

Research Article

How should a government intervene in a digital economy for controlling inflation?

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ABSTRACT

In order to save an economy from the detrimental effect of inflation, the government of that economy must make a full transition from the paper money based traditional economic system to an electronic money based digital economic system. This article proposes a system by which a government can control inflation in a digital economy. The central argument of the article is that a government fails to trace myriad transactions in an economy and hence have to leave the matter of price determination in the hand of the automatic interaction of demand and supply. However, as the digital technologies now allow for tracking every transaction, a government can get involved actively and intensively in the matter of price determination through a central price control system. The article describes the system architecture along with how it works and how the mutual interaction takes place among the various components of the system. It also discusses the major challenges in implementing the proposed system. Finally, it delineates the pricing policy instruments that may be used in overcoming the challenges of the proposed system. The system holds an iconoclastic view of the traditional economic system by proposing the abolition of paper money, price determination by the mutual interaction between demand and supply, the existence of invisible hand, and the laissez faire policy of a government in an economy. Although the idea seems to be utopian and devoid of practical sense at this stage of economic reality, it will make sense in the near future when only digital currency will exist as the sole legal tender money in a digital economy.

Keywords: inflation; governmental intervention; cashless model; digital economy; system architecture; pricing policy instruments; implementation challenges

1. Introduction

Money is the nidus of inflation^[3] and Inflation is a necessary evil for an economy because it helps to keep an economy rolling and prevents an economy from becoming stagnant^[2]. In the absence of inflation, economic recession would be inevitable because there would be no stimulus for the people to produce, consume, save, or invest^[3]. For the sake of accommodating the unlimited want and burgeoning demand of the ever-growing population in an economy, the increase in production is necessary. However, without inflation, the increased production would not have found an avenue to reach the consumers in an economy^[4].

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If there were no inflation in an economy, it would make the inertial nature of the inflationary process evident and would result in stagflation^[5]. Stagflation is not the desired state of an economy and so does the galloping inflation and hyperinflation^[3].

Since time immemorial, governments of all ages in all the countries of the world have failed miserably to control inflation^[6]. This is evident from the fact that the prices and wages have increased several hundred times over the last century^[7]. Some countries such as Zimbabwe are the worst victims of the unfettered price and wage hikes^[8]. The governments all over the world and in all ages have tried to address the problem of inflation with the help of some monetary and fiscal policy instruments^[9]. However, the efforts of the government to curb inflation have resulted in a vicious cycle of that starts with adjusting the prices and wages with inflation followed by printing money and increasing the denomination of paper notes^[10].

No government can break this vicious cycle because of the lack of direct, active and intensive control over the transactions in an economy that relate to the purchase of goods and services^[11]. Lack of control over the transactions is due to the lack of traceability of myriad transactions in an economy^[12]. As a matter of fact, the traditional economic system, whose lifeblood is the paper money, does not have the capacity to track myriad transactions in an economy^[13]. In the traditional economic system, a government cannot exert direct control over the prices of goods and services and the prices of the factors of production due to the lack of traceability of transactions and the parties to the transactions^[14]. Digital transactions in a digital economy pave the way for direct, active, and intensive control over prices and wages that can put a rein on the burgeoning rate of inflation.

At present, we live in a digital era. One of the benefits of this era is the traceability of a digital activity through a digital footprint. The digital era has opened up a new vista of opportunity in tracking the digital financial transactions. A government can utilize the digital technologies for exercising better control over the prices and wages in an economy.

This paper proposes a model named the “cashless model” of governmental intervention in a digital economy for controlling inflation. There are some prerequisites for the successful implementation of this model. First, the paper currency will have to be abolished completely from an economy. Secondly, a digital currency will be the sole legal tender money in an economy. Thirdly, every transaction relating to the sale and purchase of goods and services (including the prices paid for deploying the factors of production) must be completed digitally using a national price control system, which will be run and maintained by the government of an economy. Fourthly, the buyers, sellers, and payment service providers must be connected to this central price control system. Fifthly, the government of an economy must fix the prices of all the goods, services and the factors of production. Sixthly, the wages must be fixed first before fixing the prices of goods and services. Seventhly, the prices will be the same within the entire jurisdiction of a government and there will be no arbitrage opportunity.

