

**Society's Emergent Behaviour:
Neoclassical Economics as Evidence of a Global Wealth Imperative**

By Tim Gooding

2015

Abstract

Consider that neoclassical economic theory rests on absurd assumptions and was mathematically debunked by economists themselves in the 1950's. Even before neoclassical theory was born, its null hypothesis has been fulfilled. So how did a failed scientific idea come to dominate economic departments, win elections, determine who gets society's wealth, and become the final arbitrator of economic morality in society? Elsewhere in science, capturing simple rules in emergent multi-agent models resulted in successfully reproducing the historic rise of ancient societies in Europe and reproducing key societal trends of modern global society. This suggests that scientifically reproducible forces are a factor in shaping human society. Specifically, placing observable characteristics of modern society in emergent models result in the formation of an evolutionary problem-solving process called a wealth aggregation evolutionary imperative or, more simply, a wealth imperative. A wealth imperative empowers any social agent that is relatively successful in aggregating wealth while disempowering poor performers. Trends in wealth inequality, politics, science, and bureaucracy are consistent with the existence of a wealth imperative. Furthermore, while neoclassical theory fails scientific tests, it is society's best available rationalisation of wealth inequality, the necessary outcome of wealth aggregation. This paper tests whether neoclassical theory is evidence for the existence of a wealth imperative in global society.

Neoclassical Theory: A Scientific Overview

The stated purpose of science is to distinguish reality from beliefs without regard to how attractive a particular belief may be. Society entrusts academia to safeguard scientific integrity and to pass its practice to future generations. Therefore, it should be a comfort to know that neoclassical economic theory, conceived in academia, was so compelling it went on to dominate economic departments the world over. In recent history, many economics students achieve their first degree having never been exposed to anything except neoclassical theory (Keen 2011, p. 36).

At the core of neoclassical theory lies equilibrium analysis. Therefore, neoclassical theory is scientifically valid only if the modern economy is an equilibrium system. This gives us enough information to conduct Popper's empirical falsification test.

Hypothesis: The modern economy is an equilibrium system.

Null hypothesis: The modern economy is not an equilibrium system.

A key trait of an equilibrium system is that it will always move towards its equilibrium, even after being subjected to shocks. By definition, it is impossible for an equilibrium system to endogenously create shocks. This offers us a simple and definitive scientific test: is there evidence of endogenous shocks occurring anywhere at anytime in market economies? As Bordo (2003, p. 1) says, 'Financial history is replete with stock market crashes'. The first modern market shock is recognised as occurring in 1720 (Dale, 2004). The two largest and most famous occurred in 1929 and 2008. Therefore the null hypothesis is true. The scientific conclusion is that neoclassical theory is not valid.

It is impossible for a scientifically invalid theory to survive in an institution primarily shaped by scientific concerns. However, not only did neoclassical theory survive and thrive, it developed an immunity to criticism. For example, even though Gorman (1953) mathematically proved that downward sloping aggregate demand curves cannot be assumed, undergraduates today are taught that aggregate demand curves are necessarily downward sloping. (Samuelson and Nordhaus, 2010). Another example is that the term for capital (K) used in neoclassical mathematical formulae lacks units. When Robinson (1953-1954) pointed this out, a fierce debate ensued in mainstream journals that raged until Robinson and her colleagues died (Cohen and Harcourt, 2003). Today, the definition of K's unit still lacks consensus which means that any calculations involving K are impossible to quantify or validate.

This leads us to an intriguing question: if not science, what is empowering neoclassical theory and why? To answer this question we step outside of economics and academia in order to examine society as a whole. There we find the precise conditions necessary to give rise to dynamic forces that would empower neoclassical theory regardless of its scientific merit. The branch of science utilized for this analysis is the same one that recently overturned core understandings in the physical sciences (Sardar and Abrams, 1999). What follows is an analysis of neoclassical economics through a lens of emergent behaviour.

The Emergent Shape of Modern Society

In the long-run, in order for a linear system analysis to be useful, the economy must be a linear system. However, it could be argued that society's economy emerges from people. We know that groups of people behave according to emergent behaviour (Challenger,

Clegg, Robinson, Mark, 2009) and we have increasing evidence that society as a whole is being shaped by emergent forces (Turchin, Currie, Turner, Gavrillets, 2013). If the economy emerges from people then it follows that the economy is likely to be an emergent phenomenon.

Modern global society is organised precisely in a manner necessary to activate a specific problem-solving function of emergent behaviour: evolve the best processes of wealth aggregation. As the problem-solving processes are evolutionary in nature, the predicted result is a society characterised by a wealth aggregation evolutionary imperative or, more simply, a wealth imperative. The term *imperative* is used to distinguish a system-wide evolutionary agency from that of human greed.

