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**NOTES ON THE DEMAND SIDE SECULAR STAGNATION**

by

**George D. Demopoulos and Nicholas A. Yannacopoulos**

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# NOTES ON THE DEMAND SIDE SECULAR STAGNATION

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## Abstract

We consider the secular stagnation hypothesis in the context of the Keynesian (*General Theory*) framework. In this framework, the drivers of secular stagnation (demographic, technological or others) exert downward pressure on the marginal efficiency of capital (the expected profitability of investment) and not on the interest rate. Unemployment and low growth may become chronic (secular) if (in the absence of technological progress) the marginal efficiency of capital falls more rapidly than the interest rate. The decline in the interest rate does not reflect an excess of savings over investment but it constitutes a constraint in achieving an adequate aggregate demand. The implications for macroeconomic policy are also considered. A closed economic system is assumed.

## 1. Introduction

Alvin Hansen, drawing on the experience of the United States following the Great Depression, gave the following description of what he called *secular stagnation*: “sick recoveries which die in their infancy and depressions which feed on themselves and leave a hard and seemingly immovable core of unemployment” (Hansen, 1939, p. 4). The drivers of secular stagnation are the diminishing returns to investment caused by demographic factors (declining population) and the lack of new markets (the loss of the “frontier spirit”). The road to secular stagnation will be closed either by a rise in technical progress, which will create new investment opportunities (Hansen, 1939, p. 10) or/and by an increase in public spending. Hansen argued, however, that if public spending were taken too far, it might alter the cost structure of the economy and this may prevent the achievement of full employment (Hansen, 1939, p.12).

Although Hansen does not refer to the *General Theory* in his 1939 paper (he refers only to Keynes lecture on population (Keynes, 1937)) he is elaborating on a theme, the theoretical foundations of which are to be found in Keynes book. In fact, Keynes (1936) speculated on the problem of maintaining full employment in a system approaching the state of capital saturation. In such a state, the marginal efficiency of capital tends to fall more rapidly than the long term rate of interest. This will lead (in the absence of technological progress) to a decline in investment and a persistent unemployment, unless there is an increase in public spending.

The hypothesis of the demand side secular stagnation was revived by Larry Summers (2015a). However, the new approach (the new theoretical framework) is Wicksellian rather than Keynesian. In fact, Summers argued that the decline of the natural rate of interest, which is a phenomenon observable in many advanced countries, is due to an excess of the supply of savings over investment. The persistent oversupply of savings over investment pushed the natural interest rate into the negative territory, inducing a low inflation and low growth. Given the zero lower bound on the nominal interest rates, it is difficult for the monetary authorities to reduce the real interest rates to raise investment to a level compatible with full employment. Thus, the economy is forced to operate below potential (under conditions of secular stagnation).

The weak point of Summers approach is its dependence on the classical theory of the rate of interest (the loanable funds theory of the rate of interest). In fact, as Keynes (1936) argued, intersection of the savings and investment schedules does not determine the rate of interest but the level of income provided that the rate of interest is given. Therefore, the decline of the interest rates does not (and cannot) reflect an excess of savings over investment. In addition, Schmelzing<sup>1</sup> (2020) questioned Summers hypothesis on the grounds that real interest rates have trended downward over the past five centuries. This means that secular stagnation, as Summers defines it, is five centuries old, which is not true.

In this paper, we discuss the secular stagnation problem (defined as a prolonged period of low growth, low interest rates and low inflation) in the context of the Keynesian model, as it was developed in the *General Theory*. In this model, the drivers of secular stagnation (demographic factors, lack of new markets, capital saving innovations) exert downwards pressure on the marginal efficiency of capital

(the expected profitability of investment) and not on the interest rate. The possibility of chronic unemployment and chronic low activity arise from the fact that the decline in the marginal efficiency of capital takes place in an environment of low interest rates that render monetary policy ineffective.

The rest of this paper is organized as follows: In the next section, we review the “modern” theory of secular stagnation. In the third section, we present the mechanism through which an economy may be trapped in an equilibrium characterized by chronic unemployment and low economic growth. In the fourth section, we analyze the effects of a negative demand shock in an economy under secular stagnation, and in the fifth section, we consider implications for macroeconomic policy. In the last section, we conclude.

## **2. The “modern” theory of secular stagnation: An assessment**

The demand side hypothesis of secular stagnation revived by Summers (Summers, 2015a; Eggertsson and Mehrotra, 2014; Eggertsson, Mehrotra and Phillips, 2011; Cuba-Borda, P. and Singh, 2019) focuses on the sustainable decline of the natural interest rate (the rate which is compatible with full employment), which is a phenomenon observable in many advanced economies. They are claiming that the sustainable decline of the natural interest rate is due to an excess of savings over investment. The increase in supply of savings is attributed to the accumulation of large reserves by a number of countries (neo-mercantilistic practices) and to the rise of income inequality that increased the marginal propensity to save. The reduction in investment demand is due to the relative decline in the price of the capital goods and to demographic factors (the decline of population growth). This saving glut pushes the natural rate into the negative territory. The existence of a negative natural interest rate implies that, at the zero nominal interest rate, savings are higher than investment. And given the zero lower bound on the nominal interest rates, it is difficult for the monetary authorities to reduce the real interest rate in order to increase investment to the level which is compatible with full employment. According to Summers (2015a, p. 62), lower equilibrium real interest rates coupled with low rates of inflation means that the zero-lower bound is likely to be a constraint on achieving adequate aggregate demand. According to him, this is “the essence of secular stagnation”.

There are two objections against Summers' theory of secular stagnation. The *first* is related to the loanable funds theory of the rate of interest that provides the basis for the analysis of the decline of the real interest rates (Bofinger and Ries, 2017). This theory fails to provide an explanation of low interest rates (and by implication of the secular stagnation hypothesis) because, as Keynes has emphasized, investment and savings schedules *do not determine the rate of interest but the level of income provided the interest rate is given*. In fact, according to Keynes, the savings and the investment schedules are not independent of each other. If the investment curve shifts, income will change, and this will affect the position of the savings schedule (it is assumed that savings depend on the level of income). The position of the new savings schedule will be determined if the level of income is known. But the level of income cannot be known unless the rate of interest is known. The rate of interest, together with the marginal efficiency of capital, determines the level of investment, and the level of investment, via the multiplier, the level of income. Therefore, low interest rates do not (and cannot) reflect an excess of savings over investment, as Summers claims. This invalidates Summers' stagnation hypothesis.

The *second* objection comes from Schmelzing (2020). In an important paper published in 2020, Schmelzing finds that, despite temporary stabilizations, real interest rates have persistently trended downward over the past five centuries, and concludes that negative real rates could become a more frequent phenomenon. According to him, the downward trend of the real interest rates "appears not directly related to growth or demographic drivers, though capital accumulation may go some way in explaining the phenomenon. But whoever posits particular recent savings-investment dislocations in the context of an alleged "secular stagnation", needs to face the likelihood that such "imbalances" may have been a continuous key driver for five centuries" (Schmelzing, 2020, p. 2). And he concludes: "the "secular stagnation" narrative (Summers, 2014; 2015; 2016; Rachel and Summers, 2019) to the extent that it posits an aberration of longer-term dynamics over recent decades, appears fully misleading" (Schmelzing, 2020, p.3).

Thus, the Summers' emphasis on the sustained decline of the real interest rates fails to explain the phenomenon of economic stagnation.

A different approach is needed: We believe that the Keynesian theoretical framework is more appropriate for this problem. Keynes, in his *General Theory*, gave considerable space to speculations on the problem of “secular” unemployment (Hicks, 1936, p.250) caused by the faster decline of the marginal efficiency of capital relative to the interest rate. He argued (Chapter 16, Section III of the *General Theory*) that as the accumulation of capital proceeds, the marginal efficiency of capital declines due to diminishing returns. With the interest rate given, investment will decline and unemployment will increase. The decline of the marginal efficiency of capital may be offset by factors, such as, certain types of technological change, opening-up of new markets or population increase.

During the nineteenth century, Keynes argued, these factors, “seem to have been sufficient, taken in conjunction with the propensity to consume, to establish a schedule of the marginal efficiency of capital which allowed a reasonably satisfactory level of employment”, despite the relatively high interest rates (Keynes, 1936, p. 307; Hicks, 1936; O’Rourke, 2015). He added, however, that “[t]o-day and presumably for the future the schedule of the marginal efficiency of capital is, for a variety of reasons, much lower than it was in the nineteenth century” (Keynes, 1936, p. 308). The “variety of reasons” referred to by Keynes include, probably, the decline of the population growth. Keynes dealt with the economic consequences of a declining population, in a lecture delivered at a meeting of the Eugenics Society on February 16<sup>th</sup> 1937 (Keynes, 1937).

Thus, according to Keynes, the drivers of secular stagnation are factors who exert downward pressure on the marginal efficiency of capital and not on the interest rate. The decline in the marginal efficiency of capital relative to the interest rate will reduce investment and, therefore, effective demand and employment. Keynes views are formalized in the next section.

### **3. The secular stagnation mechanism: Keynesian aspects**

**3.1. The setting.** Keynes defines effective demand  $Y$ , as the sum of expected consumption  $C$ , and the expected investment  $I$  (Keynes, 1936; Pasinetti, 1974, pp.36-38). Effective demand may be written as:

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

Consumption  $C$ , depends on the level of income. The consumption function is written as:

$$C = \varphi(Y) \quad (2)$$

with the properties  $0 < \varphi' < 1$  and  $\varphi'' < 0$ , where  $\varphi'$  is the marginal propensity to consume.

Investment  $I$ , is determined by the rate of interest  $i$ , and the marginal efficiency of capital  $E$  (the expected profitability of investment), or in symbols:

$$I = g(i, E) \quad (3).$$

Investment is a negative function of the interest rate and a positive function of the marginal productivity of capital. There is an inducement to invest if the marginal efficiency of capital is higher than the interest rate.

Finally, the rate of interest  $i$ , is a monetary phenomenon, and is determined by the stock of money  $M$ , and the liquidity preference  $L$ . The liquidity preference is inversely related to the interest rate, and tends to infinity before the interest rate reaches the zero level bound (liquidity trap). Thus, in the Keynes analysis, the rate of interest is determined in the money market and it is affected by the monetary policy, and not by the intersection of the savings and investment schedules, as modern ‘stagnationists’ claim.

**3.2. The mechanism of secular stagnation.** The mechanism that may lead an economy to secular stagnation can now be described. In the context of the Keynesian analysis, the drivers of secular stagnation are demographic factors, lack of new markets or capital saving technology. They are the same as those referred to by modern “stagnationists”. But in the Keynesian analysis, these factors affect the marginal efficiency of capital and not the interest rate. Thus, with the interest rate  $i$  given, the decline in the marginal efficiency of capital reduces the level of investment  $I$ , in accordance with the equation (3). Given the new (reduced) level of investment  $I$ , the equations (1) and (2) simultaneously determine the (reduced) levels of output  $Y$  and consumption  $C$  (Pasinetti, 1974). Ideally, the decline in investment can be offset by a decline in the interest rate, but there is a limit below which the interest rate cannot fall (liquidity trap or zero lower bound constraint on nominal interest rates). When that limit is reached, investment will decline, output will fall and unemployment will rise. And since the liquidity trap (or the zero lower bound on the nominal interest rate) acts as a constraint on achieving adequate aggregate demand,

the reduced economic activity (low output) and the high unemployment may become “secular”.

Price flexibility is not sufficient to restore full employment. Falling prices may stimulate aggregate demand through the following two channels (Tobin, 1972; Tobin 1980; Demopoulos and Yannacopoulos, 2015):

The first is the *Keynes effect*. With the nominal supply of money given, falling prices will increase the real money supply. If we assume that liquidity preference is given, the increase in the real supply of money will reduce the interest rate with favourable effects on output and employment. The Keynes effect vanishes in the case of liquidity trap (or in the case of the zero lower bound on the nominal interest rates). Therefore, it is inoperative in the present case.

The second channel is the *Pigou effect* or the *real balance effect*. Falling prices increase the real value of wealth, which is expected to stimulate aggregate demand. However, the positive effects of declining prices may be offset by what we may call a Tobin-Fisher effect. In fact, as Fisher (1933) has remarked, an unanticipated deflation redistributes real income from debtors to creditors making the creditors better off and the debtors worse off. If we assume that creditors have a lower propensity to consume than debtors (Tobin, 1980), then this redistribution of wealth reduces aggregate demand because creditors spend a lower fraction of their additional income, while debtors are forced to cut back investment and consumption in order to reduce (or repay) their debts. In addition, debtors tend to become liquidity constrained and, therefore, unable to borrow in order to increase their spending either as consumers or/and as investors. In fact, as their debt/equity ratio increases with deflation, their credit lines tend to shrink or, in the case of bankruptcies, disappear (Tobin, 1975; Tobin, 1980). Thus falling prices may reverse the Pigou effect. Low economic activity and unemployment will persist, possibly in the long run (in the absence of technological progress), unless there is an increase in public spending.

The above analysis sets the following questions. The first has to do with the form of the demand and supply schedules of a system under secular stagnation. The second question (which is not unrelated to the first) is referred to the stability of this system. These questions are discussed in the next section.



#### 4. Aggregate demand and aggregate supply under secular stagnation

**4.1. Aggregate demand.** We write the aggregate demand in the form:

$$y = f(p) \quad (4)$$

where  $y$  is the output and  $p$  is the price level. The derivative  $dy/dp$  of the (4) is negative, if the Keynes and Pigou effects are dominant. However, in the case of the liquidity trap (or the ZLB), the Keynes effect vanishes and the Pigou effect may be reversed by the stronger Tobin-Fisher effect. Thus, falling prices are associated with a decline in spending and, therefore, output. This means that the sign of the derivative  $dy/dp$  changes from negative to positive, implying that the aggregate demand curve has a positive slope. This is summarized in the following proposition: *The derivative  $dy/dp$  of (4) has a positive sign in the case of a liquidity trap (or ZLB) provided that the Tobin-Fisher effect is dominant.*

**4.2. Aggregate supply.** The supply curve describes the relationship between the supply of the output and the price level. It can be written as:

$$y_s = \varphi(w/p, K) \quad (5)$$

with the properties  $\partial y / \partial (w/p) < 0$  and  $\partial y / \partial K > 0$ , where  $y_s$  denotes the output supplied,  $w/p$  the real wage ( $w$  is the nominal wage and  $p$  the price level) and  $K$  the capital stock. It is assumed that the capital stock  $K$  is constant and that so long as the  $y_s$  is below the full employment level  $y_F$ , the nominal wages  $w$  are rigid. Therefore, as prices increase, real wages decline and the output expands. But the output cannot expand beyond its full employment level  $y_F$ . If prices increase further (i.e., if prices continue to expand while the economy has reached its full employment level) nominal wages have to increase if the equilibrium in the labour market is to be preserved. Thus, at the full employment level, the economy operates as if prices and nominal wages were fully flexible. The aggregate supply curve has a positive slope as long as the economy operates below the full employment and becomes vertical when the full employment is reached (Eggertsson et. al. 2014).

The rigidity of money wages, when the economy operates below potential, has to be explained: According to Tobin (1972), the rigidity of wages, observed during the Great Depression, reflected a long run trade-off between inflation and unemployment

at low levels of inflation. Daly and Hobijn (2014) formalized Tobin's analysis in the form of an upward sloping long run Phillips curve. A straightforward explanation of wage rigidity is offered by the long term labour contracts. Long term labour contracts and the resulting wage rigidity are implications of the uncertainty and incomplete insurance markets that characterize the modern economic system. In this economic system, "there is no organized insurance against deficient labour incomes, other than downwards wage rigidity and unemployment benefits" (Dreze, 1991, pp.13-14).

In our model, the assumption of the wage rigidity is necessary for the stability of the system in the case in which the ZLB is binding or /and in the case in which the wealth effect (the Tobin-Fisher effect) is dominant (see below).

### **5. Equilibrium and its stability under secular stagnation**

Equilibrium obtains at the point at which aggregate supply and aggregate demand curves cross. We know that, when the ZLB is binding, the slope of the aggregate demand curve is positive. This raises the question of whether this equilibrium is *statically stable* (Demopoulos and Yannacopoulos, 2015; Demopoulos and Yannacopoulos, 2019).

A system is (statically) stable if the economic forces that act on it are able to restore equilibrium after a shock. This means that a rise in price above the equilibrium level generates forces tending to produce a fall in price; this implies that a rise in price, above its equilibrium level, makes supply greater than demand, and a decline in price below its equilibrium level makes demand greater than supply (Hicks, 1939, p. 62). This stability condition, known as Walrasian stability, is different from that proposed by Marshall in his *Principles of Economics* (1956). According to Marshall, a system is (statically) stable if, when quantity is higher than the equilibrium level, the supply price associated with this quantity exceeds the demand price associated with the same quantity and vice versa. These different stability conditions reflect the different assumptions on which they are based. Walras and Hicks treated price as the independent and the quantity, supplied and demanded, as the dependent variables. In the Walrasian (Hicksian) world, the economic system adjusts through changes in prices. Marshall, on the other hand, treated the quantity as the independent variable and the price as the dependent. In the Marshallian world, the economic system adjusts through changes in quantities. In this paper, we adopt the Walrasian condition for

stability, because it is consistent with our assumption that price is the independent variable and quantity the dependent (see equations (4) and (5)). The same assumption is adopted (tacitly) by Eggertsson and Krugman (2012), and Lukkezen, et al., (2016).

When the ZLB is binding (the aggregate demand curve is positively sloping), the Walrasian (Hicksian) condition for stability is satisfied if, at the equilibrium point, the slope of the upward bending aggregate demand curve is higher than the slope of the aggregate supply curve (Figure 1). This condition suggests that increased price flexibility may destabilize the economic system. Figure 2 illustrates the point: The aggregate supply curve AS is drawn parallel to the y axis in the (y,p) space and, therefore, indicates that prices and wages are fixed or inflexible (extreme Keynesian case). Since the aggregate demand curve AD has a greater slope than the AS curve at the equilibrium point A, the economic system is statically stable in the Walrasian (Hicksian) sense. An increase in the wage flexibility, which can be presented as a steeper AS curve, may destroy the stability of the system if the slope of the AS curve becomes larger than the slope of the AD curve. *The system is always unstable when prices and wages are fully flexible, i.e., when the aggregate supply curve is vertical on the horizontal axis as in the classical case.*

## **6. Effects of declining aggregate demand when the ZLB is binding**

In this section, we consider the effects of the decline of aggregate demand on the output of an economy in which the ZLB is binding. If we assume that the economy is in a stable equilibrium, as shown in Figure 1, then, a decline in aggregate demand is expected to reduce both output and prices. The following two remarks are important:

- (1) *The adverse effects of the negative demand shock are exacerbated by the increased wage and price flexibility.*

This “paradox of flexibility” (Eggertsson and Krugman, 2012) is explained with the help of Figure 3. With relatively inflexible wages and prices (the aggregate supply curve is shown as AS), the original equilibrium is at A. A negative demand shock shifts the aggregate demand curve from AD to the position AD'. The new equilibrium is at B. Both, prices and output, have declined. When prices and wages are more flexible (the aggregate supply curve is the AS'), a negative demand shock of the same

size, shifts the equilibrium point to C. The output and prices corresponding to the equilibrium point C are lower than those corresponding to B.

(2) *The decline in output and prices, due to a negative demand shock, will be greater in the case of liquidity trap (or ZLB) than in the “normal” case.*

Figure 4 illustrates the point. The equilibrium in the ‘normal’ case (the aggregate demand curve has a negative slope) is at the point A at which the aggregate demand schedule AD crosses the aggregate supply curve AS. A negative demand shock shifts the AD curve to the left, say to the position AD'. The new equilibrium is at B. Both output and prices have declined. With the ZLB binding (or in the context of a liquidity trap) the aggregate demand curve has a positive slope. Let AD<sub>1</sub> be this curve. Now a negative demand shock, *of the same size as before*, shifts the aggregate demand curve to the left. Its new position is AD<sub>2</sub> and the new equilibrium is at C. The output and the price level corresponding to the point C are lower than those corresponding to the point B. This is explained: With the ZLB binding and the wealth effects dominant (or in the context of a liquidity trap), a negative demand shock sets in motion Fisher's debt deflation dynamics that may lead the economy deeper in secular stagnation.

## **7. Escaping from the secular stagnation trap**

There are three possible policy options open to the authorities: structural reforms (supply side policies), monetary policy and fiscal policy. *Supply side policies* are counterproductive (Demopoulos and Yannacopoulos, 2015). In fact, supply side policies shift the aggregate supply curve down. Given the positive sloping aggregate demand curve, both output and prices have to decline. This result is similar to Eggertsson's toil paradox (Eggertsson, 2010). Deflation may set in motion the Fisherian debt-deflation dynamics that may lead the economy deeper in economic recession. *Monetary policies* are ineffective because the ZLB is binding. Monetary authorities cannot stimulate aggregate demand by reducing the nominal interest rate. Thus, the only option left is *fiscal policy*.

However, fiscal expansion has to be strong enough to stop deflation and generate a price increase (Lukkezen, et al. 2016).

As long as the zero lower bound on interest rate remains binding (or as long as the economy is constrained by the liquidity trap), increasing prices increase the marginal

efficiency of capital (if entrepreneurs *expect* that increasing prices will increase their prospective yields from their investment). An increase in the marginal efficiency of capital, with the interest rate given, will increase investment and this will stimulate aggregate demand. In addition, higher inflation reduces the burden of the debts, which gives an additional boost to aggregate demand. This is represented by shifts of the aggregate demand curves to the right. The economy escapes from the stagnation trap (and the liquidity trap) when price increases eliminate the Tobin-Fisher effect, i.e., when the Keynes-Pigou effect becomes dominant and the slope of the aggregate demand curve turns negative.

Figure 5, illustrates these points. In the Figure, the aggregate demand curve AD has two regimes: It has a negative slope when the Keynes and Pigou effects are dominant and a positive slope when the Tobin - Fisher effect is dominant (see section 4.1). The kink occurs at the price level  $p_0$ , at which the Keynes and the Pigou effects are overtaken by the Tobin-Fisher effect. The aggregate supply curve is shown as AS. The equilibrium with stagnation is at A (see section 5, and Figure 1). Since A is below the critical price level  $p_0$ , the economy experiences deflationary pressures. Fiscal expansion has to be strong enough in order to generate a price increase above  $p_0$ . Price increases stimulate aggregate demand via the increase in the marginal efficiency of capital and the reduction of the burden of the debt. Therefore, the aggregate demand curve shifts to the right. Fiscal expansion will be successful if the aggregate supply curve crosses the aggregate demand curve, resulting from the fiscal expansion, at its negatively sloping part, as shown in the Figure.

## 8. Closing remarks

We have argued in this paper that the drivers of secular stagnations (demographic, technological, etc.) exert downward pressures on the marginal efficiency of capital (the expected profitability of investment) and not on the interest rate. Low growth and unemployment may become chronic in the case in which the marginal efficiency of capital falls more rapidly than the interest rate. The decline of the interest rate does not reflect an excess of savings over investment, but it acts as a constraint in achieving sufficient aggregate demand. The policy implications of this model are the following: Supply side policies (structural reforms) are counterproductive and monetary policies ineffective. The only option for the authorities is the fiscal policy,

the amount of which has to be large enough so as to stop deflation and generate a price increase. Increasing prices will stimulate aggregate demand, through the increase in the marginal efficiency of capital and the reduction of the burden of the debt. The economy recovers only when the zero lower bound on the nominal interest rates is no longer binding (or only when the liquidity trap constraint is removed), and the slope of the aggregate demand curve changes from positive to negative.

### Notes

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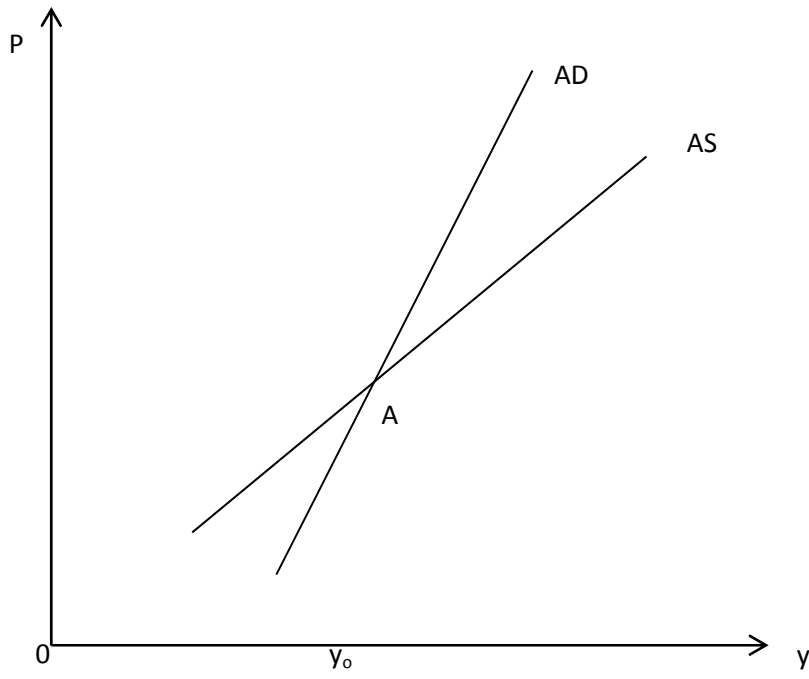


Figure 1

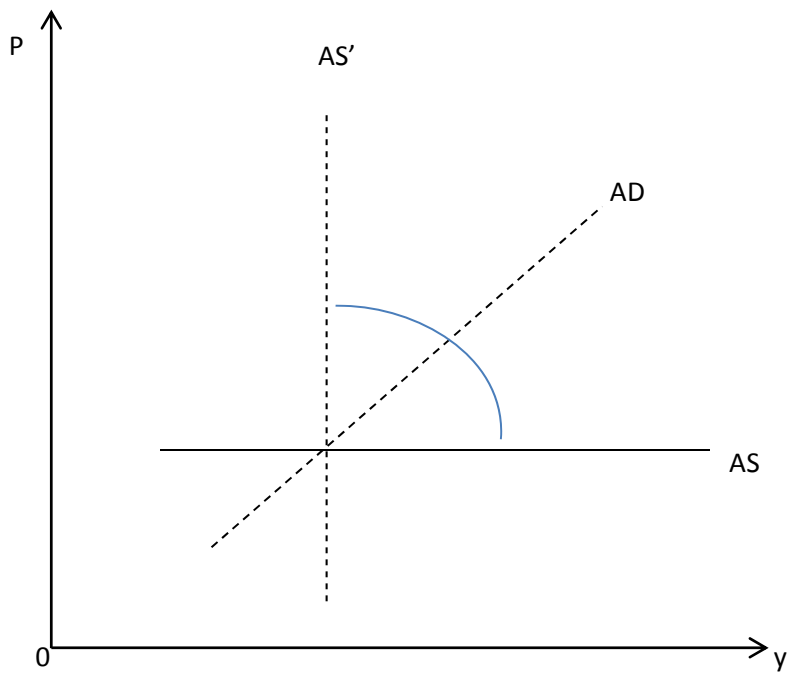


Figure 2

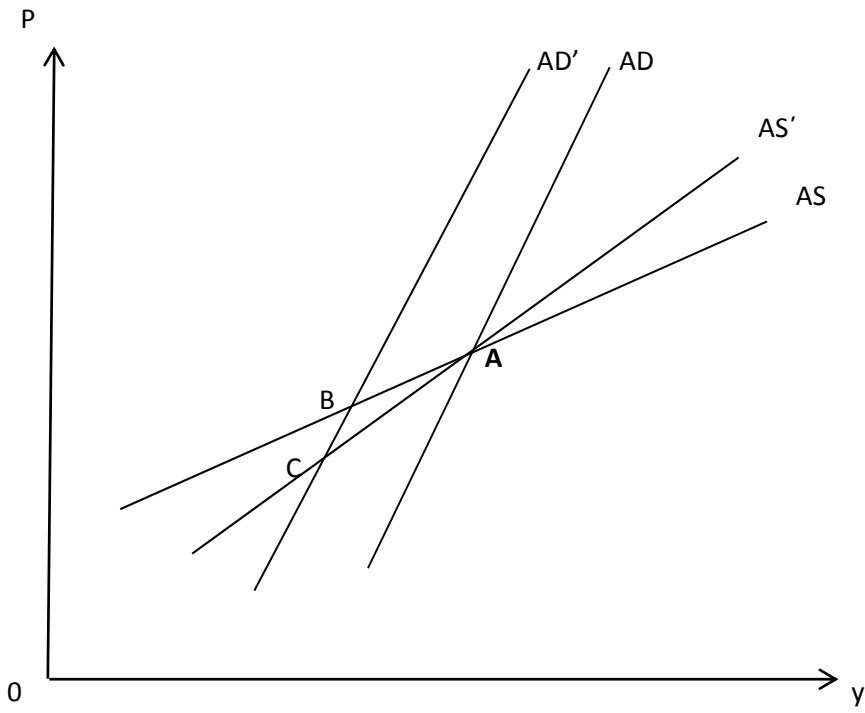


Figure 3

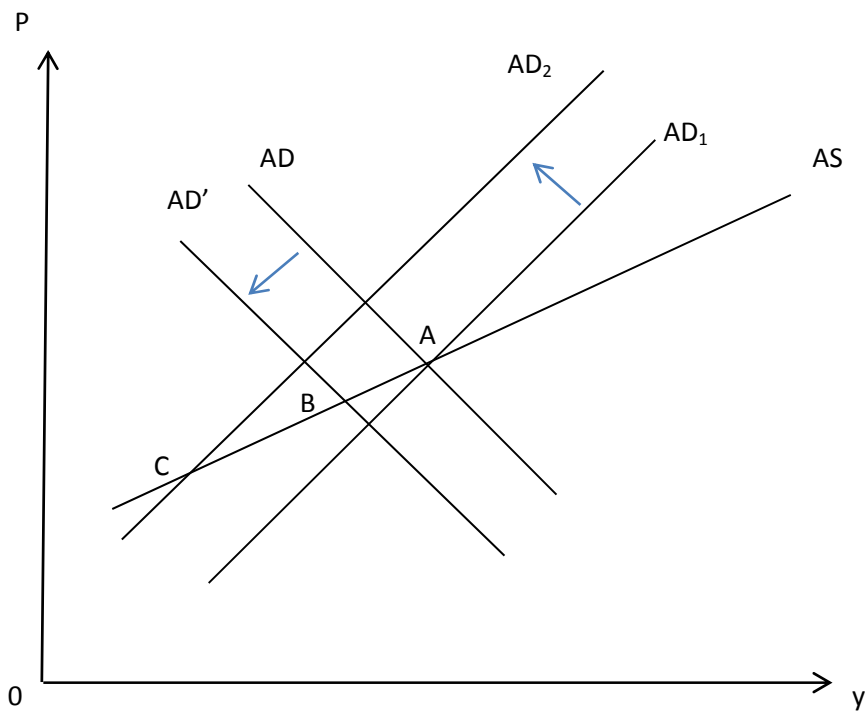


Figure 4

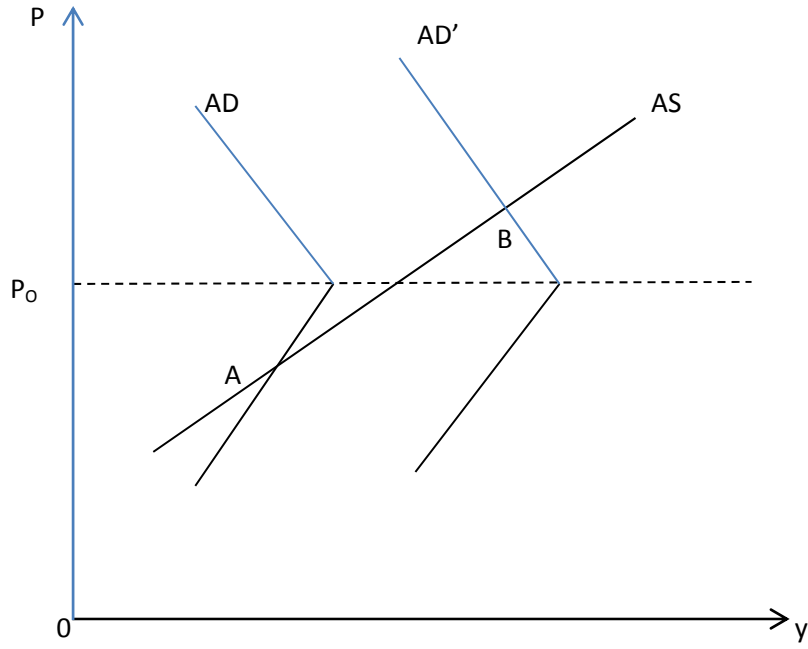


Figure 5