In this system, the government of an economy will be able to fix the wages and the prices of the goods and services in such a way that allows a person to purchase all the necessities, comforts, and luxuries for him or her with the wages that he or she receives. This would enable two things. First of all, a government can ensure that the highest standard of living is possible with the minimum wage. Secondly, a government can regulate the price level and can fix the price of labor (wage) and the price of goods and services at any amount, which would drastically bring down the prices of everything in an economy. For example, if the government of an economy fixes the minimum wage as \$1, it may fix the prices of goods and services at a very small fraction of \$1, say \$0.000000000001 for 1 kilograms of rice. As the accounting will be done by the computers, the government will not need to circulate a large amount of money in an economy to price a

goods or service. In this system, expensive goods, such as an aircraft can be priced at even \$10, depending on the amount of minimum price for the factors of production fixed by the government.

2. The system architecture

As is evident from **Figure 1** below, the proposed system will be comprised of six major components, such as buyers, sellers, payment service providers, observers, operation and maintenance (O & M) partners, and government. The salient features of each component and the interaction among the components are discussed below.

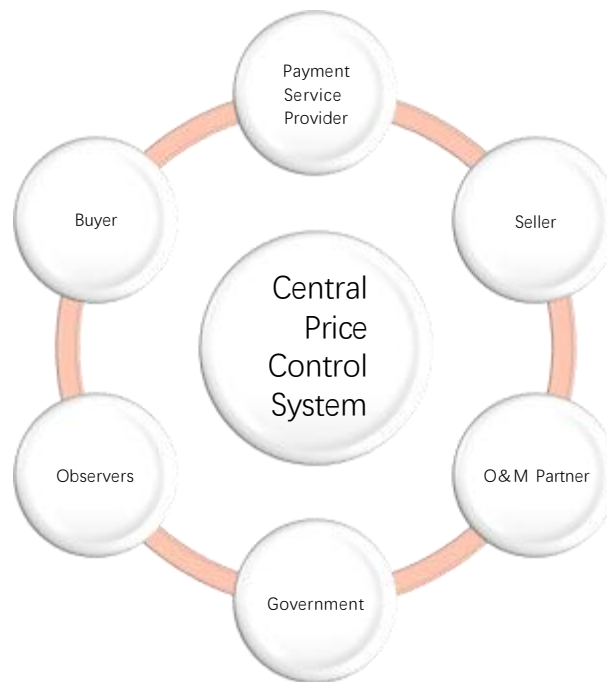


Figure 1. The system architecture of the central price control system.

2.1. Buyers

Buyers will be the triggers of the system. They will initiate transactions in this system by ordering for goods and services. The system will be so comprehensive that it will not only control prices but also allow consumers to make decisions on their purchases through incorporating all the elements of a purchasing process, such as searching information, evaluating alternatives, choosing products, choosing suppliers, making the purchase, and finally paying for the goods and services. Buyers will make the system vibrant. Every buyer will have to purchase by logging into the system. Buyers may visit physically the shops to choose from the alternatives. However, they cannot buy them directly from the shop by paying for it. They will have to place the order through the system. Ordering and paying through other means will be banned through legislations. As there will be no other means of ordering and paying for the goods and services, there will be no scope of any entente between buyers and seller except for the old barter system or other informal arrangements, such as exerting labor for purchasing goods. These lacunae can also be closed by controlling the stocks even at the micro level through this system so that there is no chance for any informal transaction in an economy. In this system, the sellers will be prevented from being duped by the buyers as any unfair means adopted by the buyers will be detected instantly and the buyers may be punished for such unscrupulous activities. Caveat emptor will apply in choosing the goods and services so that there will be

minimal complaints in purchases. In order to prevent the stock out of a certain product, each customer will have a purchase limit.

2.2. Sellers

Sellers will have individual vendor identification number (ID). They will have to put essential information on their products in the form of barcodes. Buyers will be able to get all the information about a product by scanning the barcodes, such as price, warranty, expiry date, and the conditions, to name a very few. When a buyer will decide to buy a certain product, he or she will log into the system with his or her ID and then will scan the barcode on the product that redirects him or her firstly to the purchase portal of the system and then to the payment portal of the system. As there will be no other means of selling the goods and services in an economy, the sellers will not be able to hoard the goods for making unethical supernormal profits. Similarly, they cannot refuse to sell to a particular customer. If any supplier commits any unlawful or unethical act, the customers will have the right to complaint to the government against that supplier. As every activity relating to the transactions will be monitored digitally, there will be robust evidence for every act. The prices will be identical for any certain type of product. However, it will not be a perfectly competitive market. Rather, it will be monopolistically competitive market, where the sellers will vie for the customers on the basis of differentiation in quality and product features. The organizational purchases will be conducted in the system through a competitive bidding process. While delivery will be physically, ordering and payment must be done using this system. It may be mentioned that the goods and services produced in an economy and their distribution all over the economy will also be an integral part of the system that will allow for balanced distribution of goods and services all over the country so that the goods and services are made available, accessible, and affordable to the concerned citizens.

