

# **T**he Unholy Marriage of Economics to Engineering

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## **Abstract**

This paper, on the one hand, focuses on the ways to build the bridges between economics and engineering activities and, on the other hand, includes some critical evaluations on the relationships between economics and the other science disciplines. In order to make some sense of its existing political and ideological roots, the question of mathematical formalism in economic research and education will be examined. The aim of this effort is to expose the political and ideological aspects of this seemingly methodological problem.

## **Keywords**

Mathematical Formalism, Engineering Ideology, Scientific Management, Economic Reason, Econometrics

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## Introduction

In the spring of 2003, I was about to finish my Master's thesis and decided to visit an authorized professor to get some information about their doctoral program at one of the Turkey's leading foundation universities. Just like many other young researchers I also wanted to enroll in that program. Unfortunately, I had some serious disadvantages in this fierce competition. For instance, I was never a very brilliant under-graduate student. My cumulative grade point average was not high enough, in fact it was low. As all these were not enough, I did not use any econometric models and test techniques in my dissertation. That means, in many scholars' eyes, I didn't know enough mathematics to do science. Those were, without a doubt, my weakest points. What is more, another attack came from this professor in an unexpected way and he said "applying here would be a waste of time for you, because we would not prefer graduates from economics; we prefer engineers, instead." However, trying to relieve me of by patting my shoulders, this kind man (he was also the department head) did not forget to wish me a good luck in searching for another doctorate program when I was leaving the office. This trend, which is trying to open more and more rooms for engineers in economics and is rather unacceptable to me, was not only peculiar to some foundation universities. But, state universities with long established traditions also tend to act in the same fashion. A strong, long-lasting and global tendency is still trying to substitute economists with engineers in order to increase the 'efficiency' of academic works dealing with micro and macroeconomics. Ironically, in the near past, by making a radical decision I had dropped out of an engineering school to become an economist. But now I was being told that I had no chances to earn a Ph.D. degree in such a highly prestigious doctoral program, because I was an economist. The worst thing is that it is mostly believed that engineers are the group of professionals who could perfectly achieve this. Therefore, in this paper, I will first focus on the ways to build the bridges between economics and engineering. This analysis includes some critical evaluations on the relationships between economics and the other science disciplines. Then, I will bring up the question of mathematical formalism in economic research and education in order to make some sense of its existing political and ideological roots. The aim of this effort is to show the critical aspects of this seemingly methodological problem.

## Money, Economic Reason and the Engineering Ideology: Frederick W. Taylor vs. Thorstein B. Veblen<sup>1</sup>

In fact, engineers as a party in the relations and organizations of production within a capitalist society cannot be understood without some insights into historical conflicts and struggles between labor and capital. A central question is what engineering means to engineer? In this sense, we may speak of two contradictory points of views or perceptions dealing with the positions of engineers. The first view, in relation to an engineer's professional background, emphasizes that the 'basic contradictions' in a society are nothing but an illusion. This point of view tries to convince us that there is no such thing as a class struggle. There are, however, undeniable possibilities in workplace and society that make capital and labor exist together in harmony rather than conflict. Therefore, such interpretations of engineering also much in line with the bourgeois way of thinking define and understand engineering through rationalities and interests of capital. The second view, on the other hand, emphasizes existing social contradictions between capital and labor and claims that there is a similar contradiction between capital and engineer. That is to say,

interests of engineer are not compatible with those of capital. This section will at first focus on the type of engineer described by Frederick W. Taylor, the founder and advocate of the 'principles of scientific management.' And then, an alternative type of engineer depicted by Thorstein Veblen as a representative of the second view will be discussed.

