

## Some Macroeconomics of Economy Pricing System

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### Abstract

*Most of the industrialized countries in addition to low prices, have had record low inflation (exception during the 2020-2024 due to pandemic and war in Europe), low interest rates (especially after the 2008 financial crisis), low growth rates and record low unemployment rates. The decline of interest rates during the 2008 global financial crisis and afterwards has created the perfect situation of cheap money for the mass of borrowers and the conditions for the economies of industrialized countries to reach a phase that we normally call the “macroeconomics of economy pricing system” or simple the “macro economy pricing”, characterized by low inflation, low interest rates, low growth rates, low unemployment rate, mass production and demand-push strategies into customers for a large assortment of non-premium products.*

### Introduction

In the last two-three decades, the economies of advanced countries have entered a new phase called “economy pricing system”, where most of the mass commodities are sold at low price during certain periods of the year, called ‘sales events’, due to decreased production cost thanks to enormous technological progress, implementation of ERP systems in many medium and large corporations, high capital mobility, huge improvements in transportation and infrastructure, innovative global supply chain management and low commercial barriers. An increasing number of push and pull demand/supply strategies used for different mass-produced commodities have helped many economies stay on the economy pricing phase (with the exception of global pandemic and the war in Ukraine during 2020-2023). Most of the industrialized countries in addition to low prices, have had record low inflation (exception 2020-2023), low interest rates (especially after the 2008 financial crisis), low growth rates and record low unemployment rates. The decline of interest rates during the 2008 global financial crisis and afterwards has created the perfect situation of cheap money for the mass of borrowers and the conditions for the economies of industrialized countries to reach a phase that we normally call the “economy pricing system” or simple the “economy pricing”, characterized by low inflation, low interest rates, low growth rates, low unemployment rate, mass production and demand-push strategies into customers for a large assortment of non-premium products. This scope of this paper is to take into consideration the macro-economic effects of economy pricing system. It will discuss how inflation, interest rates, unemployment and growth work at the

macro level in an economy pricing system dominated by competition and characterized by different categories of non-premium products rather than premium products in almost all sectors of the economy. The paper is divided into seven parts. The first segment takes into considerations the determination of inflation in economy pricing. The second one will talk about the relationship between the inflation and supply chain management efficiency. The third part will discuss about the causes of low unemployment rate in economy pricing. The fourth segment will talk about the effects of interest rates in economy pricing. The fifth part is about the relationship between slow economic growth and outsourcing in economy pricing. The sixth segment will talk about how aggregate demand and aggregate supply act in economy pricing. The seventh part will discuss the challenges of IS-LM model in an economy pricing system.

#### 1. The Determination of Inflation in Economy Pricing System

It’s interesting to take into consideration the causes of inflation. Rising prices are the root of inflation, though this can be attributed to different factors. In the context of causes, inflation is classified into three types: Demand-Pull inflation, Cost-Push inflation and Built-In inflation.

**The Demand-Pull Effect:** In the standard macroeconomics studies, we have that the Demand-pull inflation occurs when the overall demand for goods and services in an economy or industry increases more rapidly than the economy's production capacity. It creates a demand-supply gap with higher demand and lower supply, which results in higher prices. For instance, when

the crop producing countries, due to poor weather conditions, are pushed to cut down on crop production, the supply diminishes, which lead to higher demand that result in price increase and inflation. In the same way, when the oil producing nations decide to cut down on oil production, the supply diminishes. It leads to higher demand, which results in price rises and contributes to inflation. In addition, as per modern macroeconomic theories, an increase in money supply by government in an economy also leads to inflation (Williamson, D. S., ch.12). With more money available to individuals, consumers behaviour will lead to higher spending. This increases demand and leads to price rises. Money supply can be increased by the monetary authorities either by printing and giving away more money to individuals, or by devaluing the currency. As a result of demand increase, the money loses its purchasing power.

**Cost-Push Effect:** Cost-push inflation is a result of the increase in the prices of raw materials and other inputs during the production process. Examples include an increase in labor costs to manufacture a good or offer a service or increase in the cost of raw material. These developments lead to higher cost for the finished goods or services and contribute to inflation.

**Built-In Inflation.** Built-in inflation is another cause of inflation that links to adaptive expectations. As the price of goods and services rises, laborers expect and demands more wages to maintain their cost of living. Their increased wages result in higher cost of goods and services, and this wage-price increase continues as one factor induces the other and vice-versa. In macroeconomics, theoretically monetarism establishes the relation between inflation and money supply of an economy. A rapid increase in money supply will bring price spikes and inflation. As a result of money supply increase, prices have jumped quickly, and the value of money has fallen, contributing to economic collapse. There are some types of inflation indexes. Depending upon the selected set of goods and services used, multiple types of inflation values are calculated and tracked as inflation indexes. Most used inflation indexes are the Consumer Price Index (CPI) and the Wholesale Price Index (WPI). Wholesale Price Index (WPI) is an indicator of price changes in the wholesale market. WPI calculates the price paid by the manufacturers and wholesalers in the market. WPI measures the changes in commodity price at selected stages before goods reach the retail level. It covers around 697 items of Primary, fuel & power, and manufactured products. Most of the items covered under WPI are manufacturing inputs and intermediate goods like minerals, machinery basic metals etc. Consumer Price Index (CPI) is a price index that represents the average price of a basket of goods over time. CPI calculates the average price paid by the consumer to the shopkeepers. It covers around 448 items of rural baskets and 460 items of urban baskets. Most of the items covered under CPI are education, communication, transportation, recreation, apparel, foods and beverages, housing and medical care. The Producer Price Index (PPI) is another index to measure the inflation. The difference from other indexes is that PPI is a family of indexes that measures the average change in selling prices received by domestic producers of goods and services over time. Theoretically, the PPI measures

price changes from the perspective of the seller and differs from the CPI which measures price changes from the perspective of the buyer or final consumer in the society.