2.3. Payment service providers

To facilitate the transactions, the payment service providers will act under the aegis of the central bank of a country. The central bank will be the custodian of the system. All the payment related requests including refund will be processed by the payment service providers. Any complaint against a certain payment service provider will be lodged to the central bank. The payment service providers will authenticate and verify the information from the buyers and sellers before executing the transactions. The payment must go through a number of steps to detect the bona fide intention of the transaction, the possible breaches of laws, the possible fraudulence and other precautionary checks. The alms, donations and other similar types of transactions that are paid without any consideration will have to be checked rigorously and diligently in the system to prevent illegal transactions, such as bribery, extortion, to name a very few.

During the payment, the first check will be on the amount charged for each unit of product. It will be checked if the unit price is consistent with the price fixed by the government. It will also be checked if there is any trade of illicit items, such as weapons and narcotics. Before fully commissioning this system, all the paper currencies including cash in hand and cash in tills will have to be called back into the banking system and they will be converted to the digital legal tender money accordingly. The payment service providers will have the right and power to suspend payment from or to an individual or organization by the general or special order of the government of an economy. The payment service providers will be constantly vigilant against the cyber threats and will ensure the integrity of the payment system.

2.4. Observers

National and international observers will look for the pitfalls of the system and will advise the government for necessary modification in the system. Such organizations include the united nations and its various agencies, amnesty international, transparency international, national consumer rights protection

organizations, economic think tanks, and members of the civil society, to name a very few. They will be the watchdog of the system and will monitor the limit, impartiality, legitimacy, effectiveness, prudence and fairness of governmental action and the action of other players of the system. They will conduct periodical audits of the system and will submit their report to the government. They will check if and to what extent the system is successful in achieving its purpose. They will also act as the mediators in settling the disputes among the players in the system. They will provide valuable inputs in framing various policies affecting the system. They will play key roles in ensuring the accountability, predictability and transparency of the system. They will be the advocates of the system and will strive for spontaneous participation of all the stakeholders in the system. They will measure the overall effort of the government and the efficacy of the system using the triple bottom line criteria of sustainable development. They will be at the other end of the negotiation table when bargaining over the determination of prices of goods and services. However, the government of an economy must be aware of the fact that some observers may commit subversive activities against the system by forming pool, cartels and other types of alliances in order to protect their vested interest. For becoming an observer, an individual or organization must be a user of the system

2.5. Operation and maintenance (O & M) partners

For effective functioning of the system, more than one O & M partners will be needed. Each O & M partner will look after the different aspect of the system. Considering the gravity of the responsibility of O & M partners, they will be separate constitutional bodies, who will work in close coordination with the government and the central bank. They will deploy people to ensure the smooth functioning of the system 24/7. They will always try to keep the system failsafe and foolproof. They will constantly monitor the feedback of the users and will make necessary changes in the system in consultation with the government and the central bank. They will conduct periodical surveys among the users of the system in order to measure their satisfaction and identify the areas of further improvement. They will watch the system constantly to identify any unauthorized entry into the system. They will have necessary technical, financial and human resource capability to stay ahead of the cyber criminals. They will educate the people and other stakeholders how to use the system. They will develop online video training and instruction materials for educating the people and the stakeholders. They will establish call centers and service centers to solve the problems of the users. They will be responsible for supplying necessary hardware for the smooth operation of the system. They will always ensure the compatibility of the software with the hardware. They will conduct periodical information technology audit in the government.

2.6. Government

Government, as the manager of the economy, will be ultimately responsible for the total functioning of the system. It will perform the control and coordination function in the system. It will monitor and intervene in the market. It will regulate the terms and conditions of each transaction. It will control the quantity of production and consumption of the goods and services in an economy. It will perform all the functions proactively in the public interest. The price control function of the government will be direct, active, and intensive. It will be responsible to declare a digital currency, which will be the sole legal tender money in an economy. It will be responsible to ensure that the new legal tender money works in the same way as the previous paper money as the medium of exchange, the unit of account, the standard of deferred payment, and the store of value. It will manage the transition between the paper money and digital money in an economy. It will ensure adequate money supply in the economy. It will store adequate amount of gold to back up the digital money. It will ensure the proper value of money and the commensurate purchasing power of people. It will manage the aftermath of the introduction of digital currency on other areas, such as gross domestic product (GDP) growth rate, unemployment rate, exchange rate, monetary policy, fiscal policy, foreign

currency reserve, foreign direct investment, wage earners' remittances, cost of living index, and stock market performance, to name a very few.

