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Rethinking economy

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Abstract

Rethinking economy requires rethinking the relationship between economics and its object. The economy is a recent product of socio-technical practice, including the practice of academic economics. Previously, the term "economy" referred to ways of managing resources and exercising power. In the mid-twentieth century, it became an object of power and knowledge. Rival metrological projects brought the economy into being. The development of the modern electricity industry illustrates the kind of work involved. It required new technical processes, new forms of distribution, addressing, and monitoring, new forms of calculation that were simultaneously electrical, chemical, economic, and social. Analyses of how the economic is embedded in social ties or in cultural meanings cannot understand these intersecting projects. The projects that form the economy involve the work of economics. Economic knowledge does not represent the economy from some place outside. It participates in making sites where its facts can survive. The case of an economic research project on property rights in Peru illustrates how this happens. Economic facts were established in a world that was organized, through specific projects, such as the property titling programs of Hernando de Soto, to enable economic knowledge to be made. There is no simple divide between a virtual world of economic theory and a real world outside it. Every economic project involves multiple arrangements of the simulated and that to which it refers.

Keywords: Economy; Economists; Embeddedness; Networks; Electricity industry; Metrology

Rethinking economy requires rethinking the relationship between economics and its object.[1] My own interest in this question began from the discovery that "the economy" is a surprisingly recent product of socio-technical practice. It emerged not in the eighteenth or early nineteenth centuries, as Karl Polanyi (1944) and Michel Foucault (1991) in their different ways have argued, but only in the mid-twentieth century (Mitchell, 1998, 2002, 2005a, 2007). Before then, economists did not use the word economy in its modern sense. "Economy" (usually with no definite article) referred to the proper husbanding of material resources or to proper management—of the lord's estate, for example, or the sovereign's realm. The term referred to a *way* of acting and to the forms of knowledge required for effective action. Political economy came to mean the knowledge and practice required for governing the state and managing its population and resources (Poovey, 1998; Tribe, 1978).

In the twentieth century, new ways of administering the welfare of populations, of developing the resources of colonies, organizing the circulation of money, compiling and using statistics, managing large businesses and workforces, branding and marketing products, and desiring and purchasing commodities brought into being a world that for the first time could be measured and calculated as though it were a free-standing object, the economy. Economists claimed only to describe this object, but in fact they participated in producing it. Their contribution was to help devise the forms of calculation in terms of which new kinds of socio-technical practice were organized, to monitor these forms of practice as though they formed a self-regulating

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system, and to put forward rival accounts of how the system worked. "Economy" no longer referred to a way of exercising power and accumulating knowledge; it now referred to an *object* of power and knowledge.

Faced with the discovery that no economist before the 1930s referred to an object called the economy, most would conclude that this was just a new word for what was always there. One way to do this would be to rely upon Polanyi, moving his argument forward by a century, and say that if nineteenth-century political economists did not talk about the economy, but covered a wider terrain of population, government, territory, and the management of resources, this was because the economy was still "embedded" in these broader processes. Polanyi's argument has been repopularized since the 1980s, thanks to Mark Granovetter's argument that he got it partly wrong. The economy *remains* embedded, according to Granovetter (1985)—in social networks. Rational economic action is supported and restrained by ties of friendship, shared experiences, professional associations, business connections, and the interlocking ownership of corporations. Similar arguments have been made in the parallel "relational turn" during the 1990s in economic geography.

The concept of embeddedness is of limited use in understanding the making of the economy. This is because it always invokes some essential form of the economic. The economic refers either to rational action, which in different social and cultural "contexts" is more or less restricted by cultural or social ties, or to materiality, which in different "contexts" is differently stabilized or imagined.

To see the limitations of these assumptions, let me take as an illustration a case that Granovetter himself uses: the development of the modern electricity industry (Granovetter and McGuire, 1998). This will illustrate the kind of work involved in making the economy. It required new technical processes, new forms of distribution, addressing, and monitoring, new forms of calculation that were simultaneously electrical, chemical, economic, and social. None of this can be adequately grasped by asking how the economic is embedded in social ties or in cultural meanings or processes.

