A 1929 Application of Multiplier Analysis by Keynes

by

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I. Introduction

Although it is recognized that Kahn has several predecessors in developing the concept of the multiplier[1], including De Lissa (Goodwin 1962), Wulff (Topp 1981), Hawtrey (Dimand 1997), Warming (Boserup 1969), Giblin (Coleman 2004; Wright 1956, pp. 189-90) and Schwoner (Hegeland 1954, pp. 23-7), he is nevertheless commonly credited with "the pioneering work in this field" on account of his June 1931 paper in the *Economic Journal*.[2] (Wright 1956, p. 193) This paper seeks to add Keynes as another "predecessor" by reproducing an exercise in multiplier arithmetic by Keynes from May 1929, over a year before Kahn began working on his multiplier article. (Kahn 1984, p. 91)

In section II the Liberal pledge to reduce unemployment made during the 1929 election campaign is presented. In section III a 1929 application of multiplier analysis by Keynes is reproduced. An interpretation of this multiplier arithmetic is offered in section IV. The question whether this is actually a multiplier analysis is addressed in section V. The study is summarized and conclusions drawn in the final section.

II. The Liberal Pledge

By way of background, in this section the Liberal Party's pledge during the 1929 election campaign to reduce unemployment by public works is presented. In a speech to the Liberal candidates on March 1, 1929 Lloyd George pledged "the Liberal Party…(is) ready with schemes of work which we can put immediately into operation…(which) will reduce the terrible figures of the workless in the course of a single year to normal proportions…" and in doing so "…not add 1 d. to the national or local taxation." (Lloyd

George 2001, p. 268) In his speech Lloyd George sketched the outlines of the Liberal Party's plans, and how they would be financed.

The fullest statement of the Liberal program was in the Yellow Book, *Britain's Industrial Future*. (Keynes 1972, p. 87) The pamphlet *We Can Conquer Unemployment*, the Orange Book, which "crystalliz(ed) the essence of the matter in a few broad and simple propositions" was written for the 1929 election. (p. 87) Keynes and Henderson wrote the pamphlet *Can Lloyd George Do It? An Examination of the Liberal Pledge* in support of Lloyd George's pledge.[3] It was "specially directed to answering recent criticisms." (p. 87) In their pamphlet Keynes and Henderson provided a short summary of the Liberal program (pp. 94-9) and examined how much employment a given expenditure would provide.

Section VII of Keynes and Henderson's pamphlet analyzed what the Liberal program would cost. Lloyd George had pledged that it would not mean an addition to taxation. Keynes and Henderson said "Perhaps this part of his pledge has attracted the most criticism…" (p. 110)

III. A 1929 Application of Multiplier Analysis by Keynes

How to finance the Liberal Party's schemes of work was a key concern for both its opponents and proponents during the election campaign in spring 1929. On May 28 Keynes spoke to a meeting in the City of London in support of the Liberal candidate T. O. Jacobson. His notes for the speech are not published in Keynes's *Collected Writings*, although they are in the *Keynes Papers*. There are six pages of notes, handwritten by Keynes. The first page enumerates five rhetorical questions; the last five sketch out Keynes's answers.

There is neither a date on the notes nor a heading specifying that they are notes for Keynes's May 28, 1929 speech. In *A catalogue of the papers of JOHN MAYNARD KEYNES in King's College Library, Cambridge*, the "28 May 1929 (autograph manuscript) notes in support of Liberal Party candidate T. O. Jacobson at hustings in the City of London" are listed just before the "29 May 1929 (autograph manuscript) notes in support of the Liberal Party in the General Election, given in Leicester". (*catalogue* 1995, p. 46-7) These May 29 notes are published in v. XIX of Keynes's *Collected Writings* (Keynes 1981a, pp. 824-8). Therefore, apparently the six pages of notes which are immediately before the May 29 notes in the *Keynes Papers* are what are identified as being Keynes's notes for his speech in the City on 28 May.

