

American Economic Association

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Source: *The American Economic Review*, Vol. 37, No. 4 (Sep., 1947), pp. 652-654

Published by: American Economic Association

Stable URL: <http://www.jstor.org/stable/651>

Accessed: 28/12/2009 22:28

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that marginalism is and has always been an instrument for combating such measures of social reform as the minimum wage legislation. Professor Stigler is no exception to this rule. A criticism of his practical conclusions has shown that marginalism is a particularly unsuitable tool for analyzing a problem which necessitates clarity of ultimate values because it must be discussed in terms of means and ends.

The proponents of marginalism must do considerably more than point out that "marginalism" describes "the logical process of finding a maximum."¹⁷ This is true but does not come to grips with the real issues involved in the application of marginalism to labor problems. It is, furthermore, not sufficient to say that marginal thought does (or rather, can) take into consideration all the factors which the "anti-marginalists" use. The issue is one of relative significance of these factors. The analysis of Professor Stigler's "conclusions" and "predictions" has shown that the marginal significance of marginalism in a dynamic situation approaches zero.¹⁸

FRED H. BLUM*

¹⁷ Fritz Machlup, *American Economic Review*, Sept., 1946, p. 519.

¹⁸ Professor Stigler's statement that the marginalists' "empirical errors have not been so crude as those with which we are charged" (*op. cit.*, p. 155) is not substantiated and cannot, therefore, be taken seriously. Professor Stigler simply ignores those empirical facts mentioned by Professor Lester which do not fit into his theory by concentrating his attention on some of Professor Lester's findings which may be subject to criticism.

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Methods of Visual Presentation and the Teaching of Economics

The present re-examination of the undergraduate economics curriculum offers a unique opportunity for an appraisal of the role which visual aids may play in the presentation and analysis of economic problems at the elementary level. The general argument in favor of making use of visual aids in the process of learning will be readily agreed upon. It was succinctly expressed by John Dryden more than 300 years ago. In his *Essay of Dramatic Poesy* Dryden spoke of our eyes as "our strongest witnesses." By co-ordinating the written or spoken word with diagrams and picture symbols we are appealing to two senses instead of one. Because our visual memory is our best aid in retaining perceptions and impressions an appeal to our eyes is frequently more effective than the spoken word. More than this, by making it possible to use our eyes in the process of learning, the grasping of difficult problems is facilitated. In fact, what appears to be a complex relationship, if orally explained, may become simple by an appeal to the eye. On the other hand, "it is unnecessary to say in words, what we are able to make clear by pictures."¹ All this is especially true for the beginning student in any given field of knowledge.

Thus far, most attempts of using methods of visual presentation in economic analysis have been confined to essentially static problems. Neither

¹ O. Neurath, *International Picture Language* (London, Kegan Paul, Trench, Trubner & Co., Ltd., 1936), p. 26.

Quesnay's *Tableau Economique*, nor supply and demand curves and even less so, of course, the visual presentation of statistical data, can truly be said to be concerned with economic dynamics in the sense of tracing the effects of changes of data. The question is, therefore, whether the time has not come to explore the possibilities of using visual aids in the presentation and analysis of economic problems of a dynamic character. Take, for instance, the problem of the flow of goods and money. I see no reason why this central problem of economic dynamics could not be broken down into its constituent parts and presented with the aid of diagrammatical, *i.e.*, visual material. One might start from a position of equilibrium and full employment and show first the circulation of goods and money between one business unit and one household by means of the familiar stream of money and commodities in opposite directions. It might be shown how money is paid out and trickles back from the consumer to the business unit. Then, leaving this highest stage of abstraction, it could be shown, by a series of successive approximations, how the flow of goods and money tends to assume the form of a process of continuous circulation between all business units and all households. The next step might be the introduction, by visual symbols, of the banking system and its function as an accumulator of liquid funds and distributor of bank credit. Savings and spending might be introduced next by directing part of the money flow into the banking system and out of it back into the monetary flow as it is spent or invested. Relationships between savings and spending might be conveniently discussed at this level with special emphasis on the effects which an excess of savings (or spending) may have on the flow of money, business receipts, income and the level of economic activity. This illustration might be further refined by studying the effects on the marginal firm through rising or falling profits. There is no reason why these processes as well as the related concepts of investment, inflation and deflation could not be represented diagrammatically, for instance, by corresponding changes in the width of the money belt.²

