Erasmus Journal for Philosophy and Economics,
Volume 19, Issue 1,
Summer 2026, pp. aa–aa.
https://doi.org/10.23941/ejpe.v19i1.1208

Reflections on the 2025 Nobel Memorial Prize Awarded to Joel Mokyr

NICOLAS L. ZIEBARTH
University of Missouri and NBER

Let me start with a disclaimer. Joel Mokyr was my dissertation advisor. He was one of the first people to come visit my wife and me after we brought our first child home from the hospital. We have written a paper together. I am an economic historian solely because of Joel (I simply cannot refer to him as "Mokyr"). For all these reasons, I am not a completely unbiased observer when it comes to judging Joel's contribution to the fields of economic history and economics, more broadly. Still, even with all the warm feelings I have for Joel, I never expected him to win the Nobel Prize. (Apparently, Joel himself never thought he would win. When people would ask him about his chances, he would reply that he had about as much chance of being elected pope.) I will never forget the morning of October 13, 2025, rolling over in bed, grabbing my iPad, and staring in disbelief at the grainy picture of Joel projected up on the screen as the Nobel Prize Committee made the announcement that he was to share the prize with Philippe Aghion and Peter Howitt.

My doubts about Joel's chances to win the prize were not based on any doubts about the intellectual merit of his work. I just did not think the Nobel Committee would award a prize to someone who has the same number of "Top 5" publications as publications in the *Journal of Institutional Economics* (2)[1] and earned his reputation for writing honest-to-goodness books (not simply collections of past essays) that frankly do not contain much math or quantitative analysis. In Joel's most famous book *The Lever of Riches* (Mokyr 1990), there is not a single table of data or regression results. The figures that appear are diagrams of various historical machines and technologies.[2] I think I found two mathematical symbols—a lonely p and p′ on pages 266 and 267. Over the more than 500

[1] Joel's first such Top 5 publication only came in 2018, and his second in 2023.
[2] My personal favorite is a picture of a pin factory from Adam Smith's time on page 78. You can literally see the division of labor at work.

pages that make up *The Enlightened Economy* (Mokyr 2009), there is a total of 2 maps, 16 tables with data (though none of them involve original archival data collected by Joel as far as I can tell), and not a single mathematical equation that I was able to find. This is not to say that the book is free of numbers, but numbers are used more like 'seasoning' rather than the main dish itself. The same dearth of quantitative work is also a feature of the other two books *The Gifts of Athena* (Mokyr 2002) and *The Culture of Growth* (Mokyr 2016) that make up what I call the Mokyr *quadrivium*,[3] for which Joel won the Nobel Prize.

What makes the style of the *quadrivium* particularly surprising is that Joel's two earlier books were heavily quantitative and deeply influenced by the Cliometric Revolution of the day. His first book *Industrialization in the Low Countries, 1795–1850* (Mokyr 1976b) which was a revised version of his Yale dissertation, tackled the diverging economic prospects of Belgium, which grew rapidly during the first half of the 19th century, and its neighbor the Netherlands, which experienced very little growth during the same period. In addition to detailed quantitative analysis, the book contained a formal economic model of industrialization that built on work by a member of Joel's dissertation committee. His second book *Why Ireland Starved* (Mokyr 1983) was about just what the title suggested—why did so many Irish people starve during the first half of the 19th century? That book contained regression upon regression and table of numbers upon table of numbers. Both of these books were solid and generally well-received by the profession if perhaps a bit workmanlike.[4] Perhaps someone else can find it, but to me, there is nothing in either of these books hinting at the direction Joel's research was to take. Though he did continue to publish standard quantitative economic history articles including one on the American Civil War,[5] the *quadrivium* to me represents a dramatic departure from his earlier work particularly in its focus and approach.

[3] The medieval *quadrivium*—arithmetic, geometry, music, and astronomy—was associated with the Scholastics, an irony that Joel would surely appreciate.

