1. The essence of the modern Keynesian position is that there is no automatic mechanism to assure the equality of full employment savings and investment. Thus, in Figure 1, at the full employment level $Y_0$, the amount people want to invest may exceed or fall short of what they wish to save,

![Figure 1](image)

Figure 1

according as $I_S$ or $I_L$ (respectively) represents the investment decisions of individuals. This discrepancy then results in inflation or deflation, as the case may be.

2. In sharp contrast with this position, classical economics finds
in interest rate variations an automatic mechanism insuring full employment.
The argument may be interpreted as follows: Real savings \( S \) and investment \( I \)
are functions of the rate of interest \( r \), as well as of the real national income
\( Y \). That is

\[
\begin{align*}
S &= \mathcal{S}(r, Y) \\
I &= \psi(r, Y)
\end{align*}
\]

Let \( Y \) represent the full employment level of real income. For this

\[ S = \mathcal{S}(r, Y_o) \]
\[ I = \psi(r, Y_o) \]

Figure 2

given level of income, savings and investment will depend only on the interest
rate. Figure 2 presents this dependence in the traditional manner: the higher
the interest rate, the greater the savings, and the less the investment. If
the interest rate were \( r_o \), then it would be true that individuals would want
1

to save more at full employment than they would be willing to invest. But this
presents no difficulty. For by permitting the interest rate to fall, savings
are discouraged, and investment stimulated until finally full employment savings
and investment are equated at the level \( S_o = I_o \). Similarly if at full employment
desired investment is greater than desired savings, a rise in the interest rate
will prevent inflation.

This argument can also be presented in terms of Figure 1: By downward
variations in the interest rate, the investment schedule $I_1$ can always be shifted upward until it coincides with $I_2$. That is, at any level of income people can be encouraged to invest more by a reduction in the rate of interest. Similarly, $I_3$ can be brought down to $I_2$ by upward movements of the interest rate. In this way full employment savings and investment will always be equated.

(3) The Keynesian answer to the classical argument is that it greatly exaggerates the importance of the interest rates. On the basis of empirical studies as well as theoretical reasoning, it has been shown that investment and saving decisions are notoriously insensitive to fluctuation in the interest rate. If we represent such an interest-inelastic investment curve by $I_1$ (cf. Figure 2), it can immediately be seen that the interest rate is powerless to equate full employment savings and investment. For in an economy in which there are negligible costs of storing money, the interest rate can never be negative. But from Figure 2 we see that the only way the interest rate can equate full employment savings and investment is by becoming negative. Thus the interest rate cannot fulfill the classical role of an automatic adjustor bringing about full employment. There is no way of equating full employment savings and investment; the result is unemployment.  

5 I have discussed this whole question of the contrast between the classical and Keynesian position in much more detail elsewhere. Cf. above, footnote 1.

(4) Some attempts have been made to defend the classical position on the grounds that the investment function is really higher (or the saving function lower) than represented by the Keynesians. But this is irrelevant. The fundamental reason Keynesian economics, if correct, destroys the foundation of classical economics, is that it denies the automaticity of the full employment postulated by the latter. Hence a successful restatement of the classical position must demonstrate the existence of some automatic mechanism which will always bring about full employment. Whether or not full employment will or
will not exist under certain specified circumstances is largely beside the point.

(3) In recent years, Pigou has made a noteworthy attempt to remedy this deficiency in the classical theory. The new mechanism which Pigou introduces to insure full employment is variation in the level of absolute prices. Pigou's argument runs as follows (cf. Figure 2): The difficulty of a negative rate of interest arises because people want to save even at zero and negative rates of interest. This desire is due to the fact that savings are not made solely for the sake of future income, but also for "the desire for possession as such, conformity to tradition or custom and so on." But the extent to which

An individual wishes to save for reasons other than the desire of future income is inversely related to the real value of his cash balances. By making the latter large enough, we can reduce the former to zero. At this point the only reason an individual will continue to save is for the promise of future income. That is, he will save only at positive interest rates. Or, in other words, the savings function becomes zero at a positive rate of interest.

Let us investigate graphically the implications of Pigou's argument with respect to the Keynesian objections of 3.