Or consider the appraisal of compensatory devices with the aid of the multiplier theory or the principle of acceleration. Although illustrations in terms of numerical examples will always remain essential for a basic understanding of these principles, it seems to me that here too there is room for diagrammatical representation. I remember a simplified multiplier diagram which J. M. Clark introduced in his "Appraisal of the Workability of Compensatory Devices" (*American Economic Review*, Suppl., 1939) which, doubtless because of its simplified character, exhibited better than anything I have seen since, the multiplier effects and the dwindling after-effects after public spending had stopped.

Two objections to the use of visual teaching aids may be mentioned. It may be feared that all methods of visual presentation are likely to involve oversimplifications of what are in reality highly complex interrelationships.

² In fact, the above outline reflects the approach followed by M. Polanyi in his diagrammatical film entitled *Money and Unemployment* which undertakes an introduction to the Keynesian mechanism. For a description and theoretical analysis of this approach see M. Polanyi, "Economics by Motion Symbols," *Rev. Econ. Stud.* (Oct., 1940), pp. 1-19.

And it may also be objected that visual instruction is bound to lead to the acceptance of too mechanistic a view of economic processes, especially at the initial stage of economic analysis. These objections should not be dismissed too lightly. Any outright rejection of methods of visual presentation on these grounds tends, however, to overlook the fact that economic theory, and for that matter all theoretical thinking, operates with intellectual models designed to simplify reality in order to interpret it. Supply and demand curves are extreme simplifications whose mechanistic nature has often been questioned by critics of modern value theory. Yet, it will be readily admitted that these tools, if properly qualified, need not mislead. They have, in fact, proved to be highly valuable aids of analysis. In short, visual aids in teaching are not meant to be substitutes for logical thinking. They are designed to facilitate the process of analysis, especially at the elementary level.

With these qualifications it may even be said that the visual presentation of economic problems has two fundamental advantages. First, it is particularly well adapted to the illustration of complex concepts and ideas through operational definitions. For example, the concept of money is understood fully only in terms of what money does (how it operates) in the economic process. If this be true, that is, if we agree with Bridgman that "the proper definition of a concept is not in terms of its properties but in terms of its actual operations,"³ it is evident that visual presentation is likely to point more directly to the phenomena than any spoken or written language. In fact, if properly organized and arranged, visual aids in the teaching of economics can furnish the mind of the beginner with concepts which, because their meaning has been conceived from the very outset with reference to experience, are bound to correspond more closely with reality than has been the case hitherto. Secondly, to the extent that methods of visual presentation play a role in the teaching of economics the quality of teaching can be improved simply by better technical means of presentation (such as diagrams, charts, pictures, films) and depends less upon the number of good teachers which, of necessity, is limited at any given time.

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³ P. W. Bridgman, *The Logic of Modern Physics* (New York, Macmillan, 1938), p. 6.

* The author, who is assistant professor of economics and social science at Wesleyan University, is chairman of the Subcommittee of Visual Aids of the Association's Committee on the Undergraduate Teaching of Economics and the Training of Economists.

J. B. Clark: A Message from Japan

The following message from Professor T. Miyajima was received earlier this year by Professor J. M. Clark:

I held a small meeting on January 26th to celebrate the 100th anniversary of your father's birthday. Some twenty persons, all my colleagues and students in political economy, joined in this memorial meeting and I could spend a delightful, rather significant afternoon with them in showing them your father's pictures and his writings, some of which are appreciated as