tension between maintaining fiscal discipline under the governance pillar and supporting household finances during a period of elevated living costs under the social pillar of ESG.

The labour market presents a similarly mixed picture. The unemployment rate has risen marginally to 5%, suggesting that businesses are becoming increasingly cautious amid higher employment costs and weak economic growth. (Clun, 2026) Firms facing uncertainty and higher national insurance payments have increasingly come to prefer temporary employment rather than permanent contracts, allowing greater flexibility but reducing job security and limiting household confidence. Consumer confidence itself remains an important determinant of the UK's economic prospects. These labour market challenges also reinforce the social dimension of the ESG framework as although confidence has shown signs of gradual improvement, many households continue to face pressure from higher borrowing costs due to relatively high interest rates and elevated living expenses as a result of persistent high inflation rates, which impacts broader social wellbeing.

Government spending remains under pressure. Ministers have been instructed to find budget savings to help finance higher defence spending commitments, highlighting ongoing fiscal constraints. (Gross, 2026) Alongside this, the government is also continuing the rapid nationalisation of the UK railway services. From just 16% in 2023-4 to ownership of 53% of all rail trips this year, the government has promised that Great British railways (GBR) will continue to expand its services. The government already provides large operational government subsidies to private railway companies, with £12bn spent in 2024-5. (The Economist, 2026) Through the angle of governance, this aims to tackle the issue of costly travel fares, whilst improving quality of service and efficiency of the coordination railway services across the UK. However, there is a risk further nationalisation creates a powerful monopoly, where GBR can prioritise its own services above private entrants which would provide much needed competition in the market.

Overall, the UK economy faces a delicate balancing act between promoting growth and maintaining fiscal stability. While measures such as easing banking regulations and investing in infrastructure are intended to stimulate investment and improve long-term productivity, they also introduce new risks and place further pressure on already constrained public finances. At the same time, persistent inflation, relatively high interest rates and a softer labour market continue to weigh on household finances and business confidence, which has resulted in the UK economy expanding by only 0.9% year-on-year for two consecutive quarters. (Clun, 2026) These challenges demonstrate the importance of ESG principles in economic policymaking. Successful balancing of these pillars is essential in achieving long term sustainable growth in the UK economy

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Environmental, Social and Governance

Why ESG Matters in Modern Media: How Love Island is Redefining Responsible Media

Nsikan Otuk

Environmental, social and governance (ESG) is a key set of principles that has evolved from a corporate measure to an approach for assessing how organisations generate long-term value beyond financial profits. ESG is normally strongly associated with industries such as manufacturing and energy but has slowly reached other industries like media.

ITV's Love Island shows this through various initiatives such as enhanced welfare, inclusion and diversity, the usage of sustainable practices and better governance. They provide a compelling case proving that reality television programmes can use ESG to tackle societal and environmental issues whilst strengthening economic resilience and monetary gain. This article argues that ESG is not only an ethical obligation but can be used as an economic strategy to reduce reputational risk and promote sustainable long-term profitability.

Television, streaming platforms, and social media have a strong influence on consumer behaviour and cultural norms. As a result, media companies must fulfil their duties not only to entertain audiences but also to promote practices that are sustainable, ethical, and inclusive. To understand how ESG principles function within the media industry, this article uses ITV and the biggest reality television franchise it has ever produced, Love Island, as a case study.

Love Island provides compelling evidence as it is the UK's most successful reality TV programme, annually attracting millions of viewers whilst generating masses of sponsorship deals, advertising revenue, and widespread social media engagement. Love Island has once again become the talking point of the summer, launching with a consolidated 2.1 million viewers, up on the most recent Love Island All Stars series (ITV, 2026). It has single-handedly become a prominent part of British culture, attracting audiences across the UK and internationally, making it a cultural and global phenomenon.

It is imperative that, as we praise their successes, we must also recognise their shortcomings. The reality show has undergone scrutiny in previous years over the treatment and welfare of contestants, the lack of diversity, environmental practices, and corporate governance (and these are still overarching topics that many have concerns about yearly). Analysing the show from an economic perspective highlights the importance of ESG when ensuring long-term sustainability, even in a fast-paced industry like media.

The social pillar of ESG is the most visible in media, especially when discussing reality television. Media organisations function as an attention economy, an economic system in which human attention, a finite and valuable resource, is treated as a commodity to be captured, analysed, and monetised, particularly by digital platforms and advertisers. Television shows that have a widespread audience create larger advertising revenue, allowing for sponsorship opportunities and long-term commercial value. However, maintaining an audience is heavily dependent on consumers' trust, a critical economic factor in securing a show's success. This is because long-term audience loyalty improves chances for financial profitability. According to the 2024 Edelman Trust Barometer (Edelman, 2024), consumers who trust a brand entirely are more likely to purchase from it, stay loyal and recommend it to others, emphasising that keeping consumer trust is economically important for brand success.

Love Island is a strong indication that the social pillar of ESG can generate long-term economic value through stakeholder management. Over the years, due to incidents, ITV

has significantly developed its welfare framework. Contestants are made to undergo many protocols to ensure safety and welfare are not compromised.

In response to growing concerns surrounding contestant welfare, ITV has improved its Duty of Care policies by ensuring contestants have access to enhanced psychological support, preparing contestants for the challenges of social media, and offering other support after the programme. These measures are a great investment in human capital and stakeholder wellbeing as they reduce reputational risk and foster trust.

Such initiatives exemplify the ESG principles of human capital investment, stakeholder engagement, and social sustainability, and reflect the idea that contestants are key stakeholders and are not just disposable agents used solely for entertainment purposes. Although these welfare protocols increase short-term production costs, they reduce reputational risk, build up consumer trust and secure ITV's brand. Investing in participant welfare reduces the risk of legal issues, withdrawal from sponsors and audience disengagement, enabling long-term profitability.

Furthermore, investing in diversity and inclusion is not only an ethical decision but a strategic investment that enhances contestant experiences, attracts wider audiences, and supports sustainable long-term profitability. Economically, greater diversity widens the audience appeal, expanding market demand whilst fortifying brand loyalty and advertising opportunities by reaching a wider consumer base.

Environmental responsibility can also generate significant economic benefits rather than simply increasing production costs. ESG pushes companies to improve resource efficiency, reduce waste, and strengthen long-term competitiveness while responding to changing consumer preferences. Since 2022, Love Island has partnered with eBay as its headline fashion sponsor, replacing fast-fashion retailers with pre-loved clothing to promote a circular economy. The partnership has produced measurable behavioural change: eBay reported a 7,000% increase in searches for "pre-loved fashion", while 53% of viewers who were aware of the campaign purchased second-hand clothing within three months (Wright, 2023). These results demonstrate how the media can influence sustainable consumption and drive commercial growth through behavioural change rather than just regulation alone.

ITV has also improved the environmental performance of its productions, with 92% of ITV Studios productions achieving BAFTA Albert certification in 2025, reflecting recognised sustainability standards across the television industry (ITV plc, 2026). Consequently, environmental initiatives not only reduce environmental impacts but also enhance brand reputation, strengthen stakeholder trust, and create long-term commercial value, clarifying that sustainability and profit maximisation can be complementary aims.

Corporate governance forms the final pillar of ESG and concerns how organisations are directed, checked, and held accountable. Within the media industry, governance encompasses transparency, ethical decision-making, editorial standards, and participant safeguarding. Following increased public scrutiny surrounding Love Island, ITV strengthened its welfare framework by introducing enhanced psychological assessments,

mandatory welfare protocols, and long-term participant support. Effective governance reduces information asymmetry between broadcasters, investors, and audiences by increasing confidence that risks are appropriately managed. Economically, this lowers legal and reputational risks, protects shareholder value, and encourages continued investment by reducing uncertainty surrounding the organisation's future performance. Strong governance therefore stands for an important mechanism through which ESG contributes to sustainable business success.

Beyond the three pillars of ESG, behavioural economics provides a further explanation for why responsible broadcasting is necessary to increase economic value. Media companies do not respond to consumer preferences; they actively shape them compared to companies within other industries. Viewers are greatly influenced by social and cultural norms, confirmation bias, and behavioural nudges, enabling reality shows to significantly change daily decisions, beauty standards, and social behaviour. The collaboration between Love Island and eBay illustrates this influence. This partnership has effectively implemented the concept of pre-loved clothing, nudging viewers into sustainable consumption without restricting consumer choice by featuring fashionable contestants. However, it is important to acknowledge that behavioural influence also carries responsibility. If media organisations exploit psychological biases solely to maximise ratings or consumption, they could potentially generate negative social externalities such as unrealistic beauty standards, unnecessary and excessive consumerism plus public distrust. Consequently, ESG pushes media organisations to use their behavioural influence responsibly, as commercial success is heavily dependent on consumers.

Despite the considerable progress made by ITV, ESG is an ongoing process of continuous improvement, not just a goal completed once. Love Island has improved its Duty of Care policies, promoted more sustainable fashion through its partnership with eBay, and invested in greater diversity and inclusion, but the criticism surrounding participant wellbeing, online abuse, and representation after the show have not disappeared entirely. Nevertheless, from an economic perspective, these current initiatives and investments are likely to create greater long-term value. By reducing reputational risk, strengthening stakeholder trust, and improving commercial resilience, ESG works not only as an ethical checkbox but as an economically strategic measure.

Ultimately, Love Island proves that ESG is far more than a corporate trend or buzzword and is now proven to be essential for sustainable media production. By investing in environmental sustainability, responsible governance and stakeholder wellbeing, ITV strengthens not only its reputation but also reduces commercial risk and supports long-term profitability. Audiences and investors increasingly favour responsible companies; ESG is becoming a highly significant source of commercial resilience and a major component of sustainable broadcasting.

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Economic Systems

How Rising Oil Prices Ripple Through the Economy and Graduate Careers

Violeta Bollano

Oil rarely gets credit for how much of modern life depends on it. Beyond petrol at the pump, it powers electricity generation in parts of the world, fuels the ships and lorries that move goods, and provides the raw material for plastics used across manufacturing, agriculture and aviation. Because so many industries sit downstream of a single commodity, a sharp rise in its price does not stay contained to the energy sector; it moves through the economy in ways that eventually reach graduate job markets.

That dynamic is playing out again in 2026. Renewed conflict in the Middle East has unsettled expectations about global oil supply, since a large share of the world's oil is either produced in or shipped through the region; the World Bank's April 2026 outlook attributed the year's sharpest energy price shock in four years to exactly this disruption (World Bank Group, 2026). Prices have since eased somewhat as supply from the region proved more resilient than initially feared (Al Jazeera, 2026), but the episode still illustrates the point: markets react to anticipated risk as much as to realised events. This is the basic mechanics of supply and demand. When supply is expected to fall while demand holds steady, price is the variable that adjusts.

The first-round effects show up in business costs. A logistics firm pays more to fuel its lorries; an airline pays more for jet fuel; a manufacturer pays more to transport raw materials; a supermarket pays more to stock its shelves. Firms rarely absorb these costs entirely. Some portion is passed on to consumers through higher prices, which is one of the principal channels through which inflation, the sustained rise in the general price level, takes hold.

For households, inflation is a quiet erosion of purchasing power. The Bank of England, whose 2% inflation target exists precisely to keep this erosion small and predictable, notes that rapid or volatile price rises make it harder for businesses to set prices and for households to plan spending (Bank of England, n.d.). If wages do not rise in step with the cost of food, transport and energy, the same pay cheque buys less. People respond by cutting back on discretionary spending, holidays, dining out and nonessential purchases, and that pullback in demand feeds through to weaker sales and slower growth for the businesses that depend on it.

Central banks watch this chain closely because inflation left unchecked can undermine confidence in the currency and the wider economy. Their standard response is to raise interest rates, which makes borrowing more expensive: mortgage repayments rise, credit costs more, and firms postpone the investment projects that rate-sensitive borrowing would have funded. This cools demand and, in time, inflation, but at a cost. Sustained rate rises can also slow growth and push up unemployment, which is why economists describe the resulting bind as stagflation: an unfortunate combination of stagnant growth, rising unemployment and persistently high inflation, historically associated with spikes in energy and commodity prices (tutor2u, 2026). Stagflation represents a worse trade-off than ordinary inflation, since standard monetary policy cannot address both problems at once (Economics Help, 2025). Raise rates, and growth suffers further; loosen policy to support growth, and inflation risks accelerating.

This is where the story becomes personal for anyone about to enter the labour market. Uncertainty makes employers cautious. Reporting on the 2026 graduate market has already noted that cost pressures and strategic paralysis brought on by economic uncertainty are among the main reasons entry level hiring has slowed (City A.M., 2026). Graduate schemes get delayed, hiring plans shrink, and expansion is deferred, particularly in sectors that live or die by consumer spending, such as retail, hospitality and leisure.

