GCOE Discussion Paper Series

Global COE Program
Human Behavior and Socioeconomic Dynamics

Revisiting the unemployment controversy: Pigou's viewpoint

Norikazu Takami

August 2009

Revisiting the unemployment controversy: Pigou's viewpoint

Norikazu Takami,[1]

the Graduate School of Economics, Osaka University

and Suntory Foundation Torii Fellow

This paper examines the unemployment controversy between J. M. Keynes and A. C. Pigou, mainly from the latter's viewpoint. In this controversy, although he eventually conceded defeat, Pigou attempted to prove that money wage cuts were effective on employment regardless of the level of interest rate. His defeat in the controversy was not due to the inconsistency in his perspective, but rather due to his inability to theorize a relevant notion, "forced anti-levies" as expounded in *Industrial Fluctuations* (1927). The "Pigou effect" devised later in 1943 could be considered as theorization of forced anti-levies. This allowed Pigou to formally demonstrate that money wage cuts were effective in increasing employment regardless of the level of interest rate. Thus, we conclude that the unemployment controversy was gainful at least to Pigou, resulting in the formulation of the notion originated in *Industrial Fluctuations*.

1   Introduction

This paper studies the unemployment controversy between J. M. Keynes and A. C. Pigou, particularly the phase after the publication of *General Theory*. The controversy mainly concerns

---

[1] dg067tn@mail2.econ.osaka-u.ac.jp

the effect of money wage cuts on unemployment. Keynes and his sidekick N. Kaldor argued that such cuts were ineffective in times of minimum interest rate, whereas Pigou attempted to prove that they were effective regardless of the level of interest rate. The controversy ended with Pigou conceding defeat. This paper deals with Pigou's initial conception of Keynes's argument in *General Theory* and the reason for his eventual concession to the views of Keynes and Kaldor.

Following the controversy, Pigou made full use of the method acquired through the controversy and systematically exposited the essence of inchoate macroeconomics in *Employment and Equilibrium* (1941). Even so, he still occasionally expressed disbelief in Keynes's views on money wages, and in 1943, he finally attempted to set up a model in which money wage cuts increase employment regardless of the level of interest rate in 1943. This achievement is now known as the Pigou effect, or wealth effect—as price declines, consumption expands. This paper proposes that the source of inspiration for the Pigou effect is to be found in his earlier notion presented in *Industrial Fluctuations* (1927).

There is extensive literature on the unemployment controversy between Keynes and Pigou in the 1930s. Collard (1999) rather briefly outlined the controversy after *General Theory*. He offered a short summary on Pigou's 1937 article and approvingly quoted the criticisms of Keynes's and others' that were privately exchanged in correspondence, such as "It is outrageous rubbish beyond all possibility of redemption" (Keynes 1973, 250). Thus, even for the sympathetic commentator, this controversy appears to have been a humiliation for Pigou. This paper attempts to redeem Pigou by revealing the reasons why he found it difficult to understand Keynes's argument, which are to be found in the argument of monetary aspects in *Theory of Unemployment*.

More recently, Ambrosi (2003) contributed considerably to the understanding of this controversy. He clarified the differences in the theories advanced by the three above-mentioned

economists, Keynes, Pigou, and Kaldor, and highlighted that the latter two used the assumption of a stationary state to theorize short-period economic interactions, whereas Keynes privately complained about the oddity of this assumption. Ambrosi eventually concluded that in terms of this issue and others, the unemployment controversy was inadequately engaged and ended without any clear development. This paper contradicts his conclusion and claims that at least from Pigou's viewpoint, the development of a useful analytical method was achieved, which resulted in the formulation of the Pigou effect.

Section 2 deals with how Pigou came to accept Keynes's views on the effect of money wage changes on employment. Pigou adopted a rather peculiar way of theorizing monetary aspects of the economy in *Theory of Unemployment*, which hindered him from rightly evaluating Keynes's argument in *General Theory*. However, Pigou eventually came to understand the interactions of real and monetary variables through the controversy with Keynes and Kaldor between 1937 and 1938. These concepts were illuminated for Pigou by Kaldor's use of a mathematical tool that calculates differential coefficients. Section 3 outlines the results Pigou derived from that newly acquired analytical tool. While this tool enabled him to fully understand the interactive movements of variables in an equation system, it likewise demonstrate clearly that a normal macroeconomic system gave rise to a result unfavorable to Pigou, namely that money wage cuts do not affect employment if the interest rate is minimum. Section 4 outlines how Pigou exactly formalized the Pigou effect and succeeded in arguing for the validity of money wage cuts even in times of the minimum interest rate. I will examine the relations between the Pigou effect and his earlier notion related to business cycles. Section 5 concludes that, at least from Pigou's viewpoint, the unemployment controversy was thoroughly ventilated and allowed him to better understand the interactions of money and real variables and formally restate an older notion in defense of his basic position.

2 How Pigou came to accept Keynes's views

2.1 Monetary aspects of *Theory of Unemployment*

First in this section, I will examine the monetary framework as expounded in *Theory of Unemployment* (1933). Aslanbeigui (1992) briefly mentioned the assumption of a "standard monetary system" in that volume. She defended Pigou by arguing that since prices are constant under this system, this would guarantee the validity of his theoretical framework exclusively based on a real analysis. I will look at the monetary aspects of *Theory of Unemployment* including the "standard monetary system," and show that the excessively strong assumptions made in this volume deterred Pigou from rightly understanding Keynes's *General Theory*.

In *Theory of Unemployment*, Pigou for the first time dealt explicitly with the question of whether a cut in monetary wage rates will result in reducing real wage rates and expanding employment (Pigou 1933, 101–102). He admits that if one assumes that all incomes are directly related to industrial activities and that there are no fixed income strata, a decline in money wages will not reduce real wages. This is because, assuming prime costs consist mainly of wages and so the commodity prices depend largely on money wage rates, money wage cuts will soon bring down commodity prices to the same extent and consequently will not bring about a reduction in real wage rates. In this case, employment will not be augmented.

However, if one assumes that there are fixed income strata, Pigou claims that a money wage cut will have an effect on employment. He divides the aggregate money income I_m into labor income I_l and non-labor fixed-income strata's income I_n. A cut in money wages will not affect the latter. When money wages are reduced from w to $(w - h)$, the labor income will decrease to $\frac{w-h}{w} I_l$ while the fixed-income strata's income will remain the same. The aggregate

4

money income will therefore become $\frac{w-h}{w}I_l + I_n$. Supposing, for the moment, that prices are proportionate to aggregate money income, prices will decrease less than the extent of the reduction of money wages, and therefore, real wages will certainly decrease.

If we highly value the consistency of this argument with those espoused in *Industrial Fluctuations* (1927), the above-mentioned process should be considered as referring to "forced anti-levies". Forced anti-levies mean the effect of a price decline expanding the real income of fixed income strata. In *Industrial Fluctuations*, Pigou treats this effect as a cause to check the activity of entrepreneurs in times of economic downturns, which usually involve a price decline. Here, he views the fixed income strata as a buffer against a price decline due to a money wage cut. M. Blaug seems to interpret the above process as referring to "lags between wage cuts and price reductions" (Blaug 1997, 664). If employment remains unchanged during those lags in which prices have not yet declined, aggregate money income does not decrease at all, contrary to Pigou's own statement. That is because, under the current postulate, the reduction in labor income due to a money wage cut is offset by the rise in employers' income.