In order to clarify the essence of the relationship between economics and engineering, we need to go back to the earlier times and primarily focus on the emergence of economics in field of engineering. A rich literature developed in the last quarter of 1800s and the first quarter of 1900s on 'scientific management' which laid the foundation of legitimizing the marriage of economics and engineering. The work done by a group of managers and engineers, members of *American Society of Mechanical Engineers* (ASME), could be seen as a good starting point for that literature (Thompson 1914, 510). They were, simply, trying to draw attention of their fellow members to the influence of wages on the output of workmen. One of them was Henry R. Towne, the then president of ASME and president of the Yale & Towne Manufacturing Company. In May 1886 Towne, as an outstanding thinker on industry, presented a paper entitled "The Engineer as Economist" before the members of ASME. According to Towne (1886, 425) 'technically trained engineers', with their financial and profit making aspect of management, should consider themselves as 'economists' because their decisions and works directly and continuously have significant effects on economies. Joseph H. Willits (1927, 298) laid a special emphasis on the importance of Towne's contribution by asserting that it could be taken as a turning point in scholarly debates on engineering, management and economics. In Willits' way of thinking, Towne's paper contained many arguments that it was the first time engineers and others became industrial managers who deal not only with problems of materials, machines and power, whose roots lie in such fields as chemistry, physics and mathematics, but also with such problems as cost, value, price, markets and labor, whose roots lie in the field of economics. As Köse and Öncü (2000, 50) indicates that in Towne's perception, the best and most appropriate measure to be used in determining the functionality and achievement of engineering is the monetary unit, or the dollar. In this respect, let us hear him while addressing to the students of Purdue University in February 1905:

The *dollar* is the final term in almost every equation which arises in the practice of engineering in any or all of its branches, except qualifiedly as to military and naval engineering where in some cases cost may be ignored. In other words, the true function of the engineer is, or should be, not only to determine how physical problems may be solved, but also how they may be solved most economically (...)  
*Therefore the engineer is, by the nature of his vocation, an economist* (in Taylor 2003 [1947], xxxvii, italics mine).

This innovative approach pioneered by Henry Towne on the functions of engineers in society was commonly shared and afterwards advanced by a number of the managers such as F. A. Halsey, James Rowan, H. L. Gantt, Carl G. Barth, Henry Metcalf, Oberlin Smith, Louis D. Brandeis, Sanford E. Thompson, Charles Day, Forrest E. Cardullo, S. G. Meyers, M. LeChatelier, Morris L. Cook, Charles W. Heyt, Herrington Emerson and

so on (see Thompson 1914). Without a doubt, the most important and influential figure among others was Frederick W. Taylor. In Taylor's view, management of a capitalist enterprise was a kind of engineering problem and at the same time an engineer was a manager whose basic function is to maximize the interests of employees and respectively those of employers. For Taylor, management is a 'scientific task' whose sole purpose is to falsify the common belief that fundamental interests of employers and those of employees are necessarily antagonistic (Köse and Öncü 2000, 50-1). The first chapter of his 'cult' work, *The Principles of Scientific Management*, starts with the following statement: "The principle object of management should be to secure the maximum prosperity for the employer, coupled with the maximum prosperity for each employee." As Öncü and Köse (2001) note that in Taylor's mind "presumption of the capital/labor antagonism is completely a misconceived body of knowledge." Scientific management, on the contrary, asserts that the "true interests of the two are one and the same." Besides, "the prosperity for the employer cannot exist through a long term of years unless it is accompanied by prosperity for the employee and *vice versa*" (Taylor 2003, 121-2). Surely, we can yield more phrases from Taylor's work which give away his true intentions; but in short, *The Principles of Scientific Management* is trying to show illusions about so-called class struggles. The orthodox explanations about the fundamental contradictions of capitalism, in fact, have no any strong background. Mark Rupert (1995) underlines the cultural/ideological dimensions of this brand-new paradigm. To him principles offered by Taylor were based not only on the coercive measures in industrial relations but also embedded in a cultural transformation of the workplace.

