

Potential Consequences of a Change in Money Wage Under Keynesian Macroeconomics Theory

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Abstract. This research paper has delved into wage dynamics and economic health. The author has chosen to juxtapose the Keynesian macroeconomics theory with that of the classical, aiming to critically examine the contrasting viewpoints of classical and Keynesian economic theories. The core of the analysis hinges on the Keynesian framework introduced by John Maynard Keynes, particularly with its stance on the implications of changes in nominal wage on the broader economy. Historical instances witnessing substantial wage fluctuations serve as real-world examples to substantiate the theoretical discussions, intending to uncover the causal factors and subsequent economic responses to these wage changes. To further bolster the inquiry, the study employs macroeconomic mathematical modelling to furnish quantitative insights that elucidate Keynesian assumptions on the labour market and its implications. By concentrating on the macroeconomic repercussions of nominal wage changes, as opposed to microeconomic consequences, this paper sheds light on the broader implications of wage adjustments in an economy, underpinned mainly by Keynesian perspectives.

Keywords: Ceteris paribus; Exogenous; Endogenous; Ignoratio Elenchi.

1. Introduction

In the realm of intricate economic thought, few topics have gained particular interest from economists. The intricate dance between wage and economic health has been a focal point of debate and study in economic theory for decades. The two dominant schools of thought, classical and Keynesian, offer different and unique interpretations of this dynamic, particularly in response to a change in nominal wage. Keynesian macroeconomics, introduced by John Maynard Keynes, has frequently postulated concepts that challenge traditional classical views while reshaping economic assumptions and discoveries. This paper will examine the effect of a change in money wage on the economy under the Keynesian theories postulation. By Juxtaposing the Keynesian perspective against that of the classical, theoretical differences in their assumptions and logical chain could be analysed and evaluated to come up with an all-rounded conclusion. Historical cases that have witnessed tangible wage changes will be highlighted to ground these theories, aiming to unravel the underlying causes and potential subsequent economic reactions. Further enhancing this paper's depth of inquiry, macroeconomic mathematical modelling will be employed to analyse these effects, providing more quantitative insights to addressing this precise problem and the Keynesian macroeconomic assumptions.

Equilibrium labour market wages typically fluctuate in most economies due to changes in the supply and demand of labour. Such changes would most necessarily lead to renegotiating labour wages in specific firms and industries, regardless of the assumptions the author chooses to adopt. At the Micro level, wage alterations could affect a firm's profitability, reflecting changes in the cost of production and quantity of labour employed. However, instead of focusing on the micro level, this paper will address the broader impacts of changes in nominal wages on the overall economy, emphasising the macroeconomic consequences. Since expected outcomes may differ significantly depending on our chosen assumptions, this paper will focus mainly on the implications proposed under John Maynard Keynes's view on the labour market. Historical examples of reductions in nominal wages will be used to assess the conclusions.

2. Historical Case Description

A reduction in money wages has occurred multiple times in several developed economies in the past decades, each with varying contexts and causations. Japan undoubtedly has faced an economic recession for 30 years since the late 1980s. During this period, the average annual wage for the Japanese workforce has fallen from its peak of 4,107,000 Yen in 1995 to 3,547,000 Yen in 2010. Such a reduction in money wage by 14% per cent can be mainly attributed to Japan's dull economic performance [1]. The downturn was primarily triggered by the bursting economic bubble and was further exacerbated by the presence of an ongoing liquidity trap [2]. In 1985, following the signing of the Plaza Accord, Japan was confronted with a surging exchange rate of Yen, declining economic performance, and a relatively stable inflation rate of 2.03%. To invigorate economic activities, the Central Bank of Japan has opted to lower the interbank lending rate, commonly understood as a cut in interest rate. Such a reduction in interest rates has increased the quantity of money circulating in the economy [3]. In which most money, instead of being injected into the real economy, has been pumped into the capital markets. Such a phenomenon has brought about rising prices in the real estate and stock markets, ultimately resulting in the economic bubble's formation.

The bubble was eventually spurred in 1989, with the central bank raising interest rates from 2.5% to 6%. The sudden liquidity contraction in 1989 triggered the collapse of both the real estate and stock market in 1991, contributing mainly to the accumulation of unhealthy debts in Japan's banking system [4]. Immediate ramifications associated with bad debts were subdued due to government intervention. Nevertheless, in 1997, latent issues began to arise with multiple investment banks and financial institutions, including the Sanyo Securities Company and Hokkaido Takushoku Bank, declaring bankruptcy. Meanwhile, the contractionary monetary policy of the central bank led to a drop in loans from commercial banks to the private sector - falling from 532500 billion JPY in 1998 to less than 400000 billion JPY in 2004 [5]. This decline in the quantity of loans issued from commercial banks would necessitate the rapid contraction of liquid money in the economy. Such a fall in the money supply in 1998 has jump-started the liquidity trap in Japan [6]. It then appears the price of goods and services (G&S) has fallen because of less liquid money in the economy. With a fall in the price of commodities, firms and businesses will generate fewer profits, thus reducing the nominal wage of labour.

3. Classical vs Keynesian

A reduction in nominal wages could affect the economy under different economic assumptions. Although both the classical and Keynesian theory has built up a bridge between a reduction in money wage, a change in effective aggregate demand, and a change in employment, their conclusions differ in major ways, as suggested by the classical theory, later refuted by Keynes [7]. In each specific industry, a demand schedule for products relating to the different quantities of products that can be sold at various prices exists. Likewise, there is a supply schedule linking the prices needed for different quantities of products based on varying costs. The combination of demand and supply schedule leads up to another schedule, which outlines the demand for labour in the industry under the assumption that all costs remain constant (except changes in costs due to changes in output). This demanding labour schedule then relates the employment quantity to different wage levels [8]. The classical idea then expands to encompass all industries, suggesting that one single demand schedule for labour connects employment quantity to the varying money wage levels [9]. It makes no material difference to this argument whether it is changes in real wages and money wages. For money wages, adjustments must be made for money's changing value, with the overall idea remaining unchanged. Keynes pointed out that if this forms the basis of the classical argument, there is a flaw. The demand schedules for individual industries are based on the demand and supply of other industries and the aggregate demand in the economy. If this logic is generalised to all industries, it must be assumed that the total effective demand in the economy remains unchanged. However, this assumption reduces the argument to an 'ignoratio elenchi'. The precise question is whether a decrease in money wages

affects the total effective aggregate demand. The classical theory lacks the means to answer this. If the classical theory can't apply its findings from a specific industry to the broader economy, it cannot determine how a change in money wages affects overall employment [10].

4. Keynesian Analysis on Changes in Nominal Wage

On the other hand, after cautioning against the oversimplified belief of the classical theory that a nominal wage cut would automatically lead to an increase in employment, this paper has decided to adopt the Keynesian theory assumptions in answering such a problem. Under Keynes's method of analysis, it has been broken into two parts. Firstly, does a fall in nominal wage has a direct tendency to increase employment? *Ceteris paribus*, with marginal efficiency of capital, rate of interest, and consumers' propensity to consume to be held constant. The second part of the question then becomes, does a reduction in money wages have a specific or possible tendency to affect equilibrium employment in a specific direction through repercussions around these three factors?

It is noted that according to Keynesian macroeconomics, employment is correlated with effective demand measured in wage units. Assuming *ceteris paribus*, an increase in employment by entrepreneurs will not bring the expected increase in profits [11]. This is because the idea that decreasing money wages (thus reducing production costs) will necessarily increase employment is invalid in many ways. While entrepreneurs may initially enjoy lowered production costs and expect to profit from larger output, they may have yet to consider the subsequent drop in effective demand for their product due to a reduced consumer income. Nevertheless, there is a way that entrepreneurs could profit through an increased output after a nominal wage cut, only under the assumption that consumers will spend all their incomes after receiving them (marginal propensity to consume of unity), or there exists a rise in investment to cover up the demand gap. These conditions are necessary for entrepreneurs to avoid losses. Even in the best-case scenario, during the period in which they have just lowered the money wage and started to expect a higher profit due to a lowered production cost and the expected increase in output, the profit they could make from this increase in output would still be limited by the entrepreneurs own investment on working capitals as a result of an increase in demand of worker due to lowered wage. Thus, the Keynesian perspectives' fundamental discoveries are centred around the repercussions of a cut in nominal wage can be counterproductive (Lower profit for firms). If every firm in the economy has decided to lower its nominal wage, the overall purchasing power of the populace will fall [11]. This reduces demand, making it harder for firms to sell their products.

5. Research Model

Based on the fundamental Keynesian macroeconomic assumptions, the author has constructed the following models as aids to carry out further analysis on the consequences of a change in money wage. The following are functions of economic variables, which should have been considered when deducing the conclusion. Moreover, for simplification and clarity, the economy has been assumed to be closed. This means that factors relating to exports and imports will not only be considered exogenous by the model but also assumed not to exist. Under Keynesian assumptions, there are various methods when it comes to calculating the GDP of the economy. This paper has chosen to adopt the expenditure approach, in which Y is the total output or GDP of the economy, which could be modelled as the sum of domestic consumption, investment, and government spending as demonstrated by the equation below.

$$Y = C + I + G \quad (1)$$

The function of total output (Y) could then be treated as the sum of the three variables as shown above, with C representing consumption, I representing investment, and G representing government expenditure. By zooming in further, based on their unique characteristics, functions of investment and consumption have also been constructed, as shown below.

$$I = f(r) = g_0 - g_1r \quad (2)$$

The function of investment has been represented as a negative function of r (Real interest rate), suggesting that a lower real interest rate could be a higher level of investment and vice versa. The underlying reasons for such a fall in investment could be understood as being deterred by the increase in the opportunity cost of investment when there is a high real interest rate. In which g_0 is the investment figure when the real interest rate has reached zero. It is not necessarily the case for g_0 the maximum investment figure, since the real interest rate could be smaller than zero. Moreover, a coefficient of $r - g_1$ could be understood as the propensity for people to do the same in general. Under the assumption that g_1 it has a relatively large value, there may still be a minuscule investment figure even if the genuine interest is close to zero (Close but cannot be equal to zero). It is also essential to notice that the investment figure is either positive or zero instead of negative. This Model also assumes g_0 to be an exogenous variable, implying that changes g_0 would result from exogenous changes outside this paper's model [12].

$$C = a + b(Y - T) = a + bY - bT \quad (3)$$

Components of the consumption function have been demonstrated above a . Being a constant is representative of the necessity of spending that consumers can't possibly avoid due to basic consumptions that have to be made. $Y - T$, It has been employed to represent disposable income, with Y being the total income and T being taxation. Thus, the author could derive that disposable income is the difference between total income and taxation. As shown above, there is a constant b outside the bracket of $(Y - T)$. The constant b represents the consumers' marginal propensity to consume (MPC). MPC of consumers indicates people's willingness to spend money and consume, defined as the increase in total consumption after receiving one extra unit of income. This means that with a high MPC, a higher proportion of the disposable income will be spent on consumption instead of being saved.

$$T = T_0 \quad (4)$$

$$G = G_0 \quad (5)$$

As this paper mainly focuses on the monetary side of Keynesian macroeconomics, for the matter of simplification, Taxation and government spending (T & G) have been treated as exogenous variables from the model. This means that causes of change in taxation and government spending will not be analysed or modelled since the change of those figures is assumed to be a result of exogenous reasons, such as change in fiscal policy, etcetera.

$$Y = a + bY - bT + g_0 - g_1r + G_0 \quad (6)$$

The function of Y could then be rearranged to the form above with no changes in its components but revealing a more detailed composition of the national total output Y .

$$E_0 = a - bT + g_0 \quad (7)$$

$$Y(1 - b) = E_0 - g_1r \quad (8)$$

The function Y could then be further rearranged, introducing the variable E_0 . In which it represents the exogenous expenditures of the economy. A fraction of the investment function (g_1r) has not been included E_0 as it has been endogenised by the model that has been adopted by this paper, given that it has the variable r included. Therefore, as mentioned in prior explanations, a , b , and g_0 exogenous variables are included E_0 .

$$Y = \frac{E_0}{1-b} - \frac{g_1}{1-b}r \quad (9)$$

After conducting further rearrangements, the function of Y has been proposed in such a way as a linear function or real interest rate r . After representing such a function on a Figure, the shape and property of the investment-saving (IS) curve could then be derived.

$$Y = f(L) \tag{10}$$

Lastly, the Keynesian theory also assumes that the total domestic output and aggregate supply is a function of the equilibrium quantity of labour employed, namely the rate of employment [13].

6. Suggestions

Outcomes and possible consequences would be critically analysed under the assumptions of the macroeconomic model demonstrated above with the aid of Figures to visualise the potential changes in factors of the economy. It is worth mentioning that under Keynesians' assumption, wages are downwardly rigid, as Keynesian economists argued that workers would resist cuts to their nominal wage more than the decreases in real wages (wages adjusted for inflation). Due to the existence of trade unions, once the real wage has dropped to the market equilibrium level, it would immediately bounce back [14]. This means that there will always be unemployment in the economy. Even if, in the best-case scenario, the rate of unemployment could be minimal but still more significant than zero, as shown in (Figure 1) by W^*/P^* and L^* [15]. The labour Figure 1 has been first used to represent perhaps a fall in nominal wage. Initially, assume the economy begins at the wage W_2/P_2 , with a quantity of L_0 labour employed. As the y-axis has been labelled as W/P (Nominal wage/price level), namely the real wage, with a fall in nominal wage from W_2 to W_1 due to exogenous reasons (shown by the black vertical arrow pointing downwards), the value of real wage is going to fall as well to W_1/P_2 (Shown by the black arrow pointing downwards). As a result, the quantity of labour employed has increased from L_0 to L_1 (Shown by the horizontal arrow pointing right).

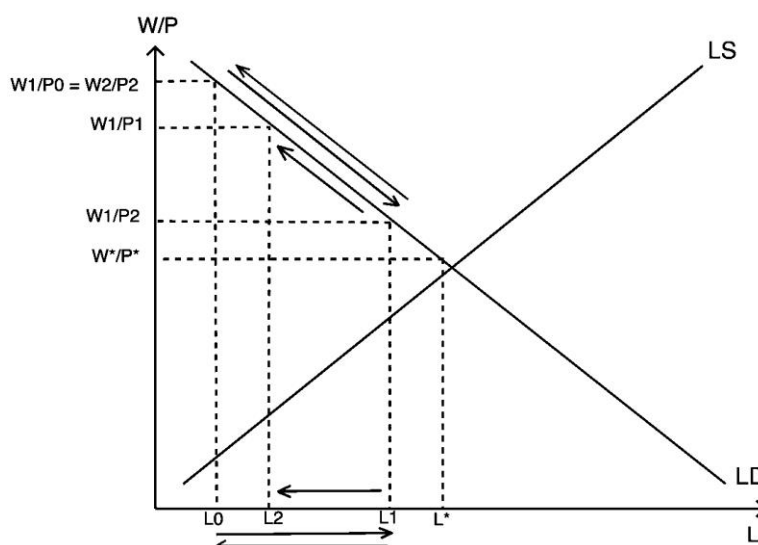


Fig. 1 Labour Market Diagram

After anticipating such a change in real wage and quantity of labour employed, after the assumption made in the prior section, $Y = f(L)$, a change in employment could then be represented by a subsequent swift (not a shift) in the Keynesian aggregate supply (AS) curve shown on Figure 2, with the price level still being held at P_2 . The dashed vertical lines have been superimposed from the previous labour market Figure since there is a direct link between these two Figures according to the assumptions being made. Moreover, the Keynesian AS curve has eventually gone steeper and steeper because of the previous assumptions. This assumes that the real wage that has been transacted is always higher than the market-clearing wage, thus revealing that the quantity of labour employed could never reach or exceed the equilibrium point. Therefore, after considering that aggregate supply has been modelled as a function of labour employment, there would then exist a limit for the productive potential, namely, the long run AS curve, which is represented by the AS curve getting steeper (Higher gradient).

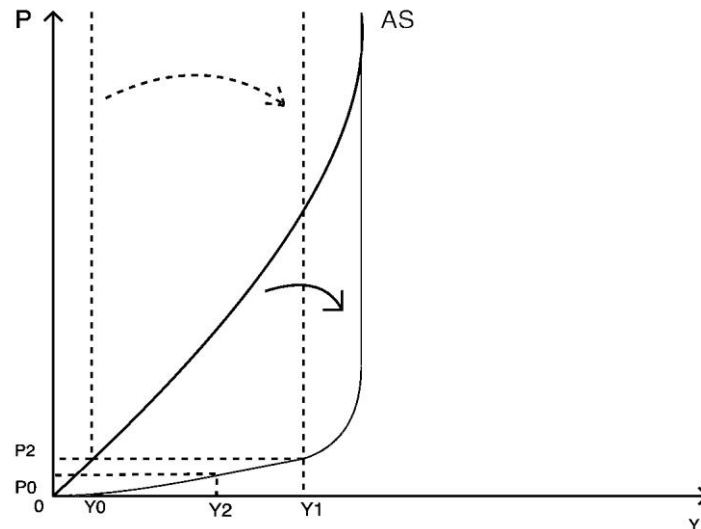


Fig. 2 Keynesian Aggregate supply diagram

Figure 4, simply being a zoomed-in version of (Figure 2), has been employed for the matter of clarity. Meanwhile, it demonstrates the effect of a swift shift in the AS curve on the equilibrium output and price level. It has been illustrated that after a swift in the AS curve, at the original P_2 , there is now a much greater aggregate supply compared to aggregate demand (AD). Consequently, when supply is greater than demand, the price would fall. To further analyse the extent of the fall in the price, a vertical dashed line has been superimposed at Y_0 . Such a vertical AD curve indeed wouldn't exist in existing economies, as supposed by this paper's model, if it is assumed that investment is independent of the real interest rate r , $Y = \frac{E_0}{1-b}$. It suggests that the value of Y will no longer be affected by a change or the value of r at all. A vertical IS curve will be obtained by representing this function graphically, as demonstrated in Figure 3. Intersections between the upward-sloping LM at each price level P_1 , P_2 , and P_3 have then appeared to be forming a vertical line on the IS curve, which is, in fact, the anticipated vertical AD curve under the assumption of investment being independent of real interest rate.

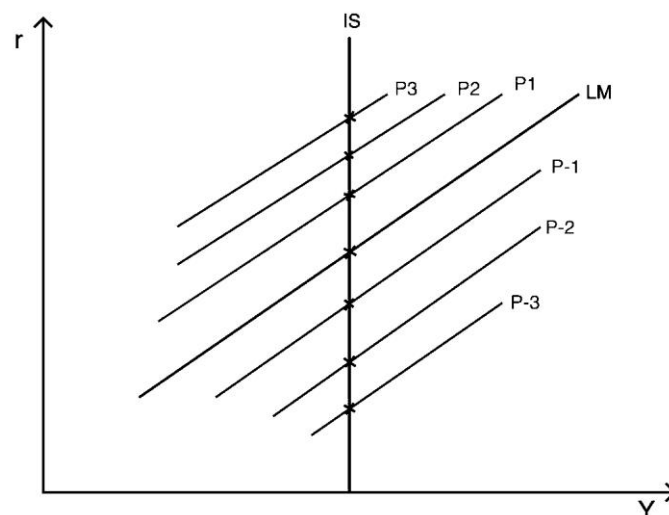


Fig. 3 Special case of IS-LM Curve

The anticipated vertical AD curve derived under the assumption has then been superimposed on Figure 4 at Y_0 . This is by further assuming that this paper is currently analysing the consequence of a shift in the AS curve when the AD curve is vertical. At P_2 , the new aggregate supply(Y_1) has become greater than aggregate demand(Y_0). Therefore, there would likely be a price fall due to excess supply in the economy. However, the genuine concern is to what extent would the price fall be. In this case, with a vertical AD curve, the price level would fall all the way from P_2 to P_0 (represented

by the downward arrow on the y-axis), as it is only at P_0 where aggregate supply = aggregate demand. Likewise, aggregate supply has fallen from Y_1 to Y_0 (represented by the leftward arrow on the x-axis) until the equilibrium point where $AS=AD$. It is vital to notice that the increase in aggregate supply from Y_0 to Y_1 and the subsequent reduction from Y_1 to Y_0 have been demonstrated only for the matter of clarity to illustrate the chain of logic, in which the aggregate supply did not increase and fall practically.

Nevertheless, without such an assumption on investment as mentioned previously. The AD curve would slope downward instead of vertically, as derived from the IS-LM Figure. In this case, the fall in the price level would no longer be from P_2 to P_0 but from P_2 to P_1 , mainly being a result of the downward-sloping AD curve. Since the new AS_2 curve now intersects the AD curve at points $P_1 Y_2$, implying that the extent of a reduction in the price level would not be as great as if there existed a vertical AD curve. Instead of the fall in price level from P_2 to P_1 , the fall in price from P_2 to P_1 has led to an increase in output from Y_0 to Y_2 , as shown in Figure 4. With a fall in price from P_2 to P_1 , there would be a subsequent rise in real wages for workers, as demonstrated in Figure 1. Although there has been a rise in real wages, the new real wage transacted is still lower than the previous one.

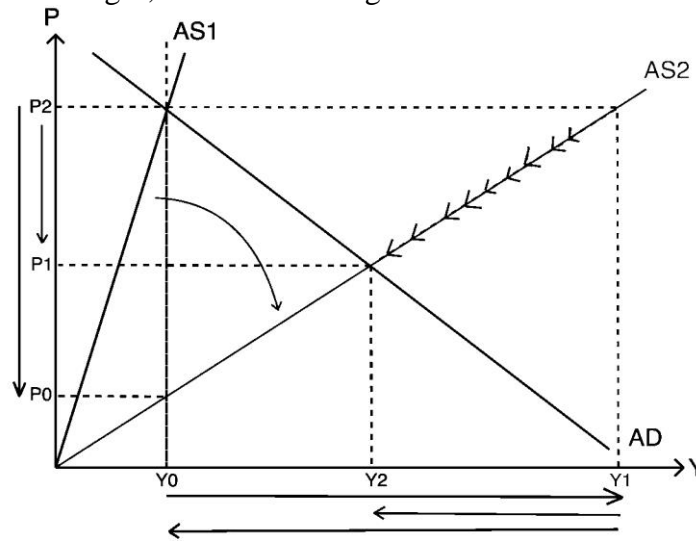


Fig. 4 Zoomed-in Aggregate supply diagram

The fall in the price level from P_2 to P_1 could then be reflected in the money market Figure 5. Assuming that the quantity of money hasn't changed, a reduction in the price level would lead to an increase in money supply since $M_1/P_1 > M_1/P_2$. The increased money supply curve has then intersected with the downward-sloping money demand curve at a point with a lowered real interest rate r_0 .

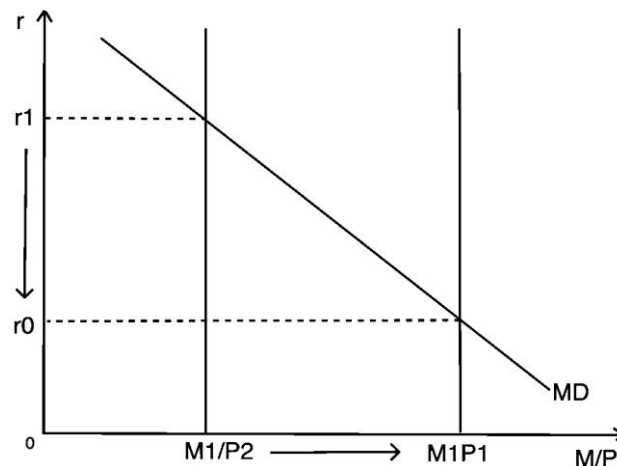


Fig. 5 Money market diagram

Based on the changes that have occurred in the money market and the linear function of Y that has been used to derive the downwardly sloping IS curve, there would be an anticipated change in the IS-LM Figure. It has been derived from the previous Figure that the money supply will increase as a result of a lowered price level. Such an increase in money supply would most necessarily bring about a downward shift in the LM curve. Ending up with the LM curve intersecting the IS curve at the new equilibrium point with a lowered real interest rate from r_1 to r_0 (Figure 5) and a higher output from Y_0 to Y_2 (Figure 6).

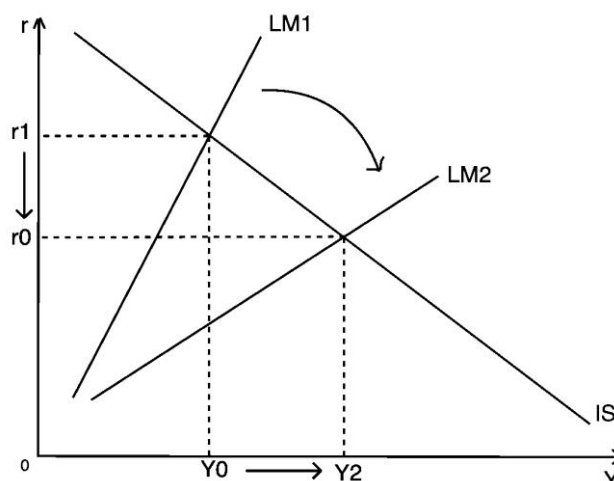


Fig.6 IS-LM curve diagram

From the analysis above based on such a macroeconomic model, this paper has adopted, the outcome of a reduction in money wage could so far be summarised as a fall in the price level, drop in interest rate, a slight increase in domestic output as well as a fall in real wage transacted in the labour market. The drop in wages could potentially lead to redistribution of income from labours and entrepreneurs to rentiers and retirees, with a likelihood of reduced overall propensity to consume. Additionally, individual industries or entrepreneurs may benefit from the reduced wages, thus fostering a positive outlook. However, if the wage reduction is expected to be temporary and if workers have resisted such a reduction in money wage or if the reduction in wage is not uniform across all sectors, opposite effects and conflicts could occur [16]. Given these factors, hoping for positive employment outcomes from wage reductions in a closed economy is a gamble. Theoretically, reducing wages can yield the same effects on interest rates and level of investment as increasing the money supply, but in practice, wage reductions may either be too minuscule to make a difference or too large, causing a loss of confidence [17].

7. Conclusion

In conclusion, delving deep into the realm of Keynesian macroeconomics has provided a profound understanding of the potential consequences of changes in money wage. This paper's mathematical models have granted a rigorous framework, illuminating the multifaceted effects that wage adjustments can impose on the broader economy, thereby serving as a bridge between theoretical concepts and empirical manifestations. One of the seminal distinctions lies in how Keynesian theory and its classical counterpart perceive the wage mechanism. Classical theory, with its foundation in the self-correcting nature of markets, posits that wages, like any price, adjust flexibly to equate supply and demand. The natural ebb and flow of market forces dictate the trajectory of both wages and employment. However, Keynes challenged this idea, asserting the possibility of wage rigidity, particularly when facing downwards. Meanwhile, the classical theory's oversimplification in analysing the direct effects of a change in money wage at a macro level.

The mathematical model that has been utilised underscored the Keynesian assertion with empirical depth. A change in money wages doesn't merely lead to a proportional shift in employment or price levels. Instead, it introduces a chain of reactions throughout the economic fabric. For instance,

decreasing money wages might not significantly boost employment if it dampens the propensity to consume or fosters expectations of further wage reductions. The subtle dynamics between wages, consumption, liquidity preferences, and investment have been meticulously captured in Keynesian assumptions and simplified through our model, emphasising that wage changes cannot be viewed in isolation. Ultimately suggesting that the intricate interplay between wages, consumption, investment, and trade demands more than just theoretical postulations—it requires rigorous, mathematically grounded analyses to navigate the complexities of real-world economies.

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