Although the above argument is sufficient to claim the effectiveness of money wage cuts, Pigou further discusses how the cut in money wage rates will affect aggregate money income under a realistic monetary policy. A 'standard monetary system' is one where aggregate money income should be changed by the exact amount of the difference in employment multiplied by the original money wage rate. If we write p_i $(i = 0, 1)$ for general prices and F_i for aggregate real income, and suppose employment is augmented by h, then

$$p_1 F_1 - p_0 F_0 = p_0 F_0' h.$$

Since the general prices in period 1 (p_1) equals $\frac{p_0(F_0 + F_0' h)}{F_1}$, the general prices in period 1 become exactly the same as those in period 0 when the difference of employment is sufficiently

small, or constant returns prevail. Thus, under the standard monetary system, prices are held rigid or changed according to the labor efficiency. Under this monetary policy, a cut in money wage rates leads to the proportional reduction in real wage rates, and this substantially increases employment along the labor demand schedule that Pigou supposes is highly elastic—the elasticity is well beyond unity according to him. He seems to think, therefore, that aggregate money income will rise, rather than decline, after money wage cuts because they will surely augment the aggregate labor income.

Pigou briefly mentions that the enlargement of public expenditure is required to carry through the standard monetary system in times of severe recession. Open market operations by the monetary authorities can increase the quantity of money supply even in those times. Even so, "there may be no positive rate of money interest that will avail to get this money used" (Pigou 1933, 213). Unless the government props up the aggregate money demand by increasing its expenditure, those monetary operations will be futile in realizing the aimed level of aggregate money income. This argument must be based on the notion of aggregate money expenditure that is ad hoc yet sufficient to allow the making of effective policy recommendations. Behind Pigou's conception that aggregate money expenditure depends on the interest rate, must lie the implicit postulate that aggregate money expenditure depends on investment and investment in turn on the interest rate. It should be noted that in *Theory of Unemployment*, Pigou does not entertain the Say's Law type of argument that a decrease in investment will be compensated for by an enlargement of consumption so that the aggregate money income will not be affected.

Pigou thus argues for the validity of money wage cuts on employment from two aspects. First, regardless of the kind of monetary policy adopted, the cut in money wage rates brings down real wage rates through the process of a forced anti-levy and expands employment. Second, under the realistic monetary policy of the standard monetary system, it is more

certain that money wage cuts decrease real rates. In the second setting, in which prices are held rigid, aggregate money income rises after the cut in money wage rates. For Pigou, the cut in money wage rate leading to the enlargement of employment is evident.

As will be stated below, the assumption of the standard monetary system was too strong a condition in the sense that it enshrouds the monetary movements later treated by J. M. Keynes. Since, under this assumption, changes in money wage rates is examined independently of the monetary framework determining the interest rate and the money income, one cannot deal with the relations between the movements of money wage rates and other monetary variables. Thus, Keynes should have directed his criticism at this very point had he not misunderstood Pigou.

2.2   Keynes's criticism

In *General Theory*, Keynes bitterly criticized Pigou's *Theory of Unemployment*. The criticism can be divided mainly into two points: First, Keynes states that Pigou assumed a labor supply function with finite real wage elasticity (i.e., the upward-sloping curve). According to Keynes, therefore, Pigou absurdly concludes that the existent unemployment is due to an aversion to labor. As Ralph Hawtrey at that time and Aslanbeigui (1992) recently pointed out,[2] it is more reasonable to suppose that Pigou postulates the labor supply function with perfect wage elasticity at the "stipulated rate" (i.e. the horizontal line).

The second criticism of Keynes's is the one directed at the monetary aspects propounded in *Theory of Unemployment*. Keynes points to the lack of the condition determining general prices in its framework. In a literary sense, this is not correct because Pigou makes the as-

---

[2] Brady (1994) claims otherwise, however. Since Pigou assumed perfect competition in *Theory of Unemployment*, this must mean he assumed an upward-sloping labor supply curve. Ambrosi (2003, 78) rules that textual evidences cannot illuminate what kind of labor supply curve Pigou had in mind in *Theory of Unemployment*.

sumption of a standard monetary system that rigidly regulates general prices. Furthermore, we should notice that Keynes completely misunderstands the argument concerning fixed income strata and a forced anti-levy discussed in the previous section (Keynes 1936, 276).

We can consider that the difference between Keynes's *General Theory* and Pigou's *Theory of Unemployment* lies in the difference of assumptions. In contrast to the latter, the former framework is built on the assumptions (1) that there are no fixed income strata, and therefore, changes in money wages do not affect real wages and (2) that the monetary authorities do not automatically intervene in the economy. Ironically, Keynes demonstrated that there is a channel where changes in money wage rates affect employment under such an adverse setting. In Keynes's world, employment depends exclusively on effective demand, and the reduction in money wages does not directly affect effective demand since it involves the same extent of reduction in prices. According to him, however, a money wage decline indirectly affects effective demand as outlined below. Among those effects advantageous to employment are the following: A cut in money wage rates

1. in an open economy improves the balance of trade and worsens the terms of trade, which leads to a rise in effective demand and in marginal propensity to consume, respectively.

2. falsely, or temporarily, creates optimism among entrepreneurs by reducing their everyday cash-flow difficulties.

3. involves the decline in prices and aggregate money income, and hence, the reduction of the liquidity preference schedule and the quantity of money supply being the same, the decrease in the interest rate.

Among the effects unfavorable to employment, are the following: A money wage cut

4. transfers the real income from laborers to rentiers and brings down the marginal propen-

sity to consume.

5. creates the expectation of a further wage cut and lowers the marginal efficiency of capital.

6. gives laborers an opportunity to resort to industrial disputes.

7. involves a price decline and so enlarges the real burden of public and private debts.

Of these effects, Keynes pays special attention to the reduction in the interest rates (3) and the expectation of a further wage cut (5). He admits, at least theoretically, that if the cut in money wage rates does not create the expectation of a further cut, it expands employment through the decline in interest and the resultant expansion of investment.

It should be noted that Keynes's emphasizing the effect through the interest rate is very important. Although probably never intending to do so, Keynes actually demonstrates that wage adjustment is effective on employment even under a less favorable theoretical setting than Pigou's. On the other hand, this argument brought about an undesirable conclusion, that is, a cut in money wages does not affect employment unless it involves interest reduction. Let us look at how Pigou came to accept this new argument concerning money wages to be able to offer an internal criticism.

2.3 Post-General Theory controversy on money wages

Just as Keynes, in *General Theory*, misrepresents Pigou, Pigou fails to understand Keynes's attempt, because he tried to view his argument exclusively through the framework of his *Theory of Unemployment*.

