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**GOLD, FIAT MONEY AND PRICE STABILITY**

**IN FOUR ADVANCED COUNTRIES**

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**Abstract**

This study examined the ability of gold and fiat money to stabilize the purchasing power after the 1971 when the Bretton Woods Agreement ended. The research examined these four countries currencies (US dollar, GBP, Yen, and Australian dollar) using descriptive statistic, and yearly data from 1971 to 2009. The result reveals that the gold still has the ability to stabilize the purchasing power more than the fiat money in the long run, while the fiat money still has the ability to stabilize the purchasing more than the gold in the short run. Otherwise the general indicator of price stability reveals that the (US dollar, GBP, and Australian dollar) have the ability to stabilize the purchasing power less than the gold, while the Yen reveals the opposite.

 It is now some 39 years since the Bretton Woods system of fixed exchange rate ended, when the president of USA (Richard Milhous Nixon) abolish the gold cover system.

The gold standard was a commitment by participating countries to fix the prices of their domestic currencies in terms of a specified amount of gold.

National money and other forms of money (bank deposits and notes) were freely converted into gold at the fixed price.

 "England adopted the gold standard in 1717 after the master of the mint, Sir Isaac Newton, overvalued the silver guinea and formally adopted the gold standard in 1819. The United States, though formally on a bimetallic (gold and silver) standard, switched to gold in 1834"1.

 In 1834 the United States fixed the price of gold at $20.67 per ounce, where it remained until 1933. Other major countries joined the gold standard in the 1870s. The period from 1880 to 1914 is known as the classical gold standard. During that time the majority of countries adhered (in varying degrees) to gold, for example Japan joined the gold standard in 1897, Australia joined in 1879…etc.

 It was also a period of unprecedented economic growth with relatively free trade in goods, labor, and capital.

Source: http://en.wikipedia.org/wiki/Gold\_standard.

1 www.econlib.org/library/Enc/GoldStandard.html.

The gold standard broke down during World War I as major belligerents resorted to inflationary finance and was briefly reinstated from 1925 to 1931 as the Gold Exchange Standard. Under this standard countries could hold gold or dollars or pounds as reserves, except for the United States and the United Kingdom, which held reserves only in gold.

 "This version broke down in 1931 following Britain's departure from gold in the face of massive gold and capital outflows. In 1933 President Roosevelt nationalized gold owned by private citizens and abrogated contracts in which payment was specified in gold. Between 1946 and 1971 countries operated under the Bretton Woods system. Under this further modification of the gold standard, most countries settled their international balances in U.S. dollars, but the U.S. government promised to redeem other central banks' holdings of dollars for gold at a fixed rate of $35 per ounce. However, persistent U.S. balance-of-payments deficits steadily reduced U.S. gold reserves, reducing confidence in the ability of the United States to redeem its currency in gold. Finally, on August 15, 1971, President Nixon announced that the United States would no longer redeem currency for gold. This was the final step in abandoning the gold standard, and the first step in the floating exchange system"2.

The floating exchange system has brought a lot of fluctuation in exchange rate and high rising in the cost of living , which has renewed the interest in the gold standard as a way to stabilize the purchasing power of the our money .

2 www.econlib.org/library/Enc/GoldStandard.html.

Today some economists advocate the return to the gold standard, because of its ability to stabilize the purchasing power, which will influence all our life standards.

 The opponents of gold standard say that the gold price is affected by the law of supply and demand and by its production.

The purpose of this research is to find out if the gold price stability still existed after 1971, or the gold price fluctuate more than the fiat money price according to the law of supply and demand and its production , and it's irrelevant to be the base of our economic.

Some of researchers have studied the ability of gold standards to stabilize the purchasing power of the money.

The importance of this research comes from studying the price stability after 1971in very important countries in the world (USA, UK, Japan, and Australia) which represent more than 35% of the world economy.

 The researcher of course will ensure the results of previous studies or will give an new result which can be discussed.

The study might answer the following questions:

1. Which can stabilize the purchasing power more in the USA after 1971 the gold or the dollar?
2. Which can stabilize the purchasing power more in the UK after 1971 the gold or the UK pound?
3. Which can stabilize the purchasing power more in Japan after 1971 the gold or the yen?
4. Which can stabilize the purchasing power more in the Australia after 1971 the gold or the Australian dollar?

 After conducting the study, the conclusions may be used for different purposes such as:

1) - Investigating if the gold price really fluctuates after 1971 more than the fiat money in the long and short run.

2) - Investigating the ability of gold to be our new monetary system.

3) - A base for further research, especially in coming periods in different economies.

4) Discussing the research result with the previous research results.

The limitation, that can be mentioned, the lack of data and accurate data for other countries especially Arab countries, which force the research to include just the countries mentioned above.

**Literature Review**

 Grytten, and Hunnes (2009) studied in the 1870s the three Scandinavian countries Denmark, Norway and Sweden formed the Scandinavian Currency Union. Both the adoption of gold and the monetary union were supposed to lead to price stability in and between these countries. By drawing on new indices of consumer prices the present paper offers an examination of inflation dynamics, defined as price stability and inflation persistence, in the periphery of Scandinavia during the heyday of the international gold standard.

Bordo, Dittmar and Gavin (2003) have concluded that the classical gold standard has long been associated with long-run price stability.

But short-run price variability led critics of the gold standard to propose reforms that look much like modern versions of price path targeting. It uses a dynamic stochastic

general equilibrium model to examine price dynamics under alternative policy regimes.

In the model, a pure inflation target provides more short-run price stability than does the gold standard and, although it introduces a unit root into the price level, it leads to as much long-term price stability as does the gold standard for horizons shorter than 20 years. Relative to these regimes, Fisher’s compensated dollar (or pure price path

targeting) reduces inflation uncertainty by an order of magnitude at all horizons. A Taylor rule with its relatively large weight on output leads to large uncertainty about inflation at long horizons. This long-run inflation uncertainty can be largely eliminated by introducing an additional response to the deviation of the price level from a desired path.

Bayoumi and Eichengreen (1995) examined some popular explanations for the smooth operation of the pre-1914 gold standard. He has found that the rapid adjustment of economies to underlying disturbances played an important role in stabilizing output and employment under the gold standard system, but no evidence that this success also reflected relatively small underlying disturbances.

Finally, the paper also suggests an explanation for the evolution of the

International monetary system based on growing nominal inertia over time.

Meissner (2002) this paper provides a cross-country analysis of why countries adopted when they did. The research uses duration analysis to show that network externalities operating through trade channels help explain the pattern of diffusion of the gold standard. Countries adopted the gold standard sooner when they had a large share of trade with other gold countries relative to GDP. The quality of the financial system also played a role. Support is found for the idea that a weak gold backing for paper currency emissions, possibly because of an unsustainable fiscal position or an un-sound banking system, delayed adoption. A large public debt burden also led to a later transition. Data are also consistent with the idea that nations adopted the gold standard earlier to lower the costs of borrowing on international capital markets. The research finds no evidence that the level of exchange rate volatility or agricultural interests mattered for the timing of adoption.

 Rafferty (2006) studied the Growing international payments imbalances (symbolised most notably by a ballooning US current account deficit), and ongoing volatility in exchange rates have become features of the current international monetary system. Not surprisingly, many economists have raised concerns about the sustainability of these imbalances and their implications for the current international monetary system. Specifically, they have raised concerns about the fragility of the US dollar, both in terms of its current value, and as an anchor for the international monetary system. This paper examines two alternative arguments suggesting that the current international monetary system has in fact quite strong material foundations. These arguments are known as the New Bretton Woods thesis, and the Dark Matter thesis. After examining the two arguments, the paper identifies a shared limitation in their attempts to understand global economic processes through national units of analysis. The paper opens up a third possible explanation for the current monetary system’s stability, namely the anchoring role being played by financial derivatives.

#####  Flandreau (1998) has studied the high level of trade and financial integration reached by Europe both today and under the late 19th-century gold standard suggests that important lessons can be learned by looking at past record to inform current issues.

#####  In this paper , the researcher draw a fresh picture of the European gold standard and use it to derive a number of useful implications.

