MANAGING THE LOSS: HOW PIGOU ARRIVED AT THE PIGOU EFFECT

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Abstract of

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The Pigou effect was conceived to counter Keynes's argument that a competitive economy could remain in the state of high unemployment. Before he introduced this idea, Pigou had debated with Keynes the same question of whether an economy has the tendency to recover full employment. He lost in this controversy. A few years later came Pigou's renewed attempt with the Pigou effect. This study points to two oddities in the way he presented the effect. One is that Pigou had used an almost identical framework he used for the Pigou effect several years before but that at that time, he did not mention the effect. This suggests that Pigou discussed the real balance effect to recover his denied conclusion. The other oddity is that Pigou did not mention real situations as an example in the discussion of the Pigou effect while he did at the time of the controversy. It is probable that he recognized the relevancy of the effect to the reality was limited. I conclude that his sole aim in the discussion of the effect was to recover his loss without damaging the Keynesian framework in the policy field, which he came to appreciate after the controversy.

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1. Introduction

The Pigou effect is the concept linking short-term and long-term equilibria. The effect serves as a theoretical antidote to low interests and the liquidity trap. It allows decreased commodity prices to raise the real value of cash balance and reduce real saving, implying that even the economy under the liquidity trap could move towards full employment without external intervention. Pigou (1941) was one of the first economists that discussed this effect, along with Scitovsky (1941) and Haberler (1941). Patinkin (1948) coined the term "Pigou effect" for this effect.

The present study examines the development of Pigou's macroeconomic theory in the late 1930s and early 1940s that culminated in the introduction of the Pigou effect. The story I will present in this paper is as follows. In his review of J. M. Keynes's *General Theory*, Pigou (1936) found fault with Keynes's claim that the economic slump in the 1930s was not only a cyclical phenomenon but also partly a long-term structural problem. In the article published next year, Pigou (1937) set up a theoretical model and thereby attempted to show that free adjustment of wages and commodity prices would achieve equilibrium in the long run. However, this attempt proved to be a more complex task than Pigou had imagined, and he was taken to task for the inconsistency in his argument by Nicholas Kaldor (1937), who published a paper along with Keynes (1937) to respond to Pigou's 1937 article. Pigou accepted Kaldor's claims and acknowledged that his attempt thus ended in a failure. The above process is closely documented by published correspondence edited by Moggridge (Keynes 1973), which I will rely on in this paper. Pigou (1941) then came back to this issue with a new concept three years later. This new concept was to be termed "the Pigou effect" by Patinkin and would serve as a cornerstone of later macroeconomics.

The present study takes a different standpoint from past literature on Pigou in two respects. First, the study will not see the exchange of papers between Pigou, Keynes, and Kaldor in 1937–38 simply as a conflict of mutually incompatible views. Collard (1981; 1999) views Pigou's 1937 article as "an extension of the ordinary theory of the firm" (Collard 1999, xxxv), namely, a theory in which aggregate labor demand moves on the decreasing marginal product curve, so that a wage reduction will necessarily raise such labor demand. Skidelsky (1992, 597) refers to Collard when he states "Pigou lost this battle in what was seen as one of the earliest triumphs of the Keynesian school." However, Collard's representation is too simple and may even suggest the wrong picture that Pigou did not even bother to create a macroeconomic model. The fact is quite the opposite:

in the 1937 paper, Pigou did attempt to build a macroeconomic model by taking savings and the interest rates into account.

Ambrosi (2003, ch 15−16) and Aslanbeigui and Oakes (2007, 43) also see a fundamental difference between Pigou's theory and Keynes's theory. Both studies argue that the difference between them lay in their saving functions: Pigou supposed that savings does not depend on income, while Keynes thought savings depend on income and claimed that Pigou's saving function was unrealistic. Although this interpretation is plausible for Keynes's position, it is not for Pigou's view. The development of Pigou's argument was rather more subtle and complex. This paper will argue that Pigou had had advanced understanding on savings and money but that he could not fully coordinate separate equations and attributed the wrong implications to his own model. This interpretation corresponds better to the fact that Pigou admitted the inconsistency of his 1937 paper in the following year, to which Ambrosi (2003, 235) and Aslanbeigui and Oakes (2007, 43) pay only passing attention. Although he conceded his failure, Pigou (1941, 1943, 1947, et al) attempted to establish the conclusion he strove to set up in the 1937 paper, that is, wage-price adjustment would achieve full employment independently of the movement of the interest rate. Thus, even after the 1938 paper, where Pigou is considered to have retracted, he was still struggling for the same objective.