## 2. Low Inflation and Supply Chain Management Efficiency

Technological innovation can influence directly the changes in the prices of information and communication technologies, leading to continued decline in the prices of computers, laptops, i-phones, i-pads, and all sort of home electronics [1]. Technological change has a positive impact on competition and market structure as it tends to reduce the barriers for new company creation in many areas, intensify market competition, and thus affect the product-price-creation. In fact, the rapid growth of e-commerce worldwide is another way by which digitalization can increase competitiveness and influence inflation [2]. New technologies have changed the way consumers think, search for new trends and compare product prices. The customers benefit from increased price transparency and comparability as never before in a short amount of time thanks to the increase of online shopping trend. Technological progress has also increased labor productivity, therefore reducing unit labor cost. In fact, with the help of easily accessible information, improved communication, and useful software/applications, is not too hard to imagine that the recent innovation in technology have contributed to improved productivity. Technological progress in different sectors tend to increase productivity, lowers the rate of wage growth relative to productivity, and as result delays rising inflation. The continues introduction of technology innovation in industry serves as a complement to the workforce, and the influence of deflation is straightforward. Higher productivity in manufacturing sector translates directly into lower production costs. The inflation rate in an economy pricing can be expressed as a function of volumes sold during sales events which offer different categories of non-premium and eventually premium products at discounted prices as

$$\text{Inflation Rate} = I = \sum_{i=1}^n f(Q_{nps}, S(p)_{ev}) \quad (1.1)$$

where  $Q_{nps}$  is the quantity in volumes of the non-premium products sold at discount price during sales events on the supply side, and  $S(p)_{ev}$  is the number of sales events that offers several types of discounts,  $p$  and  $i=1, \dots, n$  is number of different categories of non-premium products offered by competitive firms in different industries. The above equation is valid if the competitive firms participating the sales events offer large volumes of non-premium products at discount prices on the supply side, pushing the demand onto customers. The number of sales events in different industries offered throughout the year with the precipitation of thousands competitive firms have an effective impact on tending to lower inflation rate at the macro level during the same period. At the microeconomic level [3], that the inflation from period  $t-1$  to period  $t$  can be written as,

$$\pi = \frac{P_t - P_{t-1}}{P_{t-1}} = \frac{\Delta P_t}{P_{t-1}} = \frac{(P_s + P_m + P_r)_t - (P_s + P_m + P_r)_{t-1}}{(P_s + P_m + P_r)_{t-1}} \quad (1.2)$$

where  $P_s$  is the sales price of the discount stores to customers,  $P_m$  is the sales price of the product produced by a manufacturer and sold to the discount store, and  $P_r$  is the sales price of the

raw material/s produced by a mining (raw materials) company and sold to the manufacturer. If the discounts store, the manufacturer and raw material producer keep the same price or with small changes from period t-1 to period t, then we can say that the inflation is low or inexistent. If we add the technology and supply chain management in the inflation function, we have that the above equation can be written as,

$$\pi = \frac{P_t - P_{t-1}}{P_{t-1}} = \frac{\Delta P_t}{P_{t-1}} = \frac{(Ps+Pm+Pr)_t - (Ps+Pm+Pr)_{t-1}}{(Ps+Pm+Pr)_{t-1}} + \theta \frac{tech_t - tech_{t-1}}{tech_{t-1}} + \epsilon \frac{SCM_t - SCM_{t-1}}{SCM_{t-1}} \quad (1.3)$$

where tech is the drag of technology onto inflation and SCM (Supply Chain Management) is the drag of efficiency of the supply chain management onto inflation from period t-1 to t, and  $\theta$  and  $\epsilon$  are coefficients respectively for tech and SCM. Technological change influences prices via sectoral innovation and reduction in unit labor cost. The tech variable in the equation above could be strong enough to lower the overall inflation. In the equation above we assume that the expected inflation rate in the next period,  $E_t\pi_{t+1}$ , is low as we already accept that in an economy pricing all levels of a production chain-line from raw materials to intermediate and finished goods push for stable and low prices thanks to technological innovation and supply chain management in order to arrive to the point of final consumption at a low and reasonable price. The firms operating in a very competitive market believe that new technology and aggressive supply chain management can manage any expected or unexpected inflation rate and any foreign currency fluctuations in the next period, unless they are due to major causes and events beyond their control (such as wars, pandemics, etc.). The supply chain management is the management of the flow of goods and services from raw materials to the final consumption and affects prices of finished goods via lowering the price of raw materials and intermediate goods produced. It involves the movement and storage of raw materials, work-in-process inventory, and finished goods as end-to-end order fulfillment from point of origin to the point of consumption. In few words, the supply-chain management is a cross-functional approach that includes managing the movement of raw materials into an organization, the internal processing of materials into finished goods, and the movement of finished goods out of the organization to the end consumer. The job of supply chain manager is to oversee and manage every stage of the production flow, from purchasing the raw material to the delivery of the final product to customers including unit labor costs and the fluctuation of exchange rates if raw materials or semi-finished goods are outsourced and purchased internationally. The managing of the supply chain allows companies to be able to cut excess costs and deliver products to the consumer faster. This is done by keeping tighter control of internal inventories, production, distribution and sales, and in many cases the inventories of suppliers as well [4]. Part of the SCM process is also the strategic decision to merge with other companies to reduce overhead costs and have better leverage on raw materials and intermediate goods in order to keep down the price of final goods and be competitive in certain segments of the market. Another important task of the supply chain man-

agers operating in a very competitive environment is to keep under control the price of raw materials and work-in-progress inventory to make sure that the final price of finished goods for the same category of products does not fluctuate too much from one period to another. If there is an increase on the raw materials due to crisis or various shocks, the supply chain managers have to source out the raw materials affected by price increase from other sources that offer a lower and more reasonable price in order to keep the whole chain supply cost under control and be consistent with the estimated budget of finished goods prices from period t-1 to period t.