But the picture is not uniformly bleak. Volatility of this kind increases demand for the people best equipped to interpret it: professionals in energy markets, risk management, supply chain planning, commodity trading, financial analysis and economic research. Firms need staff who can read shifting conditions, model forward risk, and advise on how to respond, which is precisely the skill set that a background in economics, finance, business or data analysis is designed to build.

For students weighing where to position themselves, this matters practically. Employers increasingly reward candidates who can connect a geopolitical headline to its effect on inflation, interest rates and firm behaviour. Recruiters in finance and professional services report that employers now look for individuals who pair technical expertise with commercial awareness and the confidence to support change (Howett Thorpe, 2026) - a combination valued across investment management, banking, consulting and government policy.

Higher oil prices also accelerate a shift already under way. As fossil fuels become costlier, renewable alternatives such as wind, solar and hydrogen look comparatively more attractive, and businesses have an added incentive to invest in them, both to cut emissions and to reduce their exposure to volatile oil markets.

That shift is opening a distinct set of graduate roles. ESG, the practice of weighing environmental, social and governance factors alongside conventional financial analysis, has moved from a niche specialism to a mainstream part of investment decision making (CFA Institute, 2024). CFA Institute research suggests the majority of its members now factor sustainability considerations into their investment decisions, and global ESG related assets under management are forecast to reach around USD 40 trillion by 2030 (CFA Institute, 2023). Organisations are consequently hiring ESG analysts, sustainability consultants, climate risk specialists and renewable energy analysts in growing numbers, while governments extend policy support for cleaner energy. Graduates who can combine economic literacy with an understanding of sustainability are finding themselves in a labour market segment that is expanding rather than contracting.

Economic pressure has a long history of forcing efficiency. Rising costs give firms a reason to invest in technologies that reduce their dependence on expensive inputs: electric vehicles, AI driven logistics, energy efficient manufacturing and alternative fuels. These investments do more than cut costs. They reshape which firms remain competitive as energy prices fluctuate, and they create further demand for graduates who can design, implement and evaluate them.

What ties all this together is a single idea: economies are dynamic systems, not static ones. A conflict in one region raises oil prices; higher oil prices raise costs; rising costs feed inflation; inflation prompts a central bank response; that response reshapes business investment and consumer spending; governments adjust policy in turn; and firms innovate and redirect capital throughout. No stage of this chain sits still while waiting for the others. Each is already influencing, and being influenced by, the rest.

For students of economics, this is the practical value of the discipline. It offers a framework for tracing how an event thousands of miles away eventually shows up in a supermarket

receipt, a mortgage statement, or a graduate job listing. Rising oil prices are a single case study, but the reasoning behind them, supply and demand, inflation, monetary policy trade-offs, and adaptive markets, applies far beyond energy.

Rising oil prices are never simply an energy story. They raise costs and prices across the economy, complicate the choices facing central banks, and reshape business investment and hiring, with real consequences for the graduates entering the job market during periods of disruption. Yet the same pressure that narrows some opportunities widens others, driving demand for expertise in risk, sustainability and innovation. For graduates able to read these connections, and to explain them clearly to employers, that understanding is itself a competitive advantage in an economy that rarely stands still.

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BOOK REVIEW COMPETITION

Book Review Competition



The NEP Book Review competition allows students to read and review one of the books from the list below, summarising the core message, connecting this with their growing knowledge and synthesising new ideas.

The books were chosen in alignment with the themes established at the start of the academic year. See them for yourself below:

Economic Systems

1. Why Nations Fail: The Origins of Power, Prosperity, and Poverty by Daron Acemoglu and James A. Robinson
2. Who Runs the Economy?: The Role of Power in Economics by Editors Robert Skidelsky and Nan Craig
3. Wealth Supremacy: How the Extractive Economy and the Biased Rules of Capitalism Drive Today's Crises by Marjorie Kelly
4. Dead Aid: Why Aid Makes Things Worse and How There is Another Way for Africa by Dambisa Moyo
5. The Rise and Fall of Patriarchal Systems: An Intersectional Political Economy by Nancy Folbre
6. Why Immigration Policy is Hard: And How to Make it Better by Alan Manning

Innovation

1. The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution by Walter Isaacson
2. Innovation and Entrepreneurship by Peter Drucker
3. A Thousand Brains: A New Theory of Intelligence by Jeff Hawkins; foreword by Richard Dawkins

Environmental, Social and Governance

1. Donut Economics: Seven Ways to Think Like a 21st-Century Economist by Kate Raworth
2. Narrative Economics: How Stories Go Viral and Drive Major Economic Events by Robert J. Shiller
3. Higher Ground: How Businesses Can Do the Right Thing in a Turbulent World by Alison Taylor
4. Less is More: How Degrowth Will Save the World by Jason Hickel

Why Nations Fail: The Origins of Power, Prosperity, and Poverty

Cezmi Erbas

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BSc Economics and Finance, 3rd Year

Daron Acemoglu and James A. Robinson's *Why Nations Fail* is one of the most influential contributions to the literature on economic development and political economy in recent decades. At its core, the book seeks to answer a fundamental question that has preoccupied economists for centuries: why do some countries achieve sustained prosperity while others remain trapped in poverty? Rejecting explanations based on geography, culture, natural resources, or simple policy errors, the authors argue that the quality of political and economic institutions ultimately determines a nation's economic trajectory.

The central distinction made throughout the book is between inclusive and extractive institutions. Inclusive institutions protect property rights, encourage investment and innovation, enforce the rule of law, and allow broad participation in economic and political life. Extractive institutions, by contrast, concentrate power and wealth in the hands of a narrow elite, creating incentives for rent-seeking rather than productive economic activity. According to Acemoglu and Robinson, nations succeed when they develop inclusive institutions and fail when extractive institutions persist. One of the book's greatest strengths lies in its ambitious historical scope. The authors draw on examples from ancient Rome, colonial Latin America, the Industrial Revolution, modern-day Africa, and East Asia to support their argument. The comparison between Nogales, Arizona, and Nogales, Sonora is particularly compelling. The two cities share similar geography, climate, and cultural origins, yet exhibit dramatically different living standards because they operate under different institutional frameworks. This example effectively challenges geographic

and cultural explanations of development and demonstrates the importance of institutional arrangements.

From an economics perspective, the argument is highly persuasive because it focuses on incentives. Institutions shape the behaviour of households, firms, and governments by determining the rewards associated with entrepreneurship, investment, and innovation. In countries where property rights are insecure and political power is concentrated, individuals have little incentive to invest in productive activities because the returns to their efforts can easily be confiscated. Conversely, societies that provide secure property rights and political accountability create an environment conducive to long term economic growth.

The authors also offer an insightful explanation of why economically inefficient institutions often persist. Standard economic theory would suggest that societies should adopt policies that maximise welfare and growth. However, Acemoglu and Robinson argue that political elites frequently prioritise preserving their own power and economic privileges over national prosperity. This idea is particularly relevant in understanding why many developing countries struggle to implement reforms despite clear evidence of their economic benefits. Political constraints, rather than a lack of economic knowledge, often prevent meaningful institutional change.

As an Economics and Finance graduate, one of the most interesting aspects of the book is its challenge to purely technical approaches to development. Modern economic analysis frequently focuses on policy instruments such as monetary policy, fiscal stimulus, foreign aid, or trade liberalisation. While these tools are undoubtedly important, the book demonstrates that their effectiveness depends heavily on the institutional environment in which they operate. Sound economic policies cannot generate sustained prosperity if political and economic institutions remain fundamentally extractive.

The discussion surrounding creative destruction is also particularly noteworthy. Drawing on Schumpeterian economics, the authors argue that innovation inevitably threatens existing economic and political elites because technological progress redistributes wealth and power. As a result, elites often resist economic change, even when such change would increase overall prosperity. This argument provides a convincing explanation for why some countries fail to industrialise or diversify their economies despite having abundant resources and growth opportunities.

Nevertheless, the book is not without limitations. While the institutional framework is compelling, the authors occasionally overstate its explanatory power. Geography, culture, and historical circumstances may not be sufficient explanations for development on their own, but they still play important roles in shaping institutional outcomes. For example, the experience of resource-rich countries such as Norway differs considerably from that of resource-dependent states such as Venezuela. Similarly, cultural norms regarding trust, social capital, and education can influence the effectiveness of institutions and the speed of economic development.

Furthermore, the book tends to underemphasise the role of global economic forces. International trade, colonial legacies, foreign intervention, and technological diffusion have all significantly influenced the development trajectories of modern economies. While the authors acknowledge these factors, they are generally treated as secondary to institutional explanations. This can make the analysis appear somewhat deterministic, implying that

institutions are the primary cause of prosperity while other factors merely reinforce existing trends.

Despite these criticisms, *Why Nations Fail* remains an exceptionally important and thought-provoking work. Its greatest contribution is not necessarily proving that institutions are the sole determinant of development, but rather demonstrating that political and economic institutions deserve far greater attention in discussions about poverty and prosperity. The book successfully bridges economics, history, and political science, offering a framework that is both intellectually rigorous and highly accessible.

For students of economics and finance, the book provides a valuable reminder that economic outcomes cannot be fully understood through mathematical models and market analysis alone. Economic growth ultimately depends on the incentives, constraints, and distribution of power embedded within institutions. Understanding these relationships is essential for analysing why some countries achieve sustained development while others repeatedly experience stagnation and crisis.

Overall, *Why Nations Fail* is a compelling and deeply insightful examination of the origins of global inequality. Its extensive use of historical evidence, clear theoretical framework, and interdisciplinary approach make it one of the most significant books in modern political economy. While some aspects of its argument invite debate, the book succeeds in forcing readers to reconsider conventional explanations of economic development. It is an essential read for anyone interested in economics, finance, public policy, or international development, and it remains highly relevant in understanding many of the economic and political challenges facing the world today.

Innovation and Entrepreneurship by Peter Drucker: A Review

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‘It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is most adaptable to change.’ — Leon C. Megginson

Writing in 1984, Drucker faced an anxious American economy grappling with the massive influx of ‘baby boomers’ entering the workforce. Contrary to prevailing economic fears that labour supply will far exceed employment demand, Drucker highlighted the era’s surprising job growth as proof of a profound structural shift.

The author’s argument for these phenomena boils down to two beliefs. First, management is the new technology (rather than any specific new science or invention) that is making the American economy into an entrepreneurial economy. Second, innovation and entrepreneurship are not mystical traits, but capable of being learned, practiced and seen as a discipline.

However, while Drucker explicitly hoped this book would be seen as a seminal work on the subject, his reliance on pre-information age case studies impedes this paradigm shift. A modern reader may struggle to draw parallels between the American automobile industry of the 1900’s and today’s hyper-digitized global market, so rather than capturing the essence of the human experience, the book can feel rigid and lacking novelty at times.

The book is thoughtfully structured into three main parts: 'The Practice of Innovation', 'The Practice of Entrepreneurship', and 'Entrepreneurial Strategies'. It opens with an examination of innovation and entrepreneurship, mentioning how the post-WWII American economy defied the stagnation predicted by the 'Kondratieff cycle', an economic theory describing 40-60 year 'boom and bust' economic cycles in capitalist development.

In the first part, Drucker establishes that innovation does not rely on random genius, but on a deliberate search for changes. In today's self-serving society, innovation is all about finding that one 'bright idea'. For Drucker, innovation based on 'bright ideas' is like trying to win the jackpot at Las Vegas by continuing to 'pull the lever'. He thus proposes a different attitude to this.

In his own words, 'invention had become 'research', a systematic, purposeful activity [...]. Something similar now has to be done with respect to innovation. Entrepreneurs will have to learn to practice systematic innovation'. His answer outlines seven specific 'sources of innovative opportunity'; the unexpected, the incongruity, the process needs, market structure, demographics, paradigm shifts, and new knowledge. To better understand the seven sources, Drucker includes the following analogy.

'They can be likened to seven windows, each on a different side of the same building. Each window shows some features that can also be seen from the window on either side of it. But the view from the center of each is distinct and different.'

The second part shifts focus to managerial strategies, asserting that adapting entrepreneurial competence is imperative for all organizations to navigate the ever changing socioeconomical landscape. A prominent strategy is the concept of 'systematic abandonment', the deliberate phasing out of obsolete services and products to free up vital resources for new growth. Although this text is plagued with outdated examples, this concept remains profoundly relevant in internet era. A prime example is Apple deliberately killing the lucrative iPod to clear the path for the iPhone. Another example is Google killing over 290 projects throughout time, abandoning platforms like Google+ to allocate more CAPEX on AI and cloud computing. Those two examples prove that Drucker's blueprint for structural renewal outlives his 'Ford Motors' / 'General Electric' case studies, and that leaders across various sectors must cultivate entrepreneurial management skills to remain relevant and effective.

