

Comment: Academic Politics and the Teaching of Statistics

Harold Hotelling, Jr.

I. INTRODUCTION

The republication of two papers on how statistics should be taught poses a problem that is all too familiar to social scientists: given that a solution to a problem has been proposed, and given that the proposed solution has not been repudiated by scientists in the area despite decades of study, why has it not been put into effect? A nonstatistician reading the papers can certainly apply some ideas of how academic decisions are made in practice and speculate on the length of time, or more precisely on the finiteness of the length of time, until the adoption of Hotelling's proposals.

Statistics as a subject has rather more political force within the university than do professional statisticians. The widespread references to Hotelling's papers are consistent both with enthusiasm for the correct teaching of statistics and with the hope of centralizing its teaching in one academic unit. This paper is an effort to explore the political and economic forces that have resisted the changes proposed by Hotelling almost half a century ago, together with some thoughts on their author based on personal acquaintance.

The papers themselves appear to have enduring attention from the professional community. The welcome present reissue recalls thoughts expressed in 1960, on the occasion of Hotelling's 65th birthday. In a *Festschrift* of that year (Olkin, Ghurye, Hoeffding, Madow and Mann, 1960), Jerzy Neyman (1960) graciously gave Hotelling's work some of the credit for subsequent improvements, especially at the great centers of statistical theory, but warned that "the current practices of offering statistical courses in substantive departments are only too often the same as those described and ridiculed by Hotelling." "The Teaching of Statistics" was included in the *Festschrift* at Neyman's suggestion, although in retrospect the inclusion may have constituted preaching to the choir.

William Madow (1960), writing in *The American Statistician* the same year, was evidently more optimistic: speaking of specialists in other fields teaching statistics in their own departments, "... there is no

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doubt that the quality of their teaching of statistics is much better than was the case when Hotelling's papers first appeared." Nevertheless, the inescapable impression is that the place for introducing statistics to the college student is within a Department of Statistics, only reluctantly to be combined, in smaller institutions, with the Department of Mathematics: "Moreover the teaching of statistics cannot be done appreciably better by mathematicians ignorant of the subject than by psychologists or agricultural experimenters ignorant of the subject" (Hotelling, 1940). Although combining the teaching in one department does not reduce the university's total load, it is certainly believable to an economist that advantages of specialization could be great even apart from considerations of class size. Our question of why separate courses persist requires us to turn to perceptions of how organizations such as universities behave, and what equilibrium is likely to emerge from some allocation of interests and bargaining power. We may divide the evidence into changes in statistics, changes in universities and changes in the role of departments within universities.

II. CHANGES IN THE ROLE OF STATISTICS IN THE UNIVERSITY

The role of the university has changed greatly since 1940, but the form has been maintained in such a way as to obscure the difference in role or, as the new breed of administrators prefers, "mission." The expansion of higher education to include about half of all high school graduates, as well as maintaining the customs of professorial ranks and some sort of research expectations at all but very unpretentious schools, has meant that the emphasis and mean academic ability of the college student are different. The vocational forces and loosening of core curricula have greatly diffused the direction of undergraduate education. The state of mathematics education in high schools appears to leave calculus as the same barrier that figures in both of Hotelling's papers. The effects of the present shift in age distribution toward including many older students are not yet known.

What is known is the virtual explosion of statistics and the recognition of its role not only in the social, biological and agricultural sciences to which Hotelling referred, but also to entire new specialties in