Second, while the foregoing literature on Pigou has tended to focus on the Keynesian side of Pigou's economics as in Hutchison (1978) and Aslanbeigui (1989), this study will highlight a different aspect of his thought. Their research drew attention to the evidence attesting to Pigou's support for public work programs. In 1930, Pigou submitted a list of his policy recommendations to the Macmillan committee that included increased public expenditure through public works (Pigou 1931); and, in 1933, he closed his letter to the editor of the *Times* with the noteworthy phrase, "When in doubt, expand" (Pigou 1933b, 13). Thus it is now fairly well known that Pigou supported expansionary policies in the 1930s as Keynes and many other economists did.[1] However, we will see Pigou persistently striving to build a model that guarantees long-run equilibrium through wage-price adjustment, and once having built it, he refers to it frequently in various writings. Therefore, we must note that there is a clear difference between Pigou and Keynes as to the question of whether economies have a tendency to move towards full employment. While Keynes was negative, Pigou was affirmative to this question. Pigou never doubted the effectiveness of money wage adjustment, and he held this belief with such a conviction that he even created an entirely new

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[1] Pigou co-signed two letters to the *Times* editor, which tried to correct a popular misconception on aggregate expenditure, with D. H. Macgregor, J. M. Keynes, W. Layton, A. Salter, and J. Stamp (Pigou et al, 1932ab).

concept to protect this belief from the impact of Keynes's *General Theory*.

Lastly, this study will consider how Pigou himself perceived the Pigou effect. In what follows, I will argue that he came to that notion in a roundabout way. Pigou first constructed a model and, after noticing this model did not support his claim, added a new element so that the new model could support it. In addition, Pigou did not refer to a realistic situation in the discussion of the effect as he had done before. It is inferred that he did not try to show his argument is concerned with real problems any more. Thus, although Pigou consistently attempted to claim that a competitive economy tend to recover full employment, he realized that this had to be done at the sacrifice of the theory becoming further remote from the reality. In fact, Pigou used a variation of IS-LM model with no real balance effect even after his first discussion of the real balance effect in 1941. He relegated the discussion of the model with the real balance effect to a later chapter and thus made the dichotomy between a policy-relevant short-term model and a purely theoretical long-term model that guarantees eventual full employment equilibrium. The message he sought to express through this treatment would be, it is inferred, that he admitted the validity of the Keynesian model almost entirely and moved the claim of full employment equilibrium to a purely theoretical sphere. By so doing, he could maintain his original position without undermining the Keynesian framework in the policy field. Thus, I will conclude that the conception of the Pigou effect was the attempt to manage his loss of the unemployment controversy.

2. What was at Stake in the Controversy: Money Wages and the Interest Rate

What argument did Pigou try to address in his claim for full employment equilibrium? In Chapter 16 of *The General Theory*, Keynes presented what he likens to "the fate of Midas," that is, the claim that an competitive monetary economy tend towards the miserable state where people's incomes are so low that they don't have extra income for saving. In a competitive monetary economy, the interest rate cannot become below zero and capital accumulates so rapidly that the decline of its marginal efficiency is likely to outpace that of the interest rate. Consequently firms find current level of employment unprofitable and start to cut down employment. Keynes argues that this process continues until people's incomes come to be sufficiently low to bring savings to zero. This is not merely a theoretical possibility for him. Keynes regards the economic stagnation after the First World War as partly a reflection of this secular downward trend instead of entirely a declining phase of a cyclical movement.[2]

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[2] The thesis that there is an underlying trend of the decreasing marginal efficiency of capital was to be later developed by Alvin

This argument corresponds to Chapter 19 of the same work. There Keynes discusses effects of a money wage change on employment and offers what is now called the "Keynes effect," which is the effect of a money wage decline to decrease liquidity preference in real terms and lower the interest rate.[3] Keynes thus made an important challenge to full employment equilibrium by pointing out that a money wage reduction is neutral to the level of employment under the liquidity trap.

Economists responded critically especially to the argument in Chapter 16, as surveyed in Laidler (1999, 292–295). Ralph Hawtrey argued that in the long run, liquidity preference is not rigid but passively reacts to the trend in the marginal efficiency of capital, so that if the latter fell over time, the interest rate would also decline and prevent the imbalance of desired saving and desired investment (Hawtrey 1937). Dennis Robertson was of a similar opinion as shown in his review of *The General Theory* (Robertson 1936, 187–188). Pigou also touched upon the flexibility of the interest rate in the long term. He argued that the long-term interest rate could decline to almost nil in a situation of chronic stagnation.

However, Pigou's main concern was rather with the discussion in Chapter 19. He claimed that high employment could be maintained through a money wage cut: "I should expect reductions in money wage rates to mitigate, though not to nullify, the associated damage to employment [in secular stagnation]" (Pigou 1936, 130). In this review article, Pigou did not explain how money wage falls affect employment or state a definitive conclusion on this issue: "This whole matter is highly speculative, but I should not myself pay a high premium to insure against Mr. Keynes' day of judgment" (Pigou 1936, 130). But he would immediately come back to this issue in his *Economic Journal* article in 1937 with a definite conclusion. There was a reason Pigou only made a passing criticism on the effect of money wage cuts in the 1936 review article. He had a tentative theory on the mechanism of a money wage fall to affect employment that was discussed in a few pages of his *Theory of Unemployment* (1933a, 100–102). It was far from well-supported argument. Hence he could not state his view conclusively.