The content of the six pages of notes definitely identify them as being from the 1929 election. The last line of Keynes's notes in which he sketched out his response to his first rhetorical question is "But in case there is anyone still left in the City of London who remains unconvinced, I am here to answer doubts, questions and objections from all comers." So it does appear that the identification of these notes as being Keynes's from his 28 May 1929 speech to the meeting in the City of London is correct.[4]

Keynes's first rhetorical question, on the first page of the notes, is "Where does Mr. Keynes think that £100,000,000 can come from, if it is not to be taken from what investors and bankers are already lending to industry?" (*Keynes Papers* 1993, reel 57, p. PS/4/120) Keynes's notes for his answer to this question begin on the top of the second page. Keynes's notes here read:[5]

contractors profits, taxation etc.

(1) A man who is unemployed

spends perhaps 30/-ˢ a week

when employed he spends 60/-ˢ

Some imports for food and raw materials

This may stimulate exports or a little diminish

foreign investment

<u>Indirect employment</u>   But of the 30/-ˢ extra he

spends a good deal goes to home industry

He buys boots and clothing

Suppose 25/-ˢ goes in this way

A man is taken off the dole and nearly half

is found in this way

A long series

I have calculated that if $\tfrac{1}{4}$ is imported

$$\tfrac{1}{2} + \tfrac{3}{4}(\tfrac{1}{4} + \tfrac{1}{8} + \cdot\cdot)$$

$$+ \tfrac{3}{16}(1 + \frac{1}{2} + \frac{1}{4} + \cdot\cdot)$$

$$+ \tfrac{3}{8}$$

$$= \tfrac{7}{8}$$

This is a technical matter. But no economist in

this country has been found who will support

this view.

It happens to have been examined in advance

by Professor Pigou   Industrial Fluctuations

The latest objection, which was present in a more

modest form in Worthing, has appeared on the lips of

the Chancellor of the Exchequer - namely that the rate

of interest would rise so high that the old-established business

firms would have to pay 8 per cent for accommodation.

One of the sillier things ever said by a Chancellor of the
                                                          Exchequer
All these arguments have been abandoned or have

receded into the background.

It is important to realise through the clouds of doubt which

are naturally raised by a General Election how completely

this government's argumentative case has been defeated.
                        still left in the City of London
But in case there is anyone ~~where~~ ^ who remains

unconvinced, I am here to answer doubts, questions and

objections from all comers.

(*Keynes Papers* 1993, reel 57, pp. PS/4/121-2)[6, 7]

IV. An Interpretation

Throughout the election campaign in spring 1929, again and again, Keynes

addressed the question of how the Liberal program was to be financed. He mentioned a

number of possible sources of finance:

1) "When the demand for investment at home is brisk, the Bank of England can

safely create more credit…", 2) "savings…will be diverted not from financing

other capital equipment but largely from financing unemployment", 3) "a

reduction of foreign lending." (Keynes 1981a, p. 810-1); and 4) "Something will be provided by the very prosperity which the new policy will foster." (Keynes 1972, p. 120)

In a review of a government White Paper, entitled *Memoranda on Certain Proposals Relating to Unemployment*, which consisted of six memoranda "dealing with the proposals in the Pamphlet entitled 'We Can Conquer Unemployment'" (*Memoranda* 1929, p. 2), in the May 18 *The Nation and the Athenaeum* Keynes expanded on the fourth point, prosperity from the new policy:

> (2) the gain to the Exchequer corresponding to the increase in the national income - which might be estimated at an eighth of the gross cost; (3) that part of the original capital expenditure which by going to business profits, purchases of land, &c., is likely to be saved for a time at least; and (4) similar benefits from the repercussions of the expenditure of the newly employed out of their wages in increasing employment in other industries - which, though not precisely calculable, are substantial. (Keynes 1981a, p. 821)

During the election campaign Keynes's explanation of how the Liberal program could be financed evolved. As the campaign progressed Keynes placed more and more emphasis on savings from the dole as a possible source of funds. In his review of the government's White Paper Keynes mentioned the idea that "there will be a saving on the dole not only from men, previously unemployed, who make roads; but also from men, now unemployed, who will make boots for the men who make the roads; and from men, now unemployed, who will make shirts for the newly employed boot operatives; and so on." (Keynes 1981a, p. 822-3)

In the equation in his speech on the hustings presented above Keynes is apparently trying to determine the savings from the dole if a program of public works is instituted. He assumes that if someone who had been on the dole is hired, the savings on the dole are equal to one-half of the wage paid. Although not explicitly stated, it appears he assumes someone hired off the dole spends all his income. The spending on public works leads to a series of repercussions of additional domestic spending. Keynes wants to find the total savings on the dole, including from the repercussions of new domestic spending.

