

Robert E. Lucas Jr., social scientist

There is a fundamental difference between the social sciences and the natural sciences: the causality between before and after. For the natural sciences, causality follows the temporal order: water heats up and evaporates, species reproduce and grow or degenerate, stars reflect light that comes from the past... This causality is also present in our lives and in our societies, but we humans have freed ourselves, in part, from the past and our actions also depend on our expectations about the future. That is, for the social sciences – in particular, economics -- the causality is also from the future to the present.

As Robert Shiller (Nobel laureate 2013) said “that we have expectations and that our actions depend on those expectations. Everyone knew that. But the idea of putting together a model that was internally consistent was a brand new idea.” This was the idea of Robert Lucas, who died last Tuesday. He was awarded the Nobel Prize in 1995: “for having developed and applied the hypothesis of rational expectations, and thereby having transformed macroeconomic analysis and deepened our understanding of economic policy.” The three components of the nomination deserve explanation.

For having developed and applied the hypothesis of rational expectations. Our past and our environment weigh, but do not determine. We make decisions about our education, work, savings or debt, etc., based on our preferences, possibilities and, of course, expectations. For example, when balancing our savings today and their return tomorrow, the interest rate we expect counts. This is our subjective rationality. Chance, and the aggregation of all our individual – subjective – decisions determine the – objective -- interest rate in an economy. An "internally consistent" model of the economy has to close the relationship between the objectively expected interest rate and our subjective expectations. The easiest way is to postulate that, although we don't know how the economy works, as far as we are concerned, this relationship is an identity. This is the rational expectations hypothesis. It is elegant and compels agreement: if my subjective expectations and yours coincide with the objective expectations (about the interest rate), yours and mine coincide. One will possibly say: this is not true! And I will say: it is not true either that there are no frictions in space, but the astrophysicist has to know first how bodies move in a space without frictions.

Having transformed macroeconomic analysis. Macroeconomics as a social science was born with John Maynard Keynes, who added individual consumption, saving, and investment decisions into functions that had to satisfy a simple system of equations. Simon Kuznets (Nobel laureate 1971) was also a pioneer, who developed the national accounting systems that gave an empirical foundation to the -- basically static -- equations of Keynes. But the problem of subjective rationality in an objective world does not appear in a system of static equations. Aggregation in dynamic economies is more complex and to solve it the ‘rational expectations revolution’ (RER) was based on two theories, developed in the 1950s.

First, the general equilibrium theory of Kenneth Arrow (Nobel laureate 1972) and Gerard Debreu (Nobel laureate 1983) and its follow-up developments for more complex economies, giving a microeconomic foundation to aggregation and macroeconomic policy. Second, the theory of dynamic programming -- developed, by the mathematician Richard Bellman, based on an idea by the brilliant Claude Shannon. Policies, individual decisions

and their aggregation are made and valued recursively: their values tomorrow are the result of their current values, today's policies and actions and, of course, chance. The RER adds: actions today depend on existing policies, as well as on 'rationally expected' values for tomorrow.

Deepened our understanding of economic policy. Keynes thought and said that: "by a continuing process of inflation, government can confiscate, secretly and unobserved, an important part of the wealth of its citizens." Thomas Sargent -- another of the leaders of the RER (2011 Nobel laureate) -- years later responded: "rational expectations undermines the idea that policymakers can manipulate the economy by systematically making the public have false expectations." In other words, when designing an economic policy, agents' reactions to it cannot be ignored, and if they have rational expectations, there is no room for deception. This is the basic idea of "the Lucas critique" to the existing designs of economic policies fifty years ago. Unfortunately, it is still valid for many current policies.

Keynes's words can also be understood as a 'false recursion'. The 'time-inconsistency in economic policy', one of the reasons why the Nobel (2004) was given to Finn Kydland and Edward Prescott (the latter, another RER leader, unfortunately also passed away recently): you say you're going to keep stable prices but later you raise them to create employment by reducing the real wage. It is a 'false recursion' because dynamic programming fails in this case.

Although many politicians have not understood it, the RER triumphed in the 20th century: central banks are independent of governments to avoid 'time-inconsistencies', neo-Keynesian macroeconomists use dynamic equilibrium models with rational expectations, and the paradigm has been extended to other fields of economics: finance, political economy, etc. In addition, the paradigm is the starting point of many advances to overcome its limits; for example, introducing learning or limits to rationality or finding recursive solutions when dynamic programming fails.

Robert Lucas's contributions to the social sciences extend beyond the RER: financial economics, labor economics, geography and, in particular, growth and development. He said: "Once one starts to think about them [inequalities between countries] it is hard to think about anything else."

In the summer of 1989 I organized a mini-summer school in the Palacio de la Magdalena in Santander, before it was renovated. The group of economists was impressive (it was Lucas's first visit to Spain, who came with his wife and co-author Nancy Stokey, Prescott, Sargent and many others). It's a pity that when the rector of the Menéndez Pelayo International University saw the program, he withdrew his financial support, but at least they left us the Palace (fairly run down) and at the last minute I found another financing source. At last, for example, Sargent was able to show how artificially intelligent agents learned to coordinate with the most efficient rational expectations equilibrium; this was a time that rational expectations (RE) was still being criticized and nobody talked about AI.

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