![Figure 3](image-url)
In Figure 3, $S$ and $I_1$ represent the same full-employment savings and investment curves as in Figure 2 and $r_2$ is again the negative rate of interest at which they are equal. Pigou then argues that by increasing the real value of cash balances, the savings curve shifts to the right until it is in such a position, that no savings are desired except at positive rates of interest. This is represented by the savings curve $S_1$ which becomes zero for a positive rate of interest, $r_3$. Hence by changing the real value of cash balances full employment savings and investment can always be equated at a positive rate of interest.

How can we be sure that real cash balances will automatically change in the required direction and magnitude? Here Pigou brings in his assumption of flexible wage and price levels, and a constant stock of money in circulation. If full employment saving exceeds investment, national income begins to fall, and unemployment results. If workers react to this by decreasing their money wages, then the price level will also begin to fall. As the latter continues to fall, the real value of the constant stock of money increases correspondingly. This process of a falling price level and increasing real value of cash balances continues until the point is reached where people desire to save only for the purpose of future income. Then the analysis of the preceding paragraph is applicable: full employment investment and saving will be equated at a positive rate of interest.

This is the automatic mechanism on which Pigou relies to assure full employment.

(6) How does this theory compare with the original classical theory? Although it too uses the slogan of "flexible prices," it is of an entirely different nature. The original classical position argued for flexibility of relative prices. Pigou now insists on flexibility of absolute prices. The classical school held
that the existence of unemployment was prima facie evidence of rigid wages. The only way to eliminate unemployment was by reducing real wages. Since workers could presumably accomplish this end by reducing their money wage, this position has implicit in it the assumption of a constant price level.\(^5\) Pigou now recognizes that changing the relative price of labor is not enough, and that the absolute price level itself must vary. In fact, a strict interpretation of Pigou's position would indicate that unemployment can be eliminated even if real wages remain the same or even rise; namely, if the proportionate fall in prices is greater than or equal to that of wages. For in any case the effect of increased real value of cash balances would still be present.\(^6\)

\(^5\) Or at least one falling relatively less than wages.

\(^6\) The role of real wages in Pigou's system is very ambiguous. At one point (p. 348, bottom) he assumes that reduced money wages will also decrease real wages. At another (p. 348, lines 20-32) no such assumption seems to be involved. ("As money wage-rates fall ... prices fall and go on falling." Ibid.)

(7) From a larger perspective, the Pigou system presents an interesting picture. Plans for stimulating production by price level changes have undoubtedly suggested themselves in the past. They have been uniformly rejected on the ground that price changes that would encourage creditors, discouraged debtors — and vice versa. The intriguing subtlety of the Pigou approach is that it has selected an asset with respect to which almost everyone is a creditor. This anomalous situation is due to the basic characteristic of money as the debt of the government. If we follow Pigou in assuming that government activity is not affected, the net effect of deflation must be stimulating. Everyone gains at the "expense" of a gracious government, ready, willing, and able to bear the "loss." Here is truly an idyllic policy.

In reality, not all of the stock of money can serve this purpose. To the extent that demand deposits are backed by loans and discounts, the gain
of the money holders is offset by the loss of the bank debtors." The relevant

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figure for the Pigou analysis is the one which measures the net obligation
of government to private individuals including banks. This is clearly the
sum of money in circulation and government debt -- where in each case the amounts
held by the treasury and central bank are excluded. It is the increase in the real
value of this sum which represents the net stimulating effect of a price decline.

(5) Let us digress for a moment and assume that the original classical
explanation of unemployment is correct. Then the statement that unemployment is
due to real wage rigidities is equally correct. But in a glorious non sequitur
which reveals the inherent bias of their thinking, some economists have considered
this statement as equivalent to the proposition that unemployment is due to the
refusal of workers to lower their wages in times of depression. From this false
implication usually follow condemnations of selfish labor unions as the source
of all evil.