To build the first electrical networks, Thomas Edison had to create more than just social connections. As the superb account of Edison's project by Hughes (1983) shows, he had to establish not only ties among investors, politicians, and technicians, but also circuits for the transmission of capital into his enterprises, generating stations to transform coal into electric power, carbon filaments whose resistance was calibrated to the current-carrying capacity of copper cables and to the cost of the copper, a system of patents and the means to enforce them, and cable networks to carry direct or alternating current from place to place (Hughes, 1983). It might be argued that these other networks were purely technical or economic, in contrast to the social ties that Granovetter describes or the shared imaginings described by cultural approaches to political economy. But the development of domestic electric lighting did not respect such categories. It depended upon networks that tied together humans and electrons, the flow of electric current and the flow of capital, imagination and illumination, the calculation of the cost of copper wiring and of its conductivity.

The Edison Electric Light Company, set up in 1878, did not sell lighting. It held patents on the devices Edison's team invented—light bulbs, generators, distribution systems—and licensed or sold the patents around the world to raise income and attract investment to finance Edison's workshops, experiments, and demonstration projects (Hughes, 1983, p. 39). It organized capital flows through networks of lawyers, legislation, patent enforcement, and publicity. Edison's first central generating station began commercial operation in 1882 in New York City close to Wall Street. The location was chosen to attract the attention of financiers, and because the half-mile radius its distribution network could reach included many shops and restaurants, which would draw customers and publicize the system (Hughes, 1983, p. 41). This was not just a human network, embedding Edison in ties to friends and financiers. Nor could one separate in any systematic way the material and the cultural, or the calculable and its calculation. It was a wiring network, connecting generators, light bulbs, buildings, shoppers, consumer desire, and capital investment.

Later on what was called a "battle of the systems" broke out between Edison's low-voltage direct current system, and the rival high-voltage alternating current system of the Westinghouse Electric Company and others, which could transmit electric power over much greater distances. In an attempt to alter the calculations about the cost effectiveness of the rival systems, Edison tried to associate the higher voltage of AC systems with the danger it posed to humans who accidentally connected themselves to the network. He joined forces with Harold Brown, who advocated the use of electrocution as a humane method of putting people to death. In July 1888 Brown gave a lecture at Columbia University in which a dog, said to be vicious, was first subjected to harmless levels of direct current and then put to death with alternating current. The demonstrations persuaded New York State to replace hanging with death by electrocution, using a Westinghouse generator installed in Auburn State Prison (Hughes, 1983, p. 108). The projects involved in building an electricity industry connected Edison with both humans and nonhumans—and even involved the turning of humans into nonhumans.

What are the advantages—for thinking about the economic—of examining these socio-technical arrangements, rather than the more limited human networks of economic sociology? Economic sociology tries to preserve a distinction, inherited from Weber and from Polanyi, between the "purely economic" and the broader social relations in which the economic is shown to be (partially) intertwined. The purely economic refers to the calculating rationality of the market. The goal of economic sociology is to show that this world of market rationality is restrained or compromised by the ties of friendship, affection, altruism, morality, control, culture or other apparently non-economic relations that market practices depend upon or cannot completely escape. From this perspective, economic calculation (or the market, or the economy) always already exists, as the expression of some sort of pure self interest.

The example of the electricity industry helps us see things differently. Edison's project did not involve designing a technology that would then be taken from the workshop to the market. The market or the economy was not an external "reality principle" against which the design would be tested (Latour, 1996, p. 183). Edison's work team had to create an economic calculus inside the workshop, as an integral part of the design of the network. They began by acquiring Gramme and Wallace arc-light generators, the older lighting technology they hoped to replace, and measured the cost of their operation. Edison collected information on the cost of copper wiring of different gauges, and visited plants using arc-light dynamos where he took notes on transmission losses and the cost of fuel. He also purchased back volumes of gas journals and the proceedings of gas engineering societies, to calculate the rival costs of gas lighting and the candle power it achieved (Hughes, 1983, pp. 28–29).