For Taylor, once productivity increases, making fruitless debates on "how to distribute surplus" will inevitably become irrelevant. But the point is how could this aim be achieved? Unlike previous methods concerning the employers' wealth maximization, what was new about Taylor's model? In this sense, by reducing work to a function of time and by measuring time by the speed of the movements of the working men, Taylor presents his own alternative program for workplace as a "complete mental revolution" (see Taylor 2003, 213). Needless to say, Taylor's scientific management model calls for a truly radical mental transition for both employers and employees. But it also shows some concrete outcomes about what happens to 'science' when capitalist rationale is taken as a yardstick. Taylor and people like him understood science as nothing more than the capacity of accomplishing any task on the basis of rules, laws and formulas, through the fastest and most appropriate instruments, "after having eliminated all unnecessary motion". Taylor defines engineering and the engineer "in terms of their use and utility to capital" and converts the engineer into "a cash machine" (Öncü and Köse 2001). The task of the engineer, thus, is to transform the worker into a sort of capital with the aim of enlarging it. In a word, "Taylor was a preeminent representative of the money-oriented reasoning which captivates the engineering activity" (Öncü 2003).

Taylor and his followers' vulgar interpretations on engineering and economics are not the only views that can be obtained. There are no constant laws dictating the interaction between economics and engineering would inevitably bring about some inhumane consequences

as suggested by Taylor's and Ford's systems.<sup>1</sup> Such an alternative perception is clearly obvious in Thorstein Veblen's (1857–1929) work. Veblen has been described, with some justification, as the last man who knew everything. He is clearly America's one of the most original social theorists. Much of Veblen's great originality came from his willingness to go beyond the narrow boundaries of orthodox economics and to examine economic life as a collection of cultural and social activities. Veblen's most famous work is *The Theory of the Leisure Class: An Economic Study of the Evolution of Institutions*, first published in 1899. It owed much of its initial success to its being incorrectly reviewed as purely a work of satire (O'Hara 2001, 1223-5). Indeed, in *Leisure Class* Veblen developed a strong criticism of consumerist, wasteful and selfish society which he saw as an offspring of capitalism. His powerful background in philosophy allowed him to formulate radical arguments against the foundations of classical political economy. His criticisms were so influential that C. Wright Mills, the author of *The Power Elite*, in the *Preface* he wrote for the 1953 edition of the *Theory of Leisure Class*, admired him by passing the following judgement: "Thorstein Veblen was the best critic of America that America has ever produced" (Mills in Veblen 1953 [1899], vi).

His theoretical and political posture, as mentioned earlier, was completely different than that of Taylor's. Veblen arguably favored a system that may best be described as 'scientific collectivism.' Under this system, the production of industry would be controlled and planned by a *collective workforce*, all of whom would share a common set of scientific values (Stabile 1986, 42). Veblen argues that it was only when the engineers solved the problems of how to organize and how to gain support for their efforts by turning to labor for support. As Stabile has put it, Veblen's vision of scientific collectivism was "a highly scientific version of socialism." As a result of this, Veblen was addressing to the engineers directly in an effort to reshape modern capitalist society. In the midst of the economic depression of the early 1920s, and of the Red Scare, "Veblen viewed the engineers as a more probable source of revolution than labor organizations whose purpose was simply to follow business practice and gain a little more income for its members" (Knoedler and Mayhew 1999, 256).

Veblen believed that engineers should inevitably be in alliance with workers in struggle against businessmen. Viewing the contemporary scene, he saw an irrepressible conflict

<sup>1</sup> The founder of the Ford Motor Company and the leader of the American automotive industry, Henry Ford, believed in the central importance of enforcing a strict discipline over the workers. In 1926, as echoing the catchwords of a much-cited passage taken from the conversation between Taylor and Schmidt, he clearly expressed their expectations from the workers as follows: "We expect the men to do what they are told. The organization is so highly specialized and one part is so dependent upon another that we could not for a moment consider allowing men to have their own way. Without the most rigid discipline we would have the utmost confusion. I think it should not be otherwise in industry. The men are there to get the greatest possible amount of work done and to receive the highest possible pay. If each man were permitted to act in his own way, production would suffer and therefore pay would suffer. Any one who does not like to work in our way may always leave" (Ford 1926, 111).