These economists forget that there are two sides to the real wage:
The money wage rate and the price level. As Keynes so aptly pointed out, workers
have control only over the former. Thus in the United States we find that al-
though the index of hourly wage rates (as measured by the New York Federal Reserve
Bank) decreased in the period 1929-1932 by approximately 15% (from 1.09 to .93),
the index of real wages (as measured by the Bureau of Labor Statistics wholesale
price index) increased over 20% (from .96 to 1.06). It seems to me that a money
wage reduction of 15% reveals ample willingness on the part of workers to carry
out a policy of "flexible wages." Clearly in this case it is much more accurate
to say that continued unemployment was due to stupid monetary policy which by
permitting a continued fall in the absolute price level, prevented workers from
reducing their real wage, despite their clear desires to do so.
A similar observation can be made for the post-World War I adjustment period in Great Britain. In some sense the difficulties of this period can be ascribed to the failure of British workers to lower their wages sufficiently. But it seems much more accurate to say that the difficulties were due to a criminally stupid policy of overvaluing the pound which required an impossible degree of deflation.

In brief, in some sense it can be said that a man who walks into a lion's cage is killed because he cannot squeeze through the bars. But just how relevant is that sense?

(9) This unconscious bias of classical economists is reflected in another interesting way. There is a curious asymmetry between the classical palliatives for unemployment and overemployment (inflation). To deal with the latter, no one ever suggested upward movement of wage rates as a solution. Yet increased real wages, by decreasing profit prospects, can play exactly the same role as decreased real wages in times of unemployment. Nevertheless inflation was almost always recognized as a problem to be dealt with by the proper monetary policy. It was readily sensed that initiating wage increases in times of overemployment might just start off a disastrous inflationary spiral. That equally dangerous deflationary spirals might be started by wage decreases in times of unemployment was rarely considered. Why this blind spot on the application of monetary policy to the problem of unemployment developed is a proper study for students of the sociology of knowledge.

(10) Similar speculations are involved with reference to Pigou's position. In face of an inflation, would he recommend wage increases to bring about price increases to decrease the real value of cash balances and thereby increase savings? It should be pointed out that granted Pigou's assumption

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of a constant stock of money this may well be a possible procedure. But then we must ask that the policy by which the stock of money is kept constant be spelled out in detail. If the monetary system is left to its own devices, it certainly will not operate in this way. For in depressions there is a perverse decrease, and in booms an increase in the stock of money. The precise manner of counteracting these tendencies and maintaining a constant stock of money must be indicated.

(11) Let us now resume the argument of 2.5 and turn to a detailed analysis of the Pigou system. Its explicit assumption is that savings is directly related to the price level, and therefore inversely related to the size of real cash balances. This assumption by itself is, on a priori grounds, quite reasonable; but it must be emphasized that it is insufficient to bring about the conclusion desired by Pigou. For this purpose he implicitly makes an additional, and much less reasonable, assumption. Specifically, in addition to explicitly postulating the direction of the relationship between savings and the price level, he must also say something about its intensity.

The force of this distinction is illustrated by Figure 4. The savings and investment functions here represent the full employment desires of people. The different saving curves $S_1$, $S_2$, $S_3$, $S_4$ represent the saving schedules corresponding to the price levels $P_1$, $P_2$, $P_3$, $P_4$ respectively. In accordance
with the Pigou assumption, as the price level falls, the savings function shifts over to the right. But it may well be that as the real value of their cash balances continues to increase, people are less and less affected by this increase. That is, for each successive increase in real balances, (for each successive price level decline) the savings function will move less and less to the right, until eventually it might respond only infinitesimally, no matter how much price falls. In graphical terms, as the price decline continues, the savings functions might reach \( S \) as a limiting position. That is, no matter how much the price level falls, the savings function would never move to the right of \( S \).\(^9\) In such an event the declining price level would fail to bring

\[ S = (SCY, r, p, M_0) \]

where \( S = \) real savings, \( Y = \) real income, \( r = \) interest rate, \( p = \) price level, and \( M_0 = \) the fixed amount of money. Pigou's explicit assumption is

\[ Sp (Y, r, p, M_0) > 0, \]

where \( Sp \) is the partial derivative of \( S \) with respect to \( p \). Let \( Y = Y_0 \) represent the full employment income. Then the argument here is that \( S \) may still be of a form such that

\[ \lim_{p \to 0} S (Y_0, r, p, M_0) = S^* (Y_0, r, M_0) \]

for any fixed \( r \)--where \( S^* \) is any curve which intersects the investment curve at a negative rate of interest. (In the argument of the text, \( S^* \) is taken to be \( S_5 \) in Figure 4.) Pigou tacitly assumes that the savings function approaches no such limit; or that if it does, the limiting function intersects the investment function at a positive rate of interest.