[4] The reviews of Joel's first book were not uniformly positive. Reviewing the book for the *Journal of Economic History*, Mendels (1977) called the narrative part of the book "not particularly original", claimed the book could have been "much improved by a good copy-editing", and pointed to "a very large number of inconsistencies and contradictions" in the theoretical argument.

[5] I like to think of these articles by Joel as similar to the articles Andrew Wiles kept releasing while he worked in secret on his proof of Fermat's Last Theorem. Supposedly, Wiles published these articles to keep other mathematicians from asking what he was working on and raising suspicions.

The broadening out of the focus of Joel's work to eventually encompass the Industrial Revolution as a whole is not that hard to explain. In fact, it seems as if every European economic historian of note is drawn to writing about that topic once she has built up enough academic capital to squander on her pet theory of the event. Joel was either brasher or quicker to build up that capital because his first paper on the Industrial Revolution would arrive two years after he finished his dissertation. The article (Mokyr 1976a) adapted the model of his dissertation to the broader European context. Even in this article, there was no hint at what was to come except for an underlying discomfort with the then prevailing theories of the Industrial Revolution. That discomfort burst out in Joel's next article on the Industrial Revolution (Mokyr 1977) titled "Demand vs. Supply in the Industrial Revolution." It began with an intriguing quote from Frank Knight that "the intelligent application of the formal principles [of economic theory] is . . . for showing what is 'wrong' rather than what is 'right'". Joel took Knight's maxim to heart and demolished the then influential theory that demand played a critical role in the Industrial Revolution.

It was in this article that you could, at least, begin to see inklings of what would become Joel's preoccupations. For one, there was an extended discussion of the economics of innovation and the market for ideas as well as the insistence that technological change was at the center of the Industrial Revolution. Nevertheless, the critiques he offered of the demand-led theory of the Industrial Revolution were quite standard. There was very careful economic theorizing (including theorems!) to cast doubt on the idea that somehow an exogenous change in demand could drive a change in income. There was even a bit of what you might call a calibration exercise to quantify by exactly how much an increase in population could raise demand for nonagricultural goods. Based on this article, you might have mistaken Joel for a neoclassical economist.

However, the article provides no hints to the coming drastic change in the rhetorical style of Joel's research. Perhaps he was reading more of the work of Frank Knight than the quote that made up the epigraph to that article would let on. While part of the Chicago School and a deeply influential teacher of Milton Friedman, George Stigler, and many other leading economists, Knight was skeptical of the quantitative and econometric approaches that were gaining ground in the 1930s and 40s. Knight would famously place a limit on quantification with his distinction between risk (situations where probabilities can be calculated like rolling

dice) and uncertainty (situations where probabilities cannot be calculated like the possibility that AI will enslave us all). Knight's line used by Joel, while in one way elevating economic theory, sharply circumscribed what theory could hope to uncover.

Based on the *quadrivium* alone, Joel seems almost like a throwback to the pre-Cliometric Revolution generation of economic historians who eschewed quantitative analysis and economic theory. To me, Joel is better described as a Knightian economic historian who saw the limits of what economic theory and (quantitative) data could achieve. This does not mean that there is no place for the tools of modern economics in economic history, but just that they are one set of tools among many for analyzing historical economic phenomena. As a result, at various points in the *quadrivium*, Joel is downright resistant to putting quantitative meat on the bones of the history he is trying to tell. Instead, he approvingly quotes Einstein's maxim ("Not everything that can be counted counts, and not everything that counts can be counted").[6] At still other points, he seems to purposively leave a trail of crumbs for future quantitative research, which many people have followed. Personally, I find much of this work "quantifying Joel" technically accomplished but somehow airless. (I will not name particular articles here.) These papers are clever in the way economics papers are clever today. Do not get me wrong. I wish I could write one of these papers. I just do not see them lasting. While I know Joel thinks highly of some of this work, to me, the bloodlessness of the new work is a sign that Joel was on to something with his resistance to quantification. There is a famous line that I think about a lot from Ludwig Wittgenstein (Wittgenstein 1922): "Whereof one cannot speak, thereof one must remain silent". Now, on a personal level, Joel is certainly not one to remain silent, but in the *quadrivium*, he took this line to heart, carefully choosing when and, more importantly, how to speak.