Recently, society's existing observable properties relevant to emergent behaviour were tested in multi-agent simulation. The result was the emergence of a wealth imperative in addition to several other recognisable trends from modern society (Gooding 2014).

A society shaped by a wealth imperative will empower successful wealth aggregation practices while disempowering unsuccessful wealth aggregation practices. In practical terms, this will cause bureaucracies to strive for complexity in order to justify larger budgets, governments to increasingly shape law and policy to better enable wealth aggregation, and academia to increasingly favour research linked to money rather than discovery. If the scientific process contradicts wealth aggregation, the scientific process will be disempowered in favour of rationalisations promoting wealth aggregation. This is exemplified by society's response to climate change research.

In a system characterised by wealth aggregation, successful agents will gather wealth from less successful agents and thereby create unemployment and starvation. This directly contradicts predictions made by neoclassical economics: 'The market system ensures that society attains maximum social welfare through rational and efficient allocation of resources. It does so by ensuring society produces at its maximum productive potential, with all resources being fully employed.' (Suresh, 2010, p. 155). This conflict offers us an opportunity to do a scientific test:

Hypothesis: Neoclassical theory serves society's wealth imperative by offering a means and a rationale for wealth aggregation.

Null Hypothesis: Neoclassical economics accurately describes and facilitates the realisation of maximum social welfare.

Neoclassical Economics - Social Welfare or Wealth Imperative?

It can be argued that society's proportionate effort in studies and reporting indicates society's priorities. For example, a vast array of comprehensive up-to-date economic information is readily available, used in policy decisions at all levels, and broadcast in all media. This suggests the economy is a high priority for society. On the other hand, consider that in 2001, the UN released a report estimating that 58% of all people born on earth would die from the effects of starvation (Ziegler, 2001). If people were a priority, one would expect a number of subsequent studies to immediately follow. How accurate is the 2001 study? Can we establish the trends of global starvation? Are there any significant correlations between global starvation trends and other global trends? None of these questions were answered because not a single follow up study was done. Today, no

figures exist for worldwide starvation rates. This suggests that modern society's priority is the well-being of the wealth economy rather than the well-being of people. It follows that society's choice of economic theory will serve the economy's needs over those of people.

The act of wealth aggregation is the process of transferring wealth from one person or group to enrich another. If starvation increases in the presence of an increasing food supply, it necessarily indicates wealth being aggregated away from the poor. This is evident in emergent models featuring a wealth imperative. In figure 1, note how starvation rises as the per capita food supply is rising.



Figure 1 – Population, Food per Capita, and Starvation Rate indicated by the green line.

(Gooding 2014)

If the UN's 2001 estimate is correct, free-market prosperity is organised to benefit less than half the people born on earth. Solving starvation would involve wealth becoming more evenly distributed. This would directly interfere with wealth aggregation. In a society featuring a wealth imperative, any actions equalising wealth will be disempowered over time, even if backed by famous singers.

Unless widespread starvation is a feature of 'maximum social welfare', the market economy is not serving society as neoclassical theory says it must. On the other hand, the

world economy is achieving increasing success at aggregating wealth. Therefore, the null hypothesis fails while the hypothesis succeeds.

Such a high level of starvation could be considered a criminal oversight if neoclassical models reported on starvation. However, unlike the model used in figure 1, the human need for food is not an intrinsic part of neoclassical models. This renders starvation invisible to neoclassical modelers. Even the most empathetic neoclassical policy-makers are forced to optimise economies while blind to any starvation consequences.

Functionally, this relegates starvation to the status of 'externality' even though starvation is a basic problem of economic distribution. In this way, neoclassical theory facilitates the nurturing of wealth while ignoring the well-being of many people. Again, the null hypothesis fails while the hypothesis is supported.

Society is required to embrace wealth inequality in order for wealth aggregation to exist. Neoclassical theory explains that wealth inequality is necessary in order for social justice and prosperity to emerge. The story goes like this: people are paid according to their marginal productivity. The more productive one is in society, the more one will get remunerated by society. If the neoclassical story is true, then empirical wealth differences can be converted back into meaningful productivity differences.

Using figures from Forbe's Billionaires List and Credit Suisse Global Wealth Datebook, Oxfam calculated that 80 (down from 2014's figure of 85) of the richest people in global society have the same aggregate wealth as 3.5 billion of the poorest people (Oxfam 2015). If we convert this difference into productivity, the result is that 1 hour of work from one of the richest people in society is equivalent to 12,943 years of work from someone in the poor half of society, assuming a 65 hour work week and no holidays for the poor person.

Neoclassical theory fails in terms of science, empirics, prediction, and human welfare while providing strong rationalisations for wealth inequality. If science was the dominant force in academia, this would not be possible. On the other hand, a society shaped by a wealth imperative will empower rationalisations of wealth aggregation over alternative theories regardless of scientific or empirical merit. Therefore, we conclude that it is possible for neoclassical theory to be evidence of a wealth imperative.