about full employment. The validity of the Pigou argument thus depends on the additional (and much more questionable) assumption that the intensity of the inverse relationship between savings and real cost balances is such that it will be possible to shift over the savings function to a position where it will intersect the investment function at a positive rate of interest: say, \( S_4 \) (cf. Figure 4).
Ascertaining the reality of this last assumption would require specific empirical investigations. The little evidence we do have is not inconsistent with the alternative hypothesis that the size of real cash balances has an insignificant effect on savings.\textsuperscript{10} It is especially important to determine the distribution of cash balances. If this turns out, as we might well expect, to be highly unequal, then the possibility of the saving function reaching a limiting position is enhanced. For individuals with already existing large cash balances, are likely to be increasingly insensitive to further increases.


(12) The Pigou analysis is offered as a "long-run" solution to the unemployment problem. It states that if the price level falls, and if at every stage the economy adjusts itself and people consider the fall as permanent, then eventually unemployment will disappear. All dynamic considerations are ignored. Thus even if the analysis were correct (i.e. even if the savings function does not approach a limit), it would not follow that it would be the proper prescription for dealing with a depression actually confronting us. Unfortunately, many people have made this illegitimate transfer, and on the basis of the Pigou analysis have recommended reduction in the general price level in times of depression.

Let us assume for the moment that the Pigou analysis provides a correct long-run unemployment policy. The crucial question that must be answered before it can be considered as an immediate technique for counter-acting depressions is the extent of the price fall (or rise in real balances) it would require. If the necessary decline is slight, then the policy might be a practical one. Conversely, if the Pigou effect would make itself felt only after a long and
continued price fall, then its usefulness is highly questionable. The only result of carrying out this policy may well be the initiation of a disastrous deflationary spiral. Price decline will lead to the expectation of further price declines. Purchasing decisions will be postponed, and unemployment increased still more. The very length of time necessary to complete the prolonged price fall militates against the success of the policy. For during this period the pessimistic gloom will further deepen, aggravating still more the task of recovery. Certainly our past experiences should have sensitized us to this danger.

What, then, should we expect? It seems to me that both on a priori and empirical grounds there is little reason to think that a small price decline — i.e., a small increase in real balances — will be sufficient to end unemployment. We still do not know as precisely as desirable the way in which a depression begins. But it appears to be associated with a pessimistic outlook for the future which paralyzes spending. I think it hardly likely that this pessimistic outlook could be offset by a small increase in real balances. The data of the 1930's certainly offer little encouragement. In the table, net balances are computed for the period 1929-32 according to the definition in 7. As we can see, although there was an enormous 28% increase in real balances from 1931 to 1932, real national income during this period decreased by 13%. Even in the following year, when a further increase of 40% in real balances took place, real income proceeded to fall by an additional 13%. For the 1929-1932 period as a whole there was an increase in real balances of 64%, and a decrease in real income of 40%. Admittedly this evidence is by no means
<table>
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<th>Money in Circulation (1)</th>
<th>Government Debt (2)</th>
<th>Net Balances of Individuals (3)</th>
<th>Wholesale Price Level (4)</th>
<th>Net Real Balances of Individuals (5)</th>
<th>Real Nat. Income (6)</th>
</tr>
</thead>
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<td>4.5</td>
<td>15.5</td>
<td>20.0</td>
<td>.953</td>
<td>20.9</td>
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<td>4.2</td>
<td>14.5</td>
<td>18.5</td>
<td>.884</td>
<td>21.4</td>
<td>76.3</td>
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<tr>
<td>1931</td>
<td>4.5</td>
<td>15.4</td>
<td>19.9</td>
<td>.730</td>
<td>27.3</td>
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<td>5.4</td>
<td>16.8</td>
<td>22.2</td>
<td>.648</td>
<td>34.3</td>
<td>54.2</td>
</tr>
</tbody>
</table>

\[a\] Money in circulation as of June 30 outside the Treasury and Federal Reserve Banks, in billions of current dollars. *Banking and Monetary Statistics*, p. 408.


\[c\] \((3) = (1) + (2)\)


\[e\] \((5) = (3) + (4)\)


Conclusive. But it certainly establishes presumptions in favor of either one of the following propositions: 12 (a) The Pigou effect, to successfully counteract a depression, requires much greater increases in real balances than are feasible; or (b) due to the dynamics of deflationary spirals, the Pigou policy leads only to a worsening (or at best a non-improvement) of the original unemployment situation.