3. Technical features of the system

The system will have separate modules for each type of pricing. For instance, for the pricing of services, there will be a separate module, under which there will be submodules for each type of service. As and when a new service needs to be added, it will be done by the O&M partners of the system. Similarly, there will be separate modules for the pricing of goods, transfer pricing, pricing of financial derivatives, interest rate pricing, exchange rate pricing, wage pricing, rent pricing, profit pricing and so on. For each type of pricing, there will be corresponding payment gateways. For example, for export, import and cross border payments, there will be a separate payment gateway. There will also be separate modules for each type of trading and payment pattern, such as business-to-business (B2B), business-to-consumer (B2C), consumer-to-consumer (C2C) business-to-government (B2G), government-to-business (G2B), and so on. There will also be separate modules for cash and credit transactions. In the traditional economic system, the prices are determined by the automatic interaction between demand and supply with minimal intervention in the market mechanism. That is why traditional economic system follows dynamic pricing models. However, in digital economies, fixed pricing models will be used due to heavy intervention of the government in the market mechanism. As uniformity will prevail over pricing for all the suppliers in the market, the only source of profit will be the minimization of cost.

4. Technical challenges in implementing the system

The proposed system will face the following technical challenges during the implementation phase.

4.1. Pricing of services

For a number of reasons, pricing of services is a complicated task as compared to the pricing of goods. First of all, most of the service products cannot be inventoried. Secondly, the intangible elements of services usually dominate value creation. Thirdly, services are often difficult to visualize and understand. Fourthly, operational inputs and outputs tend to vary more widely in the case of service delivery. The last but not the least, the time factor often assumes great importance in the case of both service production and delivery. For these reasons, pricing decisions often revolve around some key questions relating to the basis of pricing, the amount to charge, and payment mechanism, to name a few. There are also some ethical concerns in pricing of services. For the above reasons, services can be analogized to water. As water can be measured by putting it into different types of containers, services can be measured by using different units of measurement. This is why the services should be measured for effective pricing of services. However, for the measurement purpose, defining a common unit of service is not practicable. Hence, there must be several basis of pricing for different types of services. The above pricing difficulties can be minimized under the proposed system by introducing barcode, QR code, and RFID tags for the services where possible. Moreover, the pricing of core and supplementary services should be priced separately and differently. If the subjective elements in pricing of services can be eliminated, it will be possible to ensure uniformity of pricing.

4.2. Export, import and cross-border payments

A major challenge is how the countries settle their import, export and other cross-border payments. Most of the countries usually have been relying on their accounts maintained at the Federal Reserve System for such transactions. They have been using United States Dollar as the currency for settlement of their mutual claims. However, using a specific nation's currency in this way will not only affect the value of that country's currency but also will affect the health and well-being of other country's currency because of the

pegging effect. In the long run, that specific country's currency will get stronger day by day and will dominate the other currencies and may force them to have more export-import transactions with that specific country. Thus, it will be logical to declare a new international currency, such as special drawing right (SDR) for the purpose of international settlements. However, in that case SDR must be the composite of all the currencies of the world, and not a handful of major currencies only. A separate international settlement bank may be formed or the existing Bank of International Settlements may be reconstructed for this purpose. Such international settlement bank will ensure the proper functioning of the international settlement system. It will also make the domestic and international price control and payment systems mutually compatible. It will link the export, import and cross-border payments with GDP account and balance of payment account. It will accommodate the agreements, treaties, and conventions, such as those of the United Nations and World Trade Organization in the payment system. Finally, it will formulate and implement policies for eliminating the superiority of the regional currencies, such as Euro and other powerful currencies.

4.3. Transfer pricing

Transfer pricing under the proposed system will face challenges in terms of intra-organizational transfer pricing, inter-organizational transfer pricing, and cross-border transfer pricing. Salient challenges include existence of different legislations relating to transfer pricing in different countries, the existence of regional transfer pricing regimes, problems of double taxation, custom valuation, and simple but accurate transfer pricing of intangibles. At present, the arm's length principle is being followed for transfer pricing. However, in a digital economy, new operating models will be necessary. New operating models are constantly on the development. For example, Base Erosion and Profit Shifting, go-forward value chain analysis and value creation, pillar one and pillar two approaches are some of the models that are becoming popular for transfer pricing in digital economy^[15]. New transfer pricing policies will have to be formulated and implemented by reassessing the supply chain and value chain. This will entail identifying the intangible assets, mapping the transfer pricing outcomes with the resultant value creation, drafting new intercompany agreements, ensuring financial systems and processes support the new transfer pricing policies, and drafting transfer pricing documentation in support of any new transfer pricing policies^[16]s. Based on the transfer pricing policy, new operating model must be developed by considering the *factors, such as revenue sourcing, tax base determination, and profit allocation*, to name a few^[17].