Even if the number of regressions is lacking in the *quadrivium*, there are places where Joel tried to develop what you might call formal (though not necessarily mathematical) models. A major part of *Gifts* is an attempt to theoretically differentiate between knowing what (propositional knowledge) and how (prescriptive knowledge). This is one place where Joel's theorizing paid off since the distinction helps to identify an important feedback loop between these two types of knowledge. Science—knowledge why—helps us build better tools, which are embodied forms

[6] Whether Einstein actually said this first or even said it at all is not clear.

of knowledge how, and those tools can in turn advance science even further. In other places, Joel's theorizing falls flat. In *Culture*, there is a whole chapter on cultural evolution drawing on the work of biologists and anthropologists. The last chapter before the epilogue in *Lever* tries to draw parallels between technological and biological change and, particularly, the debate at the time over the existence of "jumps" in the fossil record. You can certainly understand why Joel reached for an evolutionary analogy given the skepticism he expressed in the "Demand vs. Supply" article with analogizing technological change to a marketplace for ideas governed by regular economic incentives. I must admit there was a time when I found potential analogies between biological, cultural, and technological evolution thrilling. I enthusiastically read the works that Joel cited approvingly by Robert Boyd and Peter J. Richerson on cultural evolution, for example, *Culture and the Evolutionary Process* (Boyd and Richerson 1985). Frankly, now I do not know what I ever saw in them. While the analogies to biological evolution are suggestive, we are still waiting (and I think will remain so) for the actual payout in terms of understanding how culture or technology change over time. Joel was on the right (though deflating) track when he wrote in *The Enlightened Economy* that there is "no simple answer to the question of why some ideas won out" (Mokyr 2009, 2).

Oftentimes the adage "data is the plural of anecdote" is used as a putdown for qualitative work. Not so for the *quadrivium*. In these four books, we are presented with example upon example, illustration upon illustration, anecdote upon anecdote that come together to create compelling economic histories. In *Lever*, we learn about different types of horse harnesses, medieval spinning wheels, Giambattista della Porta, who invented an incubator for hatching eggs in 1588, and the invention of food canning. I remember being a bit dazed after I finished reading Lever. Jack Goldstone (2010) in a review for the *Journal of Economic History*, in a similar vein, called *The Enlightened Economy* "a sweeping picture of Britain that shows in exhaustive (and exhausting) detail how many aspects of life changed dramatically" following the Industrial Revolution.

While Joel's techniques and rhetorical style have changed, what has remained the same is his resistance to monocausal theories of historical events. One classic debate in Irish economic history was whether population outstrips food supply as Malthus would have it, or whether population pressure induces agricultural innovation as Boserup thought. Joel's answer in *Why Ireland Starved* was "Why not both?" There was also a debate about whether the cause of the starvation was the potato blight or

British political failures (because of either malice or a laissez-faire attitude). Joel's answer was that there was enough blame to go around. Similarly, while Joel is usually thought of as developing an "intellectual" explanation for the Industrial Revolution, in reality, his views are much more of "a little bit of this and a little bit of that". No doubt Joel in *The Enlightened Economy* and *Culture* spends an enormous amount of time arguing that a change in ideology about the nature of progress was a precondition for the Industrial Revolution, but Joel also makes it clear that this shift was just one of many conditions that were necessary for modern economic growth. The seed of this ideological change had to fall on good soil for there to be the good fruit of economic growth as the Parable of the Sower in the synoptic gospels puts it. In Europe as a whole, part of that good soil was a lack of political integration leaving political and religious leaders unable to suppress dissident thinkers who could always up and leave for a friendly environment. In the specific case of Britain, part of the good soil was an ample supply of workers who, while not necessarily formally educated, were mechanically skilled in making things. Joel is also more than happy to point to aspects of good soil that others have emphasized including North and Weingast (1989) on the importance of property rights for the (British) case; Allen (2009) on the role of cheap energy and high wages; and (even) McCloskey (2010) on the role of bourgeois virtues. As Goldstone put it in his review, "Mokyr gives all the single- or primary-cause explanations of Britain's sea-change a respectful hearing" (Goldstone 2010).