But information about comparative costs could be made useful only by integrating it with technical calculations about the properties of materials and electrical circuits, and social calculations about the density of housing and population. Edison's team realized that Joule's and Ohm's laws could be used as tools to relate the costs and material properties of the components. They wanted to lower the current in the system, to reduce expensive transmission losses and the cost of copper cable. Learning how to use Joule's law (energy equals voltage times current), they realized that a proportionate increase in the voltage would enable them to reduce the current without any loss in the level of energy. But how to increase the voltage in proportion to the current? Ohm's law (resistance equals voltage divided by current) provided the method: raise the resistance, by designing an incandescent bulb not with a low-resistance filament, as his rivals were trying to do, but with a high-resistance filament. At a constant current, the voltage would then increase (Hughes, 1983, p. 36). These calculations were related in turn to the number of households and businesses in certain cities located within the radius that could be reached by a network of a given energy and gauge of distribution wiring.

The economic calculus was not a market of rational agents outside the system. It was an apparatus of calculation that brought elements from other projects—generator costs, transmission losses, data on gas lighting, population densities—into Edison's workshops at Menlo Park, New Jersey, where it could be combined with other instruments of measurement and calculation in the construction of an electrical system. These calculations, built into the design of the new electrical equipment, would then be carried back, depending on the success of Edison's project and the rivalry of alternative calculations built into the designs of his competitors, and installed in the wider world.

Calculation, then, was not a question of figuring the rates of demand and supply for an existing object. The durable-filament light bulb was invented in a process of "econotechnical" calculation (Hughes, 1983, p. 29). Economic calculation involved the design of the object, the specification of its qualities and properties (Callon, 1998; Callon et al., 2002), which were modified in accordance with the design of the network. To introduce a new technology involved defining what the technology was, which was never a merely technical question. Edison avoided the mistake of his English rival in the invention of incandescent light, Joseph Swann, who tried to create a market for electric light bulbs. Edison defined the product he was promoting not as light bulbs but as the supply of electric lighting—as a power network to which households and commercial premises could be connected, rather than individual sources of light for which they might generate their own power. This required the construction of electricity networks, but also overcoming existing arrangements based on isolated systems—where, as with the production of domestic heating, individual houses or businesses generated their own electric power. Centrally generated power replaced isolated systems not for technical reasons alone, but because Edison's companies were able to build socio-technical complexes (arrangements involving patents, legal powers, political connections, capital flows, generating equipment, and power cables) that succeeded in overcoming rival systems. The decisions involved were never merely economic. Economic calculation was caught up in the same complexes.

Since these calculations were helping to bring into being the world they calculated, success did not necessarily depend on having the most accurate figures. What mattered more was whether the calculations enabled the network to be conceived and built. "Edison's estimates of the cost of his system were grossly in error, but contributed conceptually to his invention" (Hughes 21, p. 9, quoting George Wise, *IEEE Spectrum* 1983). A study by Mirowski and Nik-Khah (2007), of the creation of another network, cellular telephones in the United States, shows how successful calculative devices are not necessarily those that are the most statistically complete or mathematically rigorous. They are those that make it possible to conceive of a network, or market, or national economy, or whatever is being designed, and assist in the practical work of bringing it into being.

The economic is not a calculus that exists in advance, which then determines the success or failure of different technologies. The economy was not a pre-existing sphere, into which technological innovation introduces changes. Rather, there are different attempts to introduce calculations and persuade others that they are superior to rival models and calculations. The economy is a twentieth-century invention that was built out of such projects.