Apart from the criticism that he directed toward the overblown rhetoric of *General Theory*, Pigou points to two problems. First, he criticizes Keynes's failure to clarify what sort of monetary policy is assumed to be adopted. As noted above, in *Theory of Unemployment*, monetary

policy means the standard by which the aggregate money income is regulated, the ways and means of which include fiscal policy in a time of need. Of course, this criticism is correct but it is beside the point. Keynes attempted to investigate how the real and monetary variables such as employment and the interest rate interact with one another under the assumption of no external intervention and how they are affected when an external intervention is made.

Second, Pigou argues contrary to Keynes that the cut in money wages is likely to raise, rather than decline, the interest rate if a realistic monetary policy is adopted. In this review, Pigou notices that Keynes admits a money wage cut expanding employment "in some way, by a process of repercussion" (Pigou 1936, 128). Clearly, Pigou seems not quite to understand what this process of repercussion entails. We can speculate what makes Pigou think that the money wage cut is likely to raise the interest rate. We mentioned above that Pigou thought the money wage cut would increase aggregate money income through the highly elastic labor demand curve under the standard monetary system. An increase in the aggregate money income, other things being equal, involves an increase in the demand for money (or, the decrease in Cambridge k) and so the rise in the interest rate.[3]

Since the two economists differ in their assumptions, both conclusions of Keynes and Pigou might be correct. Under Pigou's assumptions, a cut in money wage rates directly brings down the real wage rates through the process of a forced anti-levy. Therefore, it could augment employment and also the aggregate money income even without a policy intervention to lower the interest rate. In this case, the money wage cut raises the interest rate. Meanwhile, under Keynes's assumptions, a money wage cut does not directly expand employment but necessarily lowers the interest rate by decreasing the liquidity preference schedule. Thus, we can defend Pigou's consistency within his own argument, though we must notice he could not realize what

---

[3] See Pigou (1917). "[O]ther things being equal, the larger [the total resources, or in so far as a certain period of time is concerned, the total income] is, the higher will be the demand schedule for money" (Pigou 1917, 43).

Keynes meant regarding the effect of a money wage cut.

In an article 'Real and Money Wage Rates in Relation to Unemployment' (1937), which followed this review of *General Theory*, Pigou formally attempts to challenge Keynes's views on money wages. In this article, Pigou sets up a new macroeconomic theory incorporating both real and monetary aspects. Since the short-period prime costs are equal to the value of marginal products, we obtain

$$w(1 + r) = pF'(e)$$

where w is money wages, r the interest rate, p general prices, $F(\cdot)$ aggregate production function, and e employment.[4] In contrast to *Theory of Unemployment* where prices are assumed to be constant, Pigou succeeds in setting up a macroeconomic model in which prices are endogenously determined. Since $p = \frac{I_m}{F(e)} = \frac{MV}{F(e)}$ (I_m is aggregate money income, M the quantity of money supply, V income velocity), the above equation becomes

$$w(1 + r)\frac{F(e)}{F'(e)} = MV.$$

Pigou supposes that money supply depends on the interest rate, and income velocity on both the interest rate and the proportion of labor income to aggregate income. Thus,

$$w(1 + r)\frac{F(e)}{F'(e)} = M(r)V(r, e) \tag{1}$$

where $\frac{dM}{dr} > 0$, $\frac{\partial V}{\partial r} > 0$, $\frac{\partial V}{\partial e} < 0$. We need another condition to endogenously determine the interest rate and employment. Pigou brings up a condition of no savings after the manner of Ramsey (1928). As Ambrosi (2003) noted, the condition of no savings is unfit for a short-

---

[4] This representation, $w(1 + r) = pF'(e)$, exists in *Theory of Unemployment* (Pigou 1933, 58). In this volume, however, Pigou does not treat it as one condition of the overall system.

period analysis, yet Pigou seems to use it simply out of theoretical necessity. When savings are nil, the interest rate equals to the rate of discounting future consumption, or the rate of time preference ρ. Then,

$$r = \rho(e) \tag{2}$$

where the rate of time preference depends on employment or real income.[5]

Using the above two equations, Pigou demonstrates with *reductio ad absurdum* that a money wage cut increases employment. Suppose first that money wage rates decline and that employment remains unchanged. Employment being constant, the interest rate will be constant from equation 2 and so will be the aggregate money income $M(r)V(r, e)$. The money income being the same, prices are the same, and the money wage cut involves the reduction in real wages. Since employment must be augmented by the reduction in real wages, then, the original supposition of constant employment contradicts the other assumption of the money wage decline.

This reasoning is, however, the only result Pigou extrapolates from the above two equations, and we should note that he does not adequately handle them in the 1937 article. While Pigou admits money wage cuts may decrease the interest rate, he thinks that this decrease is a temporary one that happens before equilibrium is reached.[6] In *Theory of Unemployment*, Pigou stated that a money wage cut temporarily involves a fall in the labor income and hence, in the aggregate money income to the same extent; however, this temporary fall in income is soon followed by a rise in employment and the aggregate money income up to its

---

[5] Ambrosi (2003) understands Pigou's 1937 article as assuming the rate of time preference is always constant. However, this is not accurate. This view is rather Keynes's (1937) than Pigou's. Keynes replies to Pigou's 1937 article in the same year. In that reply, Keynes misrepresents Pigou's theory perhaps intentionally to make something rational out of Pigou's statement.

[6] Kaldor interpreted that Pigou had already noticed that money wage cuts would directly reduce the interest rate at the time of the 1937 article (Keynes 1973, 244). Even if Kaldor's interpretation is right, it is certain that Pigou failed to offer a theory compatible with that view.

original amount or even more than this amount. Thus, Pigou relies, once again, on the ad hoc reasoning presented in *Theory of Unemployment* and still fails to grasp Keynes's argument.

Keynes makes a very brief reply to Pigou's 1937 article. All that Keynes attempts to say in this note is that the model in the 1937 article is either inadequate to grasp the relationships of the variables in reality or internally inconsistent. Keynes mentions the lack of consideration over the liquidity preference and the dependence of savings on real income. If these relationships are incorporated, Pigou's model does not behave as Pigou explains. Pigou implicitly assumes in the 1937 article that money wage cuts do not affect money income. Keynes, however, thinks that a money wage cut directly lowers aggregate money income and if aggregate money income were to stay the same, the quantity of money supply must be augmented conversely with the decline in money wage cuts.[7] As I mentioned above, this is all that in *General Theory*, Keynes should have criticized in Pigou's argument of *Theory of Unemployment*. In this note, however, Keynes phrases it very briefly and almost unintelligibly, so that Pigou was left none the wiser with regard to the relationship between money wage rates and the interest rate.