4.4. Pricing of financial derivatives

Under the traditional economic system, the pricing of the derivatives of the assets, such as commodities, stocks, bonds, interest rates and currencies are based on the prices of the underlying assets. In the traditional economic system, the price of the derivatives are determined based on the current bids and offers placed on a particular contract at any one time. Thus, the process is based on the automatic interaction of demand and supply. The situation is worse in the case of over the counter (OTC) or floor-traded contracts, where trading takes place manually. The traditional pricing system allows various types of market manipulation and paves the way for economic and financial crises. In order to avoid the risk of such turmoil, complex pricing models should be developed for the derivative products in a digital economy. Such pricing models must ensure that the prices are structured in both exchanges and OTCs, and there is no arbitrage opportunities. The government must ensure predictability and transparency in price determination in order to eliminate both systematic and unsystematic risk in the market.

4.5. Exchange rate determination

Most of the existing exchange rate systems will become redundant under the new economic order. Under the traditional economic system, there are four types of exchange rate, such as fixed, freely floating,

managed float and pegged. However, as the new pricing system eliminates the automatic interaction between demand and supply, only the fixed exchange rate system will prevail. Moreover, as there will be only one international currency (such as the proposed SDR), there will no pegging between currencies. There will be a fixed exchange rate between the local currency and the proposed SDR. As the local currency is also a part of the proposed SDR, the fixed exchange rate will take into account the weight of the local currency in the composition of the proposed SDR and the transaction volume between the local currency and the other currencies.

4.6. Interest rate determination

All sorts of interest rate, such as cost of capital, discount rate, bank rate, call money rate, real and nominal interest rate will be fixed by the government. While fixing the interest rate, the government will consider the quantity of money in an economy, the price levels of goods and services and the levels of denomination, time value of money, interest rate of other economies, the monetary and fiscal policy targets, to name a few. All the components of interest rate, such as risk-free rate, risk premium, inflation premium, and liquidity premium will be fixed by the government.

4.7. Bad debts in the banking and financial sector

Bad debts are the catalyst of inflation in an economy. The more accumulated they are over the years, the more complicated they are. If the money remains within the country, the management of bade debts is much simpler than if it leaves the country. If the bad debts remain within the country, they only affect the inflation and interest rates. However, if the bad debts cross the border in the form of smuggling or capital flight or other means of drainage, it affects exchange rate in addition to the inflation rate and interest rate. In the case of bade debts, the pricing of bad debts is the main challenge for controlling inflation in a digital economy. How to deal with the existing bad debts in an inflation-inflicted economy will be a major headache for the governments. One solution is to write-off the bad debts totally and to compensate the the banking and financial sector in such a way that it does not take a toll on the purchasing power of the people. Another option is to reschedule the existing debts with the new small denominations and to ward off the effect of such rescheduling and small denominations by making the money equally dear and valuable to the banking and financial sector. Another technique is to use the discounting method to find the present value of the bad debts and then using the discounted value to rescheduling and revaluation purpose. The last option is to exchange goods and services of equivalent value for the bad debts. Using this method, the fixed real assets of the debtors will be sold at the market price and will be handed over to the creditors.

4.8. Functionalizing the digital money

The four functions of money, i.e., a medium of exchange, a unit of account, a standard of deferred payment, and a store of value need to be restored fully in the new digital currency to be introduced as the sole legal tender money in a digital economy. The government needs to store adequate gold for backing the money in circulation. The exchange between goods or services and money need to be seamless. The new currency can secure the trust and acceptability of the general people of it is able to create transparency in the transaction process so that the corruption money, speed money and other illegal proceeds are detected easily. The general acceptability will be ensured using the sovereign authority of the government. The use of the money will not be a matter of choice. Rather, it will be mandatory. The government needs to engage in a huge change management program in order to ensure greater popularity and acceptability of the new digital currency. Many people in developing world and even in the developed world are not technologically literate. There are many people who are not able to use digital technologies due to a number of limitations. People who are physically and mentally challenged are not in a position to use digital platforms to conduct

transactions. They need to rely on other people who may betray with them. The government of an economy must embed necessary accessibility features when designing the payment systems. They must also design the currencies in such a way that it can be recognized even by the physically handicapped people.