Seeking Society's Wealth Imperative

The null hypothesis for this paper is that neoclassical theory is an anomaly in society. In order to hold neoclassical theory as evidence of a wealth imperative influencing society, neoclassical theory would have to be a single piece of a much larger body of evidence.

While a full analysis of society is beyond the scope of this paper, the following is offered as an example of the rich diversity of evidence of a wealth imperative. We start with the story society has been telling us about academia.

The primary function of academia, we are told, is to research and teach. Unfortunately, one result of this honourable calling is a 'funding crunch'. The university system 'funding crunch' is causing fees to rise to distressing levels for many students while squeezing the salaries, resources, and time for many lecturers.

Meanwhile, society tells us another story about how the modern economy is a miracle of increasing prosperity as evidenced by recent new highs in the stock markets. Obviously, increasing prosperity will necessary increase the potential for funding.

When these two stories are combined, the root cause of the university 'funding crunch' becomes rather puzzling. Fortunately, a New York Times article clarifies the situation by reporting the following about US universities (Campos, 2015):

- 1) The public funding of universities increased 390% over 20 years.
- 2) Tuition rose 400% since 1980.
- 3) Numbers of tenured professors and their salaries did not significantly rise.

So where did this significant funding increase go?

- 1) Administrative positions increased by 60% between 1993 and 2009, 10 times the increase of tenured professors over the same time period.
- 2) High ranking university officials are increasingly compensated over a million dollars annually.

As a wealth imperative predicts, over time, academic institutions are increasingly funneling their money to the top. Specifically, bureaucracies successfully rationalise a large expansion. This allows top bureaucrats to command much larger salaries. Not to be outdone, top university executives have also successfully increased their share of the available budget. In other words, over time, academia is increasingly serving the wealth imperative at the expense of research and teaching. Evidence that UK universities are experiencing similar trends have been widely reported (Leigh and Evans, 2014 and Coughlin, 2015).

As society's organisations increasingly change their shapes along the lines predicted by a wealth imperative, it is perhaps more helpful to seek the null hypothesis to a wealth imperative. The null hypothesis states that, over time, people and organizations can become increasingly powerful in society while becoming progressively less economically significant.

Examples of the null hypothesis have yet to be identified.

Assuming the Hypothesis: Solutions

An evolutionary imperative is a formidable agency and cannot be equated to human agency such as human greed. Emergent systems guided by an evolutionary problem-solving process demonstrate an ability to produce more efficient solutions than those designed by human experts (Hornby, Lohn, Linden, 2011) . In addition, these solutions can operate in a manner that is incomprehensible to human beings (Hillis, 1998, pp. 146-147). As such, it may be unwise to directly challenge an evolutionary imperative. It is far more feasible to change or disempower the imperative itself.

The most powerful solution is to change the fitness test. If society were to reorganise itself to create an imperative for cooperation leading to life, for example, modern society would be subjected to solutions creating life-giving cooperation over all other things. A single example of this occurring in nature is insect pollinators and plants.

The first practical step towards changing the wealth imperative is to have schools teach the basics of emergent behaviour. In the absence of understanding, the necessary

changes in society would likely be impossible to achieve. Once education is accomplished, solutions will likely become evident to most people.

A second strategy also requires people to be taught the basics concerning emergent behaviour. However, instead of using that knowledge to change society's imperative, we could use our understandings in an attempt to weaken the wealth imperative. The key to the power of any imperative lies in the nature of how we connect with one another.

Change the connection and everything changes. Perhaps we can find ways to diminish the power of the monetary connection between us and allow other connections to flourish. If done properly, the result could be the re-emergence of a life-giving societal imperative.

Emergent systems can have several imperatives going on at once. For example, before the prerequisites for the wealth imperative are initiated in a multi-agent societal simulator, the imperative is for the quality of life. The death rate is driven down, longevity is driven upwards and child mortality decreases. Once the wealth imperative becomes dominant, the death rate rises and longevity falls (Gooding 2014). The life imperative still exists but its effects are overshadowed by the newly dominant wealth imperative. As the conditions of the wealth imperative diminish, the previous imperative once again reasserts itself.

Conclusion

Science has repeatedly demonstrated that emergent behaviour predictably shapes groups of people. As a group of people, it follows that society is also being shaped by emergent behaviour. The observable characteristics of modern society include the prerequisites for a wealth imperative. Testing these prerequisites in an emergent model results in the

formation of a wealth imperative along with several recognisable trends from modern society. This suggests that society is being shaped by a wealth imperative.

Neoclassical theory's null hypothesis was evident before its conception. Later, logical and empirical challenges were successfully ignored by neoclassical economists and are today being misrepresented in economic textbooks. This suggests neoclassical economic theory fails the test of scientific integrity.