### 3. Low Unemployment Rate in Economy Pricing

The Phillips curve theory stays that if the unemployment rate drops below a certain level, referred to as the natural rate of unemployment (it includes frictional and structural unemployment, and not cyclical), the inflation rate will tend to increase and continue to rise until the unemployment rate returns to its natural rate. In the same way, when the unemployment rate rises above the natural rate, the inflation rate will tend to decrease. The natural rate of unemployment is the level of unemployment consistent with sustainable economic growth. An unemployment rate below the natural rate means that the economy is growing faster than its sustainable natural rate of unemployment, which places upward pressure on wages and prices in general leading to increased inflation [5]. The opposite will happen if the unemployment rate rises above the natural rate, which will put downward pressure on wages and prices in general leading to decreased inflation. Wages and salaries make up a significant portion of the costs of goods and services, therefore upward or downward pressure on wages pushes average prices in the same direction based on the traditional macroeconomic theories. The so-called Phillips curve, which many central banks rely on in guiding its policy direction, argues that as unemployment declines, inflation should rise, a phenomenon that has not occurred during this economic expansion after the 2008-9 crisis. In recent years, the economy has challenged the Phillips Curve [6]. As unemployment has dropped, wages and inflation haven't risen sharply. In some ways, they've weakened. It is supposed to be a connection because low unemployment will drive wages up and ultimately higher wages will drive inflation, yet we have not reached that point. Recent data suggests that in many cases, the direct connection between unemployment and inflation is quite small or inexistent. [7] the unemployment is low because the rate at which people exit unemployment is high or because the rate at which people enter unemployment is low, which is different from the previous business cycle peaks when unemployment was low due to high rates at which people were leaving the unemployment status.

Low unemployment rates can also be explained in terms of economy pricing. For a given firm the combination of linear demand function for premium and non-premium products is equal to the total production capacity utilization during a fiscal period which is supposed to reach about 70- 80 percent of total produc-

tion capacity utilization rate deemed to cover total variable and fixed costs and reach the sales target in order to make the company stay competitive. Based on the microeconomics of economy pricing [3], we have that the linear demand function for a firm that produces premium and non-premium products meeting the sales target in a competitive market is given as,

$$D_p(P_p) + D_{np}(P_{np}) = \text{Sales Target} = 80\% U_c \quad (1.4)$$

where  $D_p$ ,  $D_{np}$ , are the respective demands for premium and non-premium products and  $P_p$ ,  $P_{np}$  are the respective price of premium and non-premium products and  $U_c$  is the production capacity utilization at 80%. This equation can be written in terms of total cost made up of variable cost (which varies according to the quantity of the goods produced and include inputs such as labor and raw materials) and fixed costs, which is independent of the quantity produced (fixed costs consist of monthly building rent and monthly leasing fees on machinery, including sunk costs, etc.). Therefore, the firm's expected profit manufacturing both premium and non-premium products can be written as,

$$\Pi = [D_p(P_p) + D_{np}(P_{np})] - [(AVC + AFC)] \quad (1.5)$$

where  $AVC$  is the total variable cost and  $AFC$  is the total fixed cost. The total variable cost can further be broken down in raw materials, quantity of labor employed by firm and real wage to produce premium and non-premium products, therefore the firm's expected profit is given as,

$$\pi = [D_p(P_p) + D_{np}(P_{np})] - [(R_p + L_p W_p) + (R_{np} + L_{np} W_{np}) + (AFC + L_f)] \quad (1.6)$$

where  $R_p$  and  $R_{np}$ ,  $L_p$  and  $L_{np}$ ,  $W_p$  and  $W_{np}$  are the respective raw materials, labor and wage used to produce respectively premium and non-premium products. Meanwhile,  $L_f$  is the fixed labor or administrative office labor as part of the total fixed cost. The production capacity utilization of 70-80 percent deemed to cover total variable and fixed costs and reach the sales target is composed of roughly 20-30% premium and 70-80% of non-premium products. This means that the firm has to commit larger amounts of labor in forms of salaried and hourly wage employees to manufacture and run the operations of non-premium product categories. The higher the component of non-premium product that makes up the 70-80 percent of production capacity utilization the more resources the firm will put in term of labor, wages and raw materials to produce the non-premium category. As a result, the firm will increase the labor force in operations by hiring new wage-employees at a minimum or above the minimum wage to keep up with the demand of non-premium products especially during the sales events. Meanwhile, the number of office staff or the salaried employees, as part of fixed costs, which enjoy higher salaries will remain stable. This is part of the fixed cost for the company. Simplifying equation (1.6) we have that  $U_c$  and  $\Pi$  of the firm operating in competitive market, depends mostly on the production of the non-premium products that in combination with the premium products make the firm profitable and competitive. However, the majority of the resources and labor are directed to the production of non-premium products that make up between 60% and 80% of total production, therefore we have that the profit portion of non-premium products by using the function of the production capacity utili-

zation is given as,

$$U_c = \pi_{np} = [D_{np}(P_{np}) - (R_{np} + L_{np} W_{np})] \quad (1.7)$$

where  $R_{np}$ ,  $L_{np}$ ,  $W_{np}$  are the respective raw materials, labor and wage used to produce non-premium products, and  $D_{np}$  and  $P_{np}$  are the respective demand and price for non-premium product, and  $U_c$  is the capacity utilization. The number of firms,  $F_i$ , operating in  $n$  markets, producing  $i$  non-premium products that meets the sales target by reaching 70-80% of capacity utilization rate,  $U_c$ , will have the profit function for each firm  $F_i$  given as,

$$\pi_i = \sum_{p=1}^n p_i [A(D_{np})(L) - (wL_{np})] \quad \text{where } \sum_{p=1}^n F_i = \sum_{p=1}^n U_c \quad (1.8)$$