What enabled Pigou to understand this relationship is an article by Nicholas Kaldor attached next to Keynes's note. In this article, Kaldor makes a mathematical argument on how the above two equations work out, which is quite intelligible to someone not familiar with the newfangled technical terms. Instead of equation 2, Kaldor uses as an identical condition $S(r, e) = 0$ where $\frac{\partial S}{\partial e} > 0$, $\frac{\partial S}{\partial r} > 0$. He also makes it clear that the income velocity should be made dependent on the interest rate to incorporate the liquidity preference. Thus, Kaldor

---

[7] "[T]he only banking policy consistent with the conditions of the simplified model [Pigou's model in the 1937 article] 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).

establishes the following system:

$$w(1 + r) = \frac{F'}{F} M(r) V(r, e) \tag{3}$$

$$S(r, e) = 0 \tag{4}$$

Though he does not write it in the article, he must have derived analytically the proportion of the change in employment to the change in money wages:

$$\frac{de}{dw} = -\frac{(1 + r)\frac{\partial S}{\partial r}}{\frac{F'}{F} \frac{\partial S}{\partial e}(M'V + M\frac{\partial V}{\partial r}) - \frac{\partial S}{\partial r} M\{\frac{d}{de}(\frac{F'}{F})V + \frac{F'}{F}\frac{\partial V}{\partial e}\} - w\frac{\partial S}{\partial e}} (< 0).^8$$

Kaldor argues that a money wage cut increases employment "if, and only if, $\frac{\partial S}{\partial r}$, $\frac{dM}{dr}$ and $\frac{\partial V}{\partial r}$ are all positive and finite" (Kaldor 1937, 749).[9] He highlights the fact that if $\frac{dM}{dr}$ or $\frac{\partial V}{\partial r}$ is infinite, $\frac{de}{dw}$ becomes nil, which means a money wage cut does not affect employment (See 3.1 below). Kaldor therefore concludes that a money wage cut expands employment only through the reduction in the interest rate.

Kaldor interprets this theoretical conclusion in the same way as Keynes does in *General Theory*. The money wage cut decreases the quantity of money required for a given level of real income. This means a decline in the demand for money and hence in the interest rate, given that the money supply remains the same. This process creates a result identical to that of the monetary policy, increasing the money supply and decreasing the interest rate. Kaldor, therefore, states that the adjustment of money wages is in fact "a piece of ritual" that brings about the same result as could be easily realized by monetary policy.

---

[8] Since there is a term $-w\frac{\partial S}{\partial e}$ in the denominator, the sign of this fraction as a whole seems undetermined. Yet, $\frac{d}{dw}(1 + r)w$ is always positive, so $\frac{de}{dw} > 0$ and $\frac{dr}{dw} < 0$ contradicts equation 3.

[9] Though it may be a typo, Kaldor makes one mistake. If $\frac{\partial S}{\partial r}$ is infinite, a money wage cut expands employment. In this situation, the interest rate does not need to decline, and the money wage cut is effective even when the interest rate is at the minimum level. Provided that $\frac{\partial S}{\partial r}$ is a typo for $\frac{\partial S}{\partial e}$, Kaldor is set free.

Replying to Kaldor in 1938, Pigou states, "I now accept Mr. Kaldor's main contention" (Pigou 1938, 134). What urges Pigou to convert was "a logical rod wielded privately by Mr. Champernowne" (Pigou 1938, 134).[10] The account in this 1938 note clearly suggests that this logical rod refers to the analytical method. Pigou more simply demonstrates that a money wage cut must involve the interest reduction to augment employment by differentiating equation 3 with r. That is,

$$\frac{d}{dr}(1+r)w = \frac{de}{dr}\frac{d}{de}(\frac{F'}{F})MV + \frac{F'}{F}M'V + \frac{F'}{F}M\frac{\partial V}{\partial r} + \frac{F'}{F}M\frac{de}{dr}\frac{\partial V}{\partial e}.$$

If the money wage cut were to involve the interest decline and the employment expansion, namely $\frac{de}{dr}$ were to be negative and $\frac{dw}{dr}$ positive, then it requires "(1) $\frac{dw}{dr}$ has the same sign as $\frac{d}{dr}(1+r)w$ and (2) that $\frac{\partial V}{\partial e}$ is negligible" (Pigou 1938, 137n, the symbols are changed). The use of this analytical argument leads Pigou to realize the accurate working of his original theory presented in the 1937 article and finally to accept Keynes's views on money wages.

Later in 1941, Pigou develops the analytical discussion in *Employment and Equilibrium.* He analytically examines the effect of the changes in all the relevant variables on employment. Let us look at the results below.

3   Analytical argument

This section first deals with the analytical discussion set forth in *Employment and Equilibrium* (1941). For consistency and simplicity, however, I choose to investigate it with the use of the model presented in another of Pigou's volumes, *Keynes' General Theory* (1950).

---

[10] Pigou often acknowledged Champernowne's contributions in his writings (Pigou 1935, v; 1941, 110). It seems that Pigou actually needed mathematical ability from without, as Collard (2002, xxxn1) states.

The model is as follows.[11]

$$I(r) = S\{r, F(e)\} \tag{5}$$

$$w = \frac{MV(r)}{F(e)} \tag{6}$$

where I is investment, S savings. Unlike the previous model he used until 1938, Pigou assumes the equilibrium between savings and investment, rather than no savings, and therewith frames the model suited to a short-period analysis.

Since the above model consists of two equations and four variables, it requires another two conditions to be determinate. Pigou stops to mention that the model can be viewed as a long-period model by adding specific conditions. In the long-period analysis typified by A. Marshall's *Principles of Economics*, one can ignore the differences in the rate of employment and general prices caused by business cycles. The quantity of employment is then determined exogenously by a certain constant proportion of population. Supposing the level of prices relates to that of money wages, the above equations work out in the following way: The population and labor efficiency determine the aggregate real income, and then the relations between savings and investment, $I(r) = S(r)$, determine the interest rate.

Taking short-period cyclical movements into account, the rate of employment must be an endogenous variable. To realize this, the money wage rate and the quantity of money supply must be exogenously controlled.

In *Employment and Equilibrium*, Pigou derives a differential coefficient with each $m_n (n =$

---

[11] In *Employment and Equilibrium*, the simplest model is as follows.

$$I(r) = S\{r, F(e)\}$$
$$y = S\{r, F(e)\}$$
$$C(x + y) = g(r)$$

where x is employment in the consumption-goods sector, y employment in the investment-goods sector, C a fixed number representing the proportion of labor income, and g the aggregate money income.

Variable		Sign
money wages $w = m_1 w$	$\frac{de}{dm_1} = -\frac{wF}{A}\left(\frac{\partial S}{\partial r} - I'\right)$	$-$
money supply $M = m_2 M$	$\frac{de}{dm_2} = \frac{MV}{A}\left(\frac{\partial S}{\partial r} - I'\right)$	$+$
income velocity $g = m_3 g$	$\frac{de}{dm_3} = \frac{de}{dm_2}$	$+$
investment schedule $I = m_4 I$	$\frac{de}{dm_4} = \frac{IMV'}{A}$	$+$
labor efficiency in investment sector $I = I(\frac{r}{m_5})$	$\frac{de}{dm_5} = -\frac{rI'MV'}{A}$	$+$
savings schedule $S = m_6 S$	$\frac{de}{dm_6} = -\frac{SMV'}{A}$	$-$
overall labor efficiency $F = m_7 F$	$\frac{de}{dm_7} = -\frac{F}{F'}$	$-$

Table. 1 $A = F'\{w(\frac{\partial S}{\partial r} - I') + MV'\frac{\partial S}{\partial F}\}$. Each m is written as 1.

