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# The Silent Tax: A Study of Inflation's Hidden Effects on Effective Taxation

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In this report, Hoor explains the relationship between taxation and inflation.

The views expressed in this article are solely those of the author and do not necessarily reflect the official position of ATOZ Tax Advisers.

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The public's understanding of inflation, particularly regarding its cumulative effects over time, is limited. Modern tax systems, which are linked to nominal values in fiat currencies, interact with inflation in ways that often escape scrutiny. This article analyzes the structural drivers of inflation, the methodological challenges of measuring it, and its long-term fiscal consequences. It explores how inflation can quietly amplify tax burdens in fiat-based systems, effectively functioning as a fiscal instrument.

## Introduction

Inflation essentially refers to a sustained increase in the prices of goods and services expressed in fiat currencies, such as the U.S. dollar, the euro, the British pound sterling, the Japanese yen, and the Swiss franc. It is most commonly measured by year-on-year changes in a consumer price index, a weighted basket of goods and services intended to reflect household spending patterns.

While many central banks, including the United States Federal Reserve and the European Central Bank (ECB), explicitly target inflation rates of 2 percent annually, much higher inflation rates have been observed in recent years. This has drawn significant attention to the issue of inflation and the ways in which central banks attempt to manage it through monetary policy, such as sharp interest rate hikes and quantitative tightening.

Beyond its direct erosion of purchasing power, inflation interacts dynamically with tax systems calibrated to nominal fiat values. These interactions — often overlooked in policy discussions — compound over time, effectively transforming inflation into a "silent contributor" to rising effective taxation.

This article analyzes the hidden effects of inflation on effective taxation, which apply to all tax systems. The statistical data in this publication is often based on the U.S. dollar, for which long-term statistics are easily accessible, and the analysis of inflation's impact on taxation is based on the tax systems of Luxembourg and Germany.

## The Concept of Inflation

### Opening Comments

A rise in prices means that a unit of fiat currency can buy fewer goods and services than in previous periods, thereby eroding its purchasing power. This loss of purchasing power has an impact on the cost of living for the general public. Economists generally agree that persistent inflation occurs when the growth of a nation's currency supply exceeds the growth of its economy.

It is interesting to note that a decline in year-on-year inflation does not mean that prices of goods and services are falling. Rather, it simply means that nominal prices are rising at a slower rate. The high inflation rates of recent years are now part of a base that will tend to rise from here.

However, it is also possible for prices to fall over time as a result of reduced consumer spending (for example, people delaying purchases during a recession). This is called deflation. Alternatively, a combination of high inflation and stagnant growth is called stagflation.

### Fiat Currencies

#### Overview

A fiat currency is a currency with no intrinsic value (unlike gold or silver) that is designated as legal tender by governments (governments mandate its acceptance for payment). Fiat currencies are used as a store of purchasing power and a medium of exchange.

While currencies have traditionally been backed by physical commodities such as gold or silver, fiat currencies are not backed by any physical commodity, but by the faith of their holders in the creditworthiness of the country.

The value of a fiat currency depends in particular on the performance of a country's economy (strong GDP growth, low unemployment, trade surpluses, etc.), the way it is governed (stable institutions, rule of law, low corruption, etc.), and interest rates (higher rates can strengthen a currency). However, the purchasing power of all fiat currencies is declining, albeit at different rates.

A fiat currency seems to work well as long as the public has enough confidence in the currency's ability to act as a store of purchasing power. In other words, people trust that it will be accepted by merchants and others as a means of payment. In addition, the rate of inflation must remain at an acceptable level.

#### Historical Background

Until 1914 the gold standard was the classic international monetary system, in which currencies were directly convertible into fixed amounts of gold. This ensured price stability and exchange rate discipline because monetary expansion was limited by a nation's gold reserves. Many countries abandoned the gold standard in 1914 at the start of World War I, primarily because of the need to fund the war effort.

However, under the Bretton Woods system negotiated in July 1944, the U.S. dollar was established as the world's reserve currency, pegged to gold at $35 per ounce, and other currencies were pegged to the value of the dollar (currencies were convertible into U.S. dollars). Accordingly, only foreign governments were promised that their dollars would be redeemed for gold at $35 per ounce.

Thus, the Bretton Woods system was a gold-exchange standard that reinstated some gold backing of the currencies. However, on August 15, 1971, President Richard M. Nixon announced that the United States would "temporarily" stop exchanging gold for dollars. This marked the end of the Bretton Woods system and the end of monetary discipline. The United States never returned to the gold-exchange standard.

In 1974 the United States negotiated the petrodollar system, essentially the global practice of trading oil for U.S. dollars rather than any other

currency (although today some of the BRICS[1] countries appear to prefer transacting in currencies other than the U.S. dollar). This means that, regardless of the country buying the oil, it must pay the oil-producing country in petrodollars, which are denominated in U.S. dollars. This has created continuous demand for the dollar, securing its position as the world's reserve currency.

## The Creation of Fiat Currencies

### *General*

The creation of a fiat currency is a complex process involving both central banks, such as the Federal Reserve, the ECB, and the Bank of Japan, and commercial banks.

A fiat currency has a debt-based architecture, meaning it comes into existence as credit issued by central banks or loans granted by commercial banks. The mechanisms of currency creation are described in the following sections.

### *Central Bank Influence on Currency Supply*

The process by which central banks control the currency supply varies depending on the central bank and the nation's economic situation. Below are some of the most common methods central banks use to control the currency supply.

#### *Changing the Central Bank's Discount Rate*

Central banks cannot directly set interest rates on loans like mortgages or car loans. However, they can influence the lending rate by changing the discount rate between the central bank and commercial banks.

This is the interest rate at which commercial banks can borrow from or deposit currency with the central bank. Central banks change these rates to encourage borrowing (monetary expansion) or lending (monetary contraction) in order to control economic growth.

When the discount rate is low, borrowing from the central bank is less expensive, and commercial banks can lend to their customers at a lower interest rate. Lower interest rates tend to increase borrowing and thus the amount of currency in circulation, which can stimulate economic growth. Conversely, if a central bank wants to reduce borrowing and encourage saving, it can raise the discount rate.

#### *Setting Reserve Requirements*

Another common way central banks manage the currency supply is by adjusting the commercial banks' reserve requirement (central banks mandate that commercial banks hold a minimum reserve ratio, defined as a percentage of deposits).

Reducing the reserve requirement allows commercial banks to use the surplus to lend out more fiat currency. A central bank can also reduce currency in circulation by increasing the reserve requirement.

#### *Conducting Open Market Operations*

Open market operations include the following tactics.

**Open Market Operations.** Central banks can also influence interest rates by conducting open market operations, in which they buy or sell government or privately issued securities (such as corporate bonds) in the open market.

These operations create artificial supply or demand that pushes interest rates toward their target. In times of economic crisis, central banks can increase the currency supply by buying government bonds, which should lower interest rates. Increased currency supply and lower interest rates mean that it is less expensive to borrow and more attractive to invest.

If the economy is expanding at an unsustainable rate, central banks can reduce the currency supply by selling government bonds on the open market, which raises interest rates. Less currency supply and higher interest rates mean that it is more expensive to borrow, and the incentive to save is greater.

**Quantitative Easing/Tightening.** Quantitative easing refers to a situation in which central banks purchase long-term government bonds from commercial banks, resulting in additional liquidity in the banking system.

Conversely, central banks engage in quantitative tightening to reduce the central bank's balance sheet by slowing the pace at which the proceeds of maturing bonds are reinvested.

[1]BRICS is an intergovernmental organization originally formed by Brazil, Russia, India, China, and South Africa — hence the acronym. As of 2025, BRICS has expanded to include 10 countries.

This has a contractionary effect on the overall currency supply.

In both cases, the goal is to influence economic growth by altering the currency supply.

**Repurchase Agreement (Repo) Operations.** A repo is a short-term liquidity tool in which a central bank buys securities (such as government bonds) from commercial banks with the agreement to sell them back at a predetermined price and date, often the next day. The transaction effectively functions as a collateralized loan, with the interest rate (repo rate) determined by the price difference.

Central banks use repos to manage liquidity in the financial system, ensure stability, and implement monetary policy. These operations are part of open market operations and are typically short-term in nature, which distinguishes them from more permanent tools such as quantitative easing.

To inject liquidity, central banks buy securities from commercial banks, providing cash to banks and increasing their reserves (repo transaction). Conversely, when central banks sell securities to commercial banks, they temporarily remove cash from the system (reverse repo transaction).

Repo operations allow central banks to fine-tune liquidity without long-term commitments that stabilize interest rates. Adjustments to repo rates signal changes in monetary policy (for example, rate hikes or rate cuts) to the markets.

### *Commercial Banks and Fractional Reserve Banking*

Commercial banks are responsible for creating around 90 percent of the currency supply through fractional reserve banking and credit creation.

Fractional reserve banking is a fundamental mechanism of debt-based fiat systems, whereby commercial banks lend out most of their clients' deposits while holding only a fraction as reserves. The reserve requirement (the minimum reserve ratio defined as a percentage of deposits) is set by central banks and therefore has a direct impact on the capacity of commercial banks to create new currency.

For example, if a bank has a reserve requirement of 10 percent and receives a deposit of $1,000 from a customer, it will retain $100 as reserves and lend $900 to another customer. When the customer spends the amount of $900 on car repairs, the car repair shop deposits the money into its account. The shop's bank then retains $90 as reserves and lends out $810. This process continues, essentially enabling banks to perpetually create new fiat currency. This phenomenon is known as the money multiplier effect.[2]

The reserve requirements in the United States (set by the Federal Reserve), Canada (set by the Bank of Canada), and the United Kingdom (set by the Bank of England) are currently set at 0 percent. In contrast, the ECB has set the reserve requirement in the EU at 2 percent. Consequently, these central banks' current reserve requirements hardly restrict the creation of new fiat currency.

However, commercial banks must comply with liquidity rules, such as the liquidity coverage ratio and the net stable funding ratio, and with capital requirements under Basel III — they must hold sufficient capital to absorb losses. This is now the global standard.

Notably, when a commercial bank makes a loan, it does not lend out existing deposits. Instead, it creates new currency digitally, thereby expanding the currency supply consisting of M2 (cash and bank deposits — see next section).

Therefore, commercial banks' ability to create new fiat currency is only constrained by capital requirements (banks must hold capital to absorb losses) and certain instruments of the central bank (interest rates and reserve requirements).

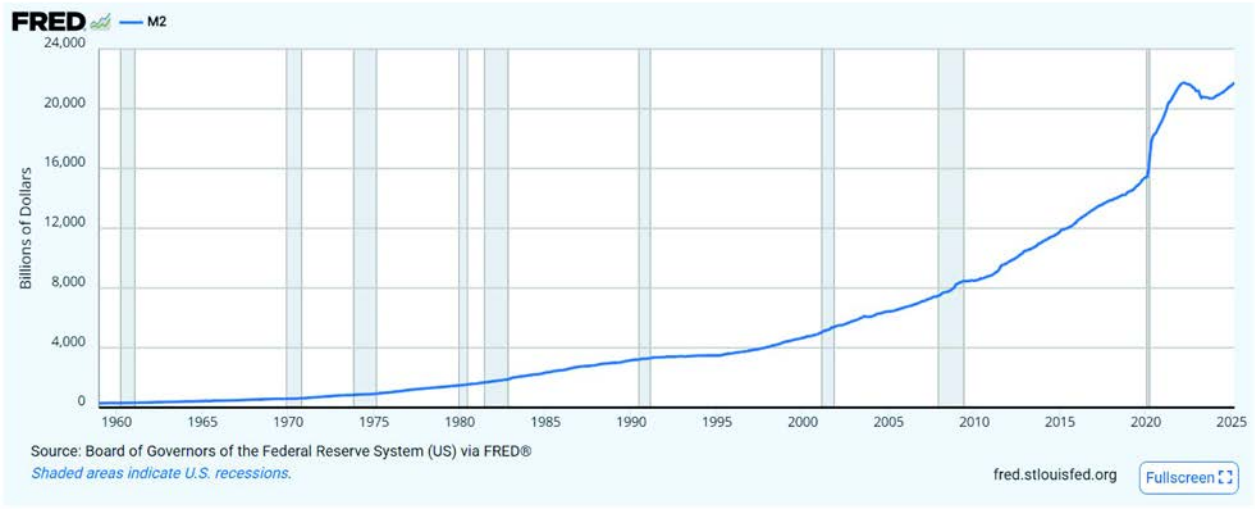
An alternative to the fractional reserve system would be a full reserve system, in which all loans created by commercial banks would have to be fully backed by deposits. This would severely restrict the ability of commercial banks to expand the currency supply.

## The Fiat Currency Supply

The fiat currency supply is measured by various currency supply aggregates (M0, M1, M2, and M3), which categorize currency according to its liquidity.

[2] If the reserve requirement is set at 10 percent, a customer deposit of $1,000 could result in a total amount of currency created of $10,000.

**Figure 1. United States M2 Currency Supply Since 1960**




***M0***

M0 is the most liquid measure of the currency supply and includes physical currency and coins in circulation (as created by the central bank), as well as commercial bank deposits held by the central bank. It is also known as narrow money or base money and serves as the base of the currency supply pyramid, underlying more illiquid forms of money such as M1, M2, and M3.

***M1***

M1 is the narrowest measure of the money supply and includes currency in circulation, demand deposits, and other checkable deposits. It represents money that is commonly used for payment and is highly liquid.

***M2***

M2 is a broader classification of money than M1 and consists of M1 plus small-denomination time deposits (time deposits in amounts of less than $100,000) and retail money market mutual fund shares. Retirement account balances and time deposits above $100,000 are omitted from M2.

Central banks aim at navigating M2 growth to manage inflation but often understate its impact. For example, while the focus is always on consumer price inflation, asset price inflation (that tends to be more sensitive to an expansion of the currency supply) is generally disregarded.

Figure 1 shows the United States M2 currency supply since 1960 (U.S. statistics are particularly useful for analyzing monetary policy because of the long history of the U.S. dollar).

Figure 1 illustrates the continuous growth in monetary expansion following the crises of 2000, 2008, and 2020-2021. Notably, the M2 currency supply increased by approximately 40 percent in 2020-2021.

***M3***

M3 includes M2 plus large time deposits (time deposits above $100,000), balances of institutional money market funds, deposits of eurodollars, and repurchase agreements. M3 is the broadest measure of the currency supply and includes items that are less liquid than M2 but are still considered part of the currency supply.

The M3 measure can help to identify hidden dangers in the economy by showing how much money is circulating in riskier, less regulated areas, such as large corporate cash reserves or dubious loans, which can make the entire financial system more vulnerable.

As of today, the Federal Reserve only publishes data on M1 and M2, having stopped publishing M3 data in 2006.[3]

## Structural Vulnerabilities of Fiat Currencies

Although fiat currencies are the foundation of modern economies, their design introduces systemic risks that can threaten long-term stability and public trust. The value of a fiat currency relies on managed scarcity. In other words, governments must strike a balance between expanding the currency supply and maintaining stability, as excessive currency creation erodes its value.

The most common structural vulnerabilities of fiat currencies are summarized below.

### *Unlimited Currency Creation*

Central banks can create currency without physical constraints (unlike gold-backed systems). Moreover, most currency is created when commercial banks lend (fractional reserve banking).

This ties economic growth to perpetual debt expansion, eventually creating a refinancing risk that can lead to situations like the 2008 global financial crisis.

### *Government Debt Monetization and Political Pressure*

While central banks are supposed to be independent of governments, central banks may buy government bonds (quantitative easing), which allows for deficit spending.

In addition, in some countries, governments may pressure central banks to finance spending, which can lead to hyperinflation (for example, Zimbabwe and Venezuela).

### *Strong Central Bank Control*

A relatively small group of policymakers at the central bank level dictates the currency supply, interest rates, and credit conditions. This gives central banks considerable control over the monetary system.

In this context, a quote from Mayer Amschel Rothschild comes to mind: "Give me control of a nation's money supply and I care not who makes its laws" (even though the origin of this quote is sometimes disputed).

### *No Intrinsic Value*

The value of fiat currencies is based solely on public trust in institutions and is not backed by physical assets (such as gold). Central banks often miss inflation targets or downplay true inflation (especially through flawed CPI calculations), which undermines transparency.

Once confidence collapses (for example, because of hyperinflation), the currency becomes worthless, as the French philosopher Voltaire predicted: "Paper money eventually returns to its intrinsic value — zero."

### *Risk of Boom-Bust Cycles*

As low interest rates and an excessive expansion of the currency supply likely inflate asset prices (stocks, real estate, etc.), this may lead to speculative bubbles (for example, the U.S. housing crisis of 2008).

In addition, central banks often try to fight the crisis by creating additional currency (for example, the stimulus package released in 2020 and 2021), thereby delaying structural reforms.

### *No Incentive for Long-Term Discipline*

Politicians seem to prioritize immediate growth (through deficit spending and currency expansion) over long-term stability. This is problematic from an intergenerational perspective, because future generations inherit debt and inflation (without consent).

### *The U.S.'s Reserve Currency Dilemma*

The global reserve status of the U.S. dollar compels nations to hold dollars for trade and stability, exposing them to spillovers from U.S. monetary policy, such as inflation and capital flight. Meanwhile, the United States benefits from lower borrowing costs and seigniorage.

However, countries whose currencies serve as global reserve currencies face a conflict of economic interest between short-term domestic and long-term international objectives, a phenomenon referred to as the Triffin Dilemma.[4]

[3] Steve Hanke, "The Fed's Misleading Money Supply Measures," *Forbes*, Oct 29, 2018.

[4] Identified in the 1960s by the Belgian-American economist Robert Triffin.

A country whose currency is the global reserve must supply the world with its currency to satisfy demand for foreign exchange reserves. This is nominally achieved through international trade, whereby the country with reserve currency status is required to run an inevitable trade deficit, which risks deindustrialization and debt dependency. This highlights the interconnected financial vulnerabilities and asymmetric power in a U.S. dollar-dominated world.

#### *Currency Wars*

Countries may deliberately devalue their own currency to boost exports through relatively cheaper prices. This may spark trade conflicts like those between China and the United States in the 2010s.

### The Cantillon Effect

The Cantillon effect[5] describes how changes in the currency supply can benefit certain groups in the economy disproportionately, depending on who receives the new currency first and how prices adjust over time.

When new currency enters the economy through certain channels (for example, central banks, commercial banks, or government spending), those who receive it first (banks, financial institutions, or government contractors) will spend or invest it before prices rise.

As the new currency circulates, demand for goods and services increases, driving up prices. Those who receive the currency later (wage earners and retirees) face higher prices but lack the benefit of having had early access to the new currency.

The Cantillon effect demonstrates that monetary expansion is not a neutral process that affects everyone equally. Instead, it redistributes wealth from late recipients to early recipients, with early recipients gaining purchasing power while late recipients lose it.

### Excursus: The U.S. Debt Situation

When analyzing the long-term effects of a fiat monetary system, it is useful to consider the United States. On August 15, 1971, Nixon stopped the exchange of U.S. dollars for gold, effectively ending the Bretton Woods system. From that day onward, the United States had no monetary constraints on creating new debt, and monetary discipline deteriorated.

While U.S. federal debt was around $400 billion in 1971, it exceeded $36 trillion by 2024. This represents a 90-fold increase in nominal terms over about 53 years.

As can be seen from the figures, U.S. debt has increased over time, particularly following the global financial crisis of 2008 and the crisis of 2020.

Figure 2 shows the evolution of total U.S. public debt.

To put the rising debt into context, it is helpful to compare the amount of federal debt with the gross domestic product. Since August 1971, federal debt as a percentage of GDP has risen from under 35 percent to over 120 percent in 2024.

In 1971, every dollar of new debt generated 35 cents of GDP growth. Today, however, each dollar of debt generates just 7 cents. Consequently, additional deficit spending has an increasingly smaller impact on GDP growth.

The evolution of total public debt relative to GDP is shown in Figure 3.

However, it should be noted that the $36 trillion figure only includes existing debt.[6] In addition, it is estimated that there are more than $90 trillion in unfunded entitlements (for example, Social Security, Medicare, and pensions) that will need to be covered in the future.[7]

In response to the emergence of double-digit inflation because of the 2020 stimulus, central banks in the Western world (including the Federal Reserve) raised interest rates in 2022. Interest rates on new government debt and rollovers of existing debt also rose.

From April 2022 to May 2023, the Federal Reserve increased its discount rate by a greater

[5] Named after the Irish-French economist Richard Cantillon (1680-1734).

[6] U.S. Debt Clock, the $36 trillion debt equates to approximately $107,000 per U.S. citizen and $323,000 per taxpayer.

[7] James C. Capretta, "Federal Unfunded Liabilities Are Growing More Rapidly Than Public Debt," American Enterprise Institute (Nov. 17, 2022).

Figure 2. Total U.S. Public Debt

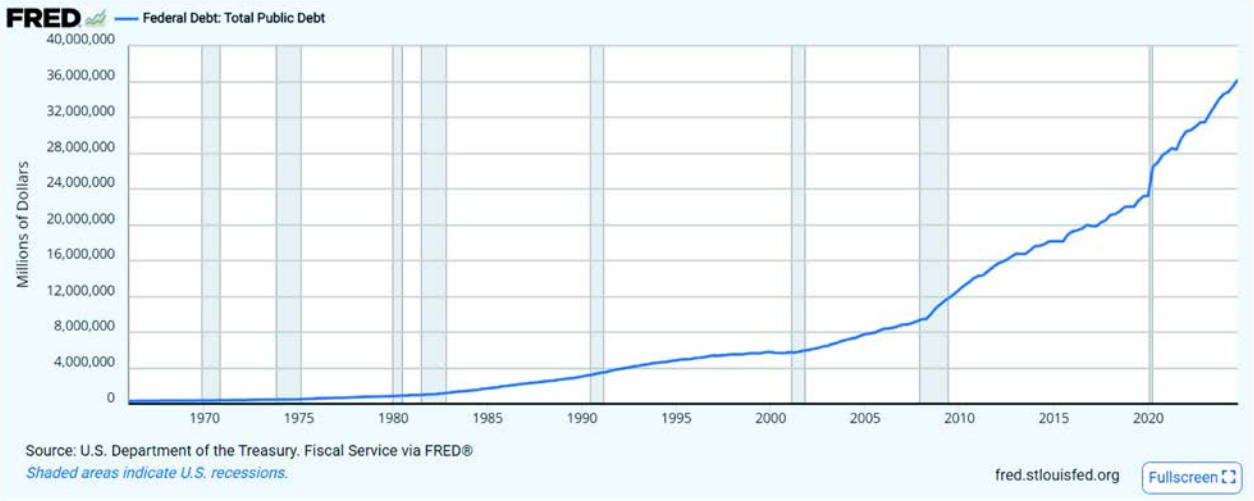
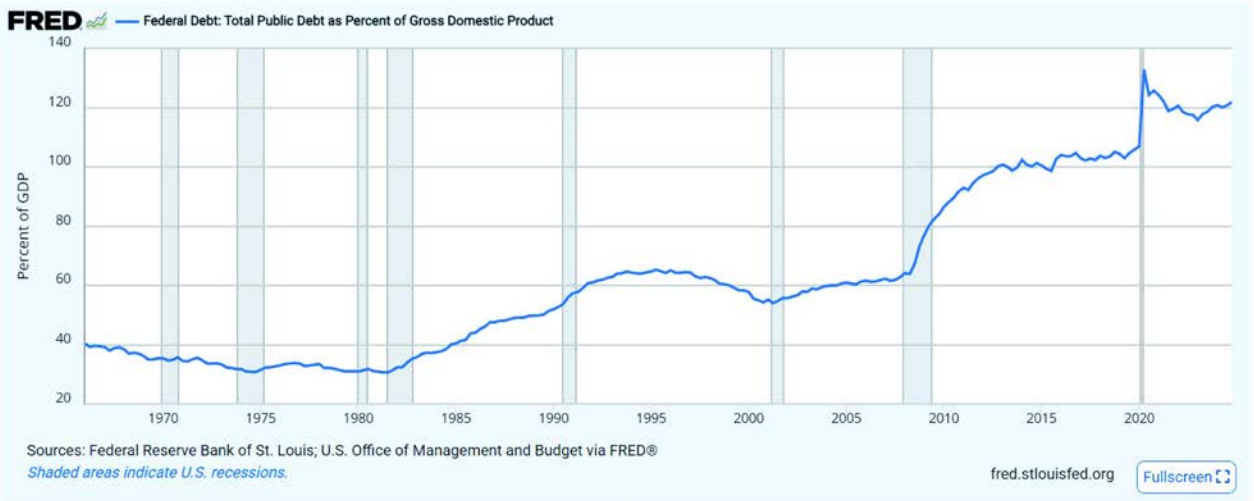



Figure 3. Total Public Debt Relative to GDP




relative magnitude than ever before, raising it from 0.33 percent to 5.06 percent.[8]

The evolution of the federal funds effective rate is shown in Figure 4.

As shown in Figure 5, the result of the Federal Reserve's interest rate policy has been a significant increase in the annual interest payments on the total U.S. public debt.

It is estimated that the United States will need to refinance around $9 trillion of public debt in

[8] Although interest rates were higher at the beginning of the 1980s, when the then-chairman of the Federal Reserve, Paul Volcker, increased the Fed rate from around 11 percent to approximately 19 percent (from February 1977 until July 1981, the FED rate has been raised from about 5 percent to 19 percent), an increase in interest rates from 0.33 percent to 5.06 percent is much stronger in relative terms (i.e., an increase of around 14 times).

Figure 4. Federal Funds Effective Rate

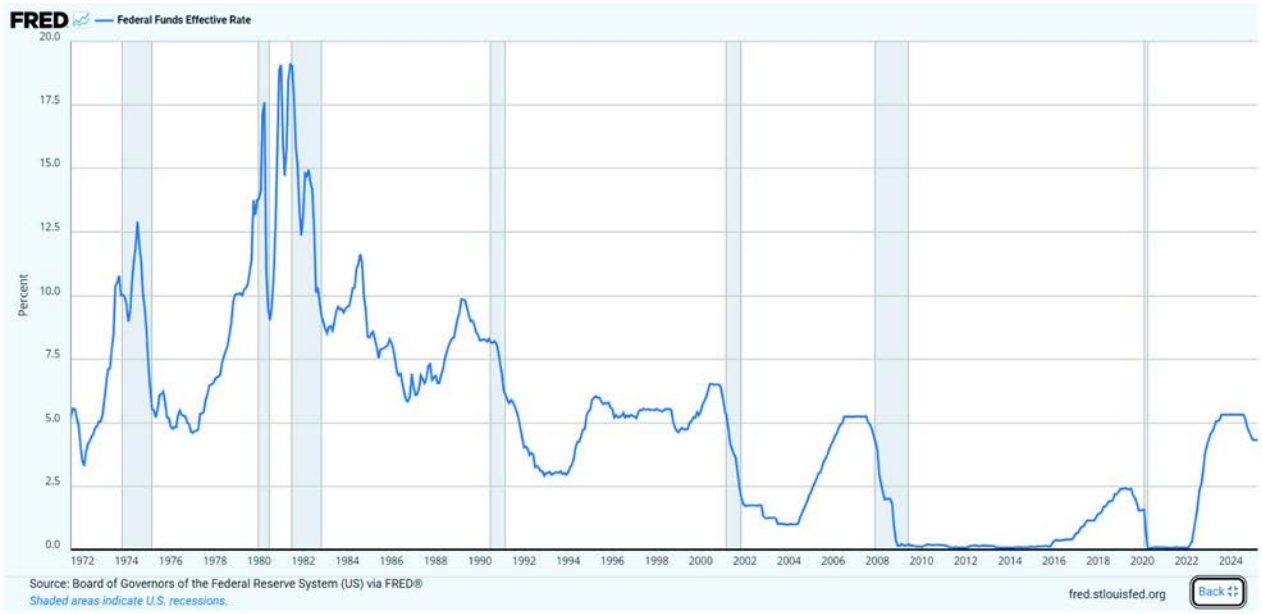
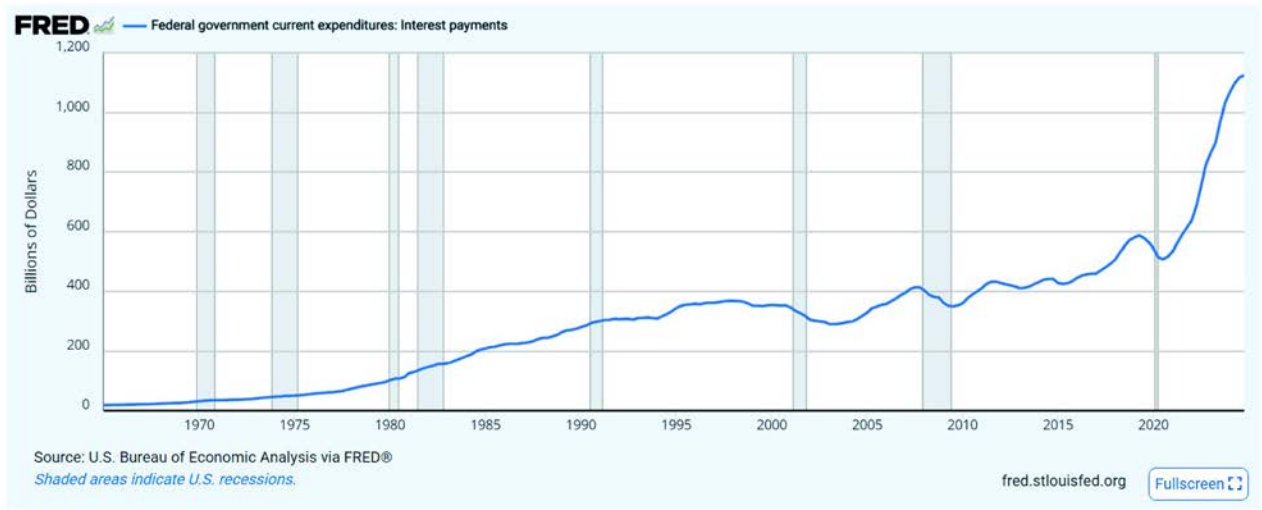



Figure 5. Interest Payments on the Total U.S. Public Debt




2025[9] at interest rates likely to be four to five times higher than before 2022. For example, the 10-year Treasury yield has risen from 0.5 percent in 2020 to over 4.5 percent in April 2025. This will increase interest payments further, widen deficits, and put pressure on the dollar.

[9] Aneena Alex, "$9 Trillion of US Debt Will Mature in 2025; Should Investors Be Worried?" *Finbold*, Feb. 4, 2025.

To illustrate the scale of U.S. interest payments in 2024, which amounted to over $1 trillion, it is helpful to compare this figure with total federal tax revenues of approximately $5.1 trillion. Interest payments accounted for around 20 percent of tax revenues in 2024. Interest payments also exceed the substantial U.S. military budget of $916 billion in 2023 (about 40 percent of global military spending in 2023).

The above illustrates a fiat currency system that does not limit the creation of new currency. However, charts spanning several decades are necessary to understand the system's natural consequences and how debt increases over time.

## The CPI

### Overview

The CPI is a measure that examines the weighted average of the prices of a basket of goods and services that represent the primary needs of consumers.

The CPI is determined as follows:

*Percent Inflation Rate = (Final CPI Index Value / Initial CPI Value) * 100*

The method and structural challenges of the CPI are analyzed below.

### The CPI Weighting Scheme

The CPI weighting scheme typically allocates 1,000 points to a basket of goods and services. Each country designs its own weighting scheme to determine price inflation.

The CPI weighting scheme is intended to reflect the average spending habits of urban consumers in a given population, rather than those of specific individuals or households (single people, couples, or families with children).

This section focuses on the Luxembourg CPI weighting scheme, which is shown in Table 1.[10]

Clearly, the consumption patterns of different households can vary greatly. For instance, the consumption pattern of a single working-age person will differ from that of a young family or a retired couple.

However, a notable feature of the Luxembourg weighting pattern is the underrepresentation of housing costs (see position No. 4 in the table). Luxembourg is known for its high housing costs, so it is difficult to assume that consumers spend only 11.2 percent of their overall spending on housing costs, whatever their configuration or assumed income situation. Based on experience, housing costs are likely to account for between 30 percent and 50 percent of total household expenditure.

According to the National Institute of Statistics and Economic Studies of the Grand Duchy of Luxembourg, the average rent in Luxembourg City increased by between 80 percent and 90 percent between 2010 and 2023. This equates with an average annual price increase of between 5 percent and 6 percent. According to the National Institute, the national average rent increase amounts to a cumulative increase of between 40 percent and 50 percent, which equates with an annual increase of between 2.8 percent and 3.3 percent across Luxembourg as a whole.

However, around 70 percent of people in Luxembourg are homeowners. It is therefore interesting to look at the increase in house prices. In Luxembourg City, property prices rose by an average of 140 and 150 percent between 2010 and 2023. This equates with an average annual increase of 6.5 percent to 6.7 percent. Outside Luxembourg City, real estate prices increased by between 90 percent and 130 percent in the same period. This equates with an average annual increase in prices of between 4.7 percent and 6.1 percent.

Considering the normal spending patterns of people living in Luxembourg, a higher weighting for housing costs in the Luxembourg inflation basket should result in much higher inflation than the official figures suggest.

### Structural Challenges of the CPI

The CPI has several structural challenges that result in an underestimation of inflation. The concept of a representative basket of goods and services is problematic because consumption patterns vary widely among different types of households, as well as within these categories (single person, young couple, family with children, retired person). The most common

[10] "Règlement Grand-Ducal du 30 Janvier 2024 Actualisant le Règlement Grand-Ducal Modifié du 20 Décembre 1999 Concernant l'Établissement de l'Indice des Prix à la Consummation," *Journal officiel du Grand-Duché de Luxembourg* (Jan. 30, 2024) (in French).

**Table 1. Luxembourg CPI Weighting Scheme (2024)**

| | Category | Weight in % | Key Components |
|---|---|---|---|
| 1. | Food and Nonalcoholic Beverages | 11.4% | Bread, meat, dairy, fruits, vegetables, non-alcoholic drinks |
| 2. | Alcoholic Beverages and Tobacco | 3.1% | Wine, beer, spirits, cigarettes |
| 3. | Clothing and Footwear | 3.5% | Apparel, shoes, repairs |
| 4. | Housing, Water, Electricity, Gas | 11.2% | Rent, utilities (water, electricity, gas), maintenance/repairs, waste collection |
| 5. | Furnishings & Household Equipment | 5.4% | Furniture, appliances, household textiles, cleaning products |
| 6. | Health | 3.4% | Medical services, pharmaceuticals, health insurance |
| 7. | Transport | 15.5% | Vehicle purchases, fuel, public transport, repairs, airfare |
| 8. | Communications | 2.3% | Phone/Internet services, postal fees |
| 9. | Recreation and Culture | 10.2% | TVs, sports equipment, pets, cultural events, hobbies |
| 10. | Education | 0.7% | School fees, tutoring, educational materials |
| 11. | Restaurants and Hotels | 10.4% | Dining out, hotel stays |
| 12. | Miscellaneous Goods and Services | 22.9% | Insurance, financial services, personal care (haircuts, cosmetics), legal fees |

structural challenges of the CPI are summarized below.

### *Substitution Bias*

There may be a systematic bias in the prices and weights of individual items when substitutable goods and services have different inflation rates (for example, if beef prices increase faster than chicken prices, beef might be replaced by chicken). This can lead to a significant downward bias in the measurement of inflation when weights are adjusted toward goods and services whose prices increase at lower rates.

The bias increases when cheaper goods have lower inflation rates than more expensive goods. However, the exact weights and price indices for individual goods and services are often unavailable to the public.

While substitution bias refers to switching between similar goods, reduced consumption (for example, driving less because of high gas prices) should be reflected as a quantity adjustment within the same category. Both are flaws, but they arise from slightly different mechanisms.

### *Hedonic Adjustments*

Another important, yet opaque, source of bias is the use of hedonic adjustments, which systematically lead to lower measures of price inflation.

These adjustments are used in CPI calculations to account for changes in the quality or utility of goods and services over time. In theory, these adjustments aim to isolate "pure" price inflation by removing the portion of a price change that reflects improvements (or declines) in product quality, rather than true inflation or deflation.

In other words, price increases related to quality should be excluded from the CPI because consumers are paying more for an improved product. Consequently, price increases are not fully accounted for when it is claimed that products are improving in quality.

Hedonic adjustments are most common in relation to electronics (for example, computers, TVs, and smartphones), appliances (for example, refrigerators and washing machines), and cars (for example, safety features and fuel efficiency), as well as housing (for example, adjustment for changes in rental property quality).

Hedonic adjustments are somewhat controversial because they may understate reported inflation and because they involve a degree of subjectivity. Unfortunately, no publicly available data exists on the extent to which quality adjustments reduce measured rates of price inflation.

### *Headline CPI Versus Core CPI*

When it comes to the CPI, it is important to distinguish between the headline CPI, which includes all items, and the core CPI, which excludes certain volatile categories to provide a smoother measure of underlying inflation.

Headline CPI reflects price increases across the entire range of goods and services, including volatile items such as energy (fuels, electricity, and gas) and food (groceries and dining out). These categories are prone to short-term price fluctuations because of factors such as weather, geopolitical events, or supply chain disruptions. In the United States, food and energy together account for around 20–25 percent of the headline CPI, depending on whether the CPI-U (general inflation metric) or CPI-W (government benefit adjustments) index is used.[11]

In contrast, the core CPI excludes food and energy to filter out short-term fluctuations. These items are excluded because energy and food prices are highly sensitive to temporary shocks, such as oil embargoes or droughts, which do not reflect long-term inflation trends.

Core CPI is generally considered to be a more reliable indicator of persistent inflation, making it a more useful tool for setting monetary policy.

### *Housing Costs*

As mentioned above, one issue is the recognition of housing costs. In Luxembourg, for example, where housing often accounts for a significant proportion of total household expenditure, allocating 11.2 percent to rent, utilities (gas, water, electricity, etc.), maintenance/repairs, and garbage collection seems counterintuitive at best.

In fact, a typical Luxembourgian household should spend between 30 percent and 50 percent of its total expenditure on housing. Given the significant increase in housing costs in recent decades, this underrepresentation should have resulted in an understatement of the CPI rate.

Another issue that is not properly represented in the CPI is home ownership. In Luxembourg, for example, about 70 percent of people own their own home. Here, the CPI uses owners' equivalent rent, which is based on imputed rent rather than actual house prices. This understates house price inflation, especially in Luxembourg where house prices have significantly outpaced rent increases over the last few decades.

### *Exclusion of Asset Inflation*

The CPI does not account for asset price inflation, such as increases in the nominal prices of stocks, bonds, and commodities. This can mask declines in an important component of purchasing power relative to productive capital assets.

Over the past few decades, asset prices have responded much more strongly to central bank policies, such as lowering interest rates and expanding the supply of fiat currency, than the CPI has. In other words, the additional currency was invested in assets that increased in value (in nominal terms) because of more currency chasing the same investments.

Although people are encouraged to invest some of their income in assets such as stocks and bonds to build up retirement funds, the CPI only considers the cost of living.

## CPI of Selected Countries

The aim of central banks is to maintain low and stable inflation, with banks in most advanced economies (for example, the U.S. Federal Reserve and the ECB) targeting an annual rate of 2 percent. To achieve this, they have several instruments at their disposal, such as changing interest rates and reserve requirements (see Central Bank Influence on Currency Supply section above).

The question is how successful different central banks have been in accomplishing this task. Table 2 shows the rate of inflation in a number of selected countries between 2000 and 2024.

[11] The CPI-U (general inflation metric) measures inflation for most urban consumers but does not adjust for Social Security benefits. The CPI-W (government benefit adjustments), historically tied to wage negotiations, is specifically used for Social Security cost of living adjustments.

**Table 2. Official Inflation Figures for Selected Countries Since 2000**

| Country* | Cumulative Inflation (2000-2019) | Average Inflation (2000-2019) | Cumulative Inflation (2020-2024) | Average Inflation (2020-2024) | Cumulative Inflation (2000-2024)** | Average Inflation (2000-2024) |
|---|---|---|---|---|---|---|
| United States of America | 47% | 2% | 22% | 4.3% | 85% | 2.5% |
| Canada | 43% | 1.9% | 16% | 3.2% | 67% | 2.1% |
| United Kingdom | 54% | 2.2% | 20% | 4.1% | 85% | 2.5% |
| Eurozone | 38% | 1.6% | 19% | 3.7% | 64% | 1.9% |
| Germany | 33% | 1.5% | 16% | 3.2% | 54% | 1.8% |
| Switzerland | 16% | 0.7% | 6% | 1.3% | 23% | 0.9% |
| Japan | 2% | 0.1% | 5% | 1% | 7% | 0.3% |
| South Korea | 52% | 2.1% | 12% | 2.5% | 70% | 2.2% |
| China | 60% | 2.3% | 8% | 1.6% | 73% | 2.3% |
| Russia | 1,200% | 14.5% | 60% | 10.5% | 2,000% | 13.2% |
| Israel | 62% | 2.4% | 15% | 2.8% | 86% | 2.5% |
| Turkey | 2,800% | 18.5% | 1,200% | 53% | 12,000% | 23% |

* The percentages shown in this table are approximate.

** The cumulative inflation from 2000 to 2024 cannot be calculated by simply adding together the inflation rates for the periods 2000-2019 and 2020-2024. This is because inflation compounds over time; the inflation rates for the period 2020-2024 are applied to the Consumer Price Index (CPI) for 2019, which already reflects inflation from 2000 onwards. To compute the true cumulative effect, the annual rates must be chained multiplicatively.

Inflation rates of these countries varied considerably between 2000-2019 and 2020-2024. As a general trend, inflation was higher in most countries in the sample in the years 2020-2024 than in the period 2000-2019. However, all fiat currencies lose purchasing power over time; only the rate of decline varies from one currency to another.

For example, an annual inflation target of 2 percent would result in cumulative inflation of around 64 percent over 25 years, whereas an annual inflation rate of 2.5 percent would result in cumulative inflation of around 86 percent over the same period. This demonstrates that even small underestimations of inflation could lead to significant changes over time.

For example, the cumulative inflation of the U.S. dollar since 1971 is over 700 percent (prices have increased sevenfold), which equates to an average annual inflation rate of 3.9 percent (geometric mean). In other words, according to official statistics, the dollar has lost about 86 percent of its purchasing power since 1971.

## Methodological Choices and CPI Representation

Analyzing the CPI's method and design flaws raises the question of why central banks and governments might be interested in suppressing real inflation figures. While outright manipulation is unlikely in Western democracies, methodological choices or selective reporting can still distort inflation measures.

These are the main motivations for suppressing or understating CPI figures.

### *Political Incentives*

High inflation erodes living standards. Therefore, lower reported inflation numbers make the government appear more competent in managing the economy, thereby increasing voter confidence.

### *Fiscal Savings*

Many social programs (for example, pensions and welfare) are linked to the CPI. If CPI numbers are suppressed, the growth of government payouts will slow, meaning these payments will lag behind real inflation.[12]

Moreover, governments with high levels of debt benefit from understated inflation, because real interest rates (nominal rates minus inflation) can become negative. For instance, if a government bond yields 2 percent interest and the real CPI rises to 5 percent, the debt effectively shrinks by 3 percent each year.

### *Managing Wage Expectations*

Unions and individuals negotiate wage increases based on official CPI figures. Therefore, lower reported inflation figures reduce demands for wage increases, thus keeping labor costs down. One of the main causes of inflation is workers' demands for higher wages to keep up with expected inflation (see Quantity Theory of Money (QTM) section below).

### *Monetary Policy Flexibility*

Because central banks are required to maintain the stability of fiat currencies (at around 2 percent), higher inflation figures would put pressure on them to raise interest rates to combat inflation.

Consequently, lower CPI figures allow policymakers more freedom to keep interest rates artificially low to stimulate borrowing and growth.

### *Social Stability*

One extreme motivation for underestimating CPI numbers could be the desire to maintain social stability. History has shown that high inflation can trigger unrest (for example, the 2010 Arab Spring occurred when food prices skyrocketed). Therefore, suppressing CPI numbers could delay panic or protests.

While these are plausible incentives for governments and central banks to understate CPI numbers, it is useful to consider some real-life examples. In the following cases, governments took measures to influence underreporting of CPI numbers.

**Example 1: Argentina (2007-2015)**

The government fined private economists for publishing inflation estimates that were higher than the official statistics, even though the true inflation rate was around 25-30 percent, whereas the reported CPI numbers were only 10 percent.

**Example 2: Turkey (2018-2023)**

The Turkish government pressured TurkStat to underreport inflation. While the official CPI figure was 50 percent in 2023, independent estimates put it at over 100 percent.

**Example 3: Venezuela (2016-2021)**

During the 2016 hyperinflation, Venezuela stopped publishing CPI numbers to hide the country's economic collapse.

## The Causes of Inflation

Various theories and models attempt to explain inflation. This section looks at the triangular model of inflation and the quantity theory of money.

### Triangular Model of Inflation

Robert J. Gordon's "triangular model of inflation" is a notable framework in macroeconomics that explains inflation dynamics by emphasizing three key interacting forces. This model has been used to explain the causes of inflation.

### *Demand-Pull Inflation*

Demand-pull inflation occurs when the demand for goods and services grows faster than the capacity to produce them. It can be triggered by economic growth, low unemployment, a loose monetary policy (for example, central banks lowering interest rates or buying assets to encourage borrowing and spending), and an expansionary fiscal policy (for example, tax cuts or transfers that increase disposable income and boost private consumption).

However, given the ever-increasing public spending ratio in Western countries, government

[12]Similarly, when tax brackets are aligned with official inflation figures, a lower inflation figure would require fewer adjustments, resulting in fewer losses in tax revenue.

spending cannot be ignored. When governments increase spending on infrastructure projects, defense, welfare programs, or stimulus packages, for example, they directly increase aggregate demand. If this increase in demand exceeds the economy's productive capacity (aggregate supply), demand-pull inflation is created.

As a general rule, when more fiat currency is chasing fewer goods and services, prices naturally rise.

#### *Cost-Push Inflation*

Cost-push inflation occurs when the costs of producing goods and services, such as those of wages or raw materials, rise. As production costs increase, the supply of goods and services decreases, forcing companies to raise their prices. Since demand hasn't changed, but supply-side factors such as higher wages have, producers will pass on the additional costs to consumers.

Cost-push inflation can also result from supply-side shocks that raise production costs, such as oil price spikes, supply chain disruptions, sanctions, or natural disasters.

Government policies such as tariffs, taxes, or regulations can also increase production costs and add to inflationary pressures.

#### *Built-In Inflation*

Built-in inflation occurs when workers demand higher wages in anticipation of inflation. This leads to an increase in the cost of production and subsequently to higher prices. This can create a cycle in which inflation spirals out of control, also known as the wage-price spiral — a self-reinforcing cycle of inflation.

### Quantity Theory of Money (QTM)

Another theory that can be considered when examining the causes of inflation is the QTM. The QTM's key formula is derived from the equation of exchange, which links the money supply to the price level and economic activity.

It is most commonly expressed as follows:

$$M * V = P * Y$$

The components of the formula are:

M = Money supply (total amount of money in the economy).

V = Velocity of money (average rate at which a unit of money is spent in a given period).

P = Price level (average price of goods and services).

Y = Real output (real GDP, adjusted for inflation).

The equation states that the total amount of money spent in an economy (M * V) is equal to the total value of goods and services produced (P * Y). Therefore, an increase in the money supply should lead to higher prices, provided that the velocity of money and real output remain unchanged.

This brings to mind a quote from economist Milton Friedman: "Inflation is always and everywhere a monetary phenomenon, in the sense that it is and can be produced only by a more rapid increase in the quantity of money than in output."

While the QTM emphasizes the long-run relationship between the money supply and inflation, its simplicity means it neglects short-run dynamics, which are better explained by the triangular model of inflation.

### The Compounding Effect of Inflation

The compounding effects of inflation are not linear, so they can be difficult for people to understand. This section therefore analyzes the effects of inflation over time.

Although inflation rates are unlikely to remain stable over long periods, the tables below illustrate the cumulative impact of inflation. Even an annual inflation target of 2 percent, as announced by some central banks, would have a devastating effect on inflation and the purchasing power of a fiat currency.

Table 3 illustrates the compounding effects of inflation over time.

**Table 3. The Compounding Effect of Inflation**

| Annual Rate of Inflation | Amount on Day 1 | Inflated Amounts After . . . | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 1 Year | 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 2% | 100,000 | 102,000 | 110,408 | 121,899 | 134,587 | 148,595 | 164,061 | 181,136 |
| 2.5% | 100,000 | 102,500 | 113,141 | 128,008 | 144,830 | 163,862 | 185,394 | 209,757 |
| 3% | 100,000 | 103,000 | 115,927 | 134,392 | 155,797 | 180,611 | 209,378 | 242,726 |
| 4% | 100,000 | 104,000 | 121,665 | 148,024 | 180,094 | 219,112 | 266,584 | 324,340 |
| 5% | 100,000 | 105,000 | 127,628 | 162,889 | 207,893 | 265,330 | 338,635 | 432,194 |
| 7% | 100,000 | 107,000 | 140,255 | 196,715 | 275,903 | 386,968 | 542,743 | 761,226 |
| 10% | 100,000 | 110,000 | 161,051 | 259,374 | 417,725 | 672,750 | 1,083,471 | 1,744,940 |

**Table 4. Currency Devaluation Over Time**

| Annual Rate of Inflation | Amount on Day 1 | Purchase Power in Today's Terms After . . . | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 1 Year | 5 Years | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 2% | 100,000 | 98,000 | 90,392 | 81,707 | 73,857 | 66,761 | 60,346 | 54,548 |
| 2.5% | 100,000 | 97,500 | 88,110 | 77,633 | 68,402 | 60,269 | 53,103 | 46,788 |
| 3% | 100,000 | 97,000 | 85,873 | 73,742 | 63,325 | 54,379 | 46,697 | 40,101 |
| 4% | 100,000 | 96,000 | 81,537 | 66,483 | 54,209 | 44,200 | 36,040 | 29,386 |
| 5% | 100,000 | 95,000 | 77,378 | 59,874 | 46,329 | 35,849 | 27,739 | 21,464 |
| 7% | 100,000 | 93,000 | 69,569 | 48,398 | 33,670 | 23,424 | 16,296 | 11,337 |
| 10% | 100,000 | 90,000 | 59,049 | 34,868 | 20,589 | 12,158 | 7,179 | 4,239 |

This raises the question of whether fiat currencies are a reliable store of value.

Table 4 illustrates the cumulative effect of the devaluation of a fiat currency's purchasing power over time.

Therefore, the purchasing power of a given amount of fiat currency is always tied to a specific point in time, because its purchasing power decreases over time. For instance, the purchasing power of €1,000 is not the same in 2024 as it was in 2000.

Of course, inflation figures change over time, which makes tracking inflation and currency devaluation more difficult. However, these tables should give readers an idea of the cumulative effect of inflation.

## The Impact of Inflation on Taxation

### Opening Comments

Fiat currency inflation affects most taxes because nominal amounts increase over time (for example, income, prices, and wealth). This effect is exacerbated by the cumulative impact of inflation, which follows the principle of interest on interest.

Inflation can be considered to be a tax in and of itself because it reduces the purchasing power of nominal deposit amounts (and of investments that fail to keep pace with inflation[13]). After-tax

[13]When benchmarking the performance of an investment, the question arises as to whether one should use the CPI or average asset inflation as a benchmark.

returns must therefore be at least equal to real inflation to maintain the purchasing power of the investment,[14] which makes it even more difficult to preserve wealth in real terms.

This section provides an overview of taxes commonly adopted by countries and analyzes the interaction of inflation with these tax categories, using Luxembourg and Germany as case studies. However, although tax systems vary around the world, the principles discussed here are applicable universally to fiat-based systems.

## Taxation of Economic Activity and Investment

### Overview

Individuals and companies are generally subject to income tax on their worldwide income. Taxable income is the amount of income subject to tax after deductions and exemptions. However, some countries have opted for a territorial tax system, whereby only domestic income is included in the tax base and foreign income is excluded.

Corporate income tax is usually levied at a flat rate, although some countries have introduced progressive rates for lower income amounts. In contrast, personal income tax is usually levied at progressive rates, though a few countries have adopted a flat rate.[15] Tax rates and brackets vary widely from jurisdiction to jurisdiction.

Companies may also be subject to federal taxes (for example, corporate income tax) and state or local taxes (for example, municipal business tax). Also, some countries impose surcharges on corporate income tax (for example, for the unemployment fund).

Similarly, individuals may be subject to surcharges on income tax (for example, for an unemployment fund). Another issue is whether churches are financed by income tax revenues or if a separate tax is levied (for example, as a surcharge on income tax).

### Progressive Versus Flat Tax Rates

This section analyzes the design and effects of progressive and flat tax rates.

#### *Flat Rates*

Corporate tax systems in the Western world typically employ a flat tax rate for companies, though some incorporate progressive elements or graduated rates for smaller businesses with lower income. For instance, in Luxembourg, the corporate income tax rate stands at 15 percent for income up to €175,000, 17 percent for income above €200,000, and a sliding scale for income between €175,000 and €200,000.

Standard corporate income tax rates in EU member states generally vary between 12.5 percent and 25 percent. However, some countries have introduced an additional corporate income tax levied at the municipal, state, or provincial level (for example, business or trade tax in Luxembourg and Germany).

#### *Progressive Tax Rates*

Progressive tax rates are widely used in income tax systems for individual taxpayers. In a progressive income tax system, the marginal tax rate increases as the taxable income increases. This is typically accomplished by establishing tax brackets with distinct tax rates.

This system imposes lower tax rates on lower-income earners and higher rates on higher-income earners. Consequently, high-income individuals pay higher tax rates than low-income individuals.

The degree to which a tax structure is progressive determines how much of the tax burden is shifted onto higher incomes. For instance, if one tax code has rates ranging from 10 percent to 30 percent, while another has rates ranging from 10 percent to 50 percent, the latter is more progressive.

Marginal tax rates must be distinguished from average tax rates. A marginal tax rate is the tax rate imposed on the last dollar of income, while average tax rates measure the total proportion of income paid in taxes (average tax rate = amount of tax paid/taxable income * 100). This means that the marginal tax rate is generally higher than the average tax rate.

[14] If inflation is at 2 percent and the applicable income tax rate is 40 percent, the investment must generate a return of at least 3.33 percent to maintain purchasing power (2 percent / 0.6 = 3.33 percent).

[15] Flat taxes for individuals are rare but do exist in some countries, such as Hungary (15 percent) and Estonia (20 percent).

**Example: Marginal Tax Rate vs. Average Tax Rate**

It is assumed that an individual with an annual salary of €100,000 has a marginal tax rate of 45 percent, resulting in a total income tax liability of €25,000. In this case, the marginal tax rate is 45 percent, while the average tax rate is 25 percent.

A key issue with inflation is that tax brackets are usually fixed and remain unchanged for years, if not decades. Thus, an increase in nominal wages over time will result in an increase in average tax rates, as marginal tax rates rise for individuals. This occurs even if individual income merely keeps up with the CPI, as the purchasing power of the nominal amount of currency remains the same.

Even if countries index income tax brackets to inflation, the increases may be lower than actual inflation rates if the CPI understates inflation. Also, because asset price inflation tends to exceed the CPI, capital gains can increase marginal (and average) tax rates.

If an individual's income increases more slowly than the CPI, average tax rates will rise while their income's purchasing power will fall. This would reduce an individual's net disposable income in two ways: a reduction in real wages and an increase in taxes.

## Income From Employment

Income from employment is usually taxed and subject to social security contributions. Also, employers may be required to pay their share of social security contributions.

A tax is defined as: A compulsory financial charge imposed by a government (local, state or national) on individuals, businesses or other entities to finance public expenditure and services.

While social security contributions are considered contributions toward specific entitlements (for example, pensions, healthcare, unemployment benefits, and long-term care), any charges levied by a government that individuals or businesses cannot choose to pay or not pay would in my view meet the definition of a tax.

This becomes clearer when considering that many countries use taxes to finance pensions and other costs that would otherwise be covered by social security (cross-financing). Thus, in theory, governments could abolish social security and increase taxation to cover social security costs.

Another concern about social security contributions is that total payments are often split between employees and employers (either equally or at different rates). This can lead employees to believe that their net pay is unaffected by the employer's share. However, if the employer's share of social security contributions were to be removed, the employee could negotiate a higher salary. From an economic perspective, the employee must generate sufficient value to cover the salary and the employer's social security contribution.

The following case studies analyze tax and social security contributions in relation to a salary of €100,000 (a round number).

**Example: Income From Employment in Luxembourg**

The following example analyzes the situation of an employee with an annual gross salary package of €100,000 in Luxembourg. (See Table 5.)

**Table 5. Case Study: Luxembourg**

| | | | |
|---|---|---|---|
| | **Total costs for the employer** | **€112,340** | |
| ./. | Social security (employer part) | €12,340 | |
| = | **Gross salary** | **€100,000** | |
| ./. | Income tax | €23,600 | |
| ./. | Social security (employee part) | €12,340 | |
| = | **Net salary** | **€64,060** | |
| | | | |
| | **Employee's view** | | |
| | **Gross salary** | **€100,000** | 100.00% |
| ./. | Deductions (tax and social security) | €35,940 | **35.94%** |
| = | **Net salary** | **€64,060** | 64.06% |
| | | | |
| | **Employer's view** | | |
| | **Total costs of the employer** | **€112,340** | 100.00% |
| ./. | Deductions (tax and social security) | €48,280 | **42.98%** |
| = | **Net salary** | **€64,060** | 57.02% |

### Example: Income From Employment in Germany

The following example analyzes the situation of an employee with an annual gross salary package of €100,000 in Germany. (See Table 6.)

**Table 6. Case Study: Federal Republic of Germany**

| | | | |
|---|---|---|---|
| | **Total costs for the employer** | **€117,483** | |
| ./. | Social security (employer part) | €17,483 | |
| = | **Gross salary** | **€100,000** | |
| ./. | Income tax | €26,429 | |
| ./. | Social security (employee part) | €17,483 | |
| = | **Net salary** | **€56,088** | |
| | | | |
| | **Employee's view** | | |
| | **Gross salary** | **€100,000** | 100.00% |
| ./. | Deductions (tax and social security) | €43,912 | **43.91%** |
| = | **Net salary** | **€56,088** | 56.09% |
| | | | |
| | **Employer's view** | | |
| | **Total costs of the employer** | **€117,483** | 100.00% |
| ./. | Deductions (tax and social security) | €61,395 | **52.26%** |
| = | **Net salary** | **€56,088** | 47.74% |

Total deductions (tax and social security contributions) on a gross salary of €100,000 amount to around 36 percent in Luxembourg and around 44 percent in Germany.

However, if we consider total social security contributions as an employee tax burden and total employer costs as the real gross salary, the tax burden in Luxembourg would be around 43 percent, while the German tax burden would be around 52 percent.

### Allowances, Tax Exemptions, and Standard Deductions

Income tax laws generally provide specific exemptions and standard deductions. The amounts are generally set once and then often left unchanged for years, if not decades, without increases to account for inflation. Even if countries adjust these amounts for inflation or increase them periodically, the increases may be insufficient to cover real inflation rates if the CPI understates inflation.

Tax laws may provide for a basic amount that is not subject to tax (a basic tax-free allowance), standard tax deductions (for example, for deductible expenses or a commuting allowance), or maximum deductible amounts (certain payments that may be deductible — within limits — for tax purposes, such as additional pension payments and extraordinary expenses).

However, if these amounts are held stable for years, inflation will lead to higher (nominal) income amounts, and the amounts of exemptions and deductions will become less meaningful (in terms of purchasing power).

### Example: Income From Capital in Luxembourg

A person living in Luxembourg may receive up to €1,500 per year in normally taxable income from capital (for example, interest or dividend income; 50 percent of dividend income from qualifying participations is exempt from tax) that is exempt from taxation in Luxembourg. However, this amount was introduced to Luxembourg tax law in 2001 and has not been increased since.

According to official statistics, cumulative inflation in Luxembourg from 2001 to 2024 was 64.33 percent. Therefore, if this figure is correct, the tax-exempt amount would need to be increased to €2,465 to maintain its purchasing power.[16]

Thus, in real terms, this tax exemption has decreased significantly over time.

[16] The amount of €1,500 in 2024 is equivalent to approximately €910 in 2001 purchasing power.

### Tax Losses

Tax losses realized by individual and corporate taxpayers can generally be used to offset future taxable income of the same taxpayer (tax loss carryforwards). In some countries, tax losses can be carried back to previous tax periods (known as tax loss carrybacks).

However, as with all amounts fixed in nominal terms of fiat currency, tax losses lose purchasing power over time. Therefore, there is generally an incentive to use tax losses as soon as possible. Notably, some countries impose time limits on the use of tax loss carryforwards.

Finally, some countries have introduced so-called minimum tax rules that limit the deductibility of tax losses in future tax periods. The minimum tax rules further reduce the purchasing power of tax losses by delaying their use.

#### Example: Corporate Tax Losses in Germany

It is assumed that, in the 2015 financial year, a German company (GerCo) realized tax losses totaling €10 million. It is also assumed that GerCo had no taxable income from 2016 to 2023. In 2024, GerCo realized taxable income of €3 million.

Given the official CPI figures for Germany (approximately 24 percent from 2015 to 2024), the tax loss incurred in 2015 should be worth around €8 million in 2024 in terms of 2015 purchasing power. Therefore, GerCo has lost approximately €2 million in purchasing power for the same nominal amount.

Under German tax law, up to €1 million of tax losses can be deducted without limitation. Income in excess of this amount can only be offset by up to 60 percent of the available tax losses (the minimum tax rules apply).

In this case, GerCo can offset the €3 million taxable income in 2024 with €2.2 million in tax losses (€1 million + 60 percent of €2 million). Consequently, GerCo should realize taxable income of €800,000.

Deferring the deduction of a tax loss carryforward will result in the amount being systematically devalued by inflation.

### Capital Gains Taxation

Capital gains tax refers to the tax levied on the profits earned by companies and individuals from selling assets, such as real estate or financial assets like stocks and bonds. It is generally part of a (corporate) income tax system, with rules that vary widely from country to country.

Capital gains are the difference between the sale price and the cost of an asset, generally without any adjustment for loss of purchasing power. While capital gains realized by companies are generally taxable, capital gains realized by individuals on their personal property may be tax exempt under certain circumstances.

For instance, the sale of owner-occupied real estate may be exempt from tax or taxed at a reduced rate. Also, capital gains realized after a specified holding period may be exempt (or taxed at a reduced rate), whereas speculative capital gains (those realized within a short period of time, as defined by law) are usually fully taxed at the individual's standard rate. Some jurisdictions tax both long-term and short-term capital gains, although lower rates and exemptions may apply to the former.

For tax purposes, the capital gain is said to have been "realized" when taxable assets are sold. Typically, tax systems only tax realized capital gains, rather than unrealized capital gains during the asset's holding period. However, former U.S. Treasury Secretary Janet Yellen even considered the taxation of unrealized capital gains.[17]

The key problem with capital gains taxation is that asset price inflation is a component of any capital gain, because the tax base is determined in nominal fiat currency terms. Although one might consider using the CPI to analyze real capital gains in terms of purchasing power, asset price inflation has generally exceeded the CPI in recent decades because of loose monetary policy. Therefore, the inflation component of capital gains is usually higher than the CPI figure.

However, if nominal capital gains are taxed despite not representing an actual increase in

[17] Yen Nee Lee, "Oaktree's Howard Marks Says This Tax Proposal in the U.S. Makes Investing Less Attractive," CNBC, Jan. 20, 2021; given the cumulative effect of inflation over time, the taxation of unrealized capital gains could have been devastating to homeowners and investors who hold their investments for long periods of time.

purchasing power, capital gains taxation becomes more akin to a disguised wealth tax.

**Example: Taxing Nominal Capital Gains**

In January 2010 a Luxembourg company (LuxCo) invested in German real estate with acquisition costs of €10 million. In December 2024 the property was sold to a third party for €14 million. Thus, LuxCo realized a nominal capital gain of €4 million.

However, according to official statistics, the cumulative inflation in Germany from 2010 to 2024 was 35.8 percent (not taking into account generally higher inflation in asset prices).

Therefore, the purchase price of €10 million paid in 2010 would have the same purchasing power as approximately €13.58 million in December 2024. Based on this, the real capital gain should be only €420,000.

In practice, however, it is difficult to determine the proportion of nominal capital gains representing inflation and the proportion representing real capital gains (an outperformance of (asset) inflation).

### Foreign Exchange Variations

The purchasing power of all fiat currencies decreases over time. However, the rate at which they decline varies from one currency to another. For example, the Turkish lira lost around 50 percent of its value against the U.S. dollar in 2023 alone. Nevertheless, the dollar itself has lost around 46 percent of its purchasing power since 2000.

When a taxpayer exchanges domestic currency for a foreign currency or invests in assets denominated in a foreign currency that is losing purchasing power at a slower rate, the resulting foreign exchange gain is generally subject to tax. Similarly, if a company is financed by debt denominated in a foreign currency, it may realize a foreign exchange gain if the foreign currency loses more purchasing power than the company's functional currency over the financing period.

This illustrates the fundamental issue with the interaction between fiat currencies and taxation. Taxing a smaller loss in purchasing power is almost absurd.[18]

**Example: Foreign Exchange Gains in Relation to Assets**

On January 2, 2021, a Luxembourg company ("LuxCo") loaned $1 million to another company in the same group. LuxCo's equity and functional currency are both denominated in euros.

Based on the exchange rate on the loan date (€1:$1.2139), the loan was recorded as the equivalent of €823,791.

The loan was repaid on September 30, 2023. On that date, the euro-dollar exchange rate was €1:$1.0575. Thus, the $1 million loan was worth €945,626, resulting in a foreign exchange gain of €121,835 for LuxCo. This gain is subject to corporate income tax and municipal business tax at a combined rate of 23.87 percent.

In the period from January 2021 to September 2023, official inflation in the United States was around 17.5 percent, while official cumulative inflation in the eurozone, based on the harmonized index of consumer prices, was approximately 19.4 percent.

Thus, both currencies lost significant purchasing power during the loan period. However, the euro lost more value than the dollar, as reflected in the exchange rate.

**Example: Foreign Exchange Gains in Relation to Debt**

On January 2, 2021, a Luxembourg company ("LuxCo") received a loan of €1 million from another group entity. For tax purposes, LuxCo's equity and functional currency is the U.S. dollar, because most of its assets and liabilities are denominated in dollars, and LuxCo has elected to use dollars as its functional currency (assuming the Luxembourg tax authorities have approved).

Based on the exchange rate on the loan's grant date (€1:$1.2139), the loan was recorded at $1,213,900.

The loan was repaid on September 30, 2023. On that date, the euro-dollar exchange rate was €1:$1.0575. Thus, the €1 million loan was worth

[18] Here, a joke comes to mind: Why did the forex trader get audited? Because the tax office couldn't believe his "gains" were real . . . and neither could he.

$1,057,500, resulting in a foreign exchange gain of $156,400 for the Luxembourg company. This gain is subject to corporate income tax and municipal business tax at a combined rate of 23.87 percent.

These examples illustrate the irony of taxing currency fluctuations.

## Taxation of Pensions

Pensions are paid following employment in the private or public sector. Self-employed members of the liberal professions may belong to a compulsory or voluntary pension scheme.[19]

The taxation of pension payments around the world typically falls under one of two main regimes, each of which has different implications for pensioners and governments in the future.

### The Exempt-Exempt-Taxed (EET) Regime

Under the EET regime, contributions are tax deductible, and investment growth is tax free during the period of active (self-)employment. Pensions are then taxable at the retiree level.

### The Taxed-Exempt-Exempt (TEE) Regime

Under the TEE regime, contributions are made using after-tax income (contributions to the pension scheme are not tax deductible), but pension payments (including investment growth) are tax exempt. Some countries combine both models into hybrid systems and may apply different regimes to different types of pensions.

Under the EET regime, contributions to the pension scheme should be tax deductible (within limits), while pension payments should be taxable upon receipt. Standard income tax rules should apply, although some countries have introduced more favorable tax rules.

While the tax treatment of pensions shares the issues outlined in the Taxation of Economic Activity and Investment section above, the main concern regarding pension payments and inflation is the difference in purchasing power between contributions paid during active self-employment and the pension received from retirement age onward.

Contributions are generally a percentage of relevant earnings, either capped at a percentage of earnings or capped at a fixed amount. Pensions are typically calculated as a percentage of the final salary before pension payments begin.[20] If the plan invests the individual's contributions, pensions should equal the amount withdrawn plus investment returns.

Once a person retires, however, pension payments are usually increased modestly, possibly in line with official CPI figures. Therefore, pensioners are likely to fall behind real inflation.

Consequently, a period of high inflation, such as that which we experienced between 2022 and 2024, would devalue the purchasing power of pension rights acquired over a long period, when the nominal value of contributions was much higher.

Nevertheless, even the 2 percent inflation target set by many central banks would