where  $D_{np}$  is the demand for non-premium products,  $L$  is the quantity of labor the firms employs,  $A$  is a factor that shifts the profit function and reflects the technology (a higher value means that the firm can produce more output from a given amount of labor) or economy-wide output, so that a higher value means that the firm can sell more for a relative stable or unchanged price for a given amount of output, and  $wL_{np}$  is the quantity of labor times wage (per hour) involved in the production and distribution of non-premium products. The distribution of  $A$  is discrete and there are  $K$  possible values of  $A$  indexed by  $i$ ;  $p_i$  denotes the probability that  $A=A_i$ . Thus, the firm's expected profits are:

$$E(\pi) = \sum_{p=1}^n p_i [A(D_{np})(L) - (w_i L_i)] \quad (1.9)$$

where  $L$  and  $w$  denote the quantity of labor and the real wage if the realization of  $A$  is  $A_i$ . The firm meets its expected profit; thus, it is risk neutral. Given that the firm sells non-premium products during sales events it also meets the  $NMP > 1$  (Net Monetary Position) condition as the firm can cover current liabilities with the current assets. Selling large volumes of non-premium products means that firms need to have a large infrastructure and employ many employees to work on the production facilities, distribution centers, customer services and stores. The larger the number of firms that produce, distribute, and sell non-premium products in different sectors the larger the number of active people employed on these firms that are paid at minimum or above the minimum wage, the lower the rate of unemployment in the economy. Let's assume that  $N^*$  is the full employment and  $N$  is the actual employment, and that unemployment rate denominated as  $u$  is that portion of labor force which has not been employed. Therefore, the unemployment rate can be written as,  $u^* - u = (N^* - N)/N^* \dots (ii)$ , where  $u^* - u$  is the unemployment rate. Meanwhile,  $B = (P_{np}^* - P_{np})/P_{np}$  is the change rate of non-premium product prices during the year. Thus, we have the Phillips curve relationship in terms of non-premium discounted prices indicated by  $P$  is given as,

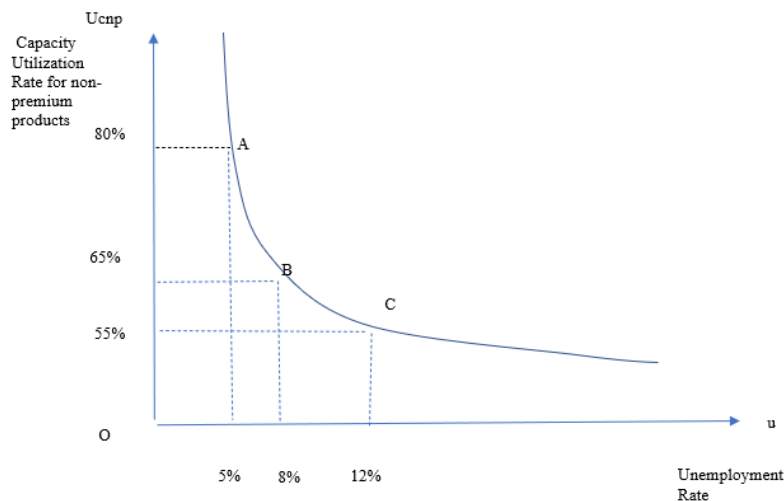
$$B = (P_{np}^* - P_{np})/P_{np} = \varepsilon(N^* - N)/N = \varepsilon(u^* - u) \quad (1.10)$$

where  $\varepsilon$  is the responsiveness of non-premium products prices to unemployment rate. Meanwhile, if we consider the Phillips curve relationship in terms of production capacity utilization,  $U_c$ , and unemployment rate,  $u$ , we have that this relationship indicated by  $P_{uc}$  is given as,

$$P_{uc} = \varepsilon'(U_c^* - U_c)/U_c = \varepsilon'(u^* - u) \quad (1.11)$$

where,  $U_c^*$  is the full production utilization capacity and  $U_c$  is the current capacity utilization and  $u^*-u$  is the unemployment rate. The term  $u^*-u$  is the unemployment rate and  $\epsilon'$  is the responsiveness of production capacity utilization of a firm manufacturing large volumes of non-premium products to the unemployment rate. Higher level of capacity utilization in different industries leads to lower unemployment rates. As we know the standard Phillips curve relates the rate of inflation with the rate of unemployment. In fact, the Phillips curve argues that unemployment and inflation are inversely related: as levels of unem-

ployment decrease, inflation increases. The relationship, however, is not linear. Graphically, the short-run Phillips curve traces an L-shape when the unemployment rate is on the x-axis and the inflation rate is on the y-axis. In an economy pricing system and in a market dominated by a variety of non-premium products, the Phillips curve relationship in terms of capacity utilization which is used mainly for non-premium products denominated as  $U_{cnp}$ , and unemployment rate denominated as  $u$ , has still an L-shape as is shown in figure 1.1.



**Fig. 1.1 The relation between Unemployment Rate and Capacity Utilization Rate in Economy Pricing**

When a number of firms in different industries produce different category of products at different non-competitive prices, they will have low-capacity utilization rate at around 55%, and the unemployment rate in economy is high at about 12%, as indicated at point C in figure 1.1, as their prices are not competitive. At point B the firms increase the production utilization capacity at 65% where they start to manufacture and sell more non-premium products at more competitive prices than premium products, which causes the unemployment rate to decrease at 8%. And finally, at point A the firms - due to technology improvements and supply chain efficiency - produce and sell large volumes of non-premium products reaching the capacity utilization rate of 80% and less premium products, causing the unemployment rate in economy to decrease further at 5%. Therefore, an economy pricing which is dominated by mass production and large sales of non-premium products during sales events has the capability to keep the unemployment rate low as the inflation rate is low due to the stability of prices for the major part of non-premium products that dominate the market.