Edison's case also helps us think about the question of virtualism (Carrier and Miller, 1998). There is no simple divide between an experimental or simulated world of the industrial workshop or business planning and a real world outside it. Every situation offers a certain arrangement of the simulated and that to which it refers. Edison's team built models to test the relationships among costs, material properties, and electrical flows using batteries, fine wires, and "Kirchhoff's laws of conductor networks" (Hughes, 1983, p. 23). Although just a model, it was a real circuit carrying live electricity. Next they built a full-scale demonstration project, providing lighting for the Menlo Park offices and workshops. The illumination was used to impress investors and tie them into the project. Even their first commercial network, the Pearl Street power station, as we saw, was designed as a demonstration project. Every instance of building networks was simultaneously a demonstration and the thing being demonstrated, something virtual and something real.

As the network was built, there were many other sociotechnical problems to be solved: basic issues of the subdivision of light (the existing arc light technology produced too intense a light for small spaces), so that large numbers of small consumers could be connected to a single distribution system (Hughes, 1983, p. 31); conventions of address and other forms of what Thrift (2004) calls "knowledges of position", so that consumers could be identified, metered, and made to show up reliably in accounts and billing procedures; and methods of anticipating trends and cycles of demand, matched with techniques for balancing load and supply. Solving such problems generated new kinds of information and calculation.

These issues were typical of the technical problems addressed by a series of large-scale projects of the early twentieth century, including such areas as the oil industry and long-distance pipelines, the building of large dams and hydro-electric systems, and the development of military technology and planning. The forms of technical calculation, distribution and the control of flows, addressing, accounting and billing, and much more helped to constitute the world that would gradually take shape and be identified as "the economy".

Latour (1987, p. 251) refers to organizing work of this sort as "metrology," meaning "the gigantic enterprise to make of the outside a world inside which facts…can survive". Edison was trying to establish a series of what Barry (2002) calls "metrological regimes," extensive but often fragile zones of measurement that have become relatively standardized. Rival entrepreneurs and corporations were attempting to establish different metrologies. Metrologies create and stabilize objects; the economy is a very large instance of such an object, with rival attempts to define it and to design tools for its measurement and calculation.

Rather than assuming there was always an economy, then, we need to explore the rival metrological projects that brought the economy into being. Understanding the making of the economy as overlapping and sometimes rival metrological projects, we can think about the relationship of economics to the economy in different way. The two are not separate things. The projects that form the economy involve economics; economics is not outside, representing the economy from some other place. It is caught up in these projects. The success of economics, like all science, is measured in the extent to which it helps make of the wider world places where its facts can survive. How is this done? A second illustration can offer some answers.

In 2003, the New York Times reported the results of a remarkable economic experiment (Mitchell, 2005b). Over the previous decade the government of Peru had carried out a program to give formal property title to people living as squatters. Launched by the well-known Peruvian development economist Hernando de Soto and funded by the World Bank, the program was the largest of its kind in the world, turning two million squatter households into property owners. Its goal was to eliminate urban poverty, by enabling people to use their homes as collateral for starting small businesses and other entrepreneurial activities, releasing what De Soto (2000), calls the "dead capital" locked up in property to which people do not have legal title.

As the New York Times reported, an American economist named Erica Field had examined the impact of the project. She found it did not have the promised outcome—there was no increase in commercial lending to the poor—but had another, unexpected result: those who gained title to their property began to work harder. They appeared to increase the number of hours they worked outside the home by up to 40% (Field, 2003).

This discovery was reported in several other newspapers and business magazines, presented at seminars and conferences around the United States, and discussed in leading economist weblogs. The research was celebrated not just because it seemed to demonstrate the remarkable power of property rights, but because of the sophistication of the "natural experiment" through which this was demonstrated. Senior economists wrote that it gave them hope of the future of the discipline. Written as a Ph.D thesis, the research gained its author a faculty appointment in the department of economics at Harvard.

To a non-economist the discovery seems utterly implausible. In another paper (Mitchell, 2005b), I explore how it came about. By following the politics of the property titling program in Peru, the mechanics of its implementation, and its interaction with other projects in various cities, in particular the war against the Shining Path in the central Andean highlands and the reconstruction that followed, I offer alternative accounts of the different levels of employment among different households. These suggest that patterns of shorter or longer working hours can be explained not by the acquisition of property rights, but by following closely the larger metrological projects that made the experiment possible.