In Part III, Drucker outlines how to successfully launch an innovation into the open market, presenting four distinct pathways. The most aggressive is the 'Fustest with the Mostest' framework, which demands total market domination from the get-go. Alternatively, organizations can leverage 'Creative Imitation'; Drucker points to Japan as evidence of a nation that systematically copied Western technologies, like office copiers from Xerox, but successfully implemented them the Japanese way. Firms could also make use of 'Entrepreneurial Judo' to exploit an established incumbent's stale habits, or detail the 'Ecological Niche' strategy, i.e. a business monopolizing a small, specialized area.

While these four strategies offer valid frameworks for market entry, they are built for an era of predictable, linear product rollouts, making them incompatible with modern lean startup methodologies and agile frameworks that prioritize rapid prototyping, continuous feedback loops, and pivoting. In a landscape dominated by open-source collaboration and

decentralized networks, Drucker's twentieth-century corporate strategies can feel overly slow and indivisible.

Concluding his book, Drucker commits to the idea that a thriving entrepreneurial society requires perpetual innovation, entrepreneurship, and continuous adaptability. Drucker's insights offer valuable guidance, rendering this book a must-read for those that want to master the disciplined approach to organisational growth, and for those that may underestimate the importance of management.



EXCEPTIONAL COURSEWORKS

Exceptional Coursework

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Research Spotlight – The Consequences of Forced Migration for the Sending Population: Evidence from Western Ukraine (Former Kresy)

George Bakosh

Dissertation 2025 – 2026

**Research Spotlight: This Section Presents a Summary of
Research and Findings Submitted Towards the
Undergraduate Dissertation Module**

Introduction

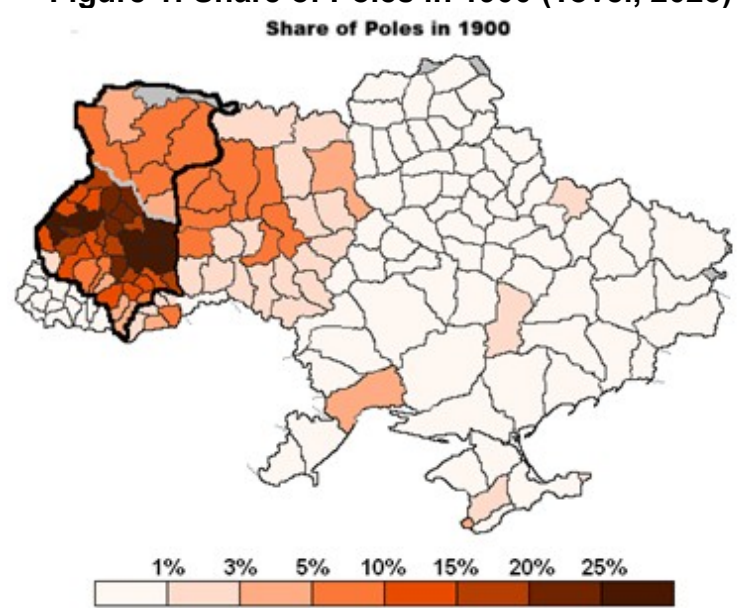
Forced displacement can have long-lasting effects on displaced people and both receiving and sending communities. The effects on sending populations have received less scholarly attention than those on receiving populations or displaced people themselves, even within the same historical episode (Becker, 2022). My study investigates the economic consequences of the Holocaust and the forced displacement of Poles from Western Ukraine (former Kresy) after World War II. This historical episode has not been studied from the perspective of economic outcomes for the sending population, and I aim to address this gap.

My investigation analyses the impact of displacement on stayers' educational attainment and population density, which serves as a proxy for local economic development. I compile a dataset on ethnic composition, human capital, and population density using publicly available and, to my best knowledge, novel data collected from archival sources. My findings provide preliminary evidence of a positive human capital legacy of minorities in rural areas, along with a low-magnitude negative association between stayer higher education levels and the Jewish human loss of the Holocaust in urban areas. Population density analysis documents a persistent negative legacy of displacement in rural and urban areas outside regional capitals.

Historical Context

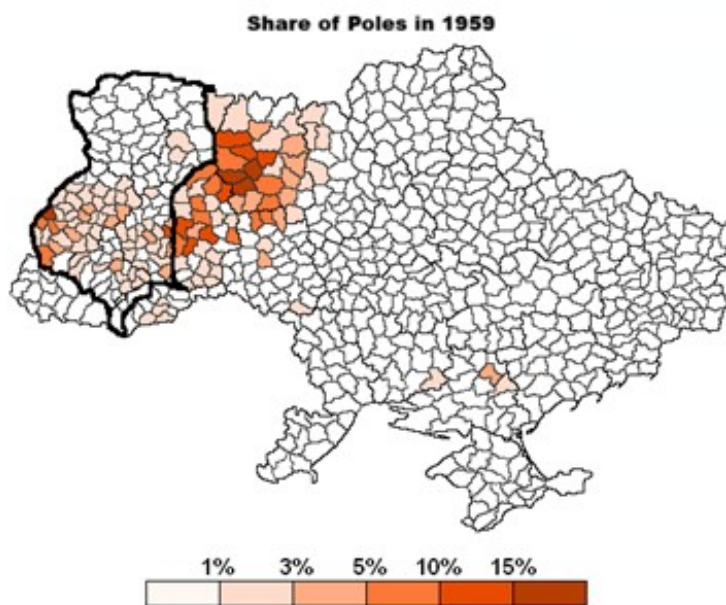
Since the Middle Ages, contemporary Western Ukraine within the former Polish Eastern Borderlands (Ivano-Frankivsk, Lviv, Rivne, Ternopil, Volyn regions; outlined in black in Figure 1) was a multicultural region, predominantly inhabited by Ukrainians, the majority, and Poles and Jews, who constituted large minorities, particularly in urban areas.

Figure 1: Share of Poles in 1900 (Tovel, 2025)



This status quo changed tragically when the Second World War broke out in 1939. Poland was jointly occupied by Nazi Germany and the Soviet Union, with the latter annexing all Western Ukraine. Between 1939 and 1946, as a result of large-scale Soviet deportations, the Holocaust, war-related deaths and inter-ethnic violence, the ethnic and demographic composition of the region irreversibly changed. According to the post-war Soviet 1959 census, only 39,611 Jews lived in the region, compared to 752,137 individuals in 1921; similarly, only 99,474 Poles remained in Western Ukraine, compared to around 2 million in 1921 (CSD UkrSSR, 1970; CSO of Poland, 1926, 1927), becoming only a 1-3% minority in most localities (see Figure 2).

Figure 2: Share of Poles in 1959 (Tovel, 2025)



According to the 1921 Polish census, both the Jewish and Polish minorities had a higher prevalence of secondary specialised and higher education (1.5-2 times) than Ukrainians and were overrepresented in white-collar positions (CSO of Poland, 1923, 1924). The first post-war decades saw substantial migration from the rest of the Soviet Union to Western Ukraine, particularly from the Russian SFSR. Because very few Russians (10,610 individuals) lived in the region in 1921 (CSO of Poland, 1923, 1924), I attribute the surge in Russian population in 1959 to in-migration.

Main Hypotheses

Based on the context of the displacement, I put forward the following hypotheses:

H1: As minorities were more educated and overrepresented in white-collar occupations, displacement negatively affected the human capital of stayers.

H2: Forced displacement led to a persistent negative effect on the population density of affected regions.

Data Preparation

The Polish 1921 and Soviet 1959 censuses constitute the main source of data on the pre- and post-displacement characteristics. While the Polish 1921 census is available online, I gathered most of the Soviet data from the archives of the TsDAVOU (Central State Archives of Supreme Bodies of Power and Government of Ukraine) with the assistance of Sofiia Bryl. I harmonised the Polish and Soviet census by recalculating the Polish 1921 data within Soviet district borders. In this process, I matched each settlement/rural commune (6317 records) from the Polish 1921 census to a corresponding Soviet district.

The dataset contains 1921 settlement-level population, gender, ethnicity, and language counts aggregated for Soviet district borders, along with 1959 Soviet census district data on ethnic and educational composition. I also link Polish district (powiat) with Soviet district (rayon) education data using the Leiden algorithm (Traag et al., 2019). The algorithm allocates observational units into non-overlapping communities based on population shares. Finally, I expand the dataset with the Soviet 1970, 1979, 1989, and 2001 Ukrainian census data to conduct a longitudinal study of population density changes.

Methodology and Findings

Based on Lee et al. (2022) and Borbely and McKenzie (2024), I use the following measure of displacement intensity:

$$\text{Forced Migration Intensity (FM Jewish or Polish)} = -\left(\frac{\text{Number of Minority 1959} - \text{Number of Minority 1921}}{\text{Number of Minority 1921}}\right) * \frac{\text{Number of Minority 1921}}{\text{Settlement population 1921}}$$

Education and Forced Migration

In the main OLS specification, I estimate the relationship between the forced migration/human loss and the levels of higher and secondary specialised education in 1959. Similar to Acemoglu et al. (2011), I find a negative correlation between Jewish loss of life and higher education in cities, with a similarly low magnitude (Table 4), which provides limited support for Hypothesis 1. In most other respects, the findings contradict Hypothesis 1 and instead suggest a predominantly positive legacy of historical minority presence, comparable to the Armenian/Greek legacy in the Ottoman Empire identified by Arbatlı and Gokmen (2023). In rural areas with historical Jewish presence, the stayer population was more educated at higher and secondary specialised levels in 1959 than in low-displacement areas (Table 4), although I cannot rule out unobserved pre-existing differences. Polish displacement is associated with higher rates of secondary specialised education in urban areas and lower illiteracy rates in both urban and rural areas.

Table 1: Panel data analysis: Education and Forced Displacement

	1959 Higher Education FM_Jewish	1959 Secondary specialised FM_Jewish	1959 Higher Education FM_Polish	1959 Secondary specialised FM_Polish
FM_intensity	.033* (0.020)	.0407* (0.022)	-.00889 (0.005)	.00124 (0.005)
Urban=1	.025*** (0.007)	.0432*** (0.005)	.00433 (0.008)	.0194*** (0.004)
Urban=1# FM_intensity	-.0729*** (0.025)	-.0798*** (0.024)	.026 (0.024)	.0403*** (0.015)
Urban=1#1959 Russian_share	.0188 (0.062)	-.0605 (0.074)	-.0562 (0.066)	-.134** (0.059)
1959_Russian_share	.12** (0.055)	.253*** (0.074)	.171*** (0.045)	.307*** (0.060)
Urban	Yes	Yes	Yes	Yes
Spatial	Yes	Yes	Yes	Yes
Russian	Yes	Yes	Yes	Yes
Lviv	No	No	No	No
R-squared	.956	.978	.95	.976
N	64	64	64	64

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Population Density and Forced Displacement

I estimate a difference-in-differences model (pooled OLS) with continuous treatment and find that a 1 percentage point increase in displacement intensity is associated with a 0.5–1% decline in population density compared to unaffected localities, controlling for the positive 1959 time effect. Settlements with a larger pre-war minority population were more densely populated in 1921. The positive time trend suggests recovery in population density in the 1959–1970 period, followed by an incremental decline or stagnation afterwards. To illustrate the population density time paths for high- and low-displacement localities, I plot the predicted change in the average of the 0–25th percentile (Low) and 75–100th percentile (High) of the displacement intensity.