Evenhandedness is certainly an academic virtue, but in lesser individuals, the cost is a narrative bogged down in making sure every paper is cited and every robustness check run. But Joel is no lesser individual, and Joel's evenhandedness serves to illustrate the fragility of economic and technological change. As implausible as it sounds, Joel truly leaves you on the edge of your seat, just waiting to see if the apostles of progress led by Francis Bacon would triumph over the bad guys led by Aquinas and his Scholastic followers. The contingency in Joel's history makes it a much more thrilling telling than, say, a Marxist one in which you always know where you are going to end up. Joel's most forceful statement of his unique explanation of the Industrial Revolution came in the form of his 2004 Presidential Address to the Economic History Association (Mokyr 2005), which formed the basis of *The Enlightened Economy*. In the address, he linked the Industrial Revolution to what he termed the "Industrial Enlightenment", which he defined as "a belief in the possibility and

desirability of economic progress and growth through knowledge". This definition includes both an epistemological ("possibility") and ethical ("desirability") claim. It certainly seems right to me that both claims are critical for intellectual, technological, and economic innovation. If there is no hope of progress, why go through the trouble of trying to make progress in the first place? If "progress" is bad because it destabilizes the existing social order, for example, then you better not do it. It is also certainly true that throughout history before the Enlightenment, arguments against both claims were made, and when the intellectual arguments did not work, there was always the stake. In Joel's view, it was Bacon with his full-throated attack on the ancients and his belief that knowledge should be used for "the relief of Man's Estate" who would usher in the Industrial Enlightenment and, eventually, the Industrial Revolution. In place of the Aristotelian syllogistic method that consisted of turgid, deductive exercises, the Baconian intellectual program called for generating new knowledge about nature through "the three "C's"—counting, classifying, cataloguing".

There is something right about this picture of the shift in thinking due to the Enlightenment, but it can certainly be overdrawn. To me, Newton's famous quote about standing on the shoulders of giants shows an appreciation for the achievements of those who came before and suggests that believing in (intellectual) progress need not require a disrespect of past generations. Moreover, Aristotle himself would not have disagreed with the Baconian approach to inquiry. Aristotle insisted that knowledge began with sense perception and experience (in contrast to, say, Plato). His biological works—*Historia Animalium*, *Generation of Animals*, and *Parts of Animals*—are extraordinarily observational, and he reportedly dissected hundreds of species.[7] You hardly needed to be a neanderthal to doubt whether scientific progress was possible before Newton. Joel even admits in *The Enlightened Economy* that "at least in the short-run, the Baconian program [of turning science into material progress] was not a success". (Mokyr 2009, 58). Clearly, Bacon won in the long run, but it is a bit unclear how people kept the faith when the odds were long and initial successes hard to find.

One question then is if the Industrial Enlightenment reflected more of a continuous change rather than a sudden jump in thinking about the

[7] Charles Darwin in a letter to William Ogle dated February 22, 1882, after praising the biologists Linnaeus and Cuvier as his "two gods", called them "mere schoolboys" relative to Aristotle.

goal of knowledge and how knowledge can be discovered, can it explain a *revolution*—the Industrial Revolution? In closing his Presidential Address, Joel approvingly quoted Robert Darnton who said the result of the Industrial Revolution was "progress with a little p". This was progress that, as opposed to ushering in some sort of utopia, "conform[ed] to the economist's prosaic and sober notion that economic growth is not an undivided blessing but the best we can hope for in a second-best world". It was progress made up of "modest and incremental gains". Again there is something spot on with this description, but then what exactly are we trying to explain? Joel's picture of the British economy circa 1700 on the eve of the Industrial Revolution in *The Enlightened Economy* is remarkably rosy "contain[ing] many elements consistent with economic growth". So how big of a change was the Industrial Revolution? Joel was right to say in *The Enlightened Economy* that "degree is everything in economic history" (Mokyr 2009, 4). However, this framing of the Industrial Revolution sounds awfully close to Steven Shapin's famous opening to his book *The Scientific Revolution* (Shapin 1996): "There was no such thing as the Scientific Revolution, and this is a book about it". To be clear, I do think the Industrial Revolution was a very big deal, which only makes the worry that Joel's framing explains it away all the more acute.