Pigou's argument on money wages in *The Theory of Unemployment* was as follows. All that he tried to prove here was that money wage reductions would necessarily lead to the reduction of real wages. The common counterargument goes that money wage reduces commodity prices proportionally so that real wages will not decline. However, if we suppose that incomes of people except workers, including the incomes accruing to employers, remain unchanged in the face of money wage cuts, the

Hansen (1939; 1941). Pigou specifically addressed Hansen in his *Economic Journal* article of 1943.

[3] Laidler (1999) shows that Keynes's view in Chapter 19 of *The General Theory* was preceded by Hawtrey. Hawtrey stated that a money wage decline would enable a fall in prices, which, in turn, makes "a given amount of money-demand absorb a greater amount of goods" (Hawtrey 1932, 322).

cost components of commodities other than wages would also remain unaltered. Commodity prices would decline only by the difference made to money wages. As a result, the new ratio of money wage rates to commodity prices, and so real wage rates, would lower down. Therefore, employment must improve. However, Pigou did not continue to use this reasoning in his later works. Instead, he would set up a model to cover relevant variables in the macroeconomic level such as savings and money supply in 1937.

3. Ad Hoc Monetary Framework and Theoretical Model in 1937 Article

The Keynes effect is a functional relationship between the interest rate and money wage rates. Pigou did opine that a money wage reduction would affect employment even without an accompanying fall of the interest rate, but did Pigou realized this connection between money wages and aggregate money demand? Apparently he did, though it was the relationship in the opposite direction to Keynes's view. In his review of *The General Theory*, he stated: "[T]he improved employment [due to money wage cuts] seems likely to be associated, ultimately at all events, if not at the beginning, with an *increased*, rather than with a reduced, money rate of interest" (Pigou 1936, 129, emphasis in original). Pigou thus envisaged that a money wage cut would involve an increase in interest rates except for a short period. For that period, he stated in the *Economic Journal* article in the next year that there was likely to be a fall in interest rates: "It may well be that immediately after a wage cut the rate of interest falls alike" (Pigou 1937, 411). Thus, to sum up, Pigou seems to have considered interest rates to fall at first, when money wages are lowered, but rise afterwards. He did not elaborate on this monetary process—in fact, he had removed "a good deal about the rate of interest" from his original draft of the 1937 article because he didn't want to disturb Keynes, who was convalescing from a heart attack in Wales during the summer this year (Keynes 1973, 257). Even so, it may be reasonable to think that the former is due to the direct decline of money demand and the latter due to an indirect stimulating effect of money wage cuts. This understanding is consonant with Pigou's claim of the direct stimulating effect of a money wage cut. A favorable effect of money wage cuts is direct in the sense that it does not require accompanying interest falls. And money wage reductions fuel overall money demand and outweigh the initial downward effect on the interest rate.

However, this claim of the movement of the interest rate carries a serious complication: it conflicts with another conclusion in the same paper, which Pigou derived from a theoretical model. Here he set up the following model:

$$\frac{f(r)V(r,x)}{F(x)} = \frac{(1+r)w}{F'(x)}$$

(1)

$$r = \rho(x).$$

(2)

The variables, r, x, and w refer to respectively the interest rate, employment, and the money wage rate. The first two are internal variables, and the last is externally given. The functions, f(r), V(r,x), F(x), and $\rho(x)$ are respectively money supply function, income velocity of money function, real income function, and time preference rate function. First, under what Pigou termed "normal banking policy," money supply is endogenously determined by the interest rate, while the schedule itself can be shifted by monetary policy. This is because he assumes that the higher the interest rate, the more willing the banking system is to inject loans to the economy. Second, income velocity is assumed to be dependent on the interest rate and employment. This reflects that money circulates in the economy faster, the higher the interest rate and the more evenly income is distributed. As to why the proportion of workers' income to overall income can be determined only by x, it is because such proportion is written as $\frac{xF'(x)}{F(x)}$ and, as long as the shape of the function F is unchanged, such proportion can be represented only by x. Third, real income function is monotonically increasing with employment x—therefore, there's no difference in saying that a certain variable depends on real income or on employment. Finally, time preference is assumed to be a variable depending on employment or real income.

Turn next to the equations. The first equation represents the equality of general prices rendered in two different ways: the left-hand side shows the ratio of money income to real income and the right-hand side the ratio of marginal prime costs in money terms to those in real terms. The second equation reflects the assumption of a stationary state. Saving and investment are both set at zero, which is realized when the interest rate is equal to the rate of time preference. Pigou implied that he was treating ρ not as a constant but as a variable dependent on the level of employment and so on real income: "[N]either, so long as employment, and, therefore, real income is unaltered, can ρ be any different" (Pigou 1937, 409).