Keynes assumes that one-quarter of any spending is accounted for by imports, and therefore three-quarters is domestic. Plus Keynes assumes one-half of the spending by a worker newly hired off the dole is new spending. Thus the rounds of new domestic spending resulting from a man being hired off the dole would be:

$$(1) \qquad 1 + \frac{3}{4}\frac{1}{2} + (\tfrac{3}{4})^2(\tfrac{1}{2})^2 + (\tfrac{3}{4})^3(\tfrac{1}{2})^3 \cdots$$

The one represents one person being hired off the dole. That person spends all his/her income. Only $\frac{1}{2}$ is new spending though. Plus $\frac{1}{4}$ of the spending is on imports, so only $\frac{3}{4}$ is on domestic items. Therefore in the first repercussion the new domestic spending is $\frac{3}{4} \cdot \frac{1}{2}$. Further repercussions are generated similarly.

Assuming that any new domestic spending results in hiring unemployed workers who previously had been on the dole, since Keynes assumes that the dole would be equal to one-half of what a newly hired worker would be paid, the total savings on the dole would be $\frac{1}{2}$ times equation (1):

(2) $\frac{1}{2}+\frac{3}{4}\cdot\frac{1}{2}\cdot\frac{1}{2}+(\frac{3}{4})^{2}(\frac{1}{2})^{2}\cdot\frac{1}{2}+(\frac{3}{4})^{3}(\frac{1}{2})^{3}\cdot\frac{1}{2}+\cdots$

To compare this with what Keynes has, rewrite equation (2) as:

(3) $\frac{1}{2}+\frac{3}{4}(\frac{1}{4}+\frac{3}{4}\cdot\frac{1}{8}+(\frac{3}{4})^{2}\cdot\frac{1}{16}+\cdots)$

Comparing this with Keynes's first equation presented above, it appears that he made an error. Keynes accounted for the leakage in each round as workers are hired off the dole in that only one-half of their spending is new, but he did not fully account for the leakage in each round because only three-quarters of spending is domestic, although he did recognize this point. In his equation Keynes does not have the $\frac{3}{4}$ terms inside the parentheses.

Keynes's concern here is not directly with the total effect on employment or income of an increase in public works, but rather the total savings on the dole. But as was mentioned previously in section II, the part of the pledge by Lloyd George that attracted the most criticism was that the Liberal program would not mean an addition to taxation, and the objection that was raised more frequently than any other was that money "raised by the state for financing productive schemes must diminish *pro tanto* the supply of capital available for ordinary industry." (Keynes 1972, p. 115)

Keynes apparently is trying to quantitatively determine what the total source of funding from savings on the dole would be. Before this campaign speech, more than once, Keynes had mentioned how much was being spent on the dole. In *Can Lloyd George Do It?*, when Keynes and Henderson enumerated the "resources which can enable new investment to provide a net addition to the amount of employment", the first one listed was "out of the savings which we are now disbursing to pay the unemployed."

(Keynes 1972, p. 116) They mentioned that "From the Unemployment Fund alone we are now paying out £50 million a year…"[8] (p. 117) In his review of the government White Paper in *The Nation and Athenaeum* Keynes said "the dole and other forms of relief now paid to the unemployed, which will no longer be payable when they are employed - this alone would furnish between a quarter and a third of the total cost…" (Keynes 1981a, p. 821)   So, it seems that in his May 28 speech in the City of London Keynes was attempting to determine quantitatively the total savings on the dole, including from the repercussions that resulted from workers being hired off the dole as a result of a new public works program.