between business and industry. The businessmen profited by interrupting or hindering production. That is to say, the wealthy part of the population and their selfish profit seeking actions (the predatory instincts) were strictly *sabotaging* the economy, in other words, the industry (the creative instinct). At this point, the notion of ‘sabotage’ defined by Veblen (1921, 1) as the “conscientious withdraw of efficiency” became an organic component of profit-oriented contemporary society. In his controversial work, *The Engineers and the Price System*, he also claimed that a genuine tendency towards production –that is, efficiency, social justice and progress- could only be represented by engineers in society. Considering the possibilities of political success of socialism in America, Veblen made a special emphasis on the ‘Soviet of Technicians’ rather than the working class. In his point of view, engineers were the only group of people who could provide a strong potential to become a revolutionary class. Layton, by referring to engineers, indicates Veblen’s vision that therefore, “those conditioned by the ‘machine process,’ were the revolutionary group in America” (1962, 65). In consistent with that, Veblen believed there was a consciousness among engineers in terms of making a class. As it was pointed out in his book, “the chances of anything like a Soviet in America, therefore, are the chances of a Soviet of Technicians” (Veblen 1921, 134). Note that there were many significant criticisms directed against Veblen’s approach to engineers and engineering activity. Specifically, his ‘technocratic’ and even ‘utopian’ vision has fiercely been challenged in literature. However, I think, our discussion here is presently adequate in making clear how antagonistic ideas Taylor and Veblen have on the social functions of engineers.

**On Methodology  
of Economics:  
Formalism,  
Econometrics and  
Ideology**

*“Modern economics is sick. Economics has increasingly become an intellectual game played for its own sake and not for its practical consequences for understanding the economic world. Economists have converted the subject into a sort of social mathematics in which analytical rigour is everything and practical relevance is nothing.”*

Mark Blaug (1997, 3)

*“Departments of economics are graduating a generation of idiot savants, brilliant at esoteric mathematics yet innocent of actual economic life.”*

Robert Kuttner (1985, 3)

Considered as a field of social study, twentieth-century economics is commonly understood through an engineering perspective. The logic behind that kind of conception is that economics turned out to be the representation of the economic world using quantitative research and in-depth analytical techniques. Needless to say, this new form is completely different than the previous one and it perfectly fits in the ‘age of progress’. We all know that even the founders of the discipline and their distinguished followers’ works did not rely on formal techniques. In those days, the extent of such techniques of representation,

analysis and intervention in economics were very limited.<sup>2</sup> At the beginning of the 20<sup>th</sup> century, there was still relatively little mathematics, statistics or modeling in any economic work. In fact, economics was a verbal tradition, rather than a quantitative one. In the first half of the century, however, innovative developments like a massive growth in the collection of economic data in addition to a detailed knowledge based economics built by empirical research had changed the whole picture in radical ways. Especially, introducing newly advanced statistical tools under the label of econometrics played a dominant role in this process. After that, mathematics started to dominate economics by expressing economic theories and formalizing them into the arguments. Nevertheless, the full dominance of these techniques (measurement methods, mathematics, statistics and modeling) occurred only after 1940. By the end of the century, economics had become a 'modeling science' both in theoretical work and applied work. Economics became, in Morgan's (2003, 277) words, a 'tool-based discipline.' A big tool kit which had a diverse set of highly sophisticated technical apparatus gave economics a 'deserved' reputation as the 'most scientific' field of the social sciences. Not surprisingly, the engineer as designer and constructor would play a central role under these new circumstances.

At the end of the 1980s, two young promising economists David Colander and Arjo Klamer (1987) carried out a study on economics graduate students and young academicians from six economic graduate programs of top-ranking US universities -University of Chicago, Columbia University, Harvard University, Massachusetts Institute of Technology, Stanford University and Yale University. Colander and Klamer's findings, in the first place, indicated that graduate economics education was successful in limiting their intellectual interests. In other words, at the initial phases of their academic education most of the respondents had wide interests but class work left little time to follow up the other interests. The authors reported that even though most graduate students believed that reading in areas such as history, political science, sociology etc. was important for their development as economists, most of them could not do such readings because they lacked the time. Another important conclusion related with this one was the lack of opportunities of interdisciplinary interactions. On the other hand, when it came to individual success, they were all aware of the importance of improving their knowledge on mathematical economics and econometrics (see Colander and Klamer 1987, 98-99).