While I'm certainly drawn to Joel's theory, I wish there was more evidence on the causal connection between the intellectual changes of the Enlightenment and the economic changes of the Industrial Revolution. I'm just not sure what the evidence would look like. It would be churlish to ask for a regression with a clever identification strategy to establish causality. In the section of Joel's Presidential Address titled "The industrial enlightenment and economic growth", Joel points to the example of James Watt and his many links to Scottish scientists as proof of the connection between ideas and economics. I'm not so sure. This is not to say that I disagree with Joel's claim, but just that I'm not sure a skeptic with a materialist worldview would be totally convinced by the evidence. Part of the problem is that it is a bit hard to pin down what the essential elements of the Industrial Enlightenment were. Sometimes it seems like a purely intellectual shift as Joel puts it to "expand the body of propositional knowledge and to steer it in those directions that might turn out to be useful". But in other places, it sounds more material when he writes in the same section that the Industrial Enlightenment's goal was to "reduce

access costs to existing knowledge". Clearly, you can see how the intellectual and material programs would fit together, but it is a bit unclear if both parts were essential and how they worked together.

Perhaps the best evidence for the content and consequences of the Industrial Enlightenment is Joel's own career. I was just back in Evanston for a conference to celebrate his 80th birthday and 50 years at Northwestern University. Almost 200 people including current and former students, colleagues, and well-wishers showed up. What struck me as I listened to other people tell stories about Joel was how much he as a scholar, teacher, and mentor embodies the virtues of the Industrial Enlightenment. First, there is the optimism—the belief that things will get better, setbacks are only temporary, and progress is possible. I never quite understood where Joel got this from. Economists do not tend to be the cheeriest people. The field is known as the dismal science after all. Add to that Joel's personal history as someone profoundly touched by the Holocaust, and no one would fault him for a certain degree of pessimism about the possibility of progress. Yet Joel's optimism was never false. It was the optimism of the great Enlightenment thinkers that while progress was possible, any gains and new insights would be hard-earned and incremental. This (at best) incremental view of progress comes naturally to economic historians who toil in a field in which there are no moments where the scales fall from your eyes, and all is made clear. Joel always seemed skeptical of those purporting to receive visions like St. Paul on the road to Damascus. His advice instead was, as the band The National put it in their song *Slow Show*, "Let's not try to figure out everything at once". Or as one of Joel's heroes Humphry Davy put it: "We consider only a state of human progression arising out of its present progression."

Finally, Joel understood that the life of the mind was not a solitary endeavor. To be successful, it required you to be a part of something like the Enlightenment's Republic of Letters that Joel so eloquently wrote about and worked hard to build his own. Like the original one, it was a republic based on openness, equality, merit, and exchange, with Joel acting like the 'glue guy'. Joel's colleague Joseph Ferrie compared Joel to Derek Smalls from the movie *This Is Spinal Tap*! who said he was the "lukewarm water" between the "fire and ice" of his bandmates, David and Nigel. Ferrie was right that Joel seemed to be the one guy who could talk

to the economic theorists, the macroeconomists, the applied people, and (God forbid) the people in the history department.[8]