On the other hand, neoclassical theory remains the best available rationalisation of wealth inequality, a necessary consequence of wealth aggregation. According to our understandings of a wealth imperative, the ability of neoclassical theory to rationalise wealth inequality will empower it far more than scientific merit or insight.

A society characterised by a wealth imperative will produce evidence throughout society. While a detail analysis of society is beyond the scope of this paper, the example of academia is used to demonstrate how the wealth imperative is shaping society's institutions over time. However, the most severe consequences the wealth imperative is best exemplified by the UN study suggesting that 58% of all people born on earth die from the effects of starvation.

A wealth imperative is predicted to impact all aspects of society including the ecosystem, population levels and society's stance over such things as a potential human induced climate change. On the positive side, it is possible that potential solutions to many of society's 'modern' problems lie within the understandings of emergent behaviour as it applies to human society.

Bibliography

Bonabeau, E. (2002) Agent-based modeling: Methods and techniques for simulating human systems, *Proc Natl Acad Sci U S A*. 2002 May 14; 99(Suppl 3): 7280–7287. doi: [10.1073/pnas.082080899](https://doi.org/10.1073/pnas.082080899)

Bordo, M. (2003) Stock Market Crashes, Productivity Boom Busts and Recessions: Some Historical Evidence, Rutgers University. Downloaded April 2015.
http://www.cfr.org/content/thinktank/Depression/Bordo_2.pdf

Campos, P., (2015) 'The Real Reason College Tuition Costs So Much', *The New York Times*, 04-04-2015, <http://www.nytimes.com/2015/04/05/opinion/sunday/the-real-reason-college-tuition-costs-so-much.html>

Challenger, R., Clegg, C. W., Robinson, M., Mark, L., (2009) Understanding Crowd Behaviours: Supporting Documentation, Emergency Planning College – University of Leeds for the Cabinet Office, UK.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/62641/supportingdocumentation1_0.pdf

Cohen, A. J. and G. C. Harcourt, (2003) “Whatever Happened to the Cambridge Capital Theory Controversies?”, *Journal of Economic Perspectives*, Volume 17, Number 1, Winter 2003, pp. 199 - 214

Coughlin, S., (2015) 'University bosses earning £260,000', *BBC News*, 04-03-2015, retrieved online 07-05-2015: <http://www.bbc.co.uk/news/education-31715020>

Dale, R., (2004) *The First Crash: Lessons from the South Sea Bubble*, Princeton University Press, New Jersey.

Gooding, T., (2014) 'Modelling Society's Evolutionary Forces', *Journal of Artificial Societies and Social Simulation*, 17(3) 3: <http://jasss.soc.surrey.ac.uk/17/3/3.html>

Gorman, W. M. (1953) 'Community preference fields,' *Econometrica*, 21(1): 63–80.

Hillis, D. W. (1998) *The Pattern on the Stone*, NY: Basic Books.

Hornby, G., Lohn, J., Linden, D., (2011) "Computer-Automated Evolution of an X-Band Antenna for NASA's Space Technology 5 Mission", *Evolutionary Computation* 19(1): 1–23, Massachusetts Institute of Technology, US.
http://www.mitpressjournals.org/doi/abs/10.1162/EVCO_a_00005#.VVJVu_IVhBc

Keen, S., (2011) *Debunking Economics: The Naked Emperor Dethroned?*, Zed Books, London.

Leigh, D., Evans, R., (2010) 'Salaries soar for heads of British universities', *The Guardian*, 14-03-2010, UK

Oxfam (2015) <https://www.oxfam.org/en/pressroom/pressreleases/2015-01-19/richest-1-will-own-more-all-rest-2016>

Robinson, Joan. (1953–54) “The Production Function and the Theory of Capital.” *Review of Economic Studies*. 21:2, pp. 81–106

Samuelson, P. A. and W. D. Nordhaus (2010) *Microeconomics*, New York: McGraw-Hill Irwin, US.

Sardar, Z., Abrams, I., (1999) *Introducing Chaos*, Icon Books, UK

Suresh, R. (2010) *Economy and Society: Evolution of Capitalism*, SAGE Publications, UK.

Turchin, P., Currie, T., Turner, E., Gavrilets, S., (2013). “War, Space, and the Evolution of Old World Societies”, *Proceedings of the National Academy of Sciences of the United States of America*, September 23, 2013, doi:10.1073/pnas.1308825110, <http://www.pnas.org/content/early/2013/09/20/1308825110>

Ziegler, J. (2001), “The Right to Food: Report by the Special Rapporteur on the Right to Food, Mr. Jean Ziegler, Submitted in Accordance with Commission on Human Rights Resolution 2000/10”. United Nations.