It can be argued that objections to excessive use of mathematics in economics are not new. These complaints, which can be found even in important figures like Alfred Marshall and John Maynard Keynes, appeared well before 1920s (see Mirowski 1989; O'Donnell 1990). With the aim of combating the effects of Great Crash of 1929 through proactive

<sup>2</sup> Unlike the classical economists, such as Adam Smith, David Ricardo or Karl Marx who saw economics as a historicized science of social relations of production and distribution of value, the neoclassical turn tried to think the social order as a mechanic phenomenon. These new economists, like Jevons, Edgeworth, Menger, Walras, Pareto, among others, have tried to empty the discipline from its social content with a rigorization through quantification and mathematization (see Pinto 2011).

policies, economists, who came from areas like mathematics or physics, intended to act on social reality. Econometrics, then as a non-neoclassical tool, was used in developing policies such as regulations and state intervention in private activities (see Pinto 2011). Since then, organizations like the National Bureau of Economic Research (NBER) and the Econometric Society helping to build relevant macro databases has played a crucial role in such formalization processes. During the 20<sup>th</sup> century, as formalization in economics got deepened by time, counter actions also emerged against it. Criticisms voiced in the 1940s' and 50s' debates, in Beed and Kane's words, "are either thought of as having been answered or are ignored" (1991, 582). To put in a different way, in the period following the 1929 crisis, new formal techniques and inter-disciplinary interaction were mainly used in order to rebuild economics and improve its robustness and validity considering real policy issues and social problems. On the contrary, excessive formalization made economics move even further away from the social realities.

Therefore, Colander and Klamer's significant work, to some extent, had stimulated a series of professional debates within the discipline and this paved way for critical perspectives on the nature of economic research and training in economics. As a response to this growing discontent about the 'state of the art' of economics, a full scale report prepared by a Commission on Graduate Education in Economics and sponsored by American Economic Review was published in another top level academic journal (the Journal of Economic Literature) in 1991. It seems Colander and Klamer's work sparked the flames and eventually the Commission could not remain distant to those burning debates. Among a diverse set of complaints and criticisms, there was one dominant argument that could be easily distinguished: "Economics as taught in graduate school had become too divorced from real world questions" (Krueger et.al., 1991, 1035). Mark Blaug has put it in another way by claiming that "economics as taught in graduate schools has become increasingly preoccupied with formal technique due to the deliberate exclusion of historical and institutional understanding" (2002, 35). As a matter of course, there were a series of unpleasant consequences undermining the prestige of economics as a social science or a profession. The Managing Editor of *The Economic Journal*, John Hey, appeared to be very irritated when he looked back over ten years of his editorship and summed up his appraisals of the types of the papers that were regularly submitted to the journal:

It often appears that the model has been constructed for no other purpose than to produce a result which is a stylised fact observed by the author. That may be an interesting exercise but it needs to be supplemented with a discussion of whether this particular explanation for the stylised fact is useful and better than the alternative explanations. Simply producing a model that comes up with a desired result is a test of the *cleverness of the author*, not a test of the relevance of the theory (quoted in Blaug 2002, 35, italics mine).

Of course, there is nothing wrong with being clever, smart and creative but the current structure of graduate economics education and the current incentives in the profession do not guide students toward combining cleverness, judgment, and knowledge. Instead, the

incentives tend to direct students “toward cleverness for cleverness’s sake” in Colander’s words (2007, 243). Once historical linkages between science and ‘the social’ have been detached, the so-called ‘scientific’ production process would inevitably turn into solely a struggle for the sake of individual careers and achievements. Under the shadow of relentless competition in almost every sense, the denial of all sorts of ‘collective actions’ caused products of this process (i.e. journal articles, conference presentations, etc.) to become merely platforms for the most arrogant intelligence show offs. Formalism, for decades, has been operating in order to exclude every collective, social, and cooperative aspect of human actions from the scope of economics. Therefore, the result would be a gigantic pile of useless articles that no one reads or discusses comprehensively. Indeed, no one reads or is curious about the work of others if these works are not directly relevant to his/her subject. This sad situation we found ourselves in can be understood as a consequence of “cleverness for cleverness’s sake.”