On the face of it, you can understand why the Nobel Committee jointly awarded the prize to Aghion and Howitt "for the theory of sustained growth through creative destruction" and Joel "for having identified the prerequisites for sustained growth through technological progress". There is certainly a connection between the creative destruction of Aghion and Howitt and Joel's prerequisites for technological progress, but there is a deeper tension between the laureates. While Joel has a joint appointment in the history department, his PhD is in economics, and his intellectual home is there. He speaks the language of marginal costs and benefits. He can run a regression and solve an economic model as his earliest work showed. Yet in my view, the work that won Joel the Nobel Prize shows the limits of the economic incentives at the heart of Aghion and Howitt's justly famous model of sustained growth through creative destruction (Aghion and Howitt 1992). Though there is a notion of a "knowledge production" in that model, what determines the amount of effort in the "research sector" is profit, pure and simple. For Joel, the prerequisites for sustained growth seem to lie outside of economics. Those prerequisites come in the form of beliefs about whether the forests are full of fairies or whether all knowledge is already in Aquinas. If these really are the prerequisites, what exactly can a "teched up" economist with training in Bellman equations and proofs of the central limit theorem say about this most important question in all of economics and the social sciences—why did the West become rich? Perhaps we economists can take solace in the fact that it was one of our own who showed us the limits of our worldview.

Joel's Nobel Prize is part of a remarkable run for economic historians. Last year, the prize was awarded to Daron Acemoglu, Simon Johnson, and James Robinson. While none of them would call themselves economic historians, the work they were honored for on the role of institutions in economic development was certainly economic history (and drew heavily on the work of economic historians Kenneth Sokoloff and Stanley Engerman). The year before, the prize was awarded to Claudia Goldin, a card-carrying economic historian, and the year before that, Ben Bernanke was honored for his work on the Great Depression. It had been 30 years before Bernanke's win when economic historians—Robert Fogel and

[8] While I appreciate Ferrie's sentiment, on a different level, if you have ever met Joel, the idea of comparing him to lukewarm water will strike you as ludicrous.

Douglass North—last won the prize. In my view, this string of prizes for economic history serves as a bit of a critique of the 2021 prize shared by Joshua Angrist, David Card, and Guido Imbens for the "Credibility Revolution" in applied work.[9]

Now no one would doubt the merits of the work of Angrist et al. Whether we like it or not, we are all applied microeconometricians now. However, the recent Nobel Prizes for economic history ask us to consider what we have given up in the profession's fetish for causality and identification. I tell the undergraduate students in my American economic history class that there is no chance the regressions in the paper Bernanke won the Nobel Prize for would fly at the *American Economic Review* today (Bernanke 1983). No doubt the Credibility Revolution has allowed us to answer very small questions very precisely, but, in the process, we seemed to have lost the daring to address the big questions at all.

In graduate school, I toyed with writing a paper about the connection between the Industrial Revolution and the decline of occasionalism, the philosophical theory that God is the only true cause of anything. When we think we are moving our arm, that simply gives God the *occasion* to actually move it. The idea of my paper as I remember it was that believing that technological progress is possible depends on a belief that causation is real and can be manipulated. Joel was enthusiastic about the idea despite its rather half-baked nature, but I gave it up quickly because I thought that writing the paper would have been career suicide (probably because it was a bad idea). Now I do not think Joel is disappointed with the path I ended up on and my career so far, but I do feel like I let him down a bit by opting for the safe research route—collecting some data, running some regressions, building a model, and doing what an economist is supposed to do. In the end, nothing would be a better tribute to Joel than if his prize serves to inspire the next generation of economists to write the papers they thought might be career suicide and address the big questions with whatever tools are at hand. Perhaps there is even still time for me to dust off that occasionalism paper.

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[9] To be sure, Acemoglu et al. used the tools of the Credibility Revolution in the paper cited by the Nobel Prize Committee (Acemoglu, Johnson, and Robinson 2001).

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Nicolas L. Ziebarth is the Sam B. Cook Professor of Economics at the University of Missouri – Columbia and a research associate at the National Bureau of Economic Research. His current research is focused on World War II. He wrote his dissertation under Joel Mokyr at Northwestern University on the Great Depression drawing on hand-collected establishment schedules from the Census of Manufactures in the 1930s. His work has appeared in such journals as *AEJ: Macroeconomics*, *Journal of Economic*

History, and *Journal of Law and Economics* among others. As an undergraduate, he majored in economics, mathematics, and philosophy at the University of Wisconsin–Madison.
Contact e-mail: <nicolas.ziebarth@me.com>