Figure 3: Predicted values of log density by year (rural only)

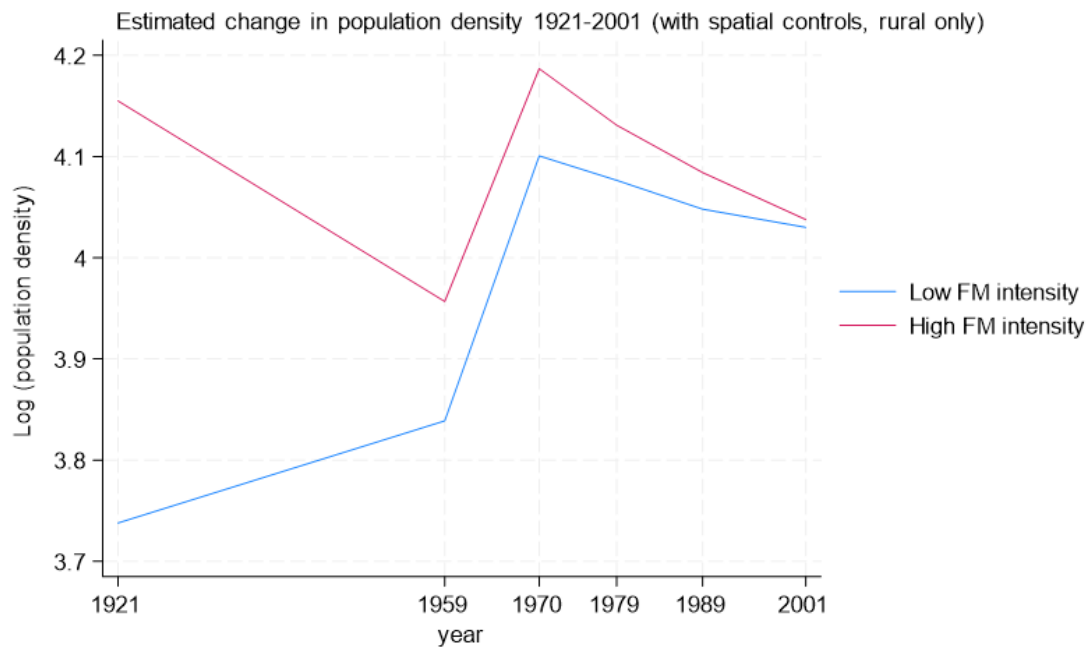


Figure 4: Predicted values of log density by year (rural+urban)

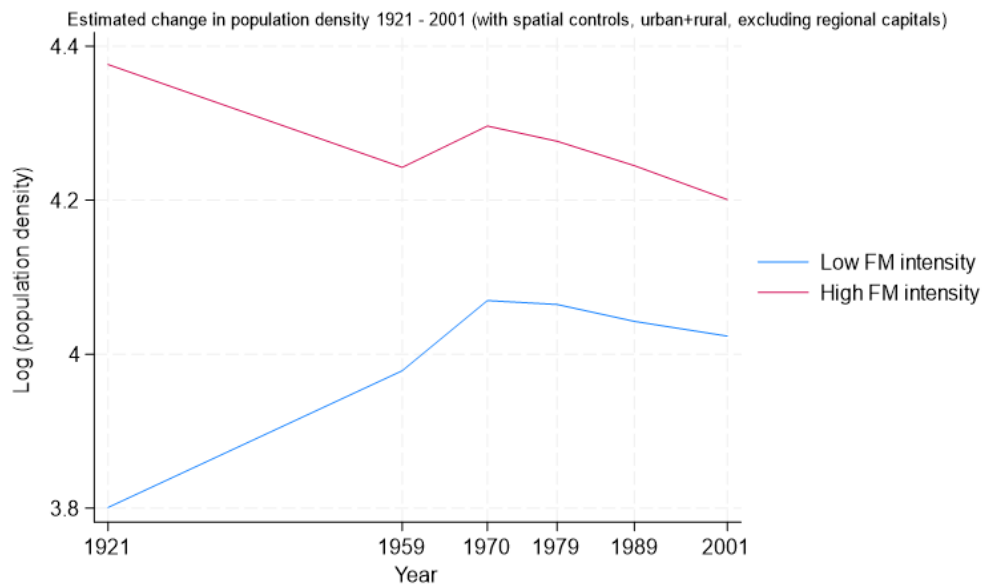
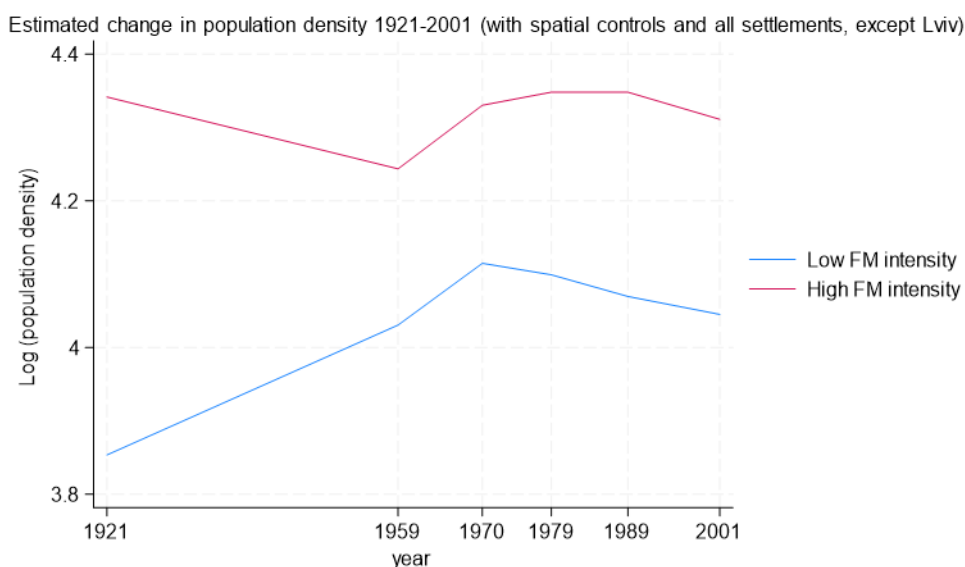


Figure 5: Predicted values of log density by year (rural+urban+regional capitals)



Affected rural and urban areas outside regional capitals have continuously been in decline since WW2, despite post-war Russian in-migration to urban areas (Figure 4). This confirms findings in similar contexts (Testa, 2021; Borbely and McKenzie, 2024) and supports Hypothesis 2. Although rural areas affected by displacement recovered to 1921 levels by 1970, they subsequently entered a steep decline (Figure 3). The inclusion of regional capitals qualifies previous findings for the High FM trend. Given that the regional capitals fall into the high forced migration category, the full specification (Figure 5) suggests some extent of internal migration to regional centres from rural areas in the 1970-2001 period.

Discussion of Findings

The evidence presented in this investigation is preliminary for two main reasons. Firstly, my estimates of the relationship between forced displacement, education and population density can only indicate association, not causation. In the OLS framework, potential omitted-variable bias can include wartime losses and destruction, differential local economic conditions, and state investment or capital stock. Extending the dataset with additional periods and collecting more detailed data would improve precision. In the difference-in-differences estimator, data from 1931 and earlier would allow testing of the parallel trend assumption and enable causal estimation. Secondly, additional data are needed to understand the mechanisms linking displacement, human capital and economic development. Information on internal migration, occupational structure, and agricultural and industrial output would help disentangle the explanatory channels behind observed findings.

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Ethical Production Signaling and Consumer Preferences: An Intervention-based Approach

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PGT Behavioural Economics 2025 – 2026

With growing consumer concerns over environmental, animal welfare, and workers' rights implications, consumers have demanded products that reflect their ethical attitudes. Ethical consumption refers to a consumer's choice to purchase a product that aligns with environmental or social issues (Doane, 2001). Thus, companies use sustainability product labels, ranging from verified labels, such as 'fair-trade', to broader, unverified labels such as 'environmentally-friendly' (Grunert et al., 2014; Hainmueller et al, 2015). Despite the availability of ethically-made products, there appears to be a gap between consumers' intention to buy such items and their actual purchasing habits (Carrington et al., 2010). Given that this discrepancy may be attributed to various factors, such as price sensitivity, 'greenwashing' concerns, or ineffective signaling, the proposed intervention aims to investigate how transparency messages may influence consumers' WTP for sustainably labelled food products.

Literature Review

Expected Utility Theory and Prospect Theory

In traditional economics, consumer choices and preferences are assumed to be stable, aiming to maximize utility. Expected utility theory suggests that rational consumers, when making decisions under uncertainty, will choose the option that maximizes their utility; however, consumers often deviate from this standard model (Von Neumann & Morgenstern, 2007). Behavioral economics and Prospect Theory have highlighted how consumers' preferences are not fixed and can be influenced by reference points, signaling, and social norms (Kahneman & Tversky, 1979). Ethical production can create an environment in which these deviations are likely to occur, as consumers are faced with verifying the credibility of sustainability labels and deciding whether this aligns with their preferences.

Signaling and Labels

Signaling Theory suggests that observable characteristics of products, such as labels, play a key role in consumer decision-making (Spence, 1978). Hainmueller et al. (2015) found that coffee products labeled with a fair-trade label were sold more compared to a generic label, and that a consumer's WTP for a fair-trade labelled product depended on their price sensitivity. Similarly, WTP premiums have been found to be higher for sustainability labelled products (Li & Kallas, 2021). While these studies lend evidence to Signaling Theory, there is little existing research on how signaling effects can be amplified through other initiatives, such as transparency messages.

Misalignment between ethical attitudes and consumer behaviors

Existing research on ethical consumerism has identified a gap between consumers' intention to buy products with sustainability labels and their actual purchasing habits, which may be attributed to shopping automation, price perception, or a lack of information (Carrington et al., 2010; Grunert et al., 2014). It is possible that consumer trust and skepticism play a key role, as consumer perceptions of the credibility of and ability to understand differences between verified and unverified labels may influence purchasing

behaviors (Grunert et al., 2014). This discrepancy poses the question of how companies can leverage tools, such as transparency messages, to more effectively demonstrate credibility to consumers. With rising concerns about 'greenwashing', which is when companies make misleading or exaggerated claims about the environmental or ethical credentials of their products to appear sustainable (Aji & Sutikno, 2015), there is limited understanding of whether this misalignment is attributed to skepticism, rather than the efficacy of product labels.

Intervention Proposal

The proposed intervention aims to identify how consumers' WTP is influenced using verified and unverified product labels, and whether a transparency message can strengthen the effect. Hypotheses for the proposed lab study are that the transparency message will increase WTP for the fair-trade bar in the treatment group relative to the control, and that WTP for the fair-trade bar will be higher than that of the eco-friendly bar across both conditions.

Sample

A convenience sample will be utilized for this study. Participants (at least 150 total) will be recruited from the University of East Anglia and will come in-person to a controlled labsetting to complete a study on consumer product evaluation. University students are a theoretically relevant population for this study, as they combine a typically higher social awareness with a greater skepticism towards corporate claims (Grunert et al., 2014), which can aid in testing whether transparency interventions can shift WTP.

Conditions

Participants will be randomly assigned to either the control group or treatment group. Each group will be presented with four chocolate bars that are identical in size, weight, and flavor (i.e. milk chocolate). The chocolate bars have fictitious product designs that vary in label contents. One bar containing a verified 'fair-trade' label and one bar containing a general, unverified 'eco-friendly' label will be used. The remaining two bars will serve as fillers, with one having a 'premium cocoa' label and the other being plainly designed without special labelling. The treatment group will receive a transparency message intervention, in which the fair-trade labelled product has a statement defining fair-trade standards and verification processes on the packaging.

Procedure

At the start of the experiment, participants will be presented four chocolate bars in accordance with their group assignment. After examining each product, the Becker-DeGrootMarschak mechanism (BDM) will be administered (Becker et al., 1964), thus no price information will be displayed prior to the bidding task. The specific procedures for the BDM task are described in Appendix A. After the BDM, participants will complete product evaluation survey questions for each bar. Participants will complete the remainder of

survey measures in a fixed order to prevent altered responses and will be debriefed at the end of participation. All survey items and scales are located in Table 1.

Table 1

<i>Outcome measures, items, and notes</i>		
Outcome measure	Item	Notes/Reference(s)
Willingness-to-pay	BDM task	See: Appendix A; (Becker et al., 1964)
	How appealing does this packaging look?	Design appeal
Product evaluation	How would you rate the quality of this chocolate?	Perceived quality
	How much do you trust this brand?	Brand trust
Purchase frequency	How often do you purchase chocolate?	Product purchase covariate
Purchasing priorities	Rank the following items in order of importance when purchasing food products: (1) Quality (2) Price (3) Ethical production practices (4) Convenience (5) Brand reputation	Researcher-generated ranking task
Advertising skepticism	E.g. In general, advertising presents a true picture of the product being advertised	9-item Likert scale measuring consumer skepticism of advertising claims (Obermiller & Spangenberg, 1998)
Perceived knowledge	On a scale of 1 (not very knowledgeable) to 5 (very knowledgeable), how familiar are you with 'greenwashing'?	The definition of greenwashing is provided to the participant before the item.
Demographics	Age in years, income range, gender	Included as covariates in alignment with Li & Kallas (2021)

Outcome Measures

Primary Outcome Measure

Willingness-to-pay. Participants' WTP will be measured using the BDM task, which has been reliably and consistently used in behavioral economics literature (Becker et al., 1964). Given that participants are incentivized to bid their true valuation, the BDM allows researchers to obtain a direct monetary measure of consumer utility.

Secondary Outcome Measures

Product evaluation. Product evaluation items capture participants' perceptions of the chocolate bars. Design appeal and the brand trust item control for perception differences

across the four fictitious bars, ensuring any WTP differences are attributed to the label and/or message rather than brand trust or packaging aesthetics. The perceived quality of the product serves as a proxy for anticipatory utility and may help explain why WTP may differ across conditions beyond just the label effect.

Covariates

Participants may have pre-existing differences in how much they value sustainability and ethical consumption, as well as knowledge of greenwashing (Grunert et al., 2014). To account for these differences, participants will complete a purchasing priority ranking task and answer an item assessing their familiarity with greenwashing. Participants will report their consumption habits, answering how often they purchase chocolate, as their WTP may differ depending on their typical consumption of the experimental product. The Ad Skepticism scale will be administered to assess consumer skepticism (Obermiller & Spangenberg, 1998). In alignment with previous studies that have identified age, income, and gender as factors that influence consumers' WTP for sustainable products (Li & Kallas, 2021), demographics will be measured.