On the one hand, all the real concrete economic, political, ecological, social issues in every region of the world are waiting to be solved; on the other hand, hundreds or even thousands of theoretical and empirical articles labeled as ‘scientific contributions’ are being published in the international cited journals every year and these mostly ignore all these real issues. It seems as if thousands of economists from all around the world can communicate with each other through an invisible and a mysterious network by overlooking such real issues. This doesn’t mean that all economists should always write about and discuss the ‘heavy’ issues like the contradictory nature of the capitalist system, the production and property relations, the existence of dominant and subordinated classes, uneven distribution of wealth among individuals and nations, ominous global ecological threats and so on. It doesn’t also say that every economist should politicize his/her work and must study some certain topics in order to get their work accepted as ‘scientific contribution.’ Such a point of view and attitude would be, without a doubt, far from being reasonable. Nevertheless, considering the editorial policies of foremost mainstream academic journals in economics, it is not possible to conceive the insensitivity of existing academic publications in economics to real world issues as just simple coincidences.

**Towards  
Understanding  
the Marriage of  
Engineering and  
Economics**

A mind-set that treats economics as a profit maximization activity and takes the profit maximization as a pure technical matter or a simple calculation, not surprisingly, could find much more in common between engineering and economics in a Taylorian sense. In the past that sort of an alliance between economics and engineering had played an important role as a surplus value transfer mechanism in favor of capitalist classes. One of the most tragic examples of such attempts could be found in the history where Fordism’s ruthless practices took place in the early 20th century. In that period of time, by following Taylor’s system, production lines had become accursed places where the human beings in labor were perfectly capitalized and completely ruined for the sake of capitalist entrepreneurship.

Since the 1950s, the dynamic analyses based on highly complicated mathematical models with the diverse set of statistical tools in academic economics have been being used increasingly. Mark Blaug once called this transformation as ‘Formalist Revolution’

in economics. Since then, economics and economists have been widely criticized for an excessive use of mathematical formalization, including differential calculus, operational research techniques and finally econometrics. To many critical scholars, this shift represents the triumph of applied research over the basic research within the discipline. On the other hand, engineers are conceived as the best experts equipped with all required tools in order to conduct well-advanced and reliable research. In my opinion, using mathematics or econometrics in economic analyses is not the main point that we should be critical of. The problem here is, instead, the misconceptions about the relationship between ends and means. It looks like, as economists, we are unnecessarily giving a priority to the means instead of the ends; in other words, we are putting the cart before the horses. Of course, the excessive 'technical' support from engineering to economics is an issue, but defining economics itself as a kind of engineering activity is, I am afraid, the real issue.

It is noteworthy that we need to go beyond the existing academic division of labor which has long dominated the Western academic life. The establishment of economics as a separate discipline represents the first and crucial separation with the philosophically grounded Western science tradition. There were, of course, a number of explanations provided in order to make sense of this academic division. One of them deals with the progressive developments of the society. According to that view, by the mid-nineteenth century, the growth of accumulated knowledge made it increasingly impossible for a single person to master its totality within a single lifetime. Therefore, as Van der Pijl pointed out, "this coincided with the emergence, in response to class struggles in the centers of capitalist production, of an approach to political economy that was apologetic, justifying capitalist market discipline and private property against the growing resistance to its dislocations and degradations" (Van der Pijl 2010, 5). As it is well known, Marx himself was well aware of the essence of the bourgeois world-view (*weltanschauung*) inherent in classical political economy and strongly criticized its foundational propositions. He defined bourgeois economists as vulgar economists "who only flounder around within the apparent framework of those relations" (Marx 1976, 175). According to him, the exponents of post-Ricardian vulgar economic theory and especially the neo-classical marginalists, do not bother to ask the question 'why', they are content just to answer the question 'how' (see Mandel 1976, 46). In his ground-breaking critical writings on political economy, the main functions fulfilled by the bourgeois economists were clearly exposed. For instance, in the first volume of *Capital*, he correctly wrote as follows:

Apart from this, the vulgar economists confine themselves to systematizing in a pedantic way, and proclaiming for everlasting truths, the banal and complacent notions held by the bourgeois agents of production about their own world, which is to them the best possible one (Marx 1976, 175).