$1, ..., 7$) that is multiplied on each variable.

$$m_4 I\left(\frac{r}{m_5}\right) = m_6 S\{r, m_7 F(e)\} \tag{7}$$

$$m_1 w = \frac{m_2 M m_3 V(r)}{m_7 F(e)} \tag{8}$$

These ms assume the value of slightly more than unity, but only one m is present at a time. Then, one can derive a differential coefficient of e in terms of each m. The results of calculation are summed up in table 1.

We can rely on G.M. Ambrosi's (2003) graphical tool to explain the above results. In figure 1, the northeast quadrant shows a downward-sloping curve representing the equilibrium of savings and investment, namely the IS curve.[12] The northwest quadrant represents the income velocity as an increasing function of the interest rate. The southeast quadrant displays the relationship between the aggregate money income and the real income, which almost corresponds to the demand for money due to the transaction motive.

A rise in money wages is represented by an increase in the slope of the curve in the southeast quadrant of figure 1. It is clear that this change leads to the rise in money income and the

---

[12] Differentiating $S = I$ with F produces $\frac{dr}{dF} = -\frac{\frac{\partial S}{\partial F}}{\frac{\partial S}{\partial r} - I'}(< 0)$. Since $\frac{\partial S}{\partial r} > 0$, the Pigouvian IS curve is less steep than the IS curve derived with the saving function that does not include the interest rate.
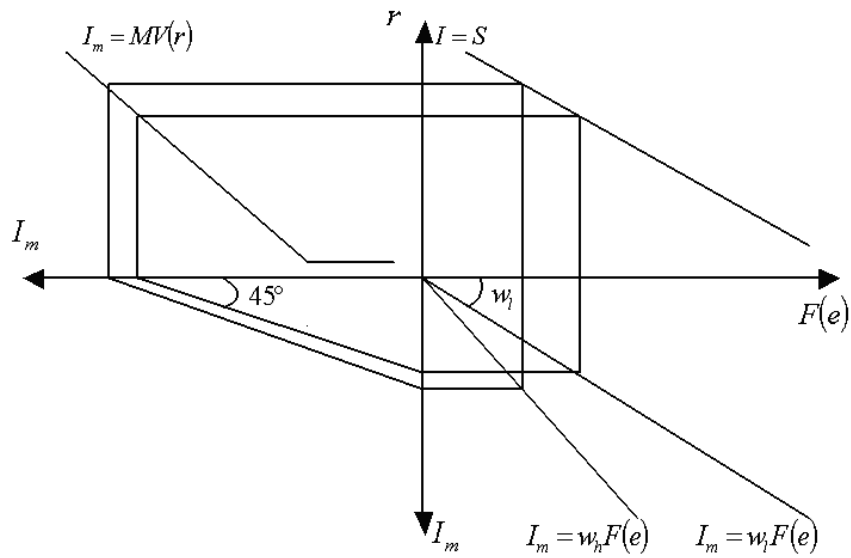
Fig. 1

decline of real income and employment.[13]

An increase in money supply corresponds to the movement of the curve in the northwest quadrant to the left. This involves the increase in money income, the decrease in the interest rate, and also the expansion in employment. The expansion of the income velocity function brings about an identical result.

The enlargement of the investment function means the upward movement of the IS curve in the northeast quadrant. In new equilibrium, therefore, real income, money income, and the interest rate all go up. Similarly, improvement in labor efficiency in the investment-goods sector is represented by the upward shift of the IS curve, which augments employment.

The increase of the saving function, as table 1 shows, involves a decrease in employment. Since the increase of the saving function means a reduction in the interest rate to a given investment function, it is represented by a downward shift of the IS curve. After this change,

---

[13] See 2.3. We discussed whether a rise (decline) in money wages leads to the rise (decline) in money income.

18

real income, money income, and the interest rate all decline.

In *Keynes' 'General Theory'* (1950), Pigou highly values the role played by Keynes in convincing the public that the increase of savings is harmful to employment. The public including politicians and bureaucrats had thought that economy campaigns by the public authorities did not damage employment at the time of economic slumps. They had had an implicit theory that even at the time of less than full employment, a restraint on public expenditure only increased savings and transferred resources from consumption to investment. However, this is not true, as both Keynes and Pigou claim. Pigou did note the unfavorable effect of economy campaigns on employment in times of slumps long before the publication of *General Theory*. He mentioned that the anticyclical adjustment of public expenditure would be effective in stabilizing economic fluctuations even before World War I.

Further, in the early 1930s, Pigou cast a reasoned doubt on the economy campaign conducted by the government (Pigou 1930).[14] Of course, he well understood the purpose of the government. Under the system of a gold standard, "if foreigners with balances here hold a similar belief, such a campaign may check a drain of gold abroad, and so help money income" (Pigou 1950, 41). As he then criticized, Pigou suspects that the pursuit of this policy was based on the underestimation of the adverse effect of increase of savings.

While Pigou thus agrees with Keynes about the effect of changes in savings on employment, he contradicts Keynes on a related point. Keynes mentions in *General Theory* that increases in consumption have a stimulating effect on investment so that investment will eventually expand, rather than contract. He, therefore, strongly supports a raise in taxes for the rich to remedy "such large disparities [of incomes and wealth] as exist to-day" (Keynes 1936, 374).

---

[14] "When, however, as at the present time, there is an enormous mass of unemployment, [the virtue and relevance of criticisms of the State's action to reduce unemployment] are lost. If employment is "artificially created" in these conditions, men are available to come into it, not merely from more useful occupations elsewhere, but from soul-destroying idleness" (Pigou 1930, 12).

Pigou, on the other hand, thinks that the reduction of the saving function, while augmenting

employment, involves a reduced amount of realized investment. This opinion is borne out by

an analytical calculation by which we obtain the proportion of the increment of the saving

function to the variation of the amount of investment, $\frac{dI}{dm_6} = -\frac{wS}{I'A}(> 0)$, from equations 5

and 6. Pigou accordingly states that the policy to reduce income disparity impedes capital

accumulation.

Lastly, an improvement in overall labor efficiency analytically produces the simple result

of no change in real income because $\frac{dm_7 F}{dm_7} = 0$. This means that an improvement in the

productivity of each worker exactly balances out the decrease in employment due to this

change. Since a production function itself is used as an abscissa axis, we cannot describe this

process in figure 1. This change also causes no variations in the interest rate or money income.

All the results shown above depend on the differential coefficients of functions having specific

signs and finite values. As Kaldor mentions in his 1937 article, however, it is plausible in a

real economy for the differential coefficient of the income velocity function to have an infinite

value. This is the situation when the interest rate is at the minimum level. In figure 1, it is

represented by the horizontal part of the curve $I_m = MV(r)$ in the northwest quadrant. Next,

let us look at what change the perfect elasticity of income velocity function brings about to

each result of analytical calculation.

3.1   Perfect elasticity of the income velocity function

Insofar as the income velocity function has perfect elasticity, we can recast table 1 into table

2. Between these two tables, all results except the last one vary. The changes in the first

three variables do not affect employment in the present setting. The changes in the next three

variables, however, have stronger effects on employment.