The very first line in the above quote, "contractors profits, taxation, etc." apparently refers to other possible sources of finance that Keynes had mentioned in his review of the government White Paper. There he had mentioned as sources of finance business profits and "the gain to the Exchequer corresponding to the increase in the national income…"[9] (Keynes 1981a, p. 821)

In *Can Lloyd George Do It?* Keynes and Henderson said:

The general problem whether capital developments financed by the government are capable of increasing employment has been carefully debated by economists in recent years. The result has been to establish the conclusion of this chapter as sound and orthodox and the Treasury's dogma as fallacious. For example – to quote authorities of diverse gifts and experience – our preceding argument has closely followed Professor Pigou's reasoning in his recent volume *Industrial Fluctuations* (part II, chapter X), where he quotes a statement of the Treasury dogma and expressly declares it to be fallacious; this conclusion is endorsed by

Sir Josiah Stamp; and it has been ardently advocated by Mr McKenna… (Keynes 1972, p. 120-1)

Most likely this is what Keynes meant by his comment that "no economist in this country has been found who will support this view" and his reference to Pigou in his May 28 speech.

Finally the reference to Worthing is apparently referring to Sir Laming Worthington-Evans and the exchange between him and Keynes about the Liberal pledge and its effects in the *Evening Standard*.[10]

V. Is This Development by Keynes a Multiplier Analysis?

Granted that Keynes made an error in his development of the estimate of the total savings on the dole as a man is taken off the dole, was what he did a multiplier analysis? Wright identifies "four distinguishing characteristics of the multiplier analysis":

(1) a multiplicand, usually, but not necessarily, in the form of an exogenous injection,

(2) the recognition of the importance of a leak factor,

(3) the geometric series formed with this leak as the determining ratio, and

(4) the summation of the series so obtained.

(Wright 1956, p. 193)

With respect to Wright's four distinguishing characteristics: 1) Keynes, in his development, has a multiplicand, which is in the form of an exogenous injection, an increase in public works spending that hires a man off the dole. 2) He recognizes two leak factors relevant to estimating savings on the dole, first, that only half of the spending by those newly employed who had been on the dole would be new spending, and second,

that one-quarter of spending would be on imported items. As was seen above, he incorporated the first leakage into his analysis, but made an error with the second, even though he did recognize it. 3) Keynes's development has a geometric series with a leakage as the determining ratio. And finally, 4) Keynes did sum the series.

So, although he did make an error in his development, based upon Wright's specification of what determines a multiplier analysis, Keynes's arithmetic in his May 28, 1929 speech is a multiplier analysis.[11]

VI. Summary and Conclusions

In the *General Theory*, Keynes said "The conception of the multiplier was first introduced into economic theory by Mr R. F. Kahn in his article on 'The Relation of Home Investment to Unemployment'". (Keynes 1973, p. 113) It has been shown in this paper, though, that two years before Kahn's *Economic Journal* article on the multiplier was published, and according to Kahn more than one year before he began working on his multiplier article, Keynes used multiplier analysis in a May 28 speech during the 1929 election campaign.[12] So, much earlier than had been previously known, Keynes attempted to estimate a multiplier process. It appears Keynes made an error in his development, but what he did does meet all the distinguishing characteristics of multiplier analysis.

That Keynes attempted to empirically estimate a multiplier process in 1929 elicits at least two questions. First, if Keynes developed a multiplier process in his speech on the hustings on May 28, 1929, why didn't he develop an estimate of the multiplier before Kahn did?

We are not aware of another attempt by Keynes, besides the one in his May 1929 speech, to estimate a multiplier before Kahn circulated an early version of his 1931 *Economic Journal* article to the Committee of Economists in September 1930. (Kahn 1972, p. vii)[13] In a January 1930 letter to Pigou Keynes seems to refer to the multiplier process presented in section III above. Pigou, in an undated letter, wrote Keynes, "Here at last is my theory about unemployment. Will you look thru it?" (Keynes 1993, reel 141, pp. PP/45/254/34-5) In his letter in response, dated January 5, 1930, Keynes said:

> …in order to get my geometrical progression I undoubtedly <u>am</u> assuming that the Government pays its way in the first instance by bringing into existence an additional quantity of money. For the essential character of my argument is as follows. Assuming that the Government borrowing is additional to, and not in place of, any existing loans, nevertheless – so I argue – the amount of expansion of bank credit ultimately required will be comparatively negligible and no more than can be balanced in its effect on the foreign exchanges by a diminution in the amount of foreign investment. For the dose of extra employment directly produced will save half its gross expenditure out of the dole; the remaining half will be satisfied after the lapse of one production period out of the labour of newly employed persons producing consumption goods, which will have the effect of saving a half of that (i.e., a quarter of the original expenditure) out of the dole; and so on. I quite agree, of course, that if the Government tried to do the trick with no greater expansion of bank money than is required to finance the extra transactions which intervene when Government takes money from non-

wage earners and hands it over to wage earners, then there would not be enough

money to bring my series of repercussions into operation.[14]

<div align="center">(Keynes 1993, reel 141, pp. PP/45/254/38-9)</div>

Here Keynes refers to a "series of repercussions" and a "geometrical

progression". Plus that the "extra employment directly produced will save half its gross

expenditure out of the dole" and that further repercussions have a similar effect. All

these ideas are components of the multiplier process of Keynes presented in sections III

and IV of this paper.

Keynes discussed the concept of the multiplier before the Macmillan Committee

on 6 March 1930 while analyzing his various possible remedies for unemployment.

(Keynes 1981b, pp. 126, 130) But it does not appear that Keynes specified, in writing, a

possible value of the multiplier until he did so in a 21 September 1930 memo to the

Committee of Economists of the Economic Advisory Council. There Keynes said "Mr

Kahn has produced an argument, which seems to me convincing, for supposing in present

conditions in Great Britain a given amount of primary employment gives rise to an

approximately equal amount of secondary employment."[15] (Keynes 1987, p. 188)

So why didn't Keynes develop an estimate of the multiplier before Kahn did?

Perhaps the reason is as Keynes lamented in a June 1929 note in the *Economic Journal*,

evidently written about the time he was wrestling with these problems during the election

campaign in 1929, "It is true, of course, that everything in the economic world sets up a

repercussion - which it is, as a rule, very difficult to follow up quantitatively or

qualitatively." (Keynes 1983a, p. 472) Plus, of course, during this period Keynes was

extraordinarily busy, finishing the *Treatise*, with the Macmillan Committee, and with the Economic Advisory Council, in addition to his normally inordinately busy schedule.[16]

Second, Keynes's attempt to empirically estimate a multiplier process in 1929 raises again the question of Keynes's role in Kahn's development of the multiplier. (Lambert 1969, p. 245) After all, Kahn, in an article responding to a critic of his 1931 *Economic Journal* article, in a footnote to a sentence concerning his "formula…which was designed to evaluate the amount of 'secondary' employment (in the ordinary consumption-goods industries of a country) brought about by a given amount of 'primary' employment (in the production of capital goods)", said that "My own ideas were largely derived from Mr. Keynes."[17] (Kahn 1936, p. 144)

As was mentioned above, Kahn circulated an early version of his 1931 article to the members of the Committee of Economists of the Economic Advisory Council in September 1930. (Kahn 1972, p. vii) For this "primitive draft of part of my article…Colin Clark not only provided the statistical basis. He helped me in the drafting." (Kahn 1984, pp. 95-6) There is a five page memo, entitled "The Relation between Primary and Secondary Employment", in the Committee of Economists' material in the *Keynes Papers* that apparently is this "primitive draft". (*Keynes Papers* 1993, reel 31, pp. EA/4/452-6)

In this early version of the article Kahn develops an expression for the ratio of secondary employment to primary employment using the same approach and notation as in his June 1931 *Economic Journal* article. (Kahn 1931, p. 183) The major difference between the two versions is that in the *Economic Journal* version as each man is placed in employment Kahn considers the man's wage, W, the increase in profits, P, and "the

value of the increase in imports of raw materials and unfinished goods that accompanies the employment of each additional man…R." (Kahn 1931, p. 183) In the early draft, Kahn considers W and P, but not R.

In the first two pages of this early version of his multiplier article Kahn develops the expression for the ratio of secondary employment to primary employment and presents a table showing different values of this ratio for various values of its component variables. Then, on the next page, he has a section entitled "The saving to the Unemployment Funds". Here he develops an expression for the total savings to the unemployment funds from the total employment, both primary and secondary, resulting from one man being hired in primary employment. (*Keynes Papers* 1993, reel 31, p. EA/4/454) This, of course, was what Keynes was attempting to do in his speech on the hustings.