First, let us set aside for the moment the question of how this model actually works and look at how Pigou used this model instead. From the second equation, Pigou inferred that interest rates cannot be altered unless aggregate employment changes. Now suppose that money wages are reduced and employment does not change. The latter condition leads to unchanged interest rates and therefore constant money income by the first equation. We thus now have reduced money wage rates and

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constant money income. Therefore, real wages must decline. This obviously contradicts the assumption of constant employment made at the beginning. Consequently, when money wages are lowered, employment cannot be unchanged. Pigou also refers to this reductio-ad-absurdum argument in his letter to Keynes.

> The argument was that, if a cut in wages leaves employment unchanged, money income has no grounds for change; that, therefore, we cannot conclude that a wage cut leaves employment unchanged without getting involved in a contradiction about money income. (Keynes 1973, 256)

Nevertheless, this complex reasoning seems to have prevented Pigou from addressing the question of whether the interest rate must fall with money wages after employment has increased. When Pigou turns to discuss the movement of the interest rate in his 1937 article, he presented the view I've mentioned at the beginning of this section. To repeat, his view was that the interest rate declines immediately after the money wage cut but it rises in the end. The complication arises here. The theoretical model does not imply this complex movement of the interest rate, but instead it involves quite clear result for the interest rate. We can note that Pigou did not notice this: "[W]hat will happen to the rate of interest and the volume of money income depend, of course, on the detailed circumstances" (Pigou 1937, 410). In this quote, Pigou seems to imply that the model by itself could not determine what happens to those variables.

Now let us consider how the model actually works. When money wages are cut in this model economy, the right hand side of equation 1 will go down first, and so, the left hand side of the equation will also fall. This will either raise real income, $F(x)$, which will increase employment because this function is an increasing function of employment, or lower money income, $f(r)V(r,x)$. In the first case, enlargement of employment involves a fall in both the time preference rate, which is the decreasing function of employment, and the interest rate by equation 2. In the second case, the fall of money income reduces the interest rate through the two functions that consist of money income, and also reduces the rate of time preference, which, in turn, must accompany an increase of employment because the rate of time preference is a decreasing function of employment. Therefore, in both cases, a money wage cut involves a reduction of the interest rate and an increase of employment. On the other hand, when there is no room for a fall in the interest rate, a money wage reduction cannot increase employment since the second equation prevents employment from increasing at all. In this case, money wage cuts will only decrease money income to

maintain the equality in the first equation and leave employment unchanged.

As I referred to in the Introduction, there is a different interpretation on Pigou's 1937 article among Pigou scholars. Ambrosi (2003) and Aslanbeigui and Oakes (2007) both suppose that the rate of time preference was assumed to be a constant rather than a variable depending on real income and employment. The model behaves differently in this case: a money wage cut leaves the interest rate unchanged and increases employment independently of the movement of the interest rate. I consider their interpretation is against textual evidence. There is two more evidence against their claim on top of the fact that Pigou implied the rate of time preference depends on employment in the 1937 article itself. First, he had argued in his earlier work *Economics of Stationary States* (1935) that an increase in real income would cause savings to rise (See Section 5 below). Second, in the above-mentioned letter to Keynes, dated October 18 1937, Pigou explained what he meant in the 1937 article with the following remark: "I don't assume or make any assumption which implies that money income is fixed" (Keynes 1973, 256)—in order that money income be fixed, the interest rate must be constant by the first equation and so the rate of time preference must also be constant by the second equation, and therefore in this letter, he denied that he had assumed the rate of time preference to be always constant.

In short, Pigou wrongly conjectured that his model by itself could not show whether the interest rate stays unchanged, rises or falls. Rather than relying on the model alone, he complemented what he thought the model could not show by presenting an ad hoc argument concerning interest rates as we have seen above. At the stage of the 1937 article, therefore, Pigou thought that money wage reductions might well diminish money income, though at the same time he thought that this effect would be reversed by the increase in employment due to a money wage cut. This inconsistency between the model and the views on interest rates was to be attacked by Nicholas Kaldor shortly afterwards.

4. Criticisms of Keynes and Kaldor

Keynes (1937) also responded to Pigou's 1937 article though in a different manner from Kaldor's. In his brief three-page article, published in the following issue of *Economic Journal*, Keynes noted two differences between his own and Pigou's theories. First, he took Pigou to task for being unaware of the connection between money wages and interest rates and reduced Pigou's argument to absurdity: "the only banking policy consistent with [Pigou's] model is one in which the amount of money created at

a given rate of interest is not constant, but is dependent on the level of money-wages" (Keynes 1937, 744), so that a money wage change leaves the interest rate unaltered.[4] Second, Keynes claimed that Pigou considered the rate of time preference to be constant and therefore savings to be independent of income: "It appears, therefore, that Prof. Pigou rejects my fundamental assumption that the amount of real saving is, in part, a function of real income" (Keynes 1937, 744). However, these criticisms are unjustified since, as we have seen above, Pigou recognized both the connection between money wages and the interest rate and the functional connection between savings and income at least in a verbal statement if not properly in his model.