Without a doubt, while Marx was formulating his radical criticisms, 'vulgar economists' exhibited a stronger class consciousness than their present counterparts. The ideological patterns they had were clear and distinct. As contemporary capitalist society is getting more and more complicated, it becomes more difficult to determine existing class conditions of

mainstream economists than the past. Certainly, 'Formalist Revolution' and mathematical transformation of the discipline have been playing a constructive role in this. As Blaug aptly states:

To pick up a copy these days of *The American Economic Review* or *The Economic Journal*, not to mention *Econometrica* or the *Review of Economic Studies* is to wonder whether one has landed on a strange planet in which tedium is the deliberate objective of professional publication (Blaug 1997, 3).

In my opinion, unprecedented developments in economics like diversification in mathematical tools and discovering various ways of inspirations from other engineering professions cannot be seen as a sign of disappearance of barriers between disciplines. We do not experience a kind of 'post-disciplinary' era in social sciences, yet. In addition, previously mentioned 'spectacular' advances have no potential to make any contribution to democratic, collective or participatory values of the social world. These advances are only about the 'appearances.' The 'essence' is almost remained the same or perhaps got worst since Marx's criticisms were directed. On the contrary, these developments strictly deepen the existing distance between intellectual and academic production in economics and the subordinated social forces or classes of the world. This is the reason why we can call contemporary mainstream economics as anti-democratic and insincere in its very nature despite its all appealing aspects, Unfortunately, what is going on in economics cannot be understood as a response to good-willed scholars who ask to 'open up the social sciences' for many years (Wallerstein et. al. 1996).

## References

- Beed, C. and O. Kane. 1991. What is the critique of the mathematization of economics. *KYKLOS* 44 (4), 581-612.
- Blaug, Mark. 1997. Ugly currents in modern economics. *Policy Options* 17 (7), 3-8
- Blaug, Mark. 2002. Ugly currents in modern economics. In *Fact and Fiction in Economics: Models, Realism and Social Construction*. ed. Uskali Maki, 35-56. West Nyack, NY-USA: Cambridge University Press.
- Colander, David. 2007. *The Making of an Economist, Redux*, Princeton University Press.
- Colander, David and Arjo Klamer. 1987. The making of an economist. *Economic Perspectives* 1 (2), 95-111
- Ford, Henry and Samuel Crowther. 1926. *Today and Tomorrow*, Garden City NY: Doubleday
- Hayford, J. F. 1917. The relation of engineering to economics. *The Journal of Political Economy* 25 (1), 59-63
- Köse, Ahmet Haşim and Ahmet Öncü. 2000. *Kapitalizm, İnsanlık ve Mühendislik: Türkiye'de Mühendisler ve Mimarlar*, Ankara: TMMOB.
- Knoedler, J. and A. Mayhew. 1999. Thorstein Veblen and the engineers: A reinterpretation. *History of Political Economy* 31 (2), 255-72.
- Krueger, A. O. et. al. 1991. Report of the Commission on Graduate Education in Economics. *Journal of Economic Literature* 29 (3), 1035-1053.
- Layton, Edwin T. 1962. Veblen and engineers. *American Quarterly* 14 (1), 64-72.
- Mandel, Ernest. 1976. Introduction. In Marx, *Capital vol.1*, 11-87.
- Marx, Karl. 1976. *Capital: A Critique of Political Economy (Vol.1)*, tran. Ben Fowkes, Penguin Books Ltd, Harmondsworth.
- Mills, C. Wright. 1953. Introduction to the mentor edition," In Thorstein Veblen, *The Theory of Leisure Class: An Economic Study of Institutions*, vi-xvi, The Macmillan Company.
- Mirowski, Phillip. 1994. *Natural Images in Natural Thought*, Cambridge: Cambridge University Press.
- Morgan, M. 2001. The formation of 'modern' economics: Engineering and ideology. *Working Paper No. 62/01*, London School of Economics.
- Morgan, M. 2003. "Economics," In *The Cambridge History of Science (Vol.7)*, T. M. Porter and D. Ross eds., 275-305.
- O'Hara, P. A. ed. 2001. *Encyclopedia of Political Economy (vol.II)*, Routledge: New York.
- Öncü, Ahmet. 2003. Para, mühendislik ve bizim mühendislerimiz. *TMMOB Makina Mühendisleri Odası Bülteni* (74), 33-39.
- Öncü, Ahmet and Ahmet Haşim Köse. 2001. Re-considering the meaning of 'scientific management' from a marxist perspective. *Cultural Logic* 4 (2).
- Pinto, Hugo. 2011. "The role of econometrics in economic science: An essay about the monopolization of economic methodology by econometric methods," *The Journal of Socio-Economics* 40 (4), 436-443.
- Rupert, Mark. 1995. *Producing Hegemony: The Politics of Mass Production and American Global Power*, Cambridge University Press.
- Stabile, D. R. 1986. Veblen and the political economy of the engineers. *American Journal of Economics and Sociology* 45 (1), 41-52.
- Şenalp, M. Gürsan. 2007. İktidar ve piyasa ilişkileri karşısında mühendisler ve iktisatçılar: 21. yüzyılda iktisatçıların değişen sınıf konumları, *Folklor/Edebiyat* (49), 161-80.