5. Pricing policy instruments

The government can rely on pricing policy instruments instead of monetary policy and fiscal policy instruments for controlling inflation in a digital economy in order to overcome the above technical challenges. The major pricing policy instruments are discussed below.

5.1. Coercive pricing

The government will use this instrument for fixing the prices of goods and services that are essential in nature. The prices of the goods and services related to food, raiment, health, accommodation, education, and transport will be fixed using this instrument. The government will fix the prices considering the public interest. Using its sovereign power, the government will force all the buyers and sellers to accept the price fixed by it.

5.2. Consultative pricing

For goods and services that undergo complex production process will be fixed using this instrument. For example, pricing of spacecraft, aircraft or oil tanker require consultative prices. These prices do not affect the public consumption directly. The government will consult with all the stakeholders and will fix the price based on consensus in such a way that it does not affect the purchasing power of the common people negatively.

5.3. Negotiated pricing

This instrument will be used when the producers in an industry incur loss due to market inefficiency, low demand for the product, economic downturn, abrupt price hike of raw materials and similar force majeure.

5.4. Pegged pricing

This is quite interesting and a new concept that requires detailed explanation. It is possible to peg the price of a commodity to another commodity in order to control the price of one in terms of the other. More broadly, it is possible to peg the price of the goods to the price of the services and vice versa in order to control inflation. In order to peg the prices, we need to decide first about what to peg against what. After deciding what to peg against what, the independent and dependent variables are specified. The price of the dependent variable is pegged to the price of the independent variable. The dependent variable is that price, which is more prone to inflation and the independent variable is that price, which is less prone to inflation. After specifying the independent and dependent variable, the nature of the relationship between the two variables is specified. Then, the minimum and maximum price of the independent variable is found out so that there is a price range for the dependent variable. This can be done with the help of derivative functions and Lagrange multiplier on the relationship between the independent and dependent variable. In this way, the price of the dependent variable is pegged to the price of the independent variable and the price of the dependent variable cannot go beyond a minimum and maximum range based on the minimum and maximum price of the independent variable. By price pegging in this way, the prices of the goods and services will be within the purchasing power of the majority of the people. The government can then regulate the amount of money supply in the economy in accordance with the minimum and maximum price of the goods and services in order to control inflation. A department of the government should take the helms of enforcing this

pricing policy instrument by declaring the maximum and minimum price of the independent and dependent variable and by carrying out intelligence and monitoring activities.

The term “pegged” has been borrowed from the discipline of international financial management^[18], where exchange rate of a currency is pegged to another currency. Similarly, in pegged pricing the aggregate price level of one or more sets of goods or services are pegged to the aggregate price level of another set of goods or services.

5.4.1. The significance of price pegging

By price pegging, the policy makers will be able to exert an effective control over prices of goods and services in an economy because both the prices will enter into a relationship of independent and dependent variable. Thus, controlling the price of the independent variable will result in the control of the prices of the dependent variable.

5.4.2. What to peg against what?

What to peg against what varies from one economy to another economy. However, this decision is affected by a number of factors that include:

- a. The type of the economy, i.e., a producer driven or a consumer driven economy;
- b. The source of income of the majority of the people of a country;
- c. The spending pattern and spending priorities of the individuals, organizations and the government;
- d. The consumers' spending pattern on necessity, comfort and luxury types of goods.
- e. The goods and services, which are more prone to inflation.

5.4.3. The pegging technique

In order to peg the prices, we need to decide first about what to peg against what. It may be pegging of price of luxury types of goods against the price of necessity types of goods. Again, it may be pegging the price of goods against the price of services. The factors mentioned in the previous section will guide us to decide what to peg against what. After deciding what to peg against what, we need to specify the two prices as independent and dependent variable. The price of the dependent variable will be pegged to the price of the independent variable because the price of the independent variable will determine the price of the dependent variable. It is important to know that the dependent variable is that price, which is more prone to inflation and the independent variable is that price, which is less prone to inflation. The reason is that we want to put a reign on the price of the items which are more prone to inflation. After specifying the independent and dependent variable, we need to specify the nature of the relationship between the two variables. Then, we need to find out the minimum and maximum price (the floor and ceiling price) of the independent variable so that there is a price range for the dependent variable. This can be done with the help of derivative functions and Lagrange multiplier on the relationship between the independent and dependent variable^[19]. In this way, the price of the dependent variable is pegged to the price of the independent variable and the price of the dependent variable cannot go beyond a minimum and maximum range based on the minimum and maximum price of the independent variable.

