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ECONOMIC FLUCTUATIONS IN THE UNITED STATES
1921—1941

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ECONOMIC FLUCTUATIONS IN THE UNITED STATES

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Von

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Dr. Klein's book¹ is a milestone in the development of econometric model building. It gives the result of an important piece of work done during the time he worked with the Cowles Commission, and is announced as an improvement of the work previously done at the League of Nations Secretariat. In fact, his models are based upon more developed theories of the behaviour of the firm as well as of the consumer. In addition the problem of aggregating individual demand into market demand has been considered very carefully. Account has been taken of the theory of expectations and considerable attention has been given to the details of the market mechanism, i. e. the formation of prices in the interplay between demand, supply, stocks and prices. Apart from these theoretical improvements the methods used for statistical testing of his theories have also been developed since the League of Nations publications were prepared, as will be set out below.

Three different models have been elaborated. Model I consists of three behaviour equations and three definition equations. Income is split into wages and profits, and consumption is assumed to be a linear function of both. Investment is supposed to depend on profits (with a possible lag), expressed as a percentage of capital, which in the linear form means that capital has been added as one of the explanatory variables. The distribution of national income over wages and profits is presumed to be given by an unknown but constant relation between total national income and wages. According to the author the model not only resembles Kalecki's, but also the Marxian theory of effective demand. It appears not to be refuted by observations, but the author is careful to point out that other theories might, and in fact do, fit the facts too. The present reviewer wonders whether there would be any difference of opinion between Marxian and non-Marxian economists concerning the model presented.

Model I has been tested by Dr. Klein with the help of three different statistical methods, (a) the maximum likelihood method (using all available a priori information), (b) the method of reduced forms (or the "limited information maximum likelihood method"), and (c) the old "one by one equation method" or leastsquares method. It may, by the way, be observed that the terms now commonly used to distinguish the three methods, do not seem very adequate, particularly if the abbreviated indications "maximum likelihood", "reduced forms" and "least-squares" methods are used. Both the second and the third methods use least squares, whereas the characteristic difference is that the first and second methods consider the system of equations simultaneously. Hence both the first and the second method are based on the maximum likelihood principle. It is to be hoped that the Cowles Commission will supply us with adequate and, if possible, short new names.

Apart from a number of interesting details about the statistical properties of the equations found with the three methods, Dr. Klein's results are interesting because

¹ L. R. Klein, *Economic Fluctuations in the United States, 1921—1941*; Cowles Commission for Research in Economics, Monograph No. 11, John Wiley & Sons, Inc., New York, Chapman & Hall, Limited, London, 1950, 174 pp, 12 graphs.

of the numerical values for the coefficients they give. Evidently his formulae fit the observations so well that they give only unimportant differences between the values for the coefficients. The marginal propensity to consume for wage earners appears to be between 0.80 and 0.82, that for non-wage earners between 0.18 and 0.25. If a lag in the consumption of non-wage earners is assumed to exist, the marginal propensity to invest is found to be between 0.76 and 0.81, whereas the influence of capital already accumulated is found to be quite clear, and not too different for the three models. The distribution of national income over wage earners and other groups also appears to be measurable with great accuracy, a marginal proportion of 0.58—0.59 for wage earners being found.

In addition Dr. Klein is able to calculate the multiplier defined as the proportion between an increase in national income and a given increase in government expenditure, both assumed to be lasting changes. It appears that the introduction of the capital term in the investment equation has a considerable influence on the size of the multiplier, which Dr. Klein finds to be about 2.

Model II is a very simple one, in fact, consisting of only one behaviour equation (for consumer expenditure). It is the intention of the author to find out with the help of this model whether or not consumption expenditure is influenced by liquid reserves in the hands of consumers. Taking as the main explanatory variables for real consumer expenditure, real disposable income lagged one year and without lag, he finds the influence of monetary reserves to be doubtful: "We cannot reject the hypothesis that the true value of the parameter is zero" (p. 82).

Model III is a large structural model and consists of 16 equations of which 4 are definition equations. This model therefore is more than the foregoing comparable with the old League of Nations model. Some important differences may be enumerated here. In particular, the monetary section is much simpler while the explanation of prices is also less elaborate. No intention is devoted to a possible influence of share prices or interest rates on the demand for consumer goods or investment goods.

On the other hand there is among the explanatory variables in the investment equation again "capital in existence". The housing sector is even split into houses built to rent and owneroccupied houses. Two attempts are made at testing this system of equations, viz. a somewhat simplified maximum likelihood method (taking the equations in groups), and the least-squares method. From the graphs given it appears that generally speaking Dr. Klein's equations give good approximations to real movements.

After having summed up the three models we come to the author's conclusions. According to model I the "marginal propensity to spend" (being the sum of the marginal propensity to consume and the marginal propensity to invest) is very near to 1. In model III it is found that the interest rate has practically no influence on demand deposits and currency holdings (p. 111). An attempt at using quarterly figures for the demand equation for inventories leads to practically the same coefficients as is the case when annual figures are used. No influence of liquid reserves on the demand for investment goods is found in the case of railways, but for investment goods as a whole some slight influence might exist.