Discussion

In alignment with hypotheses, the expected results of the experiment are that the treatment group will report a higher WTP for the fair-trade bar than the control group. It may also be that the transparency message serves as a reference point for the participant, consistent with Prospect Theory (Kahneman & Tversky, 1979). Knowledge of what fair-trade practices actually entail may increase consumer valuation of the product due to resolving concerns over greenwashing, which lends evidence to Signaling Theory (Spence, 1978).

Across both conditions, it is expected that the fair-trade labelled chocolate bar will have a higher WTP compared to the broadly labelled eco-friendly bar. This finding would align with results from Li & Kallas (2021) which revealed that fair-trade labelled products had a 30.5% higher WTP premium and 'environmentally-friendly' labelled products had a 21.3% higher WTP premium. If WTP were to increase with transparency messages, then this implies that consumer welfare would increase. In contrast, without additional information regarding credibility, participants would undervalue the fair-trade chocolate bar, resulting in consumer welfare being lost.

It is possible that the results of this study do not align with hypotheses. Regardless of message content, consumers may not be willing to purchase ethically produced goods due to other factors such as price sensitivity (Hainmueller et al., 2015). It may be that the treatment effect is null or very minimal, as real purchasing behavior is not captured in a lab-setting (Carrington et al., 2010). Advertising skepticism may also play a key role, as participants with higher advertising skepticism may be less sensitive to the treatment effect, presenting the possibility that advertising skepticism, or even perceived greenwashing knowledge, may moderate the treatment effect.

Conclusion

The proposed experiment aims to investigate whether transparency messages about fairtrade certification shift consumers' WTP for sustainably labelled chocolate bars. While this study offers an empirical approach to addressing the ethical purchasing gap, it is not without limitations. The use of a convenience sample of university students limits external validity due to possible sampling bias. Findings may also have limited generalizability to other ethically-made goods, as previous research has indicated that consumers' WTP varies among different product types (Li & Kallas, 2021). Future research could extend this intervention design to other product categories in a diverse sample and should consider field experiments to more accurately capture purchasing behaviors.

The expected findings of the study have policy implications, as producers may be financially incentivized to voluntarily incorporate transparency messages regarding ethical production practices if consumers' WTP were to increase with such messages. Additionally, if the WTP for fair-trade and eco-friendly labelled products are similar for the control group, but not for the treatment group, it would suggest that using broad, unverified labels is misleading consumers into paying similar prices for verified and unverified products. Therefore, regulation for labels like eco-friendly that do not need third-party verification may be encouraged to protect consumers.

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Consumer Demand for Ethical Production

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Introduction

There is a growing awareness of the importance of consuming environmentally friendly products, such as plastic, in the present market (Van Rensburg et al., 2020). Plastic is a very abundant material, but one of the most environmentally harmful, with predictions of more plastic in the oceans than fish by 2050 (Floyd, 2016). This has led to a proliferation of green products in the market, with consumer purchasing of green products the result of complex interactions between psychological and behavioural factors (Suhartanto et al., 2021), like social preferences, trust and willingness to pay (WTP).

Literature Review

Ethical consumption allows consumers to project a socially responsible identity, which can enhance the consumer's social standing, as it creates external perceptions of conscientiousness and moral superiority (Shang & Pelozo, 2015). Additionally, when consumers internally perceive their purchases as aligning with their moral values, they gain personal satisfaction and emotional esteem (Trudel et al., 2019). This is reflected in consumers' WTP; Greek consumers were willing to pay an average premium of 27% for feta cheese labelled with animal welfare certification (Papoutsi et al., 2022). Similarly, 80% of wine tourists in South Africa were willing to pay more for socially responsible wine and were more concerned with the morality and quality of the purchase than the price (Saayman & Saayman, 2019). This suggests that ethical consumption provides not only functional utility but also emotional utility.

However, when consumers are sceptical of the validity of claims made by firms, this generates confusion around true green products and can cause consumers to become less emotionally involved in environmental issues (Sinha & Annamdevula, 2022). Scepticism is often fuelled by greenwashing and inconsistent standards. Greenwashing refers to the act of misleading consumers about the environmentally friendly practices of a company (Yu et al., 2024). Greenwashing perceptions negatively impact consumers' green-purchasing intentions, with detrimental effects on product sales (Ho et al., 2023).

Economic signalling theory (von Neumann & Morgenstern, 1944) can be employed as a theoretical framework to understand how green labels influence consumer behaviour and market dynamics. Green labels can be viewed as signals which indicate product quality, and convey unobservable information to a consumer, in situations of information asymmetry where the consumer has less information about the product than the manufacturer (Kakovic et al., 2015). In the case of plastic, the manufacturing process is unobservable to the consumer, so the manufacturer uses green labels to express that the manufacturing process is sustainable. Reliable signals are known as 'costly' signals because they represent a cost on behalf of the sender; a manufacturer using a green label presents a structural, legal and reputational cost rendering the signal a reliable indicator of trust (Palmer & Pomianek, 2007). A further example comes from evolutionary contexts, where resource sharing is a costly signal of trust (Palmer & Pomianek, 2007). Trust in environmentally sustainable brands enriches the perceived green value of the product and

validates the consumer's projected socially responsible identity through transparency (Uikey et al, 2026). Greenwashing represents a failure mode of signalling, where low-cost imitation signals are produced, creating noise.

Experiment

The intervention tested will be a verified green label, specifically regarding the recycling of plastic food storage containers. They are familiar, inexpensive and realistically purchased, with consumers already encountering green claims around these products (Van Rensburg et al., 2020). Plastic goods are standardised and less tied to taste preferences, as compared to food products like coffee and chocolate. Information asymmetry is high since consumers cannot observe recycling practices or whether claims are exaggerated. The experimental design used to test the effectiveness of the intervention will be a 2x2 factorial design, with claim specificity and verification as independent variables. Participants will be split into the following treatment groups (see Table 1), along with a control group who will receive no ethical information.

Table 1

Claim Specificity	Verification	Label
Ambiguous	No	'Made with recycled plastic.'
Ambiguous	Yes	'Made with recycled plastic' and 'Independently certified by the Environmental Standards Agency.'
Unambiguous	No	'Made with 100% recycled plastic.'
Unambiguous	Yes	'Made with 100% recycled plastic' and 'Independently certified by the Environmental Standards Agency.'

The certification agency is fictional, to avoid any preconceived notions, and the labels were chosen for their specificity and simplicity (Sigurdsson et al., 2022).

The intervention will be tested using a Becker-DeGroot-Marschak (BDM) auction (Becker et al., 1964), in a lab environment, since this auction incentivises truthful revelation of maximum WTP. Each participant will receive an endowment of currency equivalent to 3 lunches and will observe the same food storage container with their respective treatment information. They will state their maximum WTP, and a random price will be drawn by a computer to mitigate experimenter effects. If the participant's WTP is bigger than or equal to the price drawn, the participant buys the product, otherwise no purchase occurs. Then participants will complete a short, post-experiment questionnaire designed to test secondary measures, such as trust and perceived greenwashing, as well as a control measure of environmental concern (Dunlap et al., 2000).

Outcome Measures

The experiment evaluates two primary outcomes: willingness to pay (WTP), measured via optimal, incentive-compatible BDM bidding to determine whether ethical signals change economic valuation and the purchase decision, which aggregates market demand and acceptance rates. Secondary measures (trust, perceived greenwashing, ethical value, and moral utility) will be captured via a novel post-experiment Likert questionnaire to provide explanations for the psychological mechanisms driving changes in WTP, with the New Ecological Paradigm scale to measure environmental concern (Dunlap et al., 2000).

Discussion

The expected finding is that both independent variables, claim specificity and third-party verification, will significantly increase participants' WTP and purchase decisions for the plastic food storage containers. Specifically, the unambiguous claim will yield higher WTP and trust than the ambiguous claim. Unverified or ambiguous claims function as noisy, low-cost imitation signals that firms can cheaply replicate, which fosters consumer scepticism and perceptions of greenwashing (Ho et al., 2023). Furthermore, the introduction of third-party certification from the fictional agency is expected to significantly enhance signal credibility, shifting demand outwards across both levels of specificity. When firms introduce an unambiguous claim backed by an independent third-party, it transforms a cheap signal into a costly signal rendering the signal more reliable (Palmer & Pomianek, 2007). Therefore, an elevated perceived ethical value, trust and emotional utility would be expected for this treatment, according to the literature.

An interaction effect is expected between claim specificity and verification, hypothesized as follows. Third-party certification will have a greater impact when paired with ambiguous claims than with unambiguous ones. When a label is vague, consumers face high baseline uncertainty and greenwashing anxiety; an independent certification acts as a "trust anchor" that legitimizes the statement and substantially increases trust (Uikey et al., 2026). Conversely, highly specific claims already signal transparency and confidence (Sigurdsson et al., 2022), meaning external verification provides only a marginal value-add. Ultimately, this suggests that external verification could compensate for structurally weak or poorly defined ethical claims.

This experiment makes a distinct contribution to academia by utilizing an incentive-compatible BDM auction in a lab experiment to attempt to quantify exactly how clarity versus credibility changes consumers' WTP. Previous literature tended to rely on self-report survey methods – for example Papoutsis and colleagues (2022) evaluated Greek consumers' WTP for ethically labelled products using a contingent valuation survey method, which is entirely hypothetical, and vulnerable to social desirability bias. The present study requires participants to back their valuations with real financial stakes, which bridges the gap between attitudes and behaviour that often weakens purely self-reported data.

Despite the research design's methodological rigor, some limitations must be acknowledged. Firstly, the lab setting remains distinct from a real-world retail environment. Participants will be artificially exposed to product labels, isolating the signals under a degree of scrutiny that rarely occurs during rapid, low-involvement grocery store purchases. Therefore, the baseline constraint of claim specificity and verification on WTP may be overstated. Additionally, the experiment focuses on immediate behavioural response and psychological utility and neglects long-term behavioural decay. Long-term habituation to costly and reliable signals may diminish to baseline market expectation. Future research could address this by conducting field experiments in retail spaces and longitudinal tracking to observe the performance of signals under conditions of market saturation.

Conclusion

By applying signalling theory to green-labelled plastic products, the experiment aims to demonstrate how claim specificity and third-party verification shape willingness to pay and purchasing behaviour under conditions of information asymmetry. Additionally, the study proposes that green labels influence consumer demand through trust, moral utility and ethical value. The proposed BDM auction strengthens the methodological contribution of the study by capturing incentive-compatible consumer valuations rather than hypothetical intentions. While limitations relating to artificial laboratory conditions and short-term behavioural measurement remain, the findings could provide valuable insight into how firms can communicate sustainability claims more credibly and effectively. More broadly, the research highlights the growing importance of transparency and trust in ethical consumption markets increasingly shaped by concerns surrounding greenwashing and environmental responsibility.

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Alternative Investments Project

Arya Tavakoli

The Economics of Alternative Investments 2025-2026

Introduction

Traditional 60/40 portfolios of stocks and bonds had a difficult start to the 2020s. The 2022 selloff drove correlated losses in both legs, and the diversification that the 60/40 was meant to provide all but disappeared. This project asks whether reallocating part of a 60/40 portfolio into alternative investments would have reduced downside risk over the past two decades, and whether the answer depends on the type of alternative and on the type of crisis.

I test three hypotheses using daily and monthly data covering February 2006 to December 2025. H1 is that adding alternative investments reduces 1-day 99% Value-at-Risk, Expected Shortfall and maximum drawdown relative to a base 60/40. H2 is that the size of the reduction varies across alternatives, with commodities and hedge funds providing more protection than REITs because REIT correlations with equities tend to rise in stress. H3 is that the benefits are state-dependent, with alternatives helping more in inflationary episodes than in pure equity sell-offs.

The findings are mixed, but more informative than a simple confirmation would have been. Tables 1 and 2 show that hedge funds and commodities reduce all three downside-risk measures of the base 60/40, while REITs make every measure worse. Quantile regressions confirm that REITs amplify equity sensitivity in the left tail. Sub-period analysis shows the benefits of commodities are heavily concentrated in 2022, while in the 2008 GFC commodities had their own crash that more than offset the daily diversification cushion. Downside-risk benefits exist, but they are highly regime-dependent.