5.4.4. How does it work?

At this stage, let me illustrate how pegged pricing controls inflation using real world data. For illustration purpose, let us take the data from the US economy. The basic facts about the US economy are as follows:

- The service sector comprise of almost 80% of the Gross Domestic Product (GDP) of the US economy^[20]. This implies that majority of the US population work in the service industry.
- Majority of the population (almost 93%) live in the urban areas in the USA^[21].
- The composition of the CPI of the all the urban consumers is as follows^[21] :

Table 1. Composition of the CPI of the all the urban consumers.

Sl.	Category	Relative Importance	Unadjusted CPI in May 2019
1.	Goods	32.688	403 (Rounded)
2.	Services	67.312	562 (Rounded)

- The consumers' average expenditure pattern in the USA shows that the US consumers spend more on services than on goods. They spend almost 67% on services and 33% on goods^[22].
- Average income of the US consumers is USD73,573^[22].

On the basis of the above facts, it is clear that in order to keep the prices of the goods and services within the purchasing power of the majority of the people, we need to control the price of the services. To this end, it is imperative that we peg the price of the services to the price of the goods, which are cheaper than the price of the services as is evident from the CPI data in **Table 1**. In other words, the price of the goods is less prone to inflation and the price of the services is more prone to inflation as is indicated by the relative importance in **Table 1** above. By pegging the price of the services to the price of the goods, we can put a reign on the price of the services so that the price of the services does not increase beyond the affordable limit of the majority of the population and remains within their purchasing power.

Now, in order to peg the price of the services to the price of the goods, let us assume that the price of the services be x and the price of the goods be y . In order to peg the price of x to the price of y , first of all, we need to find the relationship between the x and y .

From the CPI data in **Table 1**, we get the values as follows:

$$x = 562 \quad (1)$$

$$y = 403 \quad (2)$$

So, the relationship is follows:

$$x + y = 965 \quad (3)$$

Now, we need to find the minimum and maximum value of y so that the price of x cannot go beyond a minimum and maximum range based on the minimum and maximum price of y . We can use the derivative functions and Lagrange multiplier on the relationship between the x and y in order to find out the minimum and maximum value of y . The way of doing this is shown below:

Original function is as follows:

$$f(x,y) = x + y - 965 \quad (4)$$

The constraint function is as follows:

$$g(x,y) = xy - 226486 \quad (5)$$

At this stage, we need to find out the first order partial derivative of f with respect to x , f with respect to y , g with respect to x and g with respect to y , which are as follows:

$$\frac{\partial f}{\partial x} = 1 \quad (6)$$

$$\frac{\partial f}{\partial y} = 1 \quad (7)$$

$$\frac{\partial g}{\partial x} = y \quad (8)$$

$$\frac{\partial g}{\partial y} = x \quad (9)$$

Now, we need to use the Lagrange multiplier (λ) in order to equate the first order partial derivative of f with respect to x , with the first order partial derivative of g with respect to x . Again, the first order partial derivative of f with respect to y with the first order partial derivative of g with respect to y so that we can ultimately find the value of x in terms of y and vice versa. This is done below:

$$1 = \lambda y \quad (10)$$

$$\text{Or, } \lambda = \frac{1}{y} \quad (11)$$

$$1 = \lambda x \quad (12)$$

$$\text{Or, } \lambda = \frac{1}{x} \quad (13)$$

So, from the above, it is clear that

$$\frac{1}{y} = \frac{1}{x} \quad (14)$$

This follows that

$$\frac{1}{x} = \frac{1}{y} \text{ and thus, } x = y \quad (15)$$

Now, we put the value of x in terms of y (and vice versa) to the constraint function formulated above so that we can find a real value of x and y . This is shown below:

$$xy = 226486 \quad (16)$$

$$\text{Or, } x^2 = 226486 \quad (17)$$

$$\text{Or, } x = +475.91 \text{ or } -475.91 \quad (18)$$

$$xy = 226486 \quad (19)$$

$$\text{Or, } y^2 = 226486 \quad (20)$$

$$\text{Or, } y = +475.91 \text{ or } -475.91 \quad (21)$$

From the above, we get two extreme points for x and y , which are as follows:

$$(+475.91, +475.91) \quad (22)$$

or

$$(-475.91, -475.91) \quad (23)$$

At this stage, we can test whether these extreme points are really the minimum and maximum by plugging the above extreme points of x and y into the original equation ($x + y - 965$), which gives us the maximum value as -13.18 and the minimum value as -1916.82 . So, this is proved that the extreme points are really the minimum and the maximum values.