#####  The paper's basic finding is that the stability of the European gold standard depended on the stance of the common monetary policy. Under the gold standard, this stance was disturbingly deflationary prior to 1895. As a result, debts became exceedingly heavy and monetary standards crumbled under their weight, not so much because fiscal policies became looser, but rather because debt burdens became unsustainable in the wake of continued deflation. Once gold was discovered and deflation gave way to inflation, real interest rates fell and debt grew more slowly. This study's clear implication for the EMU zone is that stability will hinge on the European Central Bank's (ECB) policy not being too restrictive.

Catao, Luis and Solomos (2003) have investigated the role of exchange rate flexibility in the periphery of the gold standard. This paper builds a new dataset on trade-weighed exchange rates for the period 1870-1913 and finds that large currency movements in periphery countries operating inconvertible paper-money and silver-standard regimes induced major fluctuations in effective exchange rates worldwide. The research relates the phenomenon to the international trade structure at the time and show that such currency fluctuations had powerful effects on trade flows. The research concludes that nominal exchange rate flexibility in the periphery was an important ingredient of international payments adjustment under the gold standard.

Young, Andrew and Shaoyin (2007) have found using monthly NBER reference dates, that, the March 1933 departure from the goldstandard is the most probable breakpoint ushering in an era of longer expansions, both absolutely and relative to recessions that follow. Cover and Pecorino view this finding as a challenge to real business cycle theory (RBCT). However, RBCT, along with most of recent macroeconomic research, has focused on the alternative concept of growth cycles - periods when the economy's production is above or below trend - rather than absolute increases or decreases in economic activity. Furthermore, empirical evaluation of RBCT has focused on the statistical properties of aggregate time series, rather than focusing exclusively on business cycle durations. Using HP-filtered quarterly real GNP, the research demonstrate that tests of growth cycle durations still imply a most probable breakpoint close to 1933. However, research also test for structural breaks in the volatility of real GNP growth rates and deviations from HP-filter trends. These tests suggest that the most probable structural break is considerably later than 1933; perhaps as late as the 1950s. This conclusion is robust to the consideration of the alternative pre-1929 real GNP series constructed by Romer (1989) and Balke and Gordon (1989).

Coleman and Andrew (2010) this paper examine the uncovered interest parity hypothesis using the dollar-sterling exchange rate during the gold standard era. This period is interesting because the exchange rate was seasonal, because transactions costs were high, and because occasions when uncovered interest rate speculation did not occur can be identified. The paper shows UIP speculation frequently did not occur, that speculation occurred more in response to expected exchange rate changes than interest rate differentials, and that profitability varied systematically with interest rate differentials. The estimated UIP equations are substantially improved by distinguishing occasions when sterling was borrowed not lent.

Martins and Campos(1994) this paper presents a structural monetary framework featuring a demand function for non-monetary uses of gold, such as the one drawn by Barsky and Summers in their 1988 analysis of the Gibson paradox as a natural concomitant of the gold standard period. That structural model is subject to government rules to command the money supply. Its fiduciary version obtains Fisherian relationships as particular cases. Its gold standard solution yields a model similar to the Barsky and Summers model, in which interest rates are exogenous and subject to productivity or thrift external shocks. This paper integrates government bonds in the analysis, treats interest rates endogenously, and shifts the responsibility for the shocks to the government budgetary financing policies. The Gibson paradox appears as practically the only class of behavioral pattern open for interest rate and price movements under a pure gold standard economy. Fisherian-like relationships are utterly ruled out.

Salvary and Stanley (2008) has examined the issue of price level changes within the context of money (types and functions), economic systems (barter, monetary, and credit), aggressive business practices, unrestrained consumer credit, and credit cycles Monetarists maintain that changes in the price level are attributable to the level of the money supply. Hence, price stabilityhas been the rationale for the money supply rule derived from the Quantity Theory of Money. Consequently, to curb inflation, the general price level index is the lever for periodic adjustments of the short-term interest rate. Nevertheless, monetary control is ineffective due the fact that: (1) with the collapse of the gold standard during the 1930s and the removal of the final link to a commodity - gold (an exogenous variable with a variable nominal value), fiat money (an endogenous variable with an invariable nominal value) emerged unchallenged; (2) the realignment of relative prices - the perennial cause of changes in the general level of prices - cannot be abated since it is the effective mechanism for the efficient functioning of the economic system; and (3) unrestrained consumer credit - driven by unbridled aggressive business policies and producing documented credit cycles with periods of credit expansion and credit saturation - has severely amplified the impact of price level changes.

Eichengreen, Barry and Peter (1997) this paper, attempts to explain why political leaders and central bankers continued to adhere to the gold standard as the Great Depression intensified. The research does not focus on the effects of the gold standard on the Depression, which we and others have documented elsewhere, but on the reasons why policy makers chose the policies they did. We argue that the mentality of the gold standard was pervasive and compelling to the leaders of the interwar economy. It was expressed and reinforced by the discourse among these leaders. It was opposed and finally defeated by mass politics, but only after the interaction of national policies had drawn the world into the Great Depression.

**Hypotheses**

 **The first hypothesis:**

Ho: In the USA, the coefficient of variation of consumer price index (CPI) will not significantly different or significantly lower than the coefficient of variation of adjusted consumer price index (ACPI).

Ha: In the USA, the coefficient of variation of consumer price index (CPI) will be significantly higher than the coefficient of variation of adjusted consumer price index (ACPI).

**The second hypothesis:**

Ho: In the USA, the mean of inflation rate (IR) will not significantly different or significantly lower than the mean of adjusted inflation rate (AIR).

Ha: In the USA, the mean of inflation rate (IR) will be significantly higher than the mean of adjusted inflation rate (AIR).

**The third hypothesis:**

Ho: In the USA, the coefficient of variation of inflation rate (IR) will not significantly different or significantly higher than the coefficient of variation of adjusted inflation rate (AIR).

Ha: In the USA, the coefficient of variation of inflation rate (IR) will be significantly lower than the coefficient of variation of adjusted inflation rate (AIR).

**The fourth hypothesis:**

Ho: In the UK, the coefficient of variation of consumer price index (CPI) will not significantly different or significantly lower than the coefficient of variation of adjusted consumer price index (ACPI).

Ha: In the UK, the coefficient of variation of consumer price index (CPI) will be significantly higher than the coefficient of variation of adjusted consumer price index (ACPI).

**The fifth hypothesis:**

Ho: In the UK, the mean of inflation rate (IR) will not significantly different or significantly lower than the mean of adjusted inflation rate (AIR).

Ha: In the UK, the mean of inflation rate (IR) will be significantly higher than the mean of adjusted inflation rate (AIR).

**The sixth hypothesis:**

Ho: In the UK, the coefficient of variation of inflation rate (IR) will not significantly different or significantly higher than the coefficient of variation of adjusted inflation rate (AIR).

Ha: In the UK, the coefficient of variation of inflation rate (IR) will be significantly lower than the coefficient of variation of adjusted inflation rate (AIR).

**The seventh hypothesis:**

Ho: In the Japan, the coefficient of variation of consumer price index (CPI) will not significantly different or significantly lower than the coefficient of variation of adjusted consumer price index (ACPI).

Ha: In the Japan, the coefficient of variation of consumer price index (CPI) will be significantly higher than the coefficient of variation of adjusted consumer price index (ACPI).

**The eighth hypothesis:**

Ho: In the Japan, the mean of inflation rate (IR) will not significantly different or significantly lower than the mean of adjusted inflation rate (AIR).

Ha: In the Japan, the mean of inflation rate (IR) will be significantly higher than the mean of adjusted inflation rate (AIR).

**The ninth hypothesis:**

Ho: In the Japan, the coefficient of variation of inflation rate (IR) will not significantly different or significantly higher than the coefficient of variation of adjusted inflation rate (AIR).

Ha: In the Japan, the coefficient of variation of inflation rate (IR) will be significantly lower than the coefficient of variation of adjusted inflation rate (AIR).

**The tenth hypothesis:**

Ho: In the Australia, the coefficient of variation of consumer price index (CPI) will not significantly different or significantly lower than the coefficient of variation of adjusted consumer price index (ACPI).

Ha: In the Australia, the coefficient of variation of consumer price index (CPI) will be significantly higher than the coefficient of variation of adjusted consumer price index (ACPI).

**The eleventh hypothesis:**

Ho: In the Australia, the mean of inflation rate (IR) will not significantly different or significantly lower than the mean of adjusted inflation rate (AIR).

Ha: In the Australia, the mean of inflation rate (IR) will be significantly higher than the mean of adjusted inflation rate (AIR).

**The twelfth hypothesis:**

Ho: In the Australia, the coefficient of variation of inflation rate (IR) will not significantly different or significantly higher than the coefficient of variation of adjusted inflation rate (AIR).

Ha: In the Australia, the coefficient of variation of inflation rate (IR) will be significantly lower than the coefficient of variation of adjusted inflation rate (AIR).

**Theoretical Framework**

 The research will discuss in details all variables related to this study, the importance of them, and why we use them instead of other variable, in order to make the reader able to understand the whole research.

**The consumer price index (CPI):**

A consumer price index (CPI) is a measure estimating the average price of [consumer goods](http://en.wikipedia.org/wiki/Final_goods) and [services](http://en.wikipedia.org/wiki/Consumer_Services) purchased by households. A consumer price index measures a price change for a constant [market basket](http://en.wikipedia.org/wiki/Market_basket) of goods and services from one period to the next within the same area (city, region, or nation)**.**

"Two basic types of data are needed to construct the CPI: price data and weighting data. The price data are collected for a sample of goods and services from a sample of sales outlets in a sample of locations for a sample of times. The weighting data are estimates of the shares of the different types of expenditure as fractions of the total expenditure covered by the index. These weights are usually based upon expenditure data obtained for sampled decades from a sample of households. Although some of the sampling is done using a sampling frame and [probabilistic sampling](http://en.wikipedia.org/wiki/Sampling_%28statistics%29) methods, much is done in a commonsense way (purposive sampling) that does not permit estimation of confidence intervals. Therefore, the sampling variance is normally ignored, since a single estimate is required in most of the purposes for which the index is used. Stocks greatly affect this cause"3.

3 http://en.wikipedia.org/wiki/Consumer\_price\_index.

The index is usually computed yearly, or quarterly in some countries, as a weighted average of sub-indices for different components of consumer expenditure, such as food, housing, clothing, each of which is in turn a weighted average of sub-sub-indices. At the most detailed level, the elementary aggregate level, (for example, men's shirts sold in department stores in San Francisco), detailed weighting information is unavailable, so indices are computed using an unweighted [arithmetic](http://en.wikipedia.org/wiki/Arithmetic_mean) or [geometric mean](http://en.wikipedia.org/wiki/Geometric_mean) of the prices of the sampled product offers. (However, the growing use of [scanner](http://en.wikipedia.org/wiki/Barcode_reader) data is gradually making weighting information available even at the most detailed level.) These indices compare prices each month with prices in the price-reference month. The weights used to combine them into the higher-level aggregates, and then into the overall index, relate to the estimated expenditures during a preceding whole year of the consumers covered by the index on the products within its scope in the area covered. Thus the index is a fixed-weight index, but rarely a true [Laspeyres index](http://en.wikipedia.org/wiki/Laspeyres_index), since the weight-reference period of a year and the price-reference period, usually a more recent single month, do not coincide. It takes time to assemble and process the information used for weighting which, in addition to household expenditure surveys, may include trade and tax data.

Ideally, the weights would relate to the composition of expenditure during the time between the price-reference month and the current month. There is a large technical economics literature on [index formulae](http://en.wikipedia.org/wiki/List_of_price_index_formulas) which would approximate this and which can be shown to approximate what economic theorists call a true [cost of living index](http://en.wikipedia.org/wiki/Cost_of_living_index). Such an index would show how consumer expenditure would have to move to compensate for price changes so as to allow consumers to maintain a constant standard of living. Approximations can only be computed retrospectively, whereas the index has to appear monthly and, preferably, quite soon. Nevertheless, in some countries, notably in the United States and Sweden, the philosophy of the index is that it is inspired by and approximates the notion of a true cost of living (constant utility) index, whereas in most of Europe it is regarded more pragmatically.

The coverage of the index may be limited. Consumers' expenditure abroad is usually excluded; visitors' expenditure within the country may be excluded in principle if not in practice; the rural population may or may not be included; certain groups such as the very rich or the very poor may be excluded. Saving and investment are always excluded, though the prices paid for financial services provided by financial intermediaries may be included along with insurance.

The index reference period, usually called the base year, often differs both from the weight-reference period and the price reference period. This is just a matter of rescaling the whole time-series to make the value for the index reference-period equal to 100. Annually revised weights are a desirable but expensive feature of an index, for the older the weights the greater is the divergence between the current expenditure pattern and that of the weight reference-period.

The CPI is often computed by this equation:
**CPI= (Product X Pricecurrent)/(Product X Price1base)**

Source: http://en.wikipedia.org/wiki/Consumer\_price\_index

**The Adjusted consumer price index (ACPI):**

The Adjusted consumer price index, this indicator has the same aspects of cpi indicator, except that it reflects the goods and services prices in gold, by multiplying the current and base year in the country currency exchange rate with gold.

This equation is used in this research for computing the ACPI:

**ACPI= ( CPIcurrent X exchange rate current )/ (CPIbaseX exchange rate base)**

**The inflation rate (IR):**

"Inflation rate is a rise in the general [level of prices](http://en.wikipedia.org/wiki/Price_level) of goods and services in an [economy](http://en.wikipedia.org/wiki/Economy) over a period of time. When the price level rises, each unit of currency buys fewer goods and services; consequently, annual inflation is also erosion in the [purchasing power](http://en.wikipedia.org/wiki/Purchasing_power) of money – a loss of real value in the internal medium of exchange and unit of account in the economy"4.

 A chief measure of price inflation is the [inflation rate](http://en.wikipedia.org/wiki/Inflation_rate), the annualized percentage change in the [Consumer Price Index](http://en.wikipedia.org/wiki/Consumer_Price_Index) over time (which mentioned above).

Inflation's effects on an economy are manifold and can be simultaneously [positive](http://en.wikipedia.org/wiki/Inflation#Positive) and [negative](http://en.wikipedia.org/wiki/Inflation#Negative).

Negative effects of inflation include a decrease in the real value of money and other monetary items over time; uncertainty about future inflation may discourage

4 http://wapedia.mobi/en/Inflation.

 Investment and saving, or may lead to reductions in investment of productive capital and increase savings in non-producing assets. e.g. selling stocks and buying gold. This can reduce overall economic productivity rates, as the capital required to retool companies becomes more elusive or expensive. High inflation may lead to shortages of [goods](http://en.wikipedia.org/wiki/Good_%28economics%29) if consumers begin [hoarding](http://en.wikipedia.org/wiki/Hoarding) out of concern that prices will increase in the future.

 Positive effects include a mitigation of economic [recessions](http://en.wikipedia.org/wiki/Recession), and [debt relief](http://en.wikipedia.org/wiki/Debt_relief) by reducing the real level of debt.

High rates of inflation and [hyperinflation](http://en.wikipedia.org/wiki/Hyperinflation) can be caused by an excessive growth of the [money supply](http://en.wikipedia.org/wiki/Money_supply). Views on which factors determine low to moderate rates of inflation are more varied. Low or moderate inflation may be attributed to fluctuations in [real](http://en.wikipedia.org/wiki/Real_versus_nominal_value) [demand](http://en.wikipedia.org/wiki/Demand) for goods and services, or changes in available supplies such as during [scarcities](http://en.wikipedia.org/wiki/Scarcity), as well as to growth in the money supply. However, the consensus view is that a long sustained period of inflation is caused by money supply growing faster than the rate of [economic growth](http://en.wikipedia.org/wiki/Economic_growth).

Inflation normally measured by many indicators like:

1. Consumer price index:

We mentioned above in details.

1. [Producer price indices](http://en.wikipedia.org/wiki/Producer_price_index) (PPIs):

 which measures average changes in prices received by domestic producers for their output. This differs from the CPI in that price subsidization, profits, and taxes may cause the amount received by the producer to differ from what the consumer paid. There is also typically a delay between an increase in the PPI and any eventual increase in the CPI. Producer price index measures the pressure being put on producers by the costs of their raw materials. This could be "passed on" to consumers, or it could be absorbed by profits, or offset by increasing productivity. In India and the United States, an earlier version of the PPI was called the [Wholesale Price Index](http://en.wikipedia.org/wiki/Wholesale_price_index).

1. [Commodity price indices](http://en.wikipedia.org/wiki/Commodity_price_index), which measure the price of a selection of commodities. In the present commodity price indices are weighted by the relative importance of the components to the "all in" cost of an employee.
2. [Core price indices](http://en.wikipedia.org/wiki/Core_inflation): because food and oil prices can change quickly due to changes in supply and demand conditions in the food and oil markets, it can be difficult to detect the long run trend in price levels when those prices are included. Therefore most [statistical agencies](http://en.wikipedia.org/wiki/List_of_national_and_international_statistical_services) also report a measure of 'core inflation', which removes the most volatile components (such as food and oil) from a broad price index like the CPI. Because core inflation is less affected by short run supply and demand conditions in specific markets, [central banks](http://en.wikipedia.org/wiki/Central_bank) rely on it to better measure the inflationary impact of current [monetary policy](http://en.wikipedia.org/wiki/Monetary_policy).
3. [GDP deflator](http://en.wikipedia.org/wiki/GDP_deflator) is a measure of the price of all the goods and services included in [Gross Domestic Product](http://en.wikipedia.org/wiki/Gross_Domestic_Product) (GDP). The US Commerce Department publishes a deflator series for US GDP, defined as its nominal GDP measure divided by its real GDP measure.

This research will depends on the consumer price index as a base for measuring the inflation rate for every year because its most widely used, and its data are more available than other indicators.

This equation is used in this research to compute the inflation rate:

IR= (CPIt – CPIt-1)/CPIt-1

Source: <http://en.wikipedia.org/wiki/Inflation>.

**The adjusted inflation rate (AIR):**

The Adjusted inflation rate, this indicator has the same aspects of IR indicator, except that it reflects the goods and services prices in gold.

This equation is used in this research for computing the AIR:

AIR= (ACPIt –ACPIt-1)/ACPIt-1

 **The Gold:**

Gold is thought to be one of the first known metals. The word “gold” came from an old English word geolo, meaning yellow.

 Gold has been a valuable metal throughout the ages because it is scarce and a beautiful metal that has a lovely yellow color and a soft metallic glow. It is soft and easy to work with. It is very malleable and can be easily shaped into various forms. It is highly resistant to rust and is corrosion-resistant.

Gold (AU is the chemical symbol) is also used today in many electrical components. But it’s most well-known use as money — as a medium of exchange. Money used to actually be made out of gold. Gold coins were traded for goods and services.

The phrase “gold standard” is defined as the use of gold as the standard value for the money of a country. If a country will redeem any of its money in gold it is said to be using the gold standard. The U.S. and many other Western countries adhered to the gold standard during the early 1900’s.

Today, however, gold’s role in the worldwide monetary system is negligible. Britain abandoned the gold standard 1931; the USA abandoned it 1971. Holdings of gold are still retained because it is an internationally recognized commodity, which cannot be legislated upon or manipulated by interested countries. On August 15, 1971, the world entered the first era in its history in which no circulating paper anywhere was redeemable in gold, by anyone. At one point in time it was illegal for a U.S. citizen to own gold.

President Richard Nixon of U.S. closed the “gold window.” This action broke the last tie between gold and circulating currency, resulting in our modern financial system which is called a “floating currency” system.

Source :http://www.essortment.com/all/goldstandards\_rgvh.htm.

**The Fiat Money:**

Fiat money is currency, which is declared by a government to be legal tender, i.e. it is not backed by a physical commodity and has value solely because a government accepts it for payments of taxes and debts. Virtually, almost all of the world's Currency today is fiat money with the most popular ones being the US Dollar, the Euro, the Japanese Yen, the British Pound, and the Australian dollar.
"The origin of the fiat money system dates back to early 11th century when the Chinese Song dynasty issued paper money subject to be redeemed for gold after three years. In reality, though, the banknotes were never redeemed, which created an enormous amount of inflation due to printing money exceeding production levels, and the system was soon abandoned"5.
Fiat money has made appearance on the world economic scene on several occasions but it was not until the beginning of the 20th century that its universal application became a topic of serious debates. By this period, most nations already had a government monopoly on printing money, which were to be redeemed in gold upon request. However, with the outburst of World War I and the escalation of military expenditure, governments suspended the redemption of the already printed banknotes. Furthermore, country officials could not be held directly responsible for the eventual negative consequences of creating money with no intrinsic value and as a result, the increased supply of money devalued the [currency](http://www.centralbanksguide.com/currency%2Bissuance/) of the countries.
Following this economic shock, at the infamous Bretton-Woods Conference in 1945, the world's leading countries decided to take precautionary measures against the frivolous government printing. The US Dollar was pegged to the gold at a fixed rate per troy ounce, and a guarantee to redeem US dollars for gold was provided by the US government. This change proved to be beneficial for the trade balances of countries, but the whole system collapsed 26 years later when, during President Nixon's fiscal policy reforms, the gold standard was removed.

5 http://www.centralbanksguide.com/fiat+money.

 With the US dollar being declared legal tender, the government was again able to print currency in order to support its increasing spending needs. This process combined with the slow economic growth at the time (caused by the Oil Crisis) led to the US falling into one of their most serious financial downfall's the period of stagflation, which encompassed the whole 70s decade.

Fiat money has been an object of severe criticism ever since its creation. Opponents of the system argue that by not backing up their currency to something tangible, governments facilitate unjustifiable printing of money, which has been proven to generate inflation.

 Furthermore as the Austrian School of Economics points out, printed money creates an explosion of debt, often mistaken for a symptom of increased economic growth. Instead, they argue, the newly released money is not backed up by any assets or an increase in the productivity of the country which, according to Austrian economists, is the real cause of economic growth.

Source: http://www.centralbanksguide.com/fiat+money.

**Price Stability:**

The objective of price stability refers to the general level of prices in the economy. It implies avoiding both prolonged inflation and deflation. Price stability contributes to achieving high levels of economic activity and employment by:

* Improving the transparency of the price mechanism. Under price stability people can recognize changes in relative prices (i.e. prices between different goods), without being confused by changes in the overall price level. This allows them to make well-informed consumption and investment decisions and to allocate resources more efficiently.
* Reducing inflation risk premium in interest rates (i.e. compensation creditors ask for the risks associated with holding nominal assets). This reduces real interest rates and increases incentives to invest.
* Avoiding unproductive activities to hedge against the negative impact of inflation or deflation.
* Reducing distortions of inflation or deflation, which can exacerbate the bad impact on economic behavior of tax and social security systems.
* Preventing an arbitrary redistribution of wealth and income as a result of unexpected inflation or deflation.

Source:http://www.ecb.europa.eu/mopo/intro/benefits/html/index.en.html.

In general, governments put the price stability goal in the priority of its economic goals, and they use the both monetary and fiscal policy to achieve this goal.

 However a lot of studies show that the prices after gold standard and the ending of Bretton Woods Agreement fluctuate more than it was, and the floating exchange system has brought a lot of fluctuation in exchange rate and high rising in the cost of living, which has renewed the interest in the gold standard as a way to stabilize the purchasing power of the our money.

Today some economists advocate the return to the gold standard, because of its ability to stabilize the purchasing power, which will influence all our life standards.

 The opponents of gold standard say that the gold price is affected by the law of supply and demand and by its production.

The purpose of this research is to find out if the gold price stability still existed after 1971, or the gold price fluctuate more than the fiat money price according to the law of supply and demand and its production , and it's irrelevant to be the base of our economic.

 In order to measure the price stability, this research used these six indicators in every country (USA, UK, Japan, and Australia):

1. MIR:

The mean of inflation rate which measures the price stability in the long run, we calculated by using this formula:

$$MIR=\frac{1}{N }\sum\_{t=1}^{N}IR$$

IR: inflation rate.

N: number of years, which is in this research 39 years.

t: year

1. MAIR:

The mean of adjusted inflation rate which measures the price stability in the long run, but it reflects the goods and services prices in gold.

We calculated by using this formula:

$$MAIR=\frac{1}{N }\sum\_{t=1}^{N}AIR$$

AIR: adjusted inflation rate.

N: number of years.

t: year.

1. CVIR:

The coefficient of variation of IR, which measures the price stability in the short run, we calculated by using this formula:

*CVIR= σIR /MIR*

MIR: mean of inflation rate.

*σIR*: standard deviation of inflation rate.

1. CVAIR:

The coefficient of variation of AIR, which measures the price stability in the short run, but it reflects the goods and services prices in gold. We calculated by using this formula:

*CVAIR= σAIR /MAIR*

MAIR: mean of adjusted inflation rate.

*σIR*: standard deviation of adjusted inflation rate.

1. CVCPI:

The coefficient of variation of CPI, which is a general indicator of price stability.

We calculated by using this formula:

*CVCPI= σCPI /MCPI*

1. CVACPI:

The coefficient of variation of ACPI, which is a general indicator of price stability, but it reflects the goods and services prices in gold.

We calculated by using this formula:

*CVACPI= σACPI /MACPI*

**Methodology**

In this research yearly CPI data and yearly average exchange rate between gold and the currency of the studied country will be used to calculate the MIR, MAIR, CVIR, CVAIR, CVCPI, and CVACPI in all countries.

The CPI data collected from various resources available for public like the united state department of labor website www.bls.gov, and [rateinflation.com](http://www.rateinflation.com) website, the exchange rate and the price of gold data collected from the goldprice.org and the fx.sauder.ubc.ca websites.

All yearly data collected about these countries (USA, UK, Japan, and Australia) from 1971 to 2009, so this research contains 39 yearly observations for each variable.

The variables of this study are:

1. The consumer price index (CPI) in the USA.
2. The adjusted consumer price index for gold (ACPI) in the USA.
3. The inflation rate (IR) in the USA.
4. The adjusted inflation rate for gold (AIR) in the USA.
5. The consumer price index (CPI) in the UK.
6. The adjusted consumer price index for gold (ACPI) in the UK.
7. The inflation rate (IR) in the UK.
8. The adjusted inflation rate for gold (AIR) in the UK.
9. The consumer price index (CPI) in the Japan.
10. The adjusted consumer price index for gold (ACPI) in the Japan.
11. The inflation rate (IR) in the Japan.
12. The adjusted inflation rate for gold (AIR) in the Japan.
13. The consumer price index (CPI) in the Australia.
14. The adjusted consumer price index for gold (ACPI) in the Australia.
15. The inflation rate (IR) in the Australia.
16. The adjusted inflation rate for gold (AIR) in the Australia.

**Analysis tools:**

This research used these six indicators in every country (USA, UK, Japan, Australia) to measure the price stability:

1. MIR:

The mean of inflation rate which measures the price stability in the long run, we calculated by using this formula:

$$MIR=\frac{1}{N }\sum\_{t=1}^{N}IR$$

IR: inflation rate.

N: number of years, which is in this research 39 years.

t: year

1. MAIR:

The mean of adjusted inflation rate which measures the price stability in the long run, but it reflects the goods and services prices in gold.

We calculated by using this formula:

$$MAIR=\frac{1}{N }\sum\_{t=1}^{N}AIR$$

AIR: adjusted inflation rate.

N: number of years.

t: year.

1. CVIR:

The coefficient of variation of IR, which measures the price stability in the short run, we calculated by using this formula:

*CVIR= σIR /MIR*

MIR: mean of inflation rate.

*σIR*: standard deviation of inflation rate.

1. CVAIR:

The coefficient of variation of AIR, which measures the price stability in the short run, but it reflects the goods and services prices in gold. We calculated by using this formula:

*CVAIR= σAIR /MAIR*

MAIR: mean of adjusted inflation rate.

*σIR*: standard deviation of adjusted inflation rate.

1. CVCPI:

The coefficient of variation of CPI, which is a general indicator of price stability.

We calculated by using this formula:

*CVCPI= σCPI /MCPI*

1. CVACPI:

The coefficient of variation of ACPI, which is a general indicator of price stability, but it reflects the goods and services prices in gold.

We calculated by using this formula:

*CVACPI= σACPI /MACPI*

Actually many researchers have used the same first four indicators when they were studying the ability of gold standard (before 1914) to stabilize the purchasing power comparing with the fiat money system , like Ola Grytten, Arngirm Hunnes (2009), and Michael D. Bordo (2003).

The major two differences of this research comparing with the previous researches are:

1. Investigate the ability of gold (not the gold standard) to stabilize the purchasing power comparing with the fiat money after the Bretton woods Agreement ended (1971).
2. Adding a new indicator of price stability CVCPI and CVACPI.

**Results and Discussion**

The analysis has done in the following way in order to test which has the ability to stabilize the purchasing power more after 1971, the gold or the country's currency in the following countries (USA, UK, Japan, and Australia).

1. The MIR and the MAIR :

 Figure (1).

As we can see, the mean of inflation was range from (3.1%) in Japan to (6.91%) in the UK, while the mean of adjusted inflation was rang from

 (-1.79%) in the USA to (0.1%) in the Japan.

The mean of adjusted inflation was lower than the mean of inflation in all countries, which refer to the ability of gold to bring much more price stability in all countries for long run.

 Thus, we can reject the null hypothesis H0, and confirm the alternative hypothesis H1 for all countries.

This conclusion supports Grytten and Hunnesy (2009) research results which studied in the 1870s ,the three Scandinavian countries Denmark, Norway and Sweden formed the Scandinavian Currency Union, and it concludes that the long run price stability in every county when they were under the gold standard, was better than when they were under the than fiat money system.

 The mean of inflation in that research was range from 0% in Denmark to 0.25% in Sweden when they where under the gold standard, while the mean of inflation was range from 4.96% in Norway to 5.08% in Sweden under the fiat money system.

This result also support Bordo (2003) research results which studied the long run price stability in the USA under the gold standard and the fiat money, by comparing the mean of inflation under gold standard which was 0.1% and the mean of inflation under the fiat money which was 4.2%. So, it concludes that the gold standard has the ability to bring much more long run price stability than the fiat money system.

According to our research result and the previous research results, we can have a strong conclusion that the gold still has the ability to stabilize the purchasing power more than the fiat money system in the long run after 1971 when the Bretton Woods Agreement ended.

1. The CVIR and the CVAIR:

 Figure (2).

The coefficient of variation of the IR was range from 0.656 in the USA to 1.56 in the Japan, while the coefficient of variation of the AIR was range from 10.98 in the USA to 197.45 in the Japan.

As we can see, the coefficient of variation of the IR was lower than the coefficient of variation of the AIR in all countries, which refer to the ability of fiat money representative in our study (US dollar, GBP, Yen, and Australian dollar) to bring much more price stability than the gold in the short run.

Thus, we can reject the null hypothesis H0, and confirm the alternative hypothesis H1 for all countries.

 This result support Bordo (2003) research results which studied the short run price stability in the USA under the gold standard and the fiat money, by comparing the coefficient of variation of IR under gold standard which was (17) and the coefficient of variation of the IR under the fiat money system which was (0.8), it concludes that the fiat money system has the ability to bring much more short run price stability than the gold standard system.

Actually, many economists explained why the gold standard doesn't have the ability to stabilize the purchasing power in the short run.

They conclude that the discovery of a new gold mine increases the local supply of gold, but does not affect real outputs in the short run, thereby raising prices.

 Thus, while inflation rates were low during the period of gold standard, prices could have been unstable. And they named this phenomenon (monetary shock).

We can add nowadays, other explanations to inability of gold in the short run to stabilize the purchasing power after 1971:

1. People look at gold as an inflation hedge, and increasing the fluctuation of the exchange rate around the world after 1971, leads the people to carry gold within the crisis or uncertainties which lead to more fluctuation on the gold price in the short run.

 Gold nowadays go up and down randomly without accompanying in real economic growth.

1. Increasing the speculation after 1971 in all currency and commodity including the gold.

Finally, according to our research result and the previous research results, we can have a strong conclusion that the fiat money has the ability to stabilize the purchasing power more than the gold in the short run.

1. The CVCPI and the CVACPI:

 Figure (3).

The coefficient of variation of the CPI was higher than the coefficient of variation of the ACPI in three countries (USA, UK, and Australia) which reflect the general ability of gold to stabilize the purchasing power more than the fiat money in these countries.

By looking at the curves below:

 Figure (4).

 Figure (5).

 Figure (6).

* It is very clear, that the price stability under the GBP, Australian dollar, and US dollar currencies was more stable than under gold commodity after 1971.

Thus, we can reject the null hypothesis which related to these currencies (GBP, US dollar, and Australian dollar) and confirm the alternative hypothesis for these currencies (GBP, US dollar, and Australian dollar).

Thus, the price stability under the gold commodity, are more stable than under GBP, Australian dollar, and US dollar currencies after 1971.

The gold has the general ability to stabilize the purchasing power more than these currencies (GBP, Australian dollar, and US dollar) after the ending of Bretton Woods Agreement.

* Otherwise the coefficient of variation of the CPI was lower than the coefficient of variation of the ACPI in the Japan, (0.253), (0.4101) respectively (see the general indicator of price stability table) which reflect the general ability of yen to stabilize the purchasing power more than the gold.

 We can't reject the null hypothesis H0 and can't confirm the alternative hypothesis H1 for the Japan country.

Thus, the price stability under the Yen currency, are more stable than under the gold after 1971.

We can explain this result by:

1. Looking at the short run price stability table:

 We can see that unlike the USA, UK, and Australia, the coefficient of variation of the AIR was extremely high (197.45) and it differs from the coefficient of variation of IR (195.89), while this difference was range from

 10.28 In the UK to 13.674 in the Australia.

2- Looking at the long run price stability table:

 We can see that unlike the USA, UK, and Australia, the MIR in the Japan was lower than in the other countries, and also the difference between the MIR and MAIR was lower in the Japan(0.03), while it was (0.0604),(0.0839),(0.0747) in the other counties respectively.

And by looking at the curve below:

 Figure (7):

It is very clear, that the price stability under the Yen was more stable than under gold commodity after 1971.

The Yen currency has the general ability to stabilize the purchasing power more than the gold commodity after the ending of Bretton Woods Agreement.

**Conclusion**

In this study the research examined if the gold has the ability to stabilize the purchasing power more than the fiat money system after the ending of Bretton Woods Agreement in 1971.

The research has studied the price stabilizing in four countries (USA, UK, Japan, and Australia) after 1971, and it found that gold has the ability to stabilize the purchasing power more in the long run in all countries.

While the fiat money system has the ability to stabilize the purchasing power more than the gold in the short runs, because of the discovery of a new gold mine increases the local supply of gold, but does not affect real outputs in the short run, and increasing the speculation of gold cause it to fluctuate a lot in the short run.

In general the research has found that the gold has the ability to stabilize the purchasing power more in three countries (USA, Australia, and UK), while the Yen has the ability to stabilize the purchasing power more than the gold after 1971.

The research conclusion supports the previous researches that conclude the same result when they comparing the price stability under the gold standards and fiat money system.

In further research, we recommend to consider more countries in the world especially Arab countries, and also to use more advanced statistical model, which may give us more accurate results and allow us to make a stronger conclusion.

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* <http://www.investorwords.com>

**Appendix**

**Table (1) the consumer price index:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CPI in Australia** | **CPI in Japan** | **CPI in UK** | **CPI in USA** (1) | **Year** |
| 18.1 | 33.8 | 80 | 40.5 | 1971 |
| 19.4 | 35.2 | 85.7 | 41.8 | 1972 |
| 20.5 | 37.5 | 93.5 | 44.4 | 1973 |
| 23.3 | 45.8 | 108.5 | 49.3 | 1974 |
| 27.4 | 53.8 | 134.8 | 53.8 | 1975 |
| 31 | 58.5 | 157.1 | 56.9 | 1976 |
| 35.3 | 64 | 182 | 60.6 | 1977 |
| 38.2 | 66.9 | 197.1 | 65.2 | 1978 |
| 41.3 | 69.3 | 223.5 | 72.6 | 1979 |
| 45.7 | 73.9 | 263.7 | 82.4 | 1980 |
| 50 | 79.3 | 295 | 90.9 | 1981 |
| 55.3 | 81.8 | 220.4 | 96.5 | 1982 |
| 61.6 | 83.6 | 335.1 | 99.6 | 1983 |
| 65.2 | 85.2 | 351.8 | 103.9 | 1984 |
| 68.1 | 87.5 | 373.2 | 107.6 | 1985 |
| 74.4 | 88.8 | 385.9 | 109.3 | 1986 |
| 81.4 | 87.8 | 402 | 113.6 | 1987 |
| 87 | 88.6 | 421.7 | 118.3 | 1988 |
| 92.9 | 89.6 | 454.5 | 124 | 1989 |
| 100.9 | 92.5 | 497.5 | 130.7 | 1990 |
| 105.8 | 96.2 | 526.7 | 136.2 | 1991 |
| 107.6 | 97.9 | 546.4 | 140.3 | 1992 |
| 108.9 | 99.1 | 555.1 | 144.5 | 1993 |
| 110.4 | 100.4 | 568.5 | 148.2 | 1994 |
| 114.7 | 100.9 | 588.2 | 152.4 | 1995 |
| 119 | 100.4 | 602.4 | 156.9 | 1996 |
| 120.5 | 101 | 621.3 | 160.5 | 1997 |
| 120.3 | 102.9 | 642.6 | 163 | 1998 |
| 121.8 | 103.1 | 652.5 | 166.6 | 1999 |
| 125.2 | 102.4 | 671.8 | 172.2 | 2000 |
| 132.7 | 102 | 683.7 | 177.1 | 2001 |
| 136.6 | 100.6 | 695.1 | 179.9 | 2002 |
| 141.3 | 100.2 | 715.2 | 184 | 2003 |
| 144.1 | 99.9 | 724.816 | 188.9 | 2004 |
| 147.5 | 100.1 | 740 | 195.3 | 2005 |
| 151.9 | 100 | 757.3 | 201.6 | 2006 |
| 155.6 | 100 | 774.8 | 207.3 | 2007 |
| 162.2 | 100.7 | 802.8 | 215.3 | 2008 |

Source: <http://www.rateinflation.com/consumer-price-index>.

**Table (2) the adjusted consumer price index:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ACPI in Australia** | **ACPI in Japan** | **ACPI in UK** | **ACPI in USA**  | **Year** |
| 248.1401275 | 93.82130927 | 190.5247 | 425.7385478 | 1971 |
| 194.3016259 | 78.00794389 | 145.6446 | 305.5220782 | 1972 |
| 146.6744145 | 55.67650535 | 93.50064 | 194.6688551 | 1973 |
| 106.7885082 | 39.97704778 | 65.47376 | 136.6954531 | 1974 |
| 109.351731 | 44.22633674 | 73.69251 | 142.8111386 | 1975 |
| 149.2733329 | 62.07533246 | 89.96133 | 194.775531 | 1976 |
| 129.9375317 | 63.299039 | 85.36476 | 175.0284072 | 1977 |
| 111.04368 | 64.50062408 | 77.68448 | 143.9524286 | 1978 |
| 74.05555193 | 40.54187595 | 61.49034 | 101.307842 | 1979 |
| 41.56328057 | 20.81206223 | 39.61249 | 57.21105629 | 1980 |
| 61.28604705 | 30.68793594 | 51.22799 | 84.37891213 | 1981 |
| 73.41711882 | 34.27980602 | 40.7047 | 109.5890946 | 1982 |
| 63.98561365 | 32.35761515 | 47.28667 | 99.59999892 | 1983 |
| 77.96381342 | 38.98267554 | 51.52749 | 122.8955665 | 1984 |
| 74.09956259 | 45.42269298 | 60.05705 | 144.9375379 | 1985 |
| 66.591871 | 56.19903966 | 61.10457 | 126.8236399 | 1986 |
| 62.73778669 | 53.29804174 | 58.42184 | 108.5172248 | 1987 |
| 76.65273568 | 62.08978115 | 68.2359 | 115.5929049 | 1988 |
| 95.47790831 | 66.87779979 | 77.58992 | 138.9711271 | 1989 |
| 100.8682032 | 65.35869476 | 91.5646 | 145.5213668 | 1990 |
| 111.5390685 | 77.50837793 | 101.9724 | 160.6069961 | 1991 |
| 112.940561 | 88.16071425 | 110.8762 | 174.2426251 | 1992 |
| 100.8155581 | 97.18128012 | 91.98884 | 171.5026248 | 1993 |
| 103.1662542 | 100.3998626 | 90.06553 | 164.7953107 | 1994 |
| 108.7105628 | 109.6333218 | 96.14498 | 169.5583504 | 1995 |
| 111.3657889 | 93.37440849 | 96.33707 | 172.7554712 | 1996 |
| 133.0100606 | 98.87888463 | 122.1457 | 207.0373369 | 1997 |
| 126.3022499 | 104.9075801 | 143.7772 | 236.5449947 | 1998 |
| 138.266 | 127.5370059 | 150.4449 | 254.9939036 | 1999 |
| 128.2939947 | 133.5307653 | 144.9703 | 263.4423675 | 2000 |
| 124.0019182 | 121.5298659 | 144.4878 | 279.0056788 | 2001 |
| 117.8367696 | 101.7512705 | 133.7509 | 248.0137512 | 2002 |
| 124.5785074 | 93.35171187 | 127.842 | 216.2144288 | 2003 |
| 127.0684523 | 88.46782873 | 128.7972 | 196.8668826 | 2004 |
| 124.1672729 | 80.19559819 | 120.26 | 187.509779 | 2005 |
| 93.0030638 | 55.89171061 | 91.87092 | 142.649387 | 2006 |
| 92.19573738 | 47.91979106 | 88.76036 | 127.2913028 | 2007 |
| 77.78670994 | 43.83898459 | 58.27866 | 105.4327022 | 2008 |

Note: all numbers in this table are calculated by using tables (1), (5), (6), and this formula:

ACPI= ( CPIcurrent X exchange rate current )/ (CPIbaseX exchange rate base).

**Table (3) the adjusted inflation rate:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **AIR in Australia** | **AIR in Japan** | **AIR in UK** | **AIR in USA**  | **Year** |
| -0.21697 | -0.16855 | -0.235560256 | -0.0744 | 1971 |
| -0.24512 | -0.28627 | -0.358022043 | -0.2824 | 1972 |
| -0.27193 | -0.28198 | -0.299750701 | -0.3628 | 1973 |
| 0.024003 | 0.106293 | 0.125527512 | -0.2978 | 1974 |
| 0.365075 | 0.403583 | 0.220766242 | 0.0447 | 1975 |
| -0.12953 | 0.019713 | -0.051094975 | 0.3639 | 1976 |
| -0.14541 | 0.018983 | -0.089970182 | -0.1014 | 1977 |
| -0.3331 | -0.37145 | -0.208460356 | -0.1775 | 1978 |
| -0.43876 | -0.48665 | -0.355793285 | -0.2962 | 1979 |
| 0.474524 | 0.474526 | 0.293228128 | -0.4353 | 1980 |
| 0.197942 | 0.117045 | -0.205420634 | 0.4749 | 1981 |
| -0.12846 | -0.05607 | 0.161700387 | 0.2988 | 1982 |
| 0.218458 | 0.204745 | 0.0896831 | -0.0912 | 1983 |
| -0.04956 | 0.165202 | 0.165534214 | 0.2339 | 1984 |
| -0.10132 | 0.237246 | 0.017442051 | 0.1794 | 1985 |
| -0.05788 | -0.05162 | -0.043903915 | -0.125 | 1986 |
| 0.221795 | 0.164954 | 0.167986205 | -0.1443 | 1987 |
| 0.24559 | 0.077114 | 0.137083573 | 0.0652 | 1988 |
| 0.056456 | -0.02271 | 0.180109442 | 0.2022 | 1989 |
| 0.10579 | 0.185892 | 0.11366675 | 0.0471 | 1990 |
| 0.012565 | 0.137435 | 0.087315437 | 0.1037 | 1991 |
| -0.10736 | 0.10232 | -0.170346466 | 0.0849 | 1992 |
| 0.023317 | 0.033119 | -0.020908159 | -0.0157 | 1993 |
| 0.053741 | 0.091967 | 0.067500394 | -0.0391 | 1994 |
| 0.024425 | -0.1483 | 0.001997904 | 0.0289 | 1995 |
| 0.194353 | 0.058951 | 0.267898882 | 0.0189 | 1996 |
| -0.05043 | 0.060971 | 0.177095948 | 0.1984 | 1997 |
| 0.094723 | 0.215708 | 0.046375242 | 0.1425 | 1998 |
| -0.07212 | 0.046996 | -0.036389117 | 0.078 | 1999 |
| -0.03346 | -0.08987 | -0.003328468 | 0.0331 | 2000 |
| -0.04972 | -0.16275 | -0.074310236 | 0.0591 | 2001 |
| 0.057213 | -0.08255 | -0.044178311 | -0.1111 | 2002 |
| 0.019987 | -0.05232 | 0.007471807 | -0.1282 | 2003 |
| -0.02283 | -0.09351 | -0.066283844 | -0.0895 | 2004 |
| -0.25099 | -0.30306 | -0.23606431 | -0.0475 | 2005 |
| -0.00868 | -0.14263 | -0.033857946 | -0.2392 | 2006 |
| -0.15629 | -0.08516 | -0.343415642 | -0.1077 | 2007 |
| -0.21697 | -0.16855 | -0.235560256 | -0.1717 | 2008 |

Note: all numbers in this table are calculated by using table (2) and this formula:

AIR= (ACPIt –ACPIt-1)/ACPIt-1

ACPIt: the adjusted consumer price index for year t

**Table (4) the inflation rate:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IR in Australia** | **IR in Japan** | **IR in UK** | **IR in USA**  | **Year** |
| 0.071823 | 0.04142 | 0.07125 | 0.043814 | 1971 |
| 0.056701 | 0.065341 | 0.091015 | 0.032099 | 1972 |
| 0.136585 | 0.221333 | 0.160428 | 0.062201 | 1973 |
| 0.175966 | 0.174672 | 0.242396 | 0.11036 | 1974 |
| 0.131387 | 0.087361 | 0.16543 | 0.091278 | 1975 |
| 0.13871 | 0.094017 | 0.158498 | 0.057621 | 1976 |
| 0.082153 | 0.045313 | 0.082967 | 0.065026 | 1977 |
| 0.081152 | 0.035874 | 0.133942 | 0.075908 | 1978 |
| 0.106538 | 0.066378 | 0.179866 | 0.113497 | 1979 |
| 0.094092 | 0.073072 | 0.118695 | 0.134986 | 1980 |
| 0.106 | 0.031526 | -0.25288 | 0.103155 | 1981 |
| 0.113924 | 0.022005 | 0.520417 | 0.061606 | 1982 |
| 0.058442 | 0.019139 | 0.049836 | 0.032124 | 1983 |
| 0.044479 | 0.026995 | 0.06083 | 0.043173 | 1984 |
| 0.092511 | 0.014857 | 0.03403 | 0.035611 | 1985 |
| 0.094086 | -0.01126 | 0.041721 | 0.015799 | 1986 |
| 0.068796 | 0.009112 | 0.049005 | 0.039341 | 1987 |
| 0.067816 | 0.011287 | 0.07778 | 0.041373 | 1988 |
| 0.086114 | 0.032366 | 0.094609 | 0.048183 | 1989 |
| 0.048563 | 0.04 | 0.058693 | 0.054032 | 1990 |
| 0.017013 | 0.017672 | 0.037403 | 0.042081 | 1991 |
| 0.012082 | 0.012257 | 0.015922 | 0.030103 | 1992 |
| 0.013774 | 0.013118 | 0.02414 | 0.029936 | 1993 |
| 0.038949 | 0.00498 | 0.034653 | 0.025606 | 1994 |
| 0.037489 | -0.00496 | 0.024141 | 0.02834 | 1995 |
| 0.012605 | 0.005976 | 0.031375 | 0.029528 | 1996 |
| -0.00166 | 0.018812 | 0.034283 | 0.022945 | 1997 |
| 0.012469 | 0.001944 | 0.015406 | 0.015576 | 1998 |
| 0.027915 | -0.00679 | 0.029579 | 0.022086 | 1999 |
| 0.059904 | -0.00391 | 0.017714 | 0.033613 | 2000 |
| 0.02939 | -0.01373 | 0.016674 | 0.028455 | 2001 |
| 0.034407 | -0.00398 | 0.028917 | 0.01581 | 2002 |
| 0.019816 | -0.00299 | 0.013445 | 0.02279 | 2003 |
| 0.023595 | 0.002002 | 0.020949 | 0.02663 | 2004 |
| 0.029831 | -0.001 | 0.023378 | 0.03388 | 2005 |
| 0.024358 | 0 | 0.023108 | 0.032258 | 2006 |
| 0.042416 | 0.007 | 0.036138 | 0.028274 | 2007 |
| 0.071823 | 0.04142 | 0.07125 | 0.038591 | 2008 |

Source: http://www.rateinflation.com/inflation-rate/usa-inflation-rate.php

**Table (5) the price of gold:**

|  |  |  |
| --- | --- | --- |
| **Australian dollar per 1 ounce** | **US$ per 1ounce** | **Year** |
| 35.81484203 | 40.62 | 1971 |
| 49.02377622 | 58.42 | 1972 |
| 68.6247798 | 97.39 | 1973 |
| 107.1304348 | 154 | 1974 |
| 123.0286807 | 160.86 | 1975 |
| 101.9673025 | 124.74 | 1976 |
| 133.3894737 | 147.84 | 1977 |
| 168.9082969 | 193.4 | 1978 |
| 273.8255034 | 306 | 1979 |
| 539.8683248 | 615 | 1980 |
| 400.5805515 | 460 | 1981 |
| 369.8360656 | 376 | 1982 |
| 472.6937269 | 427 | 1983 |
| 410.6161137 | 361 | 1984 |
| 451.2455516 | 317 | 1985 |
| 548.5714286 | 368 | 1986 |
| 637.0546318 | 447 | 1987 |
| 557.2794899 | 437 | 1988 |
| 477.7429467 | 381 | 1989 |
| 491.1547492 | 383.51 | 1990 |
| 465.7363344 | 362.11 | 1991 |
| 467.7823129 | 343.82 | 1992 |
| 530.3734644 | 359.77 | 1993 |
| 525.4275941 | 384 | 1994 |
| 518.0517435 | 383.79 | 1995 |
| 524.6583991 | 387.81 | 1996 |
| 444.8197088 | 331.02 | 1997 |
| 467.6662252 | 294.24 | 1998 |
| 432.5271318 | 278.98 | 1999 |
| 479.1587983 | 279.11 | 2000 |
| 525.4410339 | 271.04 | 2001 |
| 569.1822358 | 309.73 | 2002 |
| 556.9042146 | 363.38 | 2003 |
| 556.810872 | 409.72 | 2004 |
| 583.2655738 | 444.74 | 2005 |
| 801.9401993 | 603.46 | 2006 |
| 828.6673287 | 695.39 | 2007 |
| 1023.827789 | 871.96 | 2008 |

Source: goldprice.org

**Table (6) the exchange rate:**

|  |  |  |
| --- | --- | --- |
| **US $ per 1 GBP** | **US $ per 1GBP** | **Year** |
| 348.046 | 0.41667 | 1971 |
| 303.1124 | 0.41092 | 1972 |
| 271.3978 | 0.40039 | 1973 |
| 291.9412 | 0.40817 | 1974 |
| 296.7663 | 0.42776 | 1975 |
| 296.478 | 0.45204 | 1976 |
| 268.3813 | 0.55651 | 1977 |
| 210.4588 | 0.57327 | 1978 |
| 219.2145 | 0.52150 | 1979 |
| 226.5769 | 0.47218 | 1980 |
| 220.4495 | 0.43029 | 1981 |
| 249.0511 | 0.49764 | 1982 |
| 237.4451 | 0.57245 | 1983 |
| 237.5867 | 0.65973 | 1984 |
| 238.4719 | 0.75181 | 1985 |
| 168.4991 | 0.77925 | 1986 |
| 144.6229 | 0.68220 | 1987 |
| 128.1426 | 0.61193 | 1988 |
| 137.9947 | 0.56217 | 1989 |
| 144.8182 | 0.61117 | 1990 |
| 134.5077 | 0.56318 | 1991 |
| 126.747 | 0.56702 | 1992 |
| 111.2314 | 0.56977 | 1993 |
| 102.1953 | 0.66676 | 1994 |
| 94.10578 | 0.65343 | 1995 |
| 108.8048 | .63367  | 1996 |
| 121.0947 | 0.64096 | 1997 |
| 130.8182 | 0.61084 | 1998 |
| 113.7132 | 0.60382 | 1999 |
| 107.8213 |  0.618 | 2000 |
| 121.5193 |  0.660 | 2001 |
| 125.2669 |  0.694 | 2002 |
| 115.9166 |  0.667 | 2003 |
| 108.1569 |  0.612 | 2004 |
| 110.1384 |  0.546 | 2005 |
| 116.3498 |  0.550 | 2006 |
| 117.7655 |  0.543 | 2007 |
| 103.3794 |  0.499 | 2008 |

Source: www.fx.sauder.ubc.ca .

**Table (7) the standard deviation of CPI:**

|  |  |
| --- | --- |
| **Standard deviation of CPI** | **County** |
| 53.46 | USA |
| 231.2 | UK |
| 21.15 | Japan |
| 46.13 | Australia |

Note: the standard deviation is calculated by using this formula:

$$Standard deviation of CPI=\sqrt{\frac{\sum\_{t=1}^{N}\left( CPI-MCPI\right)}{N}} $$

N: the number of year, which in our study 39 years.

t: year

MCPI: the mean of consumer price index.

**Table (8) the standard deviation of ACPI:**

|  |  |
| --- | --- |
| **Standard deviation of CPI** | **County** |
| 70.42 | USA |
| 35.75 | UK |
| 28.88 | Japan |
| 38.1 | Australia |

Note: the standard deviation is calculated by using this formula:

$$Standard deviation of ACPI=\sqrt{\frac{\sum\_{t=1}^{N}\left( ACPI-MACPI\right)}{N}} $$

N: the number of year, which in our study 39 years.

t: year

MACPI: the mean of adjusted consumer price index.

**Table (9) the standard deviation of IR:**

|  |  |
| --- | --- |
| **Standard deviation of IR** | **County** |
| 0.0297 | USA |
| 0.1 | UK |
| 0.0483 | Japan |
| 0.0425 | Australia |

Note: the standard deviation is calculated by using this formula:

$$Standard deviation of IR=\sqrt{\frac{\sum\_{t=1}^{N}\left( IR-MIR\right)}{N}} $$

N: the number of year, which in our study 39 years.

t: year

MIR: the mean of inflation rate.

**Table (10) the standard deviation of AIR:**

|  |  |
| --- | --- |
| **Standard deviation of AIR** | **County** |
| 0.1966 | USA |
| 0.1747 | UK |
| 0.199 | Japan |
| 0.186 | Australia |

Note: the standard deviation is calculated by using this formula:

$$Standard deviation of AIR=\sqrt{\frac{\sum\_{t=1}^{N}\left(AIR-MAIR\right)}{N}} $$

N: the number of year, which in our study 39 years.

t: year

MAIR: the mean of adjusted inflation rate.