Data and Methodology

The analysis uses daily total-return data from Yahoo Finance for five exchange-traded funds: SPY for the S&P 500 equity leg, AGG (US Aggregate Bond) as the primary bond leg, plus IEF (7-10 year US Treasury) and LQD (investment-grade corporate bond) as robustness alternatives. The three alternative-asset classes are represented by DBC for commodities, VNQ for REITs, and the EDHEC Hedge Fund Indices for hedge funds, available monthly from January 1997 to June 2021 and provided in Workshop 7. A separate set of daily individual commodity prices from Workshop 4 is used to construct an equally weighted commodity index in the style of Bhardwaj, Gorton and Rouwenhorst (2015) as a robustness check on DBC. The daily sample runs from 7 February 2006, the first date all six ETFs have data, to 31 December 2025, giving 5,006 trading days. The hedge fund analysis is run on a monthly panel covering February 2006 to June 2021, the binding constraint of the EDHEC release. Returns are daily log returns from adjusted close prices. Monthly returns are obtained by summing daily log returns within each calendar month. The base 60/40 is 60% SPY and 40% AGG, rebalanced daily. Augmented portfolios reduce the equity weight by x in $\{10\%, 20\%, 30\%\}$ and reallocate to a 3 single alternative, keeping the 40% bond weight unchanged so the effect is isolated to substituting alternatives for equity. A multi-alts basket (ALT30) at the daily frequency holds DBC and VNQ in equal weights; the monthly version (ALT30m) adds hedge funds. I focus discussion on the 30% allocations because they produce the clearest signal; the 10% and

20% versions are in the do file. Downside risk is measured using the framework introduced in Brown (2026a): 1-day 99% historical Value-at-Risk, the corresponding Expected Shortfall, and maximum drawdown computed from cumulative log returns. Rolling 60-day CAPM betas (single-factor specifications, risk-free rate set to zero) follow the approach used in Workshops 4 and 7, estimated with rangestat.

Hypothesis 1: Do Alternatives Reduce Downside Risk?

Table 1 reports annualised performance and downside-risk statistics for the base 60/40 and the nine daily augmented portfolios over February 2006 to December 2025.

Table 1

Table 1: Downside risk and performance statistics, daily portfolios.

Statistic	p6040	DBC30	VNQ30	ALT30
Ann_Mean	7.48%	4.64%	6.14%	5.39%
Ann_SD	11.84%	9.92%	13.93%	11.20%
Skewness	-0.15	-0.51	-0.45	-0.49
Kurtosis	20.68	15.43	18.90	18.44
Min	-7.67%	-5.89%	-8.74%	-6.87%
Max	9.65%	7.21%	7.81%	7.33%
VaR99	-2.24%	-1.86%	-2.73%	-2.19%
ES99	-3.31%	-2.76%	-4.07%	-3.25%
MaxDD	-36.43%	-35.55%	-43.27%	-38.43%
Sharpe	0.63	0.47	0.44	0.48
N	5006	5006	5006	5006

Notes: Daily log returns, N = 5,006. Sample: 7 February 2006 to 31 December 2025. For brevity, only the base 60/40 and 30% allocations are shown; 10% and 20% versions are in the do file output.

Adding 30% commodities reduces the base 60/40's Value-at-Risk from -2.24% to -1.86%, Expected Shortfall from -3.31% to -2.76%, maximum drawdown from -36.4% to -35.5%, and the worst single day from -7.7% to -5.9%. The REIT-augmented portfolios move the other way: 30% VNQ raises Value-at-Risk to -2.73% (22% worse), Expected Shortfall to -4.07% (23% worse), and maximum drawdown to -43.3% (19% worse). This is consistent with the well-documented widening of REIT correlations with equities during stress periods, though the size of the daily-frequency penalty across a 20-year sample is still striking.

Table 2 repeats the exercise at monthly frequency, narrowing the window to February 2006 to June 2021 but including hedge funds.

Table 2

Table 2: Downside risk and performance statistics, monthly portfolios including hedge funds.

Statistic	p6040	DBC30	VNQ30	HF30	ALT30m
Ann_Mean	7.59%	4.40%	6.82%	5.79%	5.67%
Ann_SD	9.23%	9.36%	11.21%	5.74%	8.29%
Skewness	-0.96	-1.47	-1.44	-1.15	-1.61
Kurtosis	5.93	8.86	9.68	7.33	9.94
Min	-11.76%	-15.01%	-17.79%	-7.75%	-13.52%
Max	7.86%	6.51%	11.06%	5.13%	5.86%
VaR99m	-8.21%	-9.92%	-10.74%	-6.08%	-8.89%
VaR95m	-4.32%	-4.14%	-3.97%	-2.33%	-3.35%
ES99m	-11.76%	-15.01%	-17.79%	-6.92%	-11.20%
ES95m	-6.33%	-6.80%	-8.55%	-4.04%	-6.35%
MaxDD	-32.98%	-32.80%	-39.31%	-20.09%	-30.01%
Sharpe	0.82	0.47	0.61	1.01	0.68
N	185	185	185	185	185

Notes: Monthly log returns, N = 185 (Feb 2006 – Jun 2021, constrained by the EDHEC release). ES99m collapses to the sample minimum for portfolios where only 1-2 monthly observations sit below the 1% threshold; the 95% measures are more reliable.

The hedge fund column tells the sharpest story of any in the project. A 30% hedge fund allocation cuts the worst monthly return from -11.76% to -7.75%, lowers maximum drawdown from -33.0% to -20.1%, drops 95% Value-at-Risk from -4.32% to -2.33%, and pushes the annualised Sharpe ratio from 0.82 to 1.01. Every downside-risk measure improves while the risk-adjusted return rises, a combination neither commodities nor REITs achieve. Figure 1 shows the same picture in distributional form. The top panel plots the four full kernel densities, which are visually similar in the centre. The lower panel zooms into the left tail by plotting the empirical CDF of returns below -1%.

Figure 1

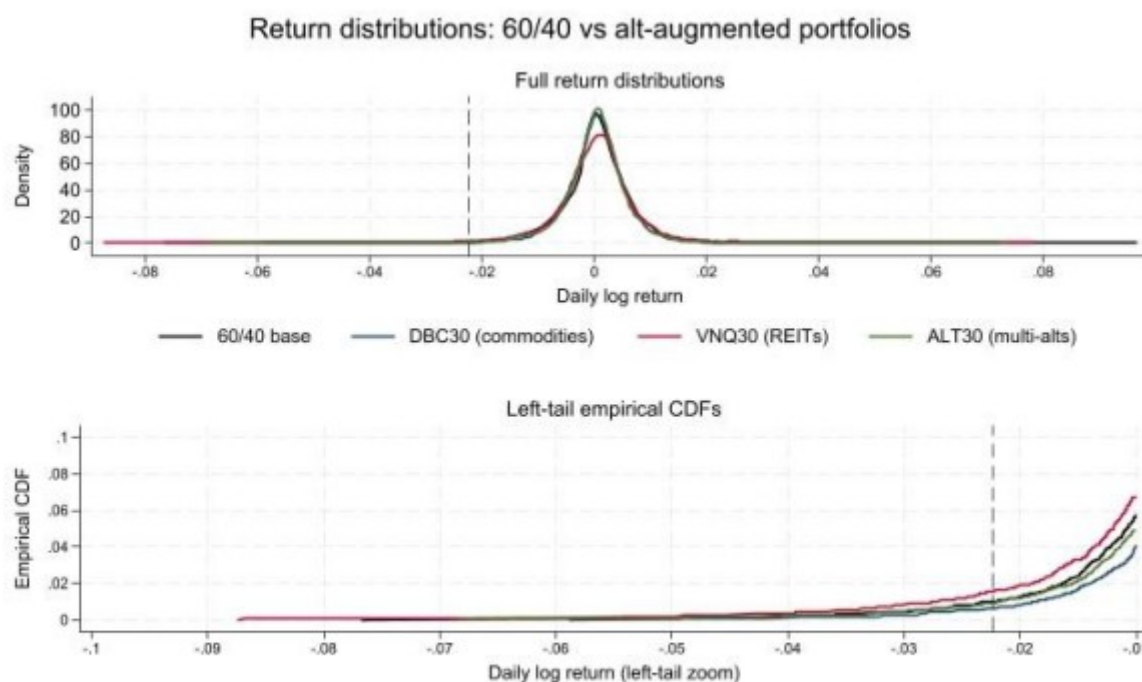


Figure 1: Daily return distributions for the base 60/40 and 30% augmented portfolios

Notes: Top panel: kernel density estimates. Bottom panel: empirical CDF of returns below -1% (lower curve = fewer days at or below threshold). Dashed line marks the base 60/40's 1% VaR (-2.24%). Daily log returns, sample 7 February 2006 to 31 December 2025.

The empirical CDFs separate clearly in the moderate tail (around -1.5% to -2.5%). The VNQ30 curve sits above the base 60/40, indicating a higher share of days at or below any given loss threshold, while the DBC30 curve sits below the base, with ALT30 between the two. The ordering is exactly what Tables 1 and 2 report numerically.

Table 3 then sharpens the H1 result with a quantile regression of each portfolio's return on the S&P 500, estimated at the 5th, 25th, 50th, 75th and 95th conditional quantiles.

Table 3

Table 3: Quantile regression of portfolio returns on the S&P 500 return.

Quantile	DBC30	VNQ30	ALT30
Q05 (left tail)	0.43***	0.66***	0.55***
Q25	0.43***	0.61***	0.52***
Q50 (median)	0.42***	0.58***	0.51***
Q75	0.41***	0.59***	0.50***
Q95 (right tail)	0.41***	0.62***	0.52***

Notes: Base 60/40 OLS $\beta = 0.599$. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

For DBC30 the slope on the S&P 500 is essentially flat across quantiles at 0.41 to 0.43, meaning the commodity-augmented portfolio's equity sensitivity is no greater on its worst days than on its best. For VNQ30 the slope is U-shaped, rising to 0.658 at the 5th percentile, higher than the base 60/40's 0.616 in the same conditional state. REITs amplify

equity exposure precisely where downside protection would be valuable, a result that is hard to read as anything other than the absence of true diversification in the left tail. Mehlig and Auer (2021) show that Expected Shortfall estimates rise sharply during recessions and bear markets, which is consistent with the absolute size of the values reported here.

Hypothesis 2: Which Alternatives are the Best Diversifiers?

The H1 results show alternatives do not act uniformly. The literature predicts hedge funds and commodities ahead of REITs, and the data agree. Table 1's five tail measures yield the same ordering throughout: DBC30 > ALT30 > VNQ30, with the base 60/40 between DBC30 and ALT30. Table 2 then places hedge funds top by every downside-risk metric, with HF30's max drawdown of -20.1% sitting 12.9 percentage points below the next-best single alternative.

Figure 2 places the cross-section in time. I estimate a rolling 60-day CAPM beta of each augmented portfolio against the S&P 500. A diversifying alternative should have a beta below the base 60/40's 0.60 and ideally one that falls during stress periods.

Figure 2

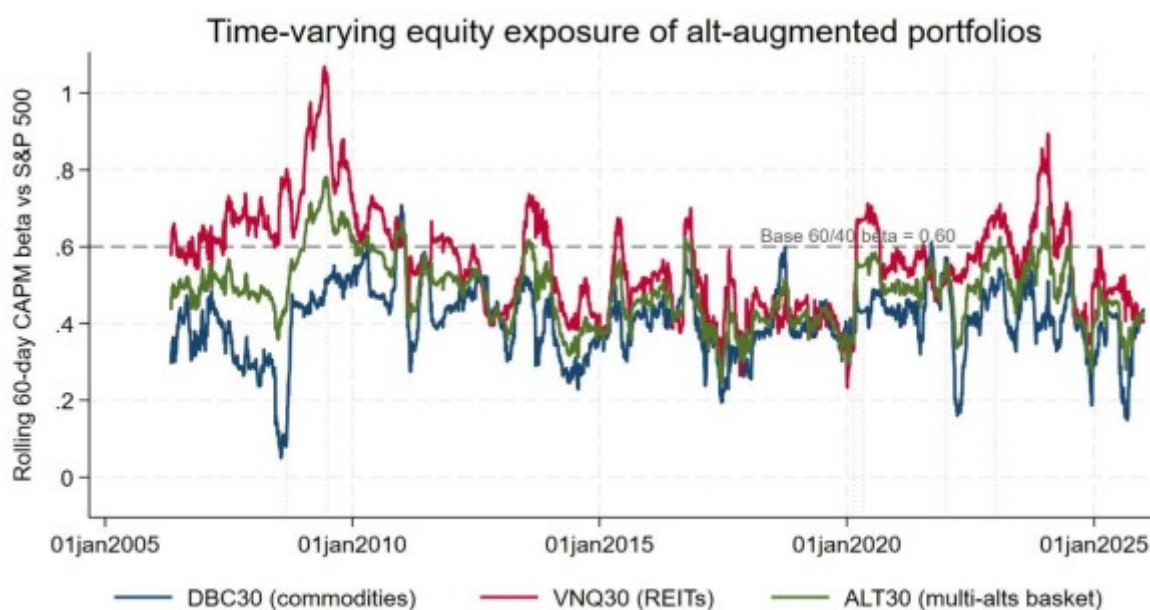


Figure 2: Rolling 60-day CAPM betas of augmented portfolios against the S&P 500.