Variable		Sign
money wages $w = m_1 w$	$\frac{de}{dm_1} = 0$	0
money supply $M = m_2 M$	$\frac{de}{dm_2} = 0$	0
income velocity $g = m_3 g$	$\frac{de}{dm_3} = 0$	0
investment $I = m_4 I$	$\frac{de}{dm_4} = \frac{I}{F'\frac{\partial S}{\partial F}}$	$+$
labor efficiency in investment sector $I = I(\frac{r}{m_5})$	$\frac{de}{dm_5} = -\frac{rI'}{F'\frac{\partial S}{\partial F}}$	$+$
savings $S = m_6 S$	$\frac{de}{dm_6} = -\frac{S}{F'\frac{\partial S}{\partial F}}$	$-$
overall labor efficiency $F = m_7 F$	$\frac{de}{dm_7} = -\frac{F}{F'}$	$-$

Table. 2   Each m is written as 1.

Let us look at figure 2. First, the changes in variables m_4, m_5 and m_6 are all represented by the shift of the IS curve in the northeast quadrant. Since the interest rate is now fixed at the minimum level, the shift of the IS curve affects employment without any set-off through the movement of the interest rate. These changes involve changes in money income in the same direction and of the same extent as the change in real income.
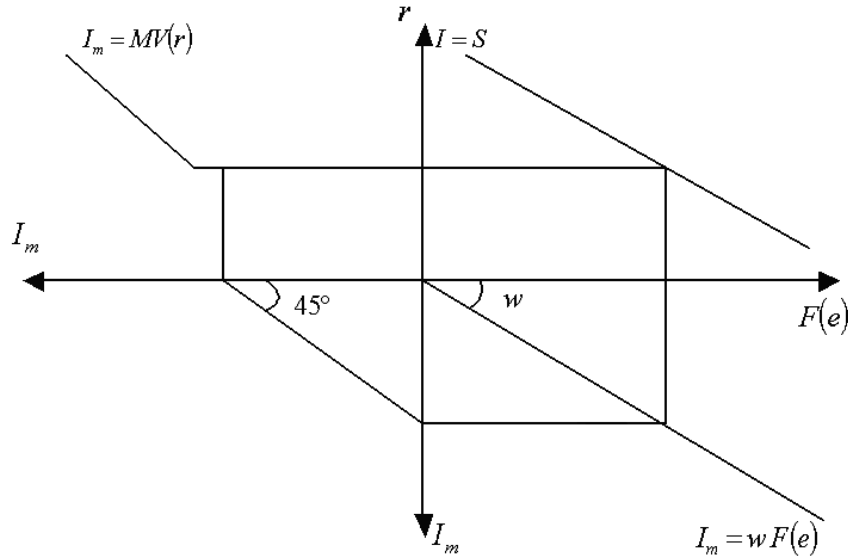

Fig. 2

Next, changes in variables m_2 and m_3 mean the leftward movement of the curve in the northwest quadrant. When the interest rate is already at the minimum level, however, these

changes do not bring down the interest rate any further. Equilibrium is attained at the same point on the same IS curve in the northeast quadrant, and employment, real income, and money income all stay the same.

Lastly, a change in money wages (m_1) consists of the change in the slope of the line in the southeast quadrant. As long as the interest rate is at the minimum level, the fixed rate of interest and the IS curve determine the level of real income and employment. A change in money wages only varies the money income because the latter is obtained by multiplying the money wage rate and the real income already decided. Thus, a rise in money wages results in no change in real income and a proportional rise in money income.

The result that a money wage cut does not influence employment in times of the minimum interest rate stands in conflict with Pigou's general views. It is, however, certain that Pigou admits this theoretical result. He states the following in the 1938 note:

> We may conclude, therefore, that, within 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. In the sense that it would not entail an increase in employment unless
> it entailed a reduction in the rate of interest, we may properly say that it acts on the
> volume of employment through the rate of interest. (Pigou 1938, 137)

In this citation, however, Pigou seems to provisionally accept only the mathematical result, not the economic argument that Kaldor, or Keynes before him, uses to explain it. In *Theory of Unemployment*, Pigou had highlighted that the existence of a fixed-income class should cause a "forced anti-levy" and claimed that a money wage cut would directly increase employment. Therefore, even though a money wage cut is ineffective in times of the minimum interest rate under the Keynesian setting, Pigou still had a reason to argue that it is effective under a different setting. In fact, he continues to argue so in *Employment and Equilibrium*, and

later.[15] In 1943, Pigou succeeds in devising an original model to formally support his claim that a money wage cut is effective in times of minimum interest rate. As mentioned below, I propose that the model presented in 1943 should be built on the idea of forced anti-levy.

4   The Pigou effect

4.1   How Pigou actually presents it

In his review of *General Theory*, Pigou criticized Keynes's notion of unemployment equilibrium—in Pigou's terms, the "Day of Judgment"—apart from the two points mentioned in the preceding section. According to Keynes, as capital accumulation substantially advances and the marginal efficiency of capital declines, desired investment and desired savings would be equilibrated if the interest rate were proportionally lowered; yet, since there is a limit below which the interest rate could not decline, they would not be necessarily equilibrated. When the marginal efficiency of capital as a long-period trend has come to fall short of the minimum interest rate, desired investment becomes zero, and desired savings must accordingly be zero; and if not, the disequilibrium between them leads to the gradual fall of aggregate income. Desired savings, however, do not easily become zero because if they were to be zero, the marginal propensity to consume must become unity, and this will require the real income to substantially decline. Thus, Keynes anticipates that the goal to which the economy leads in the long run will be "one in which employment is low enough and the standard of life sufficiently miserable" (Keynes 1936, 217–218).

In his 1936 review, Pigou claims that the ultimate situation after effective investment outlets

---

[15] In *Employment and Equilibrium*, Pigou states that under a hypothetical situation where the interest rate is zero and people still desire to save, it is possible that "full employment is still maintained, in accordance with the 'classical view', through an appropriate succession of adjustments in money wage-rates" (Pigou 1941, 132).

disappear should not be the Day of Judgment as Keynes predicts. Pigou claims this on the grounds that a money wage cut will prevent unemployment from expanding. Even so, in this volume, Pigou does not fully address the related theoretical considerations.

Later in *Employment and Equilibrium* (1941) and in journal articles, Pigou formally deals with the doctrine of the Day of Judgment. Among the treatments of this theoretical matter, I focus on that presented in an article "The Classical Stationary State" (1943). In that article, Pigou sets up the following model:

$$I(r) = 0 \tag{9}$$

$$S(e, r, T) = 0 \tag{10}$$

$$V(r) = \frac{F(e)}{T} \tag{11}$$

where T is the real value of the stock of money.[16] Let us suppose that capital accumulation advances beyond a certain limit, and that the amount of desired investment as a long-period trend is nil. These suppositions naturally entail that the interest rate be minimum.