#### 4. Interest Rates in Economy Pricing

The Neo-Fisherian theory is based on Irving Fisher's theory of interest rates, which explains movements in interest rates by movements in expected inflation [8]. However, it reverses the standard inflation-to-interest rates connection, claiming instead that the interest rates are causing the inflation to move up or down. The Neo-Fisherian theory confirms that monetary policy alone is unable to move the equilibrium real interest rate, which

is the interest rate that would prevail under normal conditions of full employment and relatively stable prices. If the interest rates cannot help, then inflation is the only economic variable that can help to restore the long-run economic equilibrium, as long as sovereign debt is sustainable. The logic behind this theoretical idea is that forward-looking economic agents presume a low inflation target from a lengthy period of low central bank interest rates, which leads nothing more than to low inflation expectations and subsequently materialises in low inflation. In fact, a lengthy period of low nominal interest rates has not resulted in high inflation [9]. This theoretical result, however, does not help the efforts of central banks such as the Federal Reserve and the ECB to reach their explicit inflation targets while policy rates are stuck at the zero lower bound and inflation continue to remain low. A low equilibrium real interest rate limits the behavior of monetary policy by bringing the central bank's policy rate too close to the zero-lower bound. The central banks such as the US Federal Reserve, Bank of England and the European Central Bank are constrained by the zero lower bound and have therefore moved to unconventional monetary policy measures like large-scale asset purchases and forward guidance. Given the persisting of low or even negative equilibrium real interest rates, this unconventional monetary policy measures have somehow become the new normal. As per theoretical results and under normal conditions, higher interest rates are advised for solving the zero lower bound problem and for preventing it from becoming a permanent challenge for monetary policy. This leads us to the question of how the real interest rate could

be increased. Given that monetary policy alone cannot move the equilibrium real interest rate, structural and fiscal policies are normally required to address the determinants of the real interest rate, such as productivity, demographic trends and infrastructure investment. The inflation has been low precisely because nominal rates had themselves been low. The relation between inflation and nominal rates for this possibility comes from the Fisher equation which can be written in a simplified form as:

$$i_t = r_t + E_t \pi_{t+1} \quad (1.12)$$

where  $i_t$  and  $r_t$  respectively denote nominal and real interest rates, while  $E_t \pi_{t+1}$  denotes expected inflation in period  $t+1$ . This equation incorporates a long-run positive relation between nominal rates and expected inflation. Given the relation between inflation and nominal rates, some economists have recommended that by keeping nominal rates relatively high for an extended period of time could help to achieve higher inflation. However, according to the “neo-Fisherian” view, central banks after the 2008-9 financial crisis have operated near the effective lower bound which may have been not an effective strategy for raising inflation [10]. If central bank’s inflation target is denominated as  $\pi^*_{t+1}$  and low inflation due to the low price of raw materials is denominated as  $\pi_{Raw,t+1}$ , then the expected inflation in period  $t+1$  is written as  $(\pi^* - \pi_{Raw})_{t+1}$ . Thus, we have that  $E_t \pi_{t+1}$  can be replaced by  $E_t(\pi^* - \pi_{Raw})_{t+1}$  and equation 4.3 can be written as,

$$i_t = r_t + \delta \pi E_t(\pi^* - \pi_{Raw})_{t+1} \quad (1.13)$$

where  $\delta \pi$  is the parameter which rules the central bank’s responsiveness to off-target inflation. Suppose, for example that if  $\delta \pi > 1$ , the central bank will commit to respond quite aggressively when inflation is off target. But, if  $\delta \pi < 1$ , and inflation is deflationary the central bank may decide to not commit to responding aggressively when inflation is lower than the inflation target, then inflation expectations may become unreliable. The above equation means that nominal interest rate is determined by real interest rate and by the expected inflation in period  $t+1$ , which in economy pricing is supposed to be low. If the inflation is expected to be low due to low prices of the mass produced non-premium products and efficient supply chain management then the nominal interest rate is equal to real interest rate. The neo-Fisherians use the fiscal theory of the price level to identify the particular equilibrium that is likely to be obtained [11]. The neo-Fisherian assumptions could hold in the short run if the government responds to higher rates by either refraining from adjusting surpluses or actively targeting lower surpluses. Furthermore, the neo-Fisherian mechanism can put the fiscal policy in an awkward and unconventional position since the government must control its influence on nominal prices and actively use inflation to manage the real value of its debt. However, if inflation is low the equilibria selected would require careful coordination with fiscal authorities, since their selection would ultimately depend on how the treasury adjusts surpluses in response to higher nominal rates. Active use of inflation to manage the government’s real debt could also lead to the perception that government is trying to merely inflate its debts away. But if inflation is kept low for much longer periods, then there is no need for government to be assigned control over nominal prices. If the

monetary policy of a central bank is to cut the short-term nominal interest rate to its effective lower bound and keep it for a long time, then this central bank is seeking to have additional demand stimulus. However, the exact degree of stimulus in economy is difficult to predict. It may not be possible to choose a length of time for which to commit to the ultra-low interest rate that does not increase simultaneously the risk of this monetary policy of being too short to be effective.

## 5. Slow Economic Growth and Outsourcing in Economy Pricing

A consistent weak demand in developed countries may lead to limited productivity growth and a shift of the labor force from manufacturing sector to service sector with lower labor force participation. The weak demand and low inflation in developed countries lead normally to higher rate of outsourcing production capacity in developing countries to keep the costs of final goods down and the price of commodities stable. Therefore, another factor that contributes to slow growth in advanced economies is a slow growth trend of capital stock in developed economies and an increase trend of capital stock exportation in developing countries to help outsource part of the production in those developing countries where there is cheaper labor force and abundance of raw materials. In an economy pricing system, we have that the equation which indicates the final price of the buy-product,  $U_n$ , sold to final customer in the superstore based on three levels of demand-push for high-volume non-premium products could be written as,

$$PU_{(s)np} = [P_a + L + VFOH + P_m] + [PM_m + L_m + VFOH_m + P_{(r)np}] + [P_r + L_r + VFOH_r + PI] \quad (1.14)$$