These extreme points tell us that the maximum CPI of both goods and services must be 475.91 more than the sum of the two, i.e., 965 and the minimum CPI of both goods and services must be 475.91 less than 965. In this way, the price range is fixed for both goods and services in order to control price.

5.4.5. How does it control inflation?

By price pegging in this way, the prices of the goods and services will be within the purchasing power of the majority of the people. The government can then regulate the amount of money supply in the economy in accordance with the minimum and maximum price of the goods and services in order to control inflation.

6. Empirical evidence on functioning of the proposed system

Since the proposed system is yet to be operational, anyone can be doubtful about the proper functioning of the proposed system. If anyone's first impression of the system is that it is devoid of practicability and if anyone is dubious of the proper functioning of the system, let me assure him or her that such system is not only practicable but also technically feasible. Some similar systems are already operating at the national level and even international level. The following paragraphs illustrate three systems that are akin to the proposed system and are well functioning in their respective peripheries.

The first one is the blockchain technology. Blockchain technology provides the best ever solution for transaction processing and settlement. The proposed system will borrow the technical features of the blockchain technology, such as its indelible transaction record, the computer algorithm for checking the authenticity of transaction, to name a very few^[23]. The proposed system will use a digital currency, which will be the sole legal tender money in the economy, which is similar to the cryptocurrency used by blockchain technology, such as bitcoin. The only significant difference between the proposed system and blockchain technology is that the former has a single central authority while the latter has a distributed system.

The second one is the billing system used in the retail supershop stores. The billing system uses a database of the products and their prices and the products on the shelves have barcodes on them. Whenever, a customer submits the product for purchase at the counter, the barcode is scanned and the quantity and unit prices are displayed on the monitor from the system database. The proposed system will borrow the technical features of the system such as, barcode technology, software for database, to name a very few.

The third one is the bidding system used for submitting tenders for goods, works and services. This system has achieved remarkable success in many countries. The proposed system will borrow the technical features of the bidding system such as, payment settlement, billing, market comparison, to name a very few.

Thus, it is more than safe to state that the technical features required for the system are already being used by other similar systems in the world, making it technically feasible for embracing and launching the system. The only task for the government is to adopt the system features with slight modification for the proposed system and to replicate those systems in a broader spectrum.

7. Conclusion

The article has addressed only the price aspect of inflation that can be controlled through instituting and implementing a central price control system. Such price control system is only the one side of the coin. The other side of the coin is the wage aspect of inflation. The price-wage spiral works as the vicious cycle of inflation^[10]. Hence, in order to break the vicious cycle, the wage control system should also be in practice. The what, why and how of the wage control system is a matter of further research. However, at this stage, it will suffice to state that the wage control system must be tagged with the price control system. in order to ensure a decent standard of living for even the lowest paid member of an economy or society. To this end, the prices of goods and services as well as the wages of the lowest paid person will have to be fixed in such a mutually compatible way that the minimum wage is sufficient for a person to survive with his or her family in a decent way. Decent way means allowing the person to meet all the basic needs and at the same time to procure some basic comfort and luxury goods and services.

The proposed model holds an iconoclastic view of the traditional economic system. It opposes the notion of a laissez faire economy. It also urges that the invisible hand of the economy be made visible by a government. It advocates that a government should monitor markets directly, actively, and intensively and interferes heavily in the market mechanism in such a way that allows it to fix prices through a variety of pricing policy instruments. The pricing policy instruments include but are not limited to forced pricing, consultative pricing, negotiated pricing, and pegged pricing. These pricing policy instruments fix the prices instead of letting the prices to be determined through the automatic interaction of demand and supply. The demand, supply and prices are regulated in this system for the sake of public interest. The government of an economy can exercise a stringent control system, which it could not do in the traditional economic system due to lack of traceability of the transactions. The digital economy, powered by the digital technologies, has paved the way for strict regulation of the prices and wages in an economy by not only tracking the transactions but also tracking the individuals and parties involved in the transactions. Some people who have doubt about the viability and sustainability of the system must remember that a government has the power of sovereignty and every citizen of a country is bound to obey the laws of a country. The crystal clear process of the transactions will bring other attendant benefits, such as traceability of black money, illegal income, and terrorism financing, to name a very few. The only challenge remains is the protection of the system from cyber threats and other digital vulnerabilities, which the patriotic information technology professionals will take care of properly.

Conflict of interest

The authors declare no conflict of interest.

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