Pigou complained in his letter to Keynes that this Keynes's note was based on misunderstanding (Keynes 1973, 255–256). Pigou received a draft of this note from Keynes on October 12 and replied to Keynes on October 18, which means that they exchanged these letters after Pigou's 1937 article came out in September and before Keynes's and Kaldor's replies were issued in December. In view of Pigou's complaint, Keynes did consider removing a paragraph criticizing Pigou's assumption of fixed money income from his draft, but in the end, he kept it probably because he "still believe[d] that it represents something at the bottom of [Pigou's] head" (Keynes 1973, 261). Despite Keynes's strong belief on what was wrong with Pigou's article, its true problem lay elsewhere.

Kaldor was not among the circle of young Cambridge economists, among whom Richard Kahn and Joan Robinson cooperated with Keynes in attacking Pigou's 1937 article in correspondence, but he was a lecturer in the London School of Economics. On September 27 Kaldor submitted a paper on Pigou's 1937 article to Keynes, who was the editor of *Economic Journal*, and Keynes accepted it for the December issue. Published next to Keynes's, Kaldor's article complemented it by conducting an internal criticism of Pigou's argument. He argued for the conclusion contrary to Pigou's assertion, namely that a money wage decline would bring about a reduction in interest rates that is not temporary. Kaldor attributed this result to equation 2 shown above: that is, if employment and real income were to increase, the rate of time preference must fall since it is a decreasing function of real income; and the interest rate must also fall with the rate of time preference by this equation. In short, under the condition represented by equation 2, the assumption of nil savings requires a reduction in interest rates in order

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[4] This sentence can be regarded as a response to Pigou's criticism of *The General Theory* about monetary policy. Pigou stated, "[Keynes] has failed, I think, to see that the consequences for employment of a given reduction in money wage rates, like the consequences of a given act of individual hoarding, are indeterminate until the character of the banking policy that is being pursued is known" (Pigou 1936, 128). Pigou thought it unrealistic to assume that money supply is constant even without an intervening change in monetary policy.

for real income and employment to increase; thus, he stated: "[A]n increase in real income will lead to savings; and savings, under the framework of our model, must lead to . . . a fall in the rate of interest" (Kaldor 1937, 749).

Kaldor went on to discuss a model "in the longer run"—he misconstrued Pigou as assuming a short run while, in fact, Pigou assumed a stationary state—that allows investment and saving to vary rather than stay at zero. In connection with the model, he presented essentially the same view as Keynes: money wage adjustment can affect only the size of idle balances held by the public, and if it were to affect employment, it would do so only through a change in interest rates and thereby a change in investment.

Pigou's reply to these criticisms was published in the next number of *Economic Journal* in 1938.[5] This is the paper in which Pigou's famous "retraction" occurred. However, the correspondence tells us that Pigou did not realize his failure just after he read Kaldor's paper. Pigou had already received Kaldor's paper from Dennis Robertson and read it by October 18, when he sent Keynes the letter that I have already referred to several times. At first he considered Kaldor misunderstood him: "Kaldor's draft has what seems to me an important misinterpretation" (Keynes 1973, 258). By December, Pigou prepared a voluminous "10,000 words" draft to explain his position, which would have included what he withdrew from the original draft of the 1937 paper. However, things took a different turn. Pigou showed his draft to Champernown, who was "keen to see" it—Alanbeigui and Oakes (2007, 38) suggest that Champernown's intervention might well have been Kahn's maneuver. Champernown pointed out "two fallacies" in the draft. Finally, Pigou submitted a fairly short paper to Keynes on December 23. Besides Kaldor, Champernown was also instrumental to make Pigou change his position.

There he abandoned almost all his claims made in his 1937 article. Pigou now accepted (1) that money wage cuts would involve a fall in interest rates, (2) that such cuts would improve employment only insofar as it entails a fall in the interest rates, and (3) that monetary policy could serve as a substitute of money wage cuts in the sense that the latter affects employment through the same channel that the former does, namely the interest rate, as Keynes argued in Chapter 19 of *The General Theory*. This complete surrender was solely due to the above equation, $r = \rho(x)$, which shows that if employment were to increase,

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[5] In this 1938 paper, Pigou said he could not understand Keynes's note as well as in the cover letter for that paper dated December 23, 1937 (Keynes 1973, 266). In the reply, Keynes said he was sorry that Pigou could not follow his note and asked Pigou to read Chapter 19 of *The General Theory* as if Pigou had not known that Kaldor's argument was originally Keynes's (Keynes 1973, 267).

interest rates must fall, or $\frac{dx}{dr} < 0$. As to whether a money wage cut involves a fall in interest rates, Pigou offered a further

discussion by using calculus. By differentiating equation 1, he demonstrated that except in extreme cases, a money wage

reduction must entail a fall in interest rates, or $\frac{dw}{dr} > 0$. Combining these two results, Pigou concluded that: "[W]ithin the

framework of our model, a cut in money wage-rates is fairly certain to entail a reduction in the rate of interest, and so an

increase in employment" (Pigou 1938, 136–137).[6]

The abandonment of the previous claim on the effectiveness of money wage adjustment independent of interest rates

forced Pigou to concede another point in dispute. As noted above, Pigou considered Keynes's secular stagnation thesis invalid

because he thought money wage reductions would stop employment from falling even while income diminishing due to the

imbalance between desired investment and savings. However, now given the ineffectiveness of money wage cuts in the case of

interest rates being at the lower bounds, Pigou was no longer able to argue that secular stagnation could be prevented by money

wage adjustment. This created a small but important anomaly in what he had attempted to contend against Keynes. In

Employment and Equilibrium (1941), Pigou undertook the task of defending the "classical view," which he defined as a view

that "full employment does . . . *always* tends to be established" or that "there is *always* a strong force making for the

establishment of [full employment]" (Pigou 1941, 78, italics added). To do this, he created a new theory of savings.