As Professor Koopmans once observed, the method followed is the only relevant method for investigating the mechanism of economic movements, and it is to be welcomed that such an important piece of work has been done by Dr. Klein. It can hardly be understood what an enormous volume of work is involved in this modest publication. The reader may gain an impression merely by looking at the

documentation on the series used, given in the appendix. It is therefore understandable that this book leaves quite a number of questions open. It may even be called rather sketchy, and from a didactic point of view it is not very strong. The conciseness of expression will make it very difficult for non-econometrists to understand the details of Dr. Klein's theories or statistical and mathematical operations¹. In a sense the book is a semifinished product from which considerably more information could be derived by those who take pains to do so. Many more conclusions could be drawn from the equations obtained and their combination, both with regard to certain theories or to particular historical situations in the development between 1921 and 1941. This only means that Dr. Klein's book represents a mine of as yet unexplored knowledge.

One main critical question may be whether sufficient attention has been given to the possibility of a structural break at the moment the New Deal was introduced. Could it not have been expected that at that moment the relation determining wages and the relation determining prices would have shown a sudden change? In some other approaches attempted by the reviewer such breaks seemed to be present. The same question may be put for the investment equation. It cannot be denied, however, that Dr. Klein's graphs do not show very much of the statistical necessity for introducing such breaks.

Among the details, one of the weaker points of the book would appear to the reviewer to be the treatment of price formation in the equation representing the process of price fixation in equation 3. 3. 49. It is presented as an "output adjustment equation" and not as a price adjustment equation. Why the equation is reversed is not explained on p. 102 where it is introduced, and the theoretical treatment of the question on p. 54 seems to have been chosen in favour of the price adjustment equation. On p. 102 where the equation is introduced, the text starts without any mention of prices as an explanatory variable for output adjustment. Only the very last line of the section says: "We have added the term up to show that price fluctuations as well as excess inventories may have a bearing on variations in output." From graph 3. 3. 49 it appears, however, that price changes are by far the most important explanatory variable. The reviewer himself thinks that this treatment is not quite satisfactory, and that perhaps on this point no improvement, as compared with the League of Nations study, has been reached. The more so, since the whole body of experience of agricultural statistical analyses does not seem to have any influence on Dr. Klein's system.

Another detail seems to be a computing error in the multiplier as given on p. 79. As far as the reviewer is able to see, the multiplier should be 2.07 instead of 1.9². A final detail is that an explanation of the trends in equation 3. 3. 46 would have been interesting.

Summarizing, it may be repeated that Dr. Klein has presented us with a most important piece of work on which we should like to congratulate him. The strongest features of the book we consider to be many points of the theoretical foundation, the treatment of the multiplier and the statistical results of model I and model III. It may be repeated that the book represents an enormous stock of knowledge only partly explored by the author.

¹ The briefness of his language may be illustrated by his treatment of the multiplier problems, and of the method of grouping used in model III. At p. 52 he starts a new theory somewhere in the middle of a paragraph, etc.

² Meanwhile the author made it clear to the reviewer that this is a question of rounded-off values.

Zusammenfassung

Dr. Klein hat drei verschiedene Modelle von dem Konjunkturmechanismus in den Vereinigten Staaten 1921—1941 ausgearbeitet. Das erste besteht aus sechs Gleichungen, das zweite aus drei und das dritte aus sechzehn. Bei dem ersten Modell wendet er drei verschiedene Methoden der statistischen Verifizierung an; bei dem dritten zwei. Der guten Übereinstimmung zwischen beobachteten und berechneten Reihen zufolge, sind die Differenzen, welche er zwischen den Koeffizienten findet, nur gering. Interessant ist, daß es sich zeigt, daß der marginale Verbrauchshang für Nichtarbeiter sehr wenig von 1 entfernt zu sein scheint. Dr. Klein nimmt an, daß die Investitionen nicht nur von den Gewinnen, sondern auch von dem anwesenden Kapital abhängen. Diese Annahme hat zur Folge, daß der Wert des „Keynesschen Multiplikators“ viel kleiner wird als bei den anderen Modellen; für ein so großes Land wie die Vereinigten Staaten wohl etwa 2. Dr. Klein findet weiter, daß der Einfluß der Liquiditätsreserven auf den Konsumhang vernachlässigt werden kann.

Sein drittes Modell ist theoretisch besser unterbaut, doch in verschiedener Hinsicht weniger ausgearbeitet als das Modell, daß damals von dem Völkerbund publiziert wurde. Auffallend ist, daß nirgendwo der Einfluß der „New Deal“-Politik signalisiert worden ist.

Résumé

Le docteur Klein a élaboré trois différents modèles du mécanisme conjuncturel des Etats-Unis. Le premier se composait de six équations, le deuxième de trois et le troisième de seize. Le premier modèle a été vérifié par trois méthodes différentes; le troisième par deux. A cause de la bonne concordance entre les séries observées et computées les différences entre les coefficients, trouvés par le docteur Klein, ne sont que petites. C'est intéressant d'observer que la propension marginale aux dépenses pour les non-travailleurs est presque 1. Le docteur Klein suppose que les investissements ne sont pas déterminés seulement par les profits, mais aussi par le capital présent. A cause de ça l'influence du multiplicateur keynésien est beaucoup plus petite que dans d'autres modèles; pour un grand pays comme les États Unis environs 2. Le docteur Klein trouve de plus que l'influence des réserves liquides sur la propension à la consommation peut être négligée. Au point de vue théorique son troisième modèle est mieux fondé mais en différents égards moins élaborés que le modèle, publié autrefois par la Société des Nations. C'est remarquable qu'une influence de la «New Deal» politique n'est signalée nulle part.