What can one learn from this case? The popularity of the research can be attributed to the fact that it seemed to affirm the tenets of neoliberal economics: that the right of private property is the fundamental requirement for economic development, and that the citizen of the third world is a natural entrepreneur, held in poverty by an overbureaucratized developmental state that fails to establish the simple rules that make possible the generation of wealth. These ideas can be traced back, of course, to the work of pioneering neoliberals, men like Freidrich Hayek and Peter Bauer, in the 1950s and earlier.

More interesting is the process by which these ideas were confirmed. Economic facts were established in a world that was organized, through specific projects such as de Soto's property titling program, to enable economic knowledge to be made. These projects occupy quite closely defined spaces—specific neighborhoods in particular cities of Peru, the local offices of a development organization and a think tank, the text of a survey questionnaire and its administrators, the offices of a parent organization in Washington that provides the funds.

This is all part of what I would call the work of economics, and its narrow but effective history can be traced. In this case, one would trace the founding of the neoliberal movement by Hayek and others, its organization in the 1950s through the Mont Pelerin society, the Chicago school of economics, the building of think tanks like the Heritage Foundation, the American Enterprise Institute, the Hudson Institute and many other neoliberal organizations established in North America and Europe from the 1950s onward. De Soto is an outcome of this movement, "discovered" by Hayek on a visit to Lima in 1979, trained by neoliberal organizations in Washington, and given the funds and the know how to create his own neoliberal policy organization in Lima, out of which the property titling program was first organized. Backed from Washington, de Soto became chief advisor to the Fujimori government in the 1990s and was able to install the metrology that made the later findings possible.

The connections among these interlocking networks created the narrow world in which economic facts could be produced—and also ensured their recirculation, as the "findings" were published by the think tanks, by de Soto, and by the World Bank. The Foundation for Teaching Economics, another organization within the neoliberal movement, turned the Peru case into curriculum material for college teachers, as part of its program to promote the teaching of neoliberal forms of economics.

To sum up: it may be the case that we need some evolutionary narrative of capitalist development, contradiction, and crisis to understand why some economic representations are chosen over others, as Bob Jessop suggests (Jessop and Oosterlynck, 2005). But I am not sure. In this case, tracing the specific history of a movement, its methods of organization, its political projects, the sites of economic knowledge it brings into being, the kinds of representation it makes possible, seems more illuminating. The successful representation, in this case, was not the account that gave the most comprehensive explanation of events. The success of the economic explanation depended upon its narrowness. Only by excluding other kinds of facts and connections can alternative accounts of household work patterns be ruled out.

To rethink economy, we will not get far by posing questions about the relationship between economy and culture—as if these were two big objects or spaces or dimensions, found everywhere, and as if our task were to identify their changing relationship, the differing degrees of embeddedness, and so on. The economy is better seen as a project, or a series of competing projects, of rival attempts to establish metrological regimes, based upon new technologies of organization, measurement, calculation, and representation.

Prior to the development of these socio-technical arrangements, there was no economy. Of course one can still use the word "economy" to refer to earlier periods, and to other projects. But by paying attention to the novel use of the term in the twentieth century, we can become more attentive to the processes that brought the economy into being and to the rival political projects that were at stake.

Finally, the question of virtualism (Carrier and Miller, 1998) can be approached in these terms—rather than in the terms that virtualism itself proposes. Academic economics does not constitute a virtual world, cutting us off from or hiding from us some more real, more material reality. As the example of Edison's workshops and the Peruvian property experiment illustrate, the distinction between virtual and real, model and reality, is found at every point. The organization of this distinction is an aspect of the kinds of experiments and metrological projects I have been discussing. These help engineer the modern sense of the real, or the material, as that from which we are cut off.

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