5. Pigou Effect as the Analysis on Savings

Pigou did not turn his attention to the theoretical analysis on savings in *Employment and Equilibrium* for the first time. He had

already made such an analysis in Chapter 32 of *Economics of Stationary States* (1935). In this work, he made the proportion of

saving to income dependent on the magnitude of real income. Pigou based this functional relationship on his observation that,

up to a certain level of income, people could not afford to set aside any portion of their incomes for savings but, as their

incomes grow larger, they gradually acquire "a wider view and a more educated appreciation of the facts of life" (Pigou 1935,

171–172) and become capable of savings. It should be noted, therefore, that before he had a controversy with Keynes and

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[6] Although Pigou was forced to admit the inconsistency arising from the equation $r = \rho(x)$, he would have had to do so even
if he had chosen the more conventional equation concerning the goods market $I(r) = S(x)$, or $I(r) = S(r, x)$, the variation
he used in his later *Employment and Equilibrium* (1941). This is because the latter two equations also imply that an increase in
real income must entail a reduction in interest rates.

Kaldor, Pigou had had in mind that savings are an increasing function of incomes.

Pigou extended this framework in his later *Employment and Equilibrium.* In this work, he presented an entirely new

notion of the "amenity utility" of saving, "in the form of power, sense of security and so on . . . as distinct from the utility which

[a typically constituted man] expects the future incomes due to [the saving] to yield" (Pigou 1941, 103). This notion served as

the basis for the Pigou effect.

With the aid of simplifying assumptions such as constant incomes and the same proportionate saving in the

subsequent periods, Pigou obtained the following relation between the proportion of saving to income and its determining

factors:

$$\frac{a}{x} = \frac{\eta_{x-a}}{r}\left\{r - \rho_{x-a} + \frac{U_{S,(x-a)}}{\phi(x-a)}\right\}$$

where *a* is saving, *x* income, $\eta(=-\frac{\phi}{x\phi'})$ the elasticity of the marginal utility of consumption function ϕ, *r* the interest rate,

considered given here, ρ the rate of time preference, which must be always positive and decline as income rises, and lastly *U*,

the amenity value, dependent on the capital stock *S* and consumption.

From this equation, Pigou inferred two results. First, the saving-income ratio would rise as income increases. This is

because almost all the determining factors will rise with an income rise. First, the elasticity of the marginal consumption utility

function η in general becomes larger for larger income because marginal utility of consumption is likely to decline after

consumption moves beyond a certain minimum level. Second, he maintained as in his earlier work *Economics of Stationary*

States that the rate of time preference will fall with rising income because people feel less urgent after they satisfy their basic

needs. Third, however, we cannot know the variation of the fraction $\frac{U_{S,(x-a)}}{\phi(x-a)}$ in face of an income rise. As the numerator *U*

is larger for smaller income and the denominator ϕ is larger for smaller income, the variation of the fraction as a whole cannot

be definitely known. On the whole, however, the above consideration suggests that an increase in income is likely to involve a

higher proportion of income being saved.

The second result he obtained from the above equation is that saving would be nil provided that either $\eta = 0$ or

$\left(r - \rho + \frac{U}{\phi}\right) = 0$. Pigou thought that the first condition, $\eta = 0$, would arise when income is below the minimum living

standard. Under this condition, people are unable to save anything from their incomes. Pigou supposed the second condition,

$\left(r - \rho + \dfrac{U}{\phi} \right) = 0$, might not be realized: If $\dfrac{U}{\phi}$ is positive with a fairly large value, the rate of time preference might not be

large enough to be equal to the sum of the interest rate and the said fraction as the interest rate cannot fall below zero. If we

accept that this condition cannot be realized, saving could not be zero unless the first condition $\eta = 0$ is satisfied, or people

do not have income large enough to save anything out of it. Then, when the economy arrives at a stationary state, which by

definition involves a constant capital stock and so no desired investment and savings, it will do so only with extremely low real

incomes. This is exactly what Pigou strove to repudiate, namely, Keynes's secular stagnation thesis.