12 I am still assuming here that the Pigou policy is correct as a long-run prescription. See the first paragraph in this section.
(13) The argument of the preceding section can alternatively be put in the following form: On the downswing of the business cycle it might be interesting to know that there exists a sufficiently low price level which, if it had always existed, and had been expected to continue existing indefinitely, would bring about full employment. Interesting, but irrelevant. For due to perverse price expectations and the dynamics of deflationary spirals, it is impossible to reach such a position.

The implication of these remarks can be clarified by consideration of the cobweb theorem for the divergent case. Assume that a certain market can be explained in terms of the cobweb theorem. It is desired to know whether (assuming unchanged demand and supply curves) the designated market will ever reach a stationary position; that is, whether it will settle down to a unique price that will continue indefinitely to clear the market. This question is clearly divided into two parts: (a) Does there exist such a price, and (b) if it does exist, will the market be able to attain it. In the case of the cobweb presented in Figure 5 it is clear that such a price does exist.

![Cobweb Diagram](image)

Figure 6

For if the price $P_0$ had always existed and had been expected to exist indefinitely, it would continuously clear the market. But Figure 5 represents the case of a divergent cobweb: hence the market will never be able to reach the price $P_0$. 
In brief, even though $P_0$ exists, it is irrelevant to the workings of the market. The analogy to the argument of the preceding paragraph is obvious.\(^\text{13}\)

13 The distinction of this section can be expressed in rigorous mathematical form using the dynamic system which has become familiar through the work of Samuelson and Lange (P.A. Samuelson, "The Stability of Equilibrium: Conformation Statics and Dynamics," Econometrica, IX (1941), 97-120. Lange, op.cit., pp. 31 ff.) Considering a single market and letting $D$, $S$, and $p$ represent the demand, supply and price of the particular good, respectively, we can write this system as

\[
\begin{align*}
(a) & \quad D = f(p) \\
(b) & \quad S = g(p) \\
(c) & \quad \frac{dp}{dt} = h(D-S)
\end{align*}
\]

The last equation is the market adjusting equation and has the property that

\[
(d) \quad \text{sign} \frac{dp}{dt} = \text{sign} (D-S)
\]

i.e., price rises with excess demand and falls with excess supply. Consider now the static system identical with (a) - (c), except that it replaces (c) by

\[
(e) \quad D = S
\]

As long as (e) is not satisfied, we see from (d) that the system will not be in stationary equilibrium, but will continue to fluctuate. Thus the existence of a solution to the static system (a), (b), (e) (i.e. the consistency of (a), (b), (c)) is a necessary condition for the existence of a stationary solution for the dynamic system (a), (b), (c). But this is not a sufficient condition. For the static system (a), (b), (e) may have a consistent solution which, if the dynamic system is not convergent, will never be reached.

Thus Pigou has completed only half the task. Setting aside the difficulties of \(^\text{12}\), we can accept his proof of the consistency of the classical system. But that still leaves completely unanswered the question of whether the dynamic system will converge to this consistent solution. (Cf. \(^\text{12}\).) I have tried to show that due to the tremendous price declines involved, it is hardly likely that the convergence will be true for the real world.

(I have discussed these issues in greater detail elsewhere. Cf. Footnote 1, above).

14 The conclusions of this essay can be briefly summarized. As a long run solution to unemployment, Pigou's analysis can be questioned on the
grounds that the savings function may well approach a limit. As a short run
mechanism of dealing with unemployment his policy is definitely unacceptable. Not
only is it unreliable, but it may also drag us into pernicious deflationary spirals.
I think that in formulating anti-depression policies we should recognize that
our economy is much too complex to be subjected to drastic price reductions with-
out disastrous results. We must then go on to devise more direct and reliable
methods of preventing depressions.

Don Patinkin

October 31, 1947

The University of Chicago and The
Cowles Commission for Research in
Economics