In summary, in this paper it has been shown that Keynes is a "predecessor" of Kahn in developing the concept of the multiplier. But there certainly are many unanswered questions concerning Keynes's role in the develop of the multiplier.[18]

Footnotes

1. Commenting on Jevons being the first economist effectively to introduce index numbers of prices into monetary science Keynes said "though like other original geniuses not without precursors…" (Keynes 1971b, p. 71)

2. Patinkin says "there can be no doubt about the importance of Kahn's 1931 multiplier article in the history of the development of macroeconomic theory." (Patinkin 1978a, p. 221) Shackle, in 1951, called Kahn's article "one of the great landmarks of economics…", "one of the most original contributions of the last fifty years." (Shackle 1951, pp. 241-2) Harcourt believes that if Kahn's dissertation had "been published closer to the time when it was first written, it and his 1931 multiplier article together would surely have meant the subsequent receipt of the Nobel Prize…" (Harcourt 1994, p. 22)

3. Keynes is listed as the first author of this pamphlet. (Keynes and Henderson 1929) Harrod says, "Keynes composed (*Can Lloyd George Do It?*) himself, but embodied large extracts from the fine leaders which Mr. Henderson had written in the *Nation* on this subject." (Harrod 1963, p. 395) The editors of volume IX of Keynes's *Collected Writings* say "It has not proved possible to apportion the pamphlet between its joint authors." (Keynes 1972, p. 86)

Skidelsky says *Can Lloyd George Do It?* "was mainly cobbled together from pieces Keynes and Henderson had been writing in the *Nation* over the preceding months." (Skidelsky 1995, p. 303) Apparently it was cobbled together relatively hastily; two of the chapters have different titles in the table of contents and in the text. In the table of contents chapter VI is entitled "How Much Employment from the Liberal Plan?". In the text it is entitled "How Much Employment Will the Liberal Plan Provide?". In the

table of contents chapter IX is entitled "Will it Divert Employment from Other Schemes?". In the text it is entitled "Will it Merely Divert Employment from Other Enterprises?". (Keynes and Henderson 1929, pp. 5, 22, 34)

4. Discussing Keynes's support of the Liberal Party during the 1929 election, Moggridge says "(Keynes) had intended to speak only once, in the City of London, but a deputation to Cambridge of two 'doughty bourgeois' from Leicester persuaded him to speak in that city on the eve of the poll" (Moggridge 1995, p. 462)

5. The notes are formatted here as they are in Keynes's original handwritten notes.

6. On May 29, 1929 *The Manchester Guardian* had a fairly long article about the meeting in which "Mr. J.M. Keynes, who is one of the chief experts on the financial side of the Liberal unemployment scheme, submitted himself to critics at a meeting of business men held at the Cannon Street Hotel…" ("Mr. J.M. Keynes Cross-Examined", 1929, p. 17) In a section entitled "The Questions" it reads:

> Where does Mr. Keynes think £100,000,000 can come from if it is not to be taken from what investors and the banks are already lending to industry?
>
> The gist of Mr. Keynes's elaborate reply was the conclusion that he had no doubt that the sum could be devoted to capital development of the right kind without any serious repercussions on the general finance of the City.
>
> ("Mr. J.M. Keynes Cross-Examined", 1929, p. 17)

(Note that the question here is almost exactly the same as Keynes's first rhetorical question quoted above.)

7. Patinkin says "the real contribution of Kahn was less in demonstrating that the multiplier was greater than unity, than in defining and analyzing the notion of leakages,

and then demonstrating rigorously that as a result of these leakages the expansionary process converges to a finite limit." (Patinkin 1978b, p. 19)

Colin Clark, in a June 1930 memo to the Economic Advisory Council, so a year before Kahn's article was published, mentioned "an infinite series of beneficial repercussions." Patinkin questions whether Clark would have known whether the sum of an infinite series was not necessarily infinite. (Patinkin 1978a, p. 217)

But here we have Keynes summing an infinite series over one year before Clark's memo. So Kahn was not the first of the economists associated with Cambridge to show the sum of an infinite series was finite. And, in fact, Pigou also summed an infinite series in an article in the June 1929 *Economic Journal.* (Pigou 1929, p. 189)