It should be noted that Pigou maintained his earlier conviction he presented in the review of *The General Theory* that

the interest rate could go down to the level of zero in chronic stagnation, where there is no uncertainty about the future interest

rate.[7] Even though the interest rate is capable of falling to nothing, Pigou still thought that there is a possibility of excessive

savings due to the above-mentioned amenity value. If such an occasion arises, people try to save money out of their incomes

despite the demand for investment being zero. Then aggregate income, whether in real or money terms, keeps on falling. While

income is falling, people continue to save because people's desire to save cannot be satisfied, and income keeps going down.

Pigou argued this process would stop before it ends up in the low-income equilibrium where people are too destitute to save

anything from their incomes as long as money wages are freely adjusted. Thus he stated:

> Now, since money income is continuously contracting, and prices, therefore, falling, the existing stock of
>
> money—as also the stock of land and of some other sorts of property, such as Old Masters, which are especially
>
> suitable as embodiments of, or receptacles for, saving—is continually becoming more and more valuable in terms
>
> of consumption goods. (Pigou 1949, 132)

By thus connecting a price reduction and a resultant rise in the real value of the present saving stock with an increase in

consumption, Pigou asserted that the ultimate goal to which the economy eventually moves is a stationary state with high

employment rather than an impoverished abyss.

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[7] Pigou saw the long-term interest rate as the present value of a series of expected short-term interest rates in term structure. This view on the long-term interest rate was akin to that of Hicks rather than Keynes, who place emphasis on uncertainty. See Boianovsky (2004).

After thus introducing what was to be called the real balance effect in 1941, Pigou continued to mention this effect in his later writings. In the article published in *Economic Journal* in 1943, we find its different representation in the saving function S= $f(C, x, r, T) = 0$, where C is the capital stock, which only increases over time, x real income, r the interest rate, T the real value of the money stock, and $\dfrac{\partial f}{\partial T}$ is negative, so that, for the equation to hold, the interest rate does not need to fall when real income has risen since the real value of the money stock could rise instead.[8] Later, Patinkin (1948) used this formulation to cite the "Pigou's saving schedule" although he dropped C from the function and replaced the real value of money stock T by general prices p. Afterwards, Pigou continued to mention this effect in many of his works (Pigou 1945, ch. 5; 1947; 1950, ch. 10).

Thus, the amenity value of savings plays a key role in Pigou's presentation of the real balance effect. This notion refers to non-pecuniary, purely emotional utility that arises from savings apart from that which comes from the future revenue due to the current savings. Pigou relied on this rather elusive kind of utility to introduce the Pigou effect.

6. Changes in Pigou's Attitude towards the Full-Employment Equilibrium Model

We have so far seen how Pigou discussed money wage adjustment as effective measure to reduce unemployment in the theoretical sphere. To argue against Keynes's secular stagnation thesis, he constructed a highly static condition in which there is no uncertainty about the interest rate in the future and introduced the real balance effect. Then, what did he think about the applicability of this notion to dynamic settings?

Patinkin (1948), who propagated this idea widely among economics profession, was not enthusiastic at all about the effectiveness of the effect in a dynamic condition mainly for two reasons: (1) the weakness of the Pigou effect itself and (2) the negative side-effects due to price declines such as the deepening of uncertainty and the expectation of further price declines. Thus, he states, "[A] full employment policy based on a constant stock of money and price flexibility does not seem to be very

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[8] Melitz (1967) gives an unconventional interpretation to Pigou's 1943 article. Melitz focuses on what he terms as the "convenience yield effect", which operates on investment at the occasion of a money wage cut when the interest rate is on the minimum level. According to Melitz, Pigou argued that at the time of the minimum interest rate, the convenience obtained from holding more money cannot fall further and therefore that a money wage reduction cannot raise money hoarding and will increase the demand for investment goods. While Pigou indeed mentioned such an process, he himself denied it right after noting it: "[T]he circumstances we have been contemplating . . . are such as cannot in fact occur" (Pigou 1943, 349). Pigou did suppose that money wage cuts would increase money hoarding and diminish money income: "As money wage-rates fall money income must fall also" (Ibid).

promising" (Patinkin 1948, 561).[9] According to Rubin (2005), Patinkin's aim in formulating the Pigou effect was not to weaken the Keynesian position but rather to strengthen it by bridging the gap between the general equilibrium theory and the Keynesian framework.

In view of the fact that Pigou also committed to expansionary measures to tackle unemployment, he did not also intend to show that a state should leave prices and wages to fall freely. We can buttress this point by noticing a change in his views on the wage flexibility that occurred after Pigou introduced the real balance effect.

In the 1937 paper, in which he set out to argue against Keynes's secular stagnation thesis, Pigou implied that money wage cuts would have been an effective remedy in England in the second half of the 1920s, when there was a high but stable level of unemployment (Pigou 1937, 406). This suggests that Pigou intended his theory in a certain real condition, namely, the one in which the economy is moving at a modest speed and even a cause only capable of a weak effect such as money wage adjustment could have significant results. At this stage, therefore, he supposed his theory was applicable to a certain realistic condition. Later in *Employment and Equilibrium* (1941), Pigou also mentioned the high unemployment in the second half of the 1920s as well as the movement in unemployment during 60 years before the pre-WWI period in order to illustrate the movement of unemployment affected by money wage adjustment or lack thereof. In the later chapter of the same book, Pigou turned to discuss the situation with the interest rate on the lower limit and introduced the real balance effect. In this chapter, however, he did not refer to any realistic situation that exemplifies his theoretical argument and kept the tone of purely theoretical discussion.