where the final sale price  $PU_{(s)np}$  of non-premium product sold to final customer is a combination of three-levels of discounted prices coming from the discount superstore, manufacturer of non-premium goods and raw-material suppliers [3]. The first level of demand-push is at the superstore level, pushing the demand into customers using different pricing strategies and marketing models of discount prices. The first part of the equation above on the right side indicates  $P_a$  as profit margin of the superstore,  $L$  as labor,  $VFOH$  as variable and fixed overhead (including the selling administrative costs) and  $P_m$  as the wholesale price the superstore buys the products from the manufacturer. The second part of the equation above indicates the second level of the demand-push at the manufacturing level where the manufacturer is asked to reduce its own final price in order to support the superstores’ sales events, where  $PM_m$ ,  $L_m$ , and  $VFOH_m$  are respectively the profit margin, labor, variable and fixed overhead (including administrative cost) to produce one unit of  $U_n$  and lastly  $P_{(r)np}$  represents the across-the-board price the manufacturer buys raw materials from different suppliers and mining industry to produce its units. The third part of the equation above indicates the third level of discounted price and demand-push when the manufacturers ask their suppliers of the raw materials and intermediate subassemblies to reduce the price of raw materials used to produce non-premium products so they can support the sales event of the superstore, where  $P_r$ ,  $L_r$ ,  $VFOH_r$  are respectively the profit margin, labor, variable and fixed overhead (including administrative cost) of the extraction or min-

ing company and PI is the price to buy land to extract minerals including the mining rights and royalties. The superstore could use a different strategy to stick to the target cost and keep the desired profit margin. It is the outsourcing strategy. In fact, the outsourcing strategy consist of agreeing with the manufactures to significantly reduce the wholesale price by changing product specifications of non-premium product in order to outsource some subassemblies in developing countries where labor, fixed and variable overheads are much cheaper. This strategy can go even further by outsourcing completely the manufacturing of the entire non-premium product to developing countries, so the superstore can better position itself with respect to its competitors during sales events. In fact, if the manufacturer decides to buy the raw materials or subassemblies directly from developing countries in agreement with the superstore to reduce the target cost of non-premium product  $PU(s)_{np}$  using the two levels of demand-push, we have that the equation that indicate this final price could be written as,

$$PU_{(s)np} = [P_a + L + VFOH + P_m] + [PM_m + L_m + VFOH_m + P_{(r)dev}] \quad (1.15)$$

where  $P_{(r)dev}$  is the price of raw materials or subassemblies purchased from developing countries at a much lower price compared to the price of raws and subassemblies purchased and made in industrialized countries. In the equation above we can see that the superstore has eliminated the profit margin, labor, variable, and fixed overhead of the third level of push-demand by outsourcing directly raw materials to developing countries. The discounted price of the non-premium product can be reduced further if the superstore decides to buy entirely the non-premium product from a developing country by using cheaper specialized labor using same product specifications as is manufactured in an industrialized country. Therefore, the discounted price of the non-premium product  $PU(s)_{np}$  using only one level of push-demand could be written as,

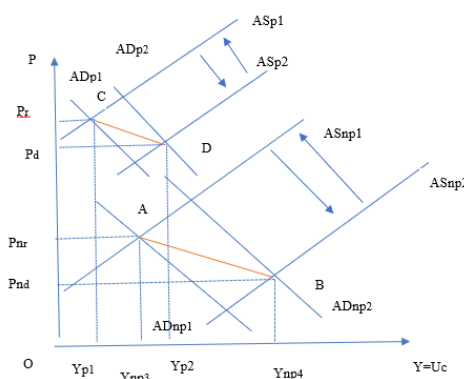
$$PU_{(s)np} = [P_a + L + VFOH + P_{manuf}] \quad (1.16)$$

where  $P_{manuf}$  is the discounted price of non-premium product outsourced, purchased directly from developing countries and sold in the superstore. This equation shows that the superstore has eliminated the profit margin, labor, variable, and fixed overhead of the second and third level of push-demand by outsourcing directly the non-premium product from the developing countries. The outsourcing of two levels of demand-push of the

supply chain in developing countries has eliminated the production of raw materials, subassemblies, and finished goods in the industrialized countries. This on returns has reduced the production capacity of the industrialized countries and has increased the production capacity of the developing countries hosting the outsourced manufacturing facilities. The reduced production capacity in industrialized countries has slowed growth as the manufacturing sector gets smaller and smaller with less specialized manufacturing labor force in favor of a cutting-edge service-oriented sector that is currently dominating the advanced countries.

## 6. Aggregate Demand and Aggregate Supply in Economy Pricing

What is the aggregate demand? As per definition the aggregate demand is an economic measurement of the total amount of demand for all finished goods and services produced in an economy for a given period. It can be expressed as the total amount of currency exchanged for those goods and services at a given price level and at a certain point in time. Aggregate demand in the long period equals the gross domestic product (GDP) because the two figures are calculated in the same way. GDP characterizes the total amount of goods and services produced in an economy while aggregate demand is the demand or the need to produce those goods. Therefore, because of the same calculation methods, the aggregate demand and GDP move in the same direction, increase or decrease together. What is the aggregate supply? As per definition the aggregate supply, also known as total output, is the total supply of goods and services produced within an economy at a given price at a certain period. What is the real aggregate demand in an economy pricing system? First, the global aggregate demand for a national economy should be split between the aggregate demand for the private sector, public sector and import-export sector. The aggregate demand of private sector in an economy pricing system is measured as the total demand of all finished goods, premium and non-premium produced in all sectors of the economy. The aggregate demand for private sector is expressed as the total amount of money exchanged for the combination of premium and non-premium goods and services offered at different prices with a price-range that goes from low-price floor given by discounted prices to high-price ceiling given by regular prices at any given period. The aggregate supply of private sector is given by the aggregate production capacity utilization of all firms offering premium and non-premium products in an economy at a given period. The aggregate demand and aggregate supply of private sector including premium and non-premium finished goods is illustrated in fig. 1.2.