To attain the equilibrium between desired savings and desired investment, the former must be zero; yet, like Keynes, Pigou does not think that the proportion of consumption to income easily becomes unity. This is, first, because, since the interest rate cannot fall below zero, the decline in desired savings due to the fall in the interest rate will cease at a certain point. Second, he thinks that the motives for savings include the desire for the possession of wealth itself and

---

[16] I have omitted the capital stock C from saving and investment functions because Pigou treats that variable as exogenously given. In addition, in the article, Pigou sets up the equation $r = g(\frac{T}{F(e)})$ instead of equation 11. Even so, it is clear that by this equation, he means the liquidity preference schedule or the Cambridge cash balance equation. Therefore, I have chosen to more directly write $V(r) = \frac{F(e)}{T}$. There is a different interpretation by Melitz (1967) that this function concerns the portfolio effect balancing yield from physical stock and opportunity yield from cash. However, this is wrong simply because r in the above equation is not the rate of yield from physical investment, but the interest rate or the rates of securities whose increases should decrease the present value of the yields from physical stock. He also overlooks the real value of cash included in the saving function, which is crucial to his conclusion that the wealth effect is immaterial in Pigou's 1943 article.

not just for the income from interest and dividends. In regard to these two considerations, Pigou admits that even when the interest rate is minimum, savings will not usually become zero.

Pigou, at the same time, proposes that the desire for the possession of wealth is variable and dependent on the real value of wealth, or the real value of the stock of money in this framework: thus, $\frac{\partial S}{\partial T} < 0$.[17] The real value of money stock depends on money supply and general prices, but money supply is not necessarily a relevant factor. Open market operations and other common ways of adjusting money supply change only the proportion of money in the total stock of all kinds of wealth, and do not increase that stock. Therefore, these ordinary monetary policy tools cannot have the effect of affecting savings. Thus, what is essential is general prices, which are supposed to move parallel with money wage rates. With these considerations in mind, we can more correctly write the above equation system as follows:

$$I(r) = 0$$

$$S(e, r, p) = 0$$

$$V(r) = \frac{pF(e)}{M}$$

$$w = p$$

where $\frac{\partial S}{\partial p} > 0$ and w and M are exogenous variables.

Let us then examine this equation system. We can obtain the proportion of the increment of money wages to the change in employment:

$$\frac{de}{dw} = -\frac{F(\frac{\partial S}{\partial r} - I') + \frac{\partial S}{\partial p} V' M}{w(\frac{\partial S}{\partial r} - I') + \frac{\partial S}{\partial e} V' M}.$$

---

[17] Pigou notices that not all the money held by the public is affected by price declines (Pigou 1947b, 250). Price declines do not affect the real value of the money based on bank loans since they also increase the real value of the debts.

If the interest rate is minimum and the income velocity function has a perfect elasticity,

$$\frac{de}{dw} = -\frac{\frac{\partial S}{\partial p}}{\frac{\partial S}{\partial e}}.$$

Pigou estimates that savings will be negative when the real value of money stock is sufficiently large, or general prices sufficiently decrease, and he means by this that desired savings and desired investment will certainly come to equilibrate with one another at some point. Thus, the sign of $\frac{\partial S}{\partial p}$ continues to be positive after savings become negative, and consequently the sign of $\frac{de}{dw}$ should always be negative despite the current situation where investment is zero and the interest rate is minimum.[18] Flexible wage adjustment cannot only solve the disequilibrium between desired savings and desired investment but also expand employment by decreasing desired savings. Under this Pigouvian setting, the Day of Judgment will not materialize.

Pigou thus demonstrates that the goal toward which the economy moves is a classical stationary state with full employment. On the other hand, he considers it implausible for the described process to fully appear because of the following external causes. First, the government will give in to demands from workers and set up a minimum wage to check the decline in money wages. This, of course, starts the pressure of income reduction again. Second, the government will also undertake investment by itself to prevent the decline in employment. Pigou thinks that this government action will halt the process toward the Day of Judgment. Third, Pigou doubts the validity of the very assumption that new investment outlets will entirely disappear for a long time. "Since . . . there is every reason to expect that scientific discoveries will continue to be made, and so that new openings for profitable investment will appear in the future, as they have in the past, it may well be that no stationary state of any

---

[18] Incidentally, we can obtain exactly the same result with regard to the effect of the changes in other variables listed in tables 1 and 2. The addition of p in the savings function only affects the result of changes in money wage rates.

kind, neither heaven nor hell, will ever be attained; but economic man for the remainder of his career will continue rather to live and move in purgatory" (Pigou 1950, 38).

4.2   Link between forced anti-levy and Pigou effect

Thus far, we have seen that Pigou emphasizes the effect of decreases in prices to expand consumption to criticize Keynes's notion of long-period unemployment equilibrium. In this section, I propose that Pigou intends this effect of price declines to stimulate employment also as a short-period effect. The most important evidence is the similarity between that effect and the process of a "forced anti-levy" mentioned in *Theory of Unemployment.*

As noted in section 2.1, Pigou argues in *Theory of Unemployment* that a money wage reduction acts on employment through the buffer of a fixed-income class. Although in that volume, he simply states that this effect leads to the divergence between money wages and product prices, more precisely it is through the expansion of aggregate expenditure in real terms that a forced anti-levy affects employment. An anti-forced levy, namely the increased income ratio of a fixed-income class, does not directly increase aggregate expenditure in real terms and so does not increase employment. The fixed-income class must enlarge its consumption and investment when faced with decreased prices. If the fixed-income class does not remain content with the same standard of living and raises its consumption in real terms, it would be due to the enlargement of its expending capacity in real terms by the price decline.

Using the present symbols, the effect of a forced anti-levy to expand aggregate real consumption is represented in the same way as the expansion of consumption due to the wealth effect shown above, that is to say, $\frac{\partial S}{\partial p} > 0$. The equation system incorporating the former short-period effect is identical with the system stated in the previous section. Thus, this equation system can be seen as either a long-period analysis incorporating the wealth effect

or a short-period analysis equipped with a forced anti-levy. We can, at least, reasonably infer that the source of inspiration for the Pigou effect was Pigou's own earlier notion of a forced anti-levy.

Further evidence suggesting that the above system is meant as a short-period analysis is that there is another instance where Pigou clearly examines short-period movements under the assumption of a stationary state. As discussed above in section 2.3, Pigou postulates a stationary state to investigate the effect of money wage cuts on employment. In spite of his evident intention to analyze a short-period effect, he chooses a less intricate situation with no investment or savings. Kaldor appears to support Pigou's methodology by stating, "the argument [advanced with the assumption of no investment] is equally applicable to the more general case where investment is assumed to be constant and positive" (Kaldor 1937, 751).

The above considerations lead us to propose to formulate the Pigouvian macroeconomic model reflecting his true intentions as follows.

$$I(r) = S(e, r, p)$$
$$V(r) = \frac{pF(e)}{M}$$
$$w = p$$

Pigou never abandoned his belief that money wage cuts are effective in raising employment regardless of whether the interest rate is at the minimum level or above it. This model unambiguously states why he could hold firmly to that belief.

4.3 Implications for the reality

We have so far discussed Pigou's views on money wages and seen that he invariably stresses the validity of money wage adjustment. What makes him think it important to demonstrate its validity? Two real-life points determine his interest.

First, Pigou thinks that apart from the 1930s, the large amount of unemployment in the latter half of the 1920s is mainly attributable to the failure of money wage adjustment. This failure, he argues, was caused by the bargaining power on workers' side being strengthened by newly introduced social legislation.[19] The prevailing circumstances were also important. In the latter half of the 1920s, monetary policy was restricted by the gold standard, and fiscal policy was also shackled because of the enormous amount of war debts. Pigou seems to be well aware of these policy constrictions because he noted in *Industrial Fluctuations* (1927) that a gold standard could restrict monetary policy and he also joined the controversy over war debts during the 1920s. Considering these circumstances, it is probable that Pigou thought that money wage cuts were the only effective way to remedy prevailing unemployment.

In the economic circumstances of the 1920s, it was crucial whether money wage cuts were effective or not when the interest rate was minimum. This is because in the 1920s, the monetary authorities had to keep the domestic interest rate high to maintain the international exchange rate of sterling, and so the prevailing interest rate at those times was, though quite high, practically at the minimum level. Consequently, if it was admitted that money wage cuts affect employment only through the decline in the interest rate, money wage cuts would be ineffective under these conditions. This seems to be the reason why Pigou so persistently argued for the validity of money wage cuts regardless of the level of interest rate.

---

[19] See Pigou (1927b, 355; 1933, 252–6; 1941, 93; 1945, 73; 1947, Pt. 2; 1952, 103).

Second, Pigou notes that money wage rates are determined by negotiations between workers and employers, and that workers tend to view the improvement in business conditions as a good opportunity to claim for wage increase.[20] If employers yield to these claims and money wages rise each time the economy improves, the recovery of employment will be partly cancelled. Pigou fears the possibility that the degree of this setoff might be very large depending on labor's attitudes. When workers behave based only on the interests within unions, unemployment would be kept high even if the economy improves. To achieve full employment in this situation, progressive increases of public expenditure will be necessary, but this surely involves uncontrollable inflation. Thus, Pigou regards the cost-push inflation as a real danger and calls for responsible actions on the part of workers. For him, the suggestion that changes in money wages do not affect employment was a hazardous one.

5 Conclusion

This paper has focused on A.C. Pigou's unemployment theory after his *Theory of Unemployment* (1933) was published. In hindsight, Pigou argued from an inadequate framework in *Theory of Unemployment*. Even so, with the aid of the notion highlighted in his earlier work, namely, a forced anti-levy, he claims that money wage cuts will certainly expand employment. After the publication of Keynes's *General Theory*, a controversy arose between Keynes and Pigou concerning the effect of money wage cuts on employment. Although Pigou eventually acknowledged his defeat and accepted Keynes's conclusion on money wages, he gained a theoretical tool in the bargain. In his 1943 article, he returns to the battleground and succeeds in formalizing and incorporating his earlier notion of a forced anti-levy to conclude that money wage adjustment is effective on employment irrespective of the interest rate.

---

[20] See Pigou (1927b, 368; 1933, 250–251; 1945, 39; 1946, 267).

What did Pigou actually gain from Keynes or their controversy? We have seen that Pigou set up a macroeconomic model by himself in his 1937 article, although he could not turn it to full account or realize the interaction between money and real movements. Therefore, we can note that what he lacked was an analytical method to calculate differential coefficients. Thus, acquiring this method served as a catalyst for Pigou to understand the Keynesian macroeconomic framework. In *Employment and Equilibrium* (1941), Pigou boldly takes advantage of this analytical method, and finally in 1943, he could offer a valid counterargument using both the newly acquired method and the idea originated in the 1920s. We can conclude that at least from Pigou's point of view, the unemployment controversy in the 1930s was sincerely fought and produced meaningful results.

References

Ambrosi, G. M. (2003) *Keynes, Pigou and Cambridge Keynesians: Authenticity and analytical perspective in the Keynes-classics debate.*, Basingstoke: Palgrave Macmillan.

Aslanbeigui, N. (1992) "Pigou's inconsistencies or Keynes's misconceptions.", *History of Political Economy.*, Vol. 24. pp. 413–3.

Blaug, M. (1997) *Economic theory in retrospect.*, Cambridge: Cambridge University Press, 5th. edition.

Brady, M. E. (1994) "A note on the Keynes-Pigou controversy.", *History of Political Economy.*, Vol. 26. No. 4. pp. 697–705.

Collard, D. (1999) "Introduction.", In *A. C. Pigou: Collected Economic Writings.*, Basingstoke: Macmillan.

——— (2002) "Introduction.", In *A. C. Pigou: Journal Article.*, Macmillan.

Kaldor, N. (1937) "Prof. Pigou on money wages in relation to unemployment.", *Economic*

Journal., Vol. 47. No. 188. pp. 745–753.

Keynes, J. M. (1936) *The general theory of employment, interest and money.*, London: Macmillan.

——— (1937) "Prof. Pigou on money wages in relation to unemployment.", *Economic Journal.*, Vol. 47. No. 188. pp. 743–745.

——— (1973) *The general theory and after: Defense and development.*, Vol. 14 of *The collected writings of John Maynard Keynes.*, London: Macmillan, edited by D. E. Moggridge.

Melitz, J. (1967) "Pigou and the 'Pigou Effect': Rendez-vous with the author.", *Southern Economic Journal.*, Vol. 34. No. 2. pp. 268–279.

Pigou, A. C. (1917) "The value of money.", *Quarterly Journal of Economics.*, Vol. 32. No. 1. pp. 38–65.

——— (1927a) *Industrial fluctuations.*, Vol. 6 of *A. C. Pigou: Collected economic writings.*, Basingstoke: Macmillan.

——— (1927b) "Wage policy and unemployment.", *Economic Journal.*, Vol. 37. No. 147. pp. 355–368.

——— (1930) "Unemployment policy.", *Times.*, June 6, p. 12.

——— (1933) *The theory of unemployment.*, Vol. 8 of *A. C. Pigou: Collected economic writings.*, Basingstoke: Macmillan.

——— (1936) "Mr. J. M. Keynes' General theory of employment, interest and money.", *Economica, ns.*, Vol. 3. pp. 115–132.

——— (1937) "Real and money wage rates in relation to unemployment.", *Economic Journal.*, Vol. 47. No. 187. pp. 405–422.

——— (1938) "Money wages in relation to unemployment.", *Economic Journal.*, Vol. 48. No. 189. pp. 134–138.

——— (1941) *Employment and equilibrium.*, Vol. 10 of *A. C. Pigou: Collected economic*

writings., Basingstoke: Macmillan.

———— (1945) *Lapses from full employment.*, London: Macmillan.

———— (1947a) *Aspects of British economic history.*, Vol. 12 of *A. C. Pigou: Collected economic writings.*, Basingstoke: Macmillan.

———— (1947b) "Economic progress in a stable environment.", *Economica.*, Vol. 14. pp. 180–190.

———— (1950) *Keynes's 'General Theory'.*, Basingstoke: Macmillan.

———— (1952) *Essays in economics.*, Vol. 14 of *A. C. Pigou: Collected economic writings.*, Basingstoke: Macmillan.

Ramsey, F.P. (1928) "A mathematical theory of saving.", *Economic Journal.*, Vol. 38. No. 152. pp. 543–559.