There is another oddity that should be noticed in the current context. Pigou incorporated the Pigou effect into the long-run model in *Employment and Equilibrium*; but in the same book, he used different models, all of which did not contain that effect and therefore allowed for the possibility of the liquidity trap. Those models had as its component a saving function $S=f(x,r)$ rather than $S=f(x,r,T)$. Pigou thus separated the chapter where he discussed the effect of money wage cuts in a short-run setting from the one where he discussed the Pigou effect; and in the former chapter, he used the framework that does not include the

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[9] Patinkin (1948, 556–557) misrepresented Pigou's position on the applicability of the real balance effect to the reality. He rightly detected Pigou's repudiation of deflationary policies, but he attributed this only to the view that downward price movements would not realize because of resistance by workers, firms and government regulations. However, this is not the only reason why he opposed to deflationary policies. Pigou often qualified his argument by the condition of stable economy in which realized price falls are not likely to create harmful expectations for further falls (Pigou 1936, 128–129; 1941, 243; 1945, 10).

real balance effect. This also applies to his later work *Lapses from Full Employment* (1945). In one chapter of the book, Pigou stated: "[D]ifferences in money wage rates entail no differences in the money demand schedule for labour unless they carry with them differences in the rate of interest" (Pigou 1945, 13); and in a later chapter, he introduced a model with the real balance effect.

The macroeconomic models he came to employ after the controversy with Keynes and Kaldor was in fact a close variation of IS-LM model. One of such models is consisted of the following two equations (Pigou 1950, 69):

$$I(r) = S(r, x) \tag{3}$$

$$MV(r) = wF(x). \tag{4}$$

Equation 3 is about the equality of investment and savings—one noticeable inflection of Pigou's version is that savings depends positively on the interest rate though he admitted this effect was small. Equation 4 is an exchange equation with money wages as a denominator of real income. If these equations are mapped in the space with the interest rate on the vertical and real income on the horizontal axis, it is shown by differential calculus that equation 3 is downward and equation 4 is upward sloping. Therefore, this model gives implications identical to those of the Hicksian IS-LM model, which does not eliminate the possibility of the liquidity trap.

We can thus see how Pigou's attitude towards the full-employment equilibrium model changed after his acception of Kaldor's criticism. Before that, Pigou had associated his equilibrium model with a realistic situation in the late 1920s, which suggests he meant this model to be realistic to a certain degree. However, after he introduced the real balance effect, Pigou treated his equilibrium model more cautiously and attached no allusion to its applicability to the reality. I infer from this contrast that he perceived his later argument as being more remote from the real conditions than his earlier one.

7. Conclusions

As we have seen, Pigou did not directly conceive the Pigou effect, but only in a stepwise manner. First, he needed to realize what conclusions would result from the views he separately developed. Even before the publication of Keynes's *General Theory*, Pigou had had advanced views on interest rates and savings. As is shown in his words in the review of *The General Theory* and the 1937 article, Pigou had recognized that there is a direct connection between money wage movements and

interest rates and that savings are an increasing function of real income. Ironically enough, however, these two views combined together created a conclusion Pigou would have been unable to admit if he had realized it: that is, economies as a whole might not move toward equilibrium even in the long run because of the imbalance between desired saving and investment due to the lower limit of the interest rate. He was forced to realize it in the exchange of articles with Kaldor in 1937–38.

Pigou dealt with this almost self-created contradiction, not by withdrawing anything from, but by adding a new element to, his theory. This process is particularly evident in his analysis on savings. First, Pigou discussed that savings increase as the level of income rises in his 1935 book. Second, however, after he realized that this conceptualization of saving turned out to be unsuitable for his intended conclusion, he appended the amenity value of saving, which could hold down desired saving when prices fall. This new concept enabled Pigou to hold the view that economies move towards full employment no matter what conditions the economy is under.

Through this development, Pigou changed his attitudes to his long-run full-employment equilibrium model from the one with relatively strong concern with the reality to the one without it. At the later stage, he treated it as something of secondary importance since he did not relate it to any real conditions as he did in his 1937 article. Pigou's argument for the real balance effect was no longer motivated by policy consideration. What was primarily important to him at this stage was his variations of IS-LM model, and this model allowed the liquidity trap because he did not incorporate the real balance effect to it. Pigou never intended to undermine the IS-LM model; on the contrary, he comfortably used it in his later works. What did Pigou try to achieve by this treatment of the real balance effect? Recovering his loss in the unemployment controversy is surely one possible answer. He did so while admitting the validity of the model that does not have the real balance effect. I conclude that the introduction of the Pigou effect was his attempt to maintain his once failed opinion without damaging the Keynesian framework.

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