**Fig. 1.2 Aggregate Demand and Aggregate Supply (Ad-As) Model For Private Sector of The Combined Premium and Non-Premium Products**

Figure 1.2 illustrates the aggregate demand and supply curves for premium and non-premium products indicated as a relationship between output and two different sets of price-ranges: (Pd-Pr) for discounted and regular premium prices and (Pnd-Pnr) for discounted and regular non-premium prices. In an economy pricing where firms work in a very competitive environment the AD-AS model follows a different logic. It works mostly from the supply side, by using push-marketing strategies onto customers to lure them to buy a variety of products offered at competitive prices. A substantial number of firms operating in the same industry will offer sales incentives, mostly for non-premium products and occasionally for premium products, to the department stores for pushing their products onto customers. In fact, these competitive firms, use the tactic of attracting customers by continuously promoting sales events and “pushing” them to buy their products. This “push-marketing” strategy on the supply side is illustrated in the aggregate demand and supply model for private sector in figure 1.2. Figure 1.2 illustrates how firms selling mass-produced non-premium products offer sales incentives by lowering the regular price Pnr to the discounted price Pnd in order to push the supply curve from point A to B where it intersects the aggregate demand ADnp2 at an increase output from Ynp3 to Ynp4 to meet the production utilization capacity target. We can use the same logic for firms in the private sector that offer premium products. The price of premium products will move from regular price Pr to the discounted price Pd, shifting the supply curve from ASp1 to ASp2 or from equilibrium point C to D to intersects the aggregate curve ADp2. The logic of Aggregate demand and supply (AD-AS) model for private sector in fig. 1.2 is to show how same firms that sell both premium and non-premium products combined in a certain order need to reach the desired production capacity utilisation of around 70-80% and meet the forecasted sales target in order to have a positive cash flow and maximize the current ratio in a given fiscal period. Therefore, the supply side and output produced in the private sector is limited to the production capacity utilization,  $U_c$ , required to produce the combination of premium and non-premium products to meet the sales target. The private aggregate supply will switch between ASp2 and ASp1 curves or between point A and B depending on the price offered in the price-range Pnr-Pnd for non-premium products and Pr-Pd for premium products. Therefore, in a traditional macroeconomics terminology, the general equilibrium is achieved when ADnp intersect ASnp for non-premium products at point A and B and ADp intersect ASp for premium products at point C and D. In economy pricing system, the general equilibrium of aggregate and supply curves in the private sector is a moving target based on the sales events indicated by the red line between point A and B for non-premium products and by the red line between point C and D for premium products. The desired total income in the private sector could be written as,

$$Y = C[Y_p - T(Y_p)] + C[Y_{np} - T(Y_{np})] = U_c = \text{Sales Target} \quad (1.17)$$

where C is consumer spending as an increasing function of disposable income (Y-T) for premium (Yp) and non-premium (Ynp) product outputs less taxes T(Yp) and T(Ynp) and  $U_c$  is the production capacity utilization required to meet the sales target.

The desired total output Y equals the desired production capacity utilization (60-80%) to meet the sales-target required to make a desired profit and is given as,

$$dY = [C_{yp-t}(1 - T_{yp})dy] + [C_{ynp-t}(1 - T_{ynp})dy] = U_c \quad (1.18)$$

after rearranging (1.18) we have that the desired output dY can be written as,

$$dY = \frac{1}{[(1 - C_{yp-t}(1 - T_{yp})) + [1 - C_{ynp-t}(1 - T_{ynp})]]} \quad (1.19)$$

Increasing disposal income will come if household decide to spend more on cheaper non-premium products than in more expensive premium products, which could help them save more money especially during financial crisis and recession. If we add investment  $I_r$  and government spending G, we have that total output for the aggregate spending in equation (1.18) can be written as,

$$dY = [C_{yp-t}(1 - T_{yp})dy] + [C_{ynp-t}(1 - T_{ynp})dy] + I_r + G \quad (1.20)$$

where  $I_r$  is investment as a function of the interest rate r, and G is government spending. For the investment  $I_r$ , we have that a higher rate of interest has a higher cost of capital, leading entrepreneurs to lower the level of investment and vice versa a low interest rate will lower the cost of capital leading the entrepreneurs to increase the level of investments. After rearranging (1.20) we have the output is given as follows,

$$dY = \frac{I_r dR + dG}{[(1 - C_{yp-t}(1 - T_{yp})) + [1 - C_{ynp-t}(1 - T_{ynp})]]} \quad (1.21)$$

Increasing government spending stimulates the output for a given level of interest rate, and especially if the interest rate is low as it happens often in an economy pricing system.

## 7. IS-LM Model in an Economy Pricing System

In an economy pricing system, there is a part of disposable income that will be quickly used in economy pricing. The economy pricing includes many components such as a large variety of cheap non-premium products, price discounts, bundle products, large number of sales events all year around, online sales, etc. that lure customers to spend more money and use more of their disposable income even without planning to do so. This is normally known as the “economy pricing portion of the disposable income”. As soon as employees receive the cash money in their paycheck every two weeks or so (after paying or planning to pay the monthly bills), will be lured by aggressive advertising to start spending on any premium or non-premium product that offer discounts. The drag of cash on economy pricing system creates a fluctuation on the demand for money. Therefore, the demand for real money balances is an increasing function of disposable income for premium and non-premium products during seasonal sales events and a decreasing function of disposable income during regular off-season sales events. Big sales events, such as Thanksgiving, Black Friday, Christmas boxing day, New Year sales, Labor Day etc., will increase the real demand for money from public and reduce savings. Regular off-season purchases will reduce the demand for money and increase savings, as people tend to buy less if there are no promotions or discounts available. Graphically the LM curve takes the form of a snake as it fluctuates based on the demand for money during seasonal and off-seasonal sales as illustrated in fig. 1.3.