8. In an April 19 response in the *Evening Standard* to Sir Laming Worthington-Evans, the Secretary for War, who had suggested "that Lloyd George would be able to fulfil neither his employment nor his taxation pledges" (Keynes 1981a, p. 808), Keynes also had mentioned that "From the unemployment fund alone we are now paying out £50,000,000 a year…" (p. 811)

9. In a letter to the *Times* in August 1929, enumerating sources of finance for additional employment, Keynes said "Not the whole of the gross outlay on development schemes eventuates in increased consumption. Part comes back to the Treasury in additional receipts from taxation, part takes the form of contractors' profits, with which the latter can finance themselves for the time being…" (Keynes 1981a, p. 829)

10. For Keynes's side of this exchange see Keynes 1981a, pp. 808-16.

11. The day after he spoke on the hustings in the City of London Keynes made a campaign speech in Leicester. There he twice used the word multiply in describing how

employment and prosperity, and unemployment, spread. In part his notes for this speech read:

> Unemployment is an infectious illness
>
> It multiplies itself and spreads from house to house unless something is done to check it
>
> …
>
> Every man who is unemployed puts another man out of work
>
> But the opposite is also true
>
> Employment is infectious health
>
> Employment and prosperity multiply themselves and spread from house to house
>
> (Keynes 1981a, p. 826)

12. In their multiplier analyses both Keynes and Kahn had basically the same goal. As Keynes said, he was trying to explain where the money can come from for a program of national development. Kahn says "My main concern…was to prove that the various offsets…added up to the cost of the investment." (Kahn 1984, p. 98)

13. This early version of Kahn's article is discussed below.

14. Bridel and Ingrao quote part of the above. They say, "The 'geometrical progression' was a first version of the multiplier process…" (Bridel and Ingrao 2005, p. 163)

15. Discussing the Committee of Economists Howson and Winch write, "An early version of Kahn's multiplier idea, together with an attempt to measure the relationship between primary and secondary employment, was circulated to the Committee of Economists. Keynes tried to use the idea to argue for public works in the report, but

Pigou's and Henderson's objections ensured that there was no sign of this in the final product." (Howson and Winch 1977, p. 49; also see pp. 59, 69)

16. The last paragraph of Keynes's January 5, 1930 letter to Pigou reads, "I have once more been engaged on a fairly drastic re-writing of Book III of my book. But now I am back in the hurly-burly of London and the Currency Committee." (Keynes 1993, reel 141, p. PP/45/254/40) In book III of the *Treatise* Keynes presents his fundamental equations.

17. There are many similarities between Keynes's approach in developing his multiplier analysis presented here and Kahn's approach in his 1931 article. Keynes considers the effect of a man being employed and taken off the dole. Kahn, in his initial development, considers the effect for each man placed in employment. So both analyze the effect of one person being employed. Both take into account that only a portion of spending by someone taken off the dole is new spending, and both consider the leakage into imports. Keynes assumes those taken off the dole spend all their income; Kahn also assumes this for wage earners. Kahn though does consider saving out of profits. The major difference between the two obviously is that Keynes is attempting to estimate the total savings on the dole while Kahn estimates an employment multiplier.

18. In May 1938, in a letter to Colin Clark concerning his article "The Determination of the Multiplier from National Income Statistics" that was published in the September 1938 *Economic Journal*, Keynes has a section entitled "History of the multiplier doctrine", in which Keynes said:

> One must distinguish here between some sort of formal statement such as was given in Kahn's *Economic Journal* article and the general notion of there being such a thing as secondary employment.

If one is to include unpublished memoranda then it must be remembered that the original draft of Kahn's theory was contained in a memorandum which he wrote (as you will remember) for the Economic Advisory Council in the late summer of 1930…

The general notion of secondary employment, however, must go back much further. For example, it is clearly explained in *Can Lloyd George do it?* by Hubert Henderson and myself, where we used the argument that because of secondary employment the aggregate saving on the dole would pay half the capital cost of public works. (Keynes 1983b, p. 806)

So, in discussing the history of the multiplier Keynes himself does not refer to his speech on the hustings in May 1929.

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