- Taylor, Frederick W. 2003 [1947]. *The Principles of Scientific Management*, In *The Early Sociology of Management and Organizations*, K. Thompson ed., Routledge: London & New York.
- Thompson, C. B. 1914. The literature of scientific management. *The Quarterly Journal of Economics* 28 (3), 506-57.
- Towne, Henry R. 1886. Engineers as economist. *Transactions: American Society of Mechanical Engineers* (7), 428-32.
- Van der Pijl, Kees. 2010. Historicising the international: Modes of foreign relations and political economy. *Historical Materialism* 18 (2), 3-34.
- Veblen, Thorstein. 1921. *The Engineers and the Price System*, New York: B. W. Huebsh.
- Veblen, Thorstein. 1899. *The Theory of Leisure Class: An Economic Study of Institutions*, New Brunswick, New Jersey: Transaction Publishers, reprinted in 1953.
- Wallerstein, Immanuel. 1996. *Open the Social Sciences: Report of the Gulbenkian Commission on the Restructuring of the Social Sciences*, Stanford University Press.
- Willits, J. H. 1927. Economics. *The Scientific Monthly* 24 (4), 298-302.

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### Özet

#### İktisat ve Mühendisliğin Uğursuz Evliliği

Bu çalışma bir yandan iktisat ve mühendislik etkinlikleri arasındaki mevcut ilişkilere odaklanırken, diğer bir yandan, iktisat ve diğer bilimsel disiplinler arasındaki ilişkilerle ilgili olarak eleştirel bir inceleme olma çabası taşımaktadır. Bu bağlamda çalışmada, dayanmakta olduğu politik ve ideolojik kökenleri ortaya çıkarabilmek amacıyla, ekonomik araştırmalarda giderek artan matematiksel biçimselcilik sorunu irdelenmektedir. Böylelikle yaygın olarak yöntembilimsel bir problem olarak algılanan iktisatta biçimselciliğin politik-ideolojik arkaplanı ortaya çıkarılmak istenmektedir.

#### Anahtar Kelimeler

Matematiksel Biçimselcilik, Mühendislik Ideolojisi, Bilimsel Yönetim, İktisadi Akıl, Ekonometri.