The DBC30 line stays well below 0.60 for almost the entire sample and dips sharply during the 2008 GFC, reaching a low of 0.05. This is consistent with Bhardwaj, Gorton and Rouwenhorst (2015), who document time-varying commodity diversification benefits: a diversified commodity index continues to provide equity-risk reduction in the moments where reduction is most valuable. The VNQ30 line tells the opposite story. Its beta spends much of the sample above 0.60, including the GFC peak at 1.07, and rises again during the COVID crash and the 2022 inflation episode. REITs amplify equity exposure precisely in stress. Ordu, Oran and Soytaş (2018) document the same pattern for agricultural

commodities after 2008, where rising index-investor positions drove cross-asset correlations higher when liquidity was abundant.

ALT30 sits between the two but does not stabilise during crises: the VNQ component drags it up at the moments the DBC component is doing useful work. The implication is that a multi-alt basket should overweight alternatives that decouple from equities in stress (commodities, hedge funds) and underweight those that do not (REITs).

Hypothesis 3: When Do Alternatives Help?

The full-sample results in Tables 1 and 2 average across very different market regimes. H3 asks whether the diversification benefits of alternatives are stable across stress episodes or whether they are concentrated in particular crisis types. I split the daily sample into four mutually exclusive regimes: the 2008 Global Financial Crisis (September 2008 to June 2009), the COVID equity crash (February to April 2020), the 2022 inflation selloff (calendar 2022), and a residual calm period that contains the remaining 4,496 trading days.

Table 4 reports cumulative returns and worst-day losses within each regime for the base 60/40 and the three 30% augmented portfolios. The results are striking. In the 2022 inflation regime, the base 60/40 lost 17.6% cumulatively while DBC30 lost only 6.3%, a 64% reduction in drawdown. VNQ30 lost 20.7%, deeper than the base. This is the inflation-hedge mechanism described in Brown (2026b): commodity prices are positively correlated with inflation while stocks and bonds are not, so commodities cushion the portfolio precisely when the bond leg fails. The 2022 finding is the strongest empirical confirmation of H3 in the project.

Table 4

Table 4: Cumulative log returns by regime.

Regime	60/40	DBC30	VNQ30	ALT30
GFC	-16.61%	-22.22%	-25.65%	-23.93%
COVID	-7.70%	-12.70%	-10.69%	-11.69%
Y2022	-17.61%	-6.29%	-20.73%	-13.51%
CALM	190.50%	133.36%	178.98%	156.17%

Notes: Sum of daily log returns within each regime. Regime counts: GFC = 209, COVID = 50, 2022 = 251, Calm = 4,496 trading days. Sample: 7 February 2006 to 31 December 2025.

The GFC complicates the picture. DBC30 lost 22.2% cumulatively, deeper than the base's 16.6%, even though its worst single day (-4.9%) was smaller (base: -5.6%). Commodities had their own crash in late 2008 as oil collapsed from \$147 to \$33, overwhelming the day-level cushion over a 10-month episode. This is the Bhardwaj, Gorton and Rouwenhorst (2015) result: commodity diversification works at high frequency but can be swamped by commodity-specific drawdowns at longer horizons. COVID shows a similar pattern, with DBC30 losing 12.7% versus the base's 7.7%. Figure 3 plots cumulative wealth across the full sample.

Figure 3

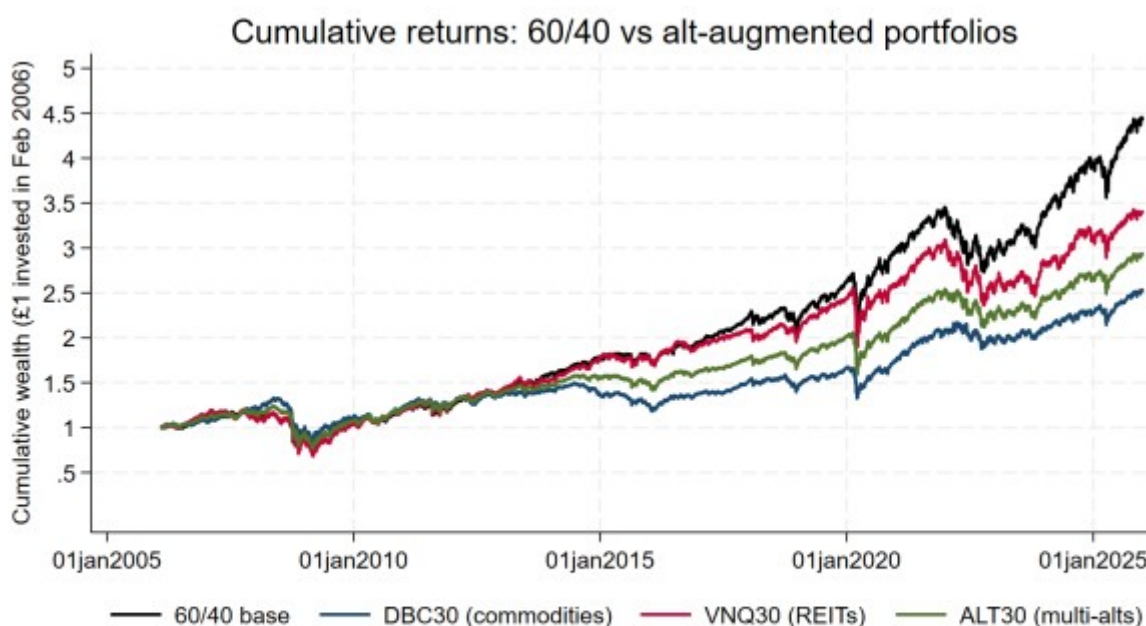


Figure 3: Cumulative wealth across the sample for the base 60/40 and 30% augmented portfolios.

Notes: Cumulative wealth path of £1 invested on 7 February 2006. Shaded bands mark the three crisis windows from Table 4. The gap between lines is the long-run cost of the downside protection in Tables 1, 2 and 4.

The base 60/40 ends highest at roughly 4.4x initial wealth, with all alt-augmented portfolios trailing. The chart visualises the cost of diversification: the dollar return given up to obtain the downside protection documented in Tables 1, 2 and 4. Whether this cost is worth paying depends on the investor's exposure to the regime types where alternatives differentiate themselves, principally the 2022-style inflationary regime where the gap between DBC30 (-6.3%) and the base (-17.6%) is large.

Robustness, Limitations and Conclusion

The findings are robust to the choice of bond proxy. Replacing AGG with the Treasury-only IEF shrinks the base 60/40's maximum drawdown from -36.4% to -33.5% and its VaR99 from -2.24% to -2.06%, while the corporate-only LQD widens both. The ordering of alternatives across diversification quality is unchanged.

The findings come with caveats. First, the EDHEC hedge fund series ends June 2021, so the 2022 inflation regime is observed only at daily frequency for commodities and REITs. Second, hedge fund indices contain survivorship and reporting biases that may flatter the HF30 result. Third, Bitcoin and other digital assets are excluded from the empirical work to keep the sample window long; the literature on crypto as an alternative is growing and a future extension would be warranted.

The headline conclusion is that downside-risk benefits from alternatives exist but are not uniform. Hedge funds dominate every metric; commodities help most in inflationary regimes; REITs amplify rather than dampen equity tail risk. The cost is roughly 23 to 43%

of cumulative wealth over 20 years (Figure 3). Whether the trade is worthwhile depends on the regime the investor expects to face.

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Does Naïve Diversification Perform Better Than Mean- Variance Optimisation When Investing in Commodities?

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Literature Review

The classical mean variance framework

Modern Portfolio Theory derived by Markowitz (1952), provides a clear theoretical case for mean-variance optimisation. Given expected returns and a covariance matrix, an investor can construct a portfolio that dominates any non-optimised alternative on a risk-return basis. The minimum variance portfolio is a uniquely attractive case, requiring only the covariance matrix and bypassing the notoriously difficult problem of forecasting expected returns. On paper, optimised portfolios should consistently beat naïve alternatives like equal weighting ($1/N$).

The empirical records suggest otherwise. DeMiguel, Garlappi & Uppal (2009) examine 14 mean-variance strategies across seven asset universes and find that none reliably outperforms $1/N$ out-of-sample, whether measured by Sharpe ratio, certainty equivalent return, or turnover. A strategy that uses no sample information matches or beats strategies that use a great deal of it — a result sharp enough to constitute a genuine puzzle, and one that has driven sizeable literature, trying to pin down when and why optimisation fails.

The $1/N$ puzzle and its theoretical foundations

The puzzle itself dissolves when one acknowledges that the inputs to optimisation are estimates rather than concrete figures. Sample means and sample covariances are noisy approximations of their population counterparts, and the mean-variance optimiser doesn't distinguish between signal and noise. It allocates capital to whatever combination of assets appears most attractive in the historical sample, including features of that sample that will not repeat. Michaud (1989) describes this tendency as "estimation error maximisation" because the optimiser overweights assets with high estimated returns or low estimated covariances. It systematically loads on the assets with statistics flattered purely by chance, and the $1/N$ rule, by contrast, ignores sample information entirely and is therefore unaffected by these 'inflated' statistics. What may look like a weakness is actually disregarding information that mostly consists of noise.

The severity of the estimation problem grows sharply with the size of the asset universe. A portfolio of N assets requires the estimation of $N(N+1)/2$ distinct covariance parameters, all drawn from the same finite sample. For 12 commodities and a 60-month rolling window, this means 78 parameters estimated from 720 observations, leaving fewer than 10 per parameter. The resulting covariance estimates are noisy, and small perturbations in the inputs produce disproportionately large shifts in the optimised weights. DeMiguel, Garlappi & Uppal (2009) make this concrete: the sample length required to outperform $1/N$ out-of-sample is roughly 3,000 months (250 years) for a 25-asset universe and 6,000 months for 50 assets. Under any realistic data constraint, the sample-based optimiser operates well outside the regime in which its theoretical advantage applies.

A natural response to this estimation error is to shrink the sample covariance matrix toward a more structured target. Ledoit & Wolf (2003, 2004) propose pulling the sample matrix toward a constant-correlation, single-factor, or scaled-identity target, with the shrinkage intensity chosen optimally to minimise expected mean squared error. The

adjusted estimator accepts a small amount of bias for a substantial reduction in variance, improving out-of-sample performance. DeMiguel, Garlappi & Uppal (2009) include shrinkage-based portfolios among the strategies they test, and find that they too fail to consistently dominate 1/N.

Commodities as an asset class

Most of the previous literature focuses on equity portfolios. Commodities differ from equities – generating no cash flows, deriving their returns from spot price movements and futures market structure rather than discounted earnings, and exhibiting pronounced regime shifts driven by supply shocks, geopolitics, and macroeconomic cycles. Gorton & Rouwenhorst (2006) document that over the period 1959 to 2004, a fully collateralised long position in a basket of commodity futures generated equity-like returns with low correlation to stocks and bonds, providing a clear diversification case. More recent work contradicts this conclusion. Daskalaki & Skiadopoulos (2011) and Tang & Xiong (2012) argue that the financialisation of commodity markets in the 2000s, driven by the growth of index investing, has elevated cross-commodity correlations and weakened the historical diversification benefit. The empirical case for commodities must therefore be sample-period sensitive, which has direct implications for the stability of any optimisation-based strategy.

Spot prices, roll yield, and frictions

Investable commodity exposure typically exists in the form of futures rather than spot positions since most commodities incur costs for storage. Erb & Harvey (2006) decompose the return on a long futures position into a spot return, a roll yield arising from rolling expiring contracts forward, and a collateral return on the cash margin. Over their sample, roll yield accounts for the majority of the average return on a diversified commodity futures basket, dominating the spot price contributions. Backtests that proxy commodity returns using spot prices alone understate the realised performance of investable strategies and misrepresent the cross-sectional structure of returns. Transaction costs and turnover also carry more weight in commodity markets than in equities, as bid-ask spreads on individual contracts are wider and due to rolling positions imposing recurring costs independent of strategic rebalancing. Optimisation-based strategies, which typically generate higher turnover than 1/N, are correspondingly more exposed to these frictions.

Personal Analysis

Methodology

This analysis examines 12 commodity price series at monthly frequencies from Jan 2005-May 2026. Energy commodities (WTI crude, Brent crude, US Henry Hub natural gas), industrial metals (copper), and agriculturals (corn, wheat, soybeans, sugar, coffee, cotton) are sourced from FRED's IMF Primary Commodity Prices database. Gold and silver are sourced as monthly-averaged front-month futures prices from investing.com, since FRED's licensed daily LBMA series were discontinued in 2022. All series data were converted to

log returns. The initial 60 months were reserved for initial covariance estimation, yielding 193 out-of-sample observations from Jan 2010 onwards.

Four strategies were compared. The 1/N strategy holds equal weights on all 12 commodities and rebalances monthly. Three minimum variance variants were constructed: an unconstrained version solved in closed form; a long-only version computed via an active-set algorithm that drops the most negative weight at each iteration until all weights are non-negative; and a third variant that first shrinks the sample covariance toward a scaled identity target following Ledoit & Wolf (2004) before applying the same long-only optimiser. The shrinkage intensity is chosen in closed form to minimise expected mean squared error. All variants re-estimate the covariance over a 60-month rolling window. Strategy returns are evaluated using annualised Sharpe and Sortino ratios, maximum drawdowns, and average annualised turnover. Transaction costs are imposed as a per-period drag equal to $(c/10,000) \times \text{turnover}_t$, evaluated at four cost levels: 0, 5, 10, and 20 basis points.

To assess whether minimum variance generates risk-adjusted excess return beyond passive commodity exposure, each strategy's returns are regressed on the 1/N return series with Newey-West (HAC) standard errors at three lags. The pairwise equality of annualised Sharpe ratios is tested separately using the Jobson-Korkie statistic with Memmel's (2003) correction. A second regression examines the determinants of relative performance by regressing the rolling 12-month Sharpe gaps between each minimum variance variant and 1/N on the average correlation across the twelve commodities and the cross-sectional dispersion of their volatilities.

Figure 1

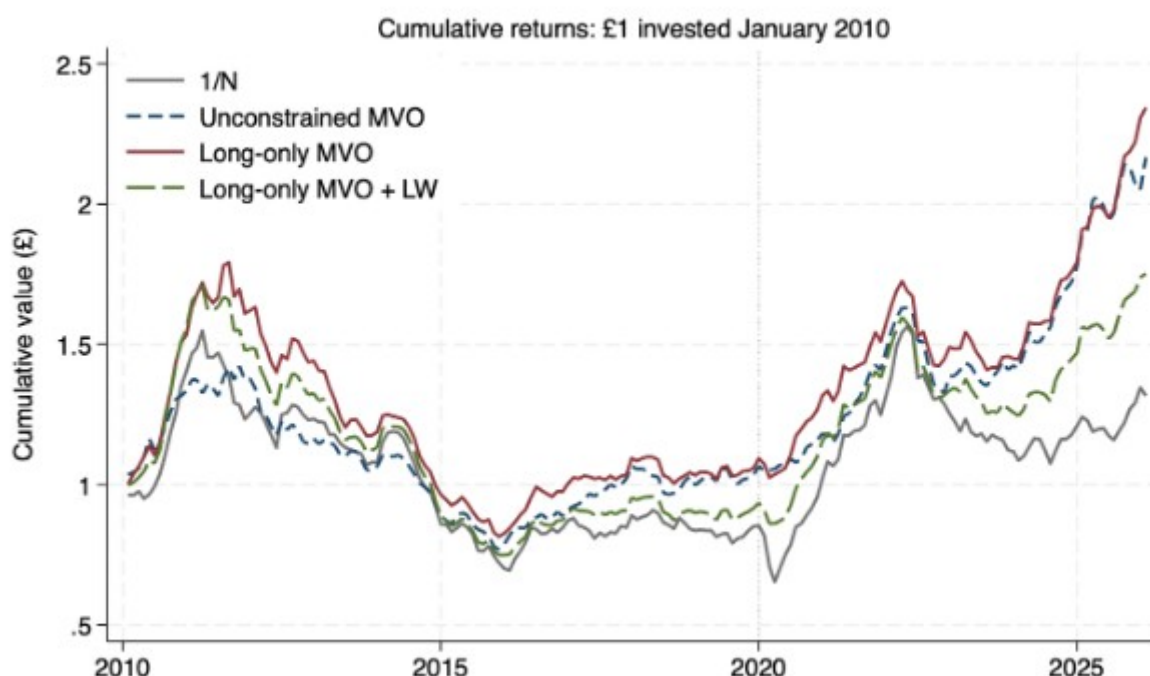


Fig 1. Cumulative growth of £1 invested from January 2010 to May 2026 under four strategies: equal-weighted (1/N), unconstrained minimum variance, long-only minimum variance, and long-only minimum variance with Ledoit-Wolf shrinkage. Returns are gross of transaction costs. The vertical dotted line at January 2020 marks the boundary used in the sub-period analysis.

Headline

Figure 1 shows the cumulative growth of £1 invested in each strategy from January 2010, and Table 1 reports the headline metrics. All three minimum variance variants outperform 1/N decisively. At zero costs, unconstrained and long-only minimum variance deliver annualised Sharpe ratios near 0.52 against 0.14 for 1/N, and the Memmel-corrected Jobson-Korkie test rejects the equality of these Sharpes at the 0.1% level ($z = 5.16$ for long-only versus 1/N, $z = 4.15$ for unconstrained). The shrinkage variant lands lower at 0.34, still significantly above 1/N ($z = 3.47$, $p = 0.001$) but significantly below plain long-only ($z = -5.76$, $p < 0.001$). Long-only's annualised turnover of 0.49 is less than half the unconstrained value of 1.06 and only modestly above 1/N's 0.27, which is driven entirely by drift in the equal-weighted holdings. The cost ladder confirms the ranking is structural rather than frictional: at 20 basis points the long-only Sharpe falls only to 0.512 while 1/N falls to 0.134. Maximum drawdowns are large across the board (46% to 58%), consistent with commodities as a high-risk asset class, but the unconstrained portfolio's -46% drawdown is materially shallower than 1/N's -58%, indicating that the freedom to short provided meaningful downside protection during major commodity sell-offs.

Table 1

Strategy	Sharpe (0bp)	Sharpe (20bp)	Sortino	<u>MaxDD</u>	Turnover	z vs 1/N
1/N	0.139	0.134	0.216	-57.8%	0.271	-
Unc	0.530	0.507	0.913	-46.0%	1.061	4.15
Lo	0.522	0.512	0.858	-54.5%	0.492	5.16
Lo + LW	0.336	0.327	0.536	-56.2%	0.436	3.47

Annualised performance metrics, Feb 2010 to Feb 2026. Sharpe ratios shown at 0 and 20 bps of one-way transaction cost. The Memmel z column reports the Jobson-Korkie test with Memmel (2003) correction against 1/N.

Mechanism

Two regressions help interpret the headline gap. Regression A regresses each minimum variance return on the 1/N return with Newey-West errors at three lags. Long-only MVO delivers a monthly alpha of 0.36% ($t = 2.03$, annualised 4.3%) on a beta of 0.60; unconstrained MVO produces a similar alpha (0.35%, $t = 1.81$) on a beta of 0.34,

consistent with its freedom to short; the shrinkage variant generates only 0.19% monthly ($t = 1.38$, statistically insignificant) on the highest beta of 0.71. The progression of betas (0.34, 0.60, 0.71) is informative: each layer of constraint or shrinkage pulls the strategy toward the equal-weighted benchmark, and shrinkage does so most aggressively because the scaled-identity target collapses cross-sectional variance information the unshrunk optimiser was exploiting. Regression B confirms the mechanism. Regressing the rolling 12-month Sharpe gap on the contemporaneous average pairwise correlation and cross-sectional dispersion of asset volatilities, both predictors enter with the expected signs and high significance: avg_corr coefficient -3.62 ($t = -3.41$), vol_disp coefficient 26.27 ($t = 4.68$) for the long-only gap, with the shrinkage gap showing identical signs and slightly smaller magnitudes. The literature's prediction holds in this universe: minimum variance outperforms 1/N when correlations are low, and volatilities are dispersed. This reframes rather than overturns DeMiguel, Garlappi and Uppal. Estimation error matters in their large-N setting, but in this 12-asset commodity universe it is not the binding constraint. When the canonical fix for estimation error destroys signal rather than preserving it, the diagnosis is that the sample covariance was already extracting genuine vol-dispersion information the scaled-identity target throws away.

Robustness

Two robustness exercises stand out. Splitting the out-of-sample period into three distinct regimes (2010-2014 supercycle peak, 2015-2019 bear market and stabilisation, 2020-2026 inflation and geopolitical premium) reveals that the headline result is heavily concentrated in the final period. In 2010-2014, no strategy produces a statistically significant alpha against 1/N and Sharpe ratios are negative across the board. In 2015-2019, MVO variants flip to modest positive Sharpes (0.16 for long-only, 0.26 for unconstrained) while 1/N remains negative, though attribution alphas remain statistically insignificant. The 2020-2026 period contains essentially all of the headline alpha: long-only generates an annualised alpha of 9.45% ($t = 2.73$), unconstrained 10.10% ($t = 2.37$), and even the shrinkage variant 6.40% ($t = 2.26$), all comfortably significant. This pattern is consistent with the conditioning regression's vol-dispersion mechanism: the post-2020 period saw extreme dispersion between energy and metals, which the optimiser exploited.

The multi-frequency rebalancing tells a complementary story. The MVO advantage survives at every rebalancing frequency tested. Annual rebalancing produces the highest Sharpe ratios for both unconstrained (0.549) and long-only (0.549), marginally above their monthly counterparts (0.530 and 0.522), with annual turnover roughly one-third of monthly. The natural practical conclusion is that the conventional default of monthly rebalancing is suboptimal for this strategy in this asset class: annual rebalancing captures the same risk-reduction benefit while avoiding the turnover and cost it generates.

Conclusion

The empirical conclusion presents that in a 12-commodity universe over 2010 to 2026, minimum variance optimisation outperforms naïve 1/N diversification by a wide margin that survives transaction costs, statistical testing, sub-period decomposition, and changes in rebalancing frequency. The DeMiguel, Garlappi and Uppal puzzle does not generalise to this setting. The mechanism is the high cross-sectional dispersion of commodity volatilities, which gives the optimiser genuine signal to act on, combined with a small enough asset universe that estimation error per parameter remains manageable. The shrinkage result tightens this interpretation: when the canonical fix for estimation error destroys signal rather than improving it, the binding constraint cannot be estimation error itself. The most important limitation is the use of spot rather than fully collateralised futures returns, which omits the roll yield that Erb and Harvey identify as the dominant contributor to long-run commodity portfolio returns. Whether the optimisation advantage survives in total-return space is the natural next question.

Appendix

Table A1. Newey-West regressions of each minimum variance strategy's monthly return on the 1/N monthly return, three lags. t-statistics in parentheses.

	L0	Unc	L0 + LW
Beta on 1/N	0.596 (9.27)	0.337 (5.06)	0.708 (10.58)
Constant (monthly)	0.00356 (2.03)	0.00353 (1.81)	0.00189 (1.38)
Annualised alpha (%)	4.28	4.23	2.27
N	193	193	193

Table A2. Newey-West regressions of the rolling 12-month annualised Sharpe gap on the contemporaneous 12-month average pairwise correlation and cross-sectional dispersion of asset volatilities, three lags. t-statistics in parentheses.

	L0 - 1/N gap	(L0 + LW) - 1/N gap
avg_corr	-3.625 (-3.41)	-2.766 (-4.32)
vol_disp	26.270 (4.68)	21.128 (6.10)
Constant	0.230 (0.85)	0.063 (0.36)
N	182	182

Table A3. Sub-period performance and attribution. Panel A reports annualised Sharpe ratios and maximum drawdowns by sub-period (gross returns, no costs). Panel B reports annualised alphas in percent from Newey-West regressions of each strategy's return on the 1/N return, with t-statistics in parentheses.

Panel A: Performance metrics						
	2010-2014		2015-2019		2020-2026	
	Sharpe	MaxDD	Sharpe	MaxDD	Sharpe	MaxDD
1/N	-0.134	-40.5%	-0.161	-19.3%	0.506	-31.2%
Unc	-0.147	-34.5%	0.261	-14.5%	1.299	-18.6%
LO	-0.007	-44.4%	0.164	-15.5%	1.346	-18.4%
LO + LW	-0.101	-45.0%	-0.064	-15.6%	1.048	-22.1%

Panel B: Annualised alpha (%) vs 1/N						
	2010-2014		2015-2019		2020-2026	
LO	1.19	(0.28)	2.11	(0.94)	9.45	(2.73)
Unc	-0.80	(-0.20)	2.70	(0.89)	10.10	(2.37)
LO + LW	0.23	(0.08)	0.59	(0.35)	6.40	(2.26)

Table A4. Multi-frequency analysis. Panel A reports annualised Sharpe ratios at zero transaction cost across three rebalancing frequencies. Panel B reports annualised turnover. The Ledoit-Wolf shrinkage variant is not extended to the multi-frequency grid.

Panel A: Annualised Sharpe ratios (0 bps)			
	Monthly	Quarterly	Annual
1/N	0.139	0.211	0.125
Unconstrained	0.530	0.459	0.549
Long-only	0.522	0.509	0.549

Panel B: Annualised turnover			
	Monthly	Quarterly	Annual
1/N	0.271	0.183	0.081
Unconstrained	1.061	0.718	0.382
Long-only	0.492	0.339	0.180

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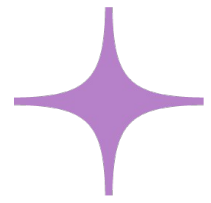
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