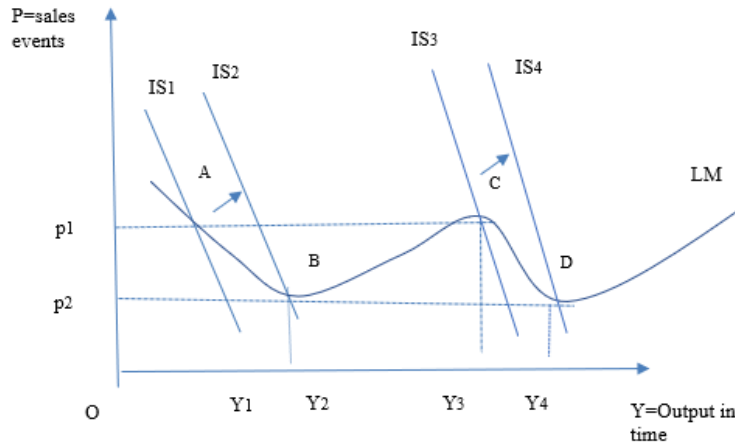


Fig. 1.3 Sales events and IS- LM curves in time.

The intersection of the IS and LM curves shows the equilibrium of sales-prices and non-sales-prices during sales-events and non-sales-event, and output when money markets and the real economy are balanced in a low-interest rate environment. Interest rate in this model does not affect the demand for money (given the low interest environment). The only parameter that affects the demand for money is the discounted price offered for the sales of non-premium and premium products during the seasonal and off-seasonal sales. Price  $p_1$ , represents the regular price during the off-sales season period and  $p_2$  represents the discounted price during the sales season where massive sales are expected to happen due to aggressive advertising. By moving the IS1 curve from point A to the right at point B (IS2) the price will move from regular price  $p_1$  to sales price  $p_2$ , and the model will give us a new combination of economic output and price sales, at point B. Then, when the sales season is over the demand for money is reduced as less sales are expected to happen, then the economy moves to point C (IS3) and then back to point D (IS4) as soon as the sales events restart and the demand for money increases again. Figure 1.3 indicates the output-in-time  $Y$  during the second massive sales event reaching equilibrium of IS-LM curves in point B and D, where the volume of output and demand for money reach again the highest levels. Therefore, the LM curve fluctuates like a 'snake shape' based on the demand for money during seasonal and off-seasonal sales events. In an economy pricing, a money-model with low interest rates, can be characterized by LM curve which represents the money market equilibrium as a set of points in equilibrium between liquidity preference (demand for money) and the money supply function at a given low interest rate and can be written as,

$$M/RL=M(P_s, Y) \quad (1.22)$$

where  $M$  is the quantity of money and  $P_s$  is the price level for sales and non-sales season,  $RL$  is the real low interest rate, and  $Y$  is the real income. The LM curve above can be expressed using the implicit function as,

$$d\left(\frac{M}{RL}\right) = l_Y dY + l_P dP_s \Rightarrow dP_s = \frac{d\left(\frac{M}{RL}\right) - l_Y dY}{l_P} \quad (1.23)$$

where the slope of the curve LM is  $-l_Y/l_P \geq 0$  and the effect of the real money supply on the price during seasonal events

is equal to  $1/l_P \leq 0$ . Here, the LM curve slopes downwards and shifts to the right if real money balances expand during massive sales events. Therefore, if there are no sales events the demand for money goes down. The restart of sales event will restart the cycle in economy pricing system and the fluctuation on the demand for money.

### Conclusions

The inflation is increasingly determined abroad and the global factors that keep inflation domestically low such as global supply chains, technological progress could continue for months, years or even decades, unless there are external shocks such as wars, pandemic, supply chain issues, etc., that could cause the inflation to rise. The technological progress in different sectors has increased productivity, lowering the rate of wage growth relative to productivity, and as result delays rising inflation. In fact, the introduction of technology innovation in industry has been a complement to the workforce, lowering the labor cost and therefore creating deflation in different kind of goods and services. We have seen that the supply chain management (SCM) manages the flow of goods and services from raw materials to final consumption and how it could affect the prices of finished goods via lowering the price of raw materials and intermediate goods. As a matter of fact, SCM, has allowed companies to be able to cut excess costs and deliver products to final consumer faster and cheaper, which is achieved by keeping tighter control of inventories, production, and distribution centers. Low unemployment rate in a competitive economy was another topic that was taken into consideration here. We have seen that there is a weak relationship between inflation and unemployment rate. The long-run sustainable rate of unemployment after the financial crisis of 2008 was lower than it was in the past [12]. An economy pricing dominated by the mass-production of non-premium products has the trend to keep the rate of unemployment low, thanks to technological progress, global supply chain management, availability of resources and cheap money. The outsourcing of the supply chain in developing countries has eliminated the production of raw materials, subassemblies, and finished goods in the industrialized countries. The reduced production capacity in industrialized countries has slowed growth as the manufacturing

sector gets smaller using less specialized labor force in favor of an innovative service-oriented sector that is helping advanced countries to become service-oriented economies.

We also discussed the real aggregate demand in an economy pricing system. We explained that the global aggregate demand for an economy should be split between the aggregate demand for the private sector, public sector and import-export sector. The aggregate demand of private sector in an economy pricing system was measured as the total demand of all finished goods, premium and non-premium produced in different sectors of the economy. Then for aggregate supply we described that the aggregate supply of the private sector was given by the aggregate production capacity utilization of all firms offering premium and non-premium products within an economy at a given period. We have also considered how the intersection of the IS and LM curves shows the equilibrium of sales-prices and non-sales-prices during sales and non-sales-events and output when money markets and the real economy are in equilibrium in a low interest environment. This equilibrium explains how the low interest rate does not affect the demand for money, given that it operates in a low interest environment. In fact, in economy pricing, the only parameter that affects the demand for money is the discounted price offered for the sales of non-premium and premium products during seasonal and off-seasonal sales. The higher the discount price offered for multi-products the higher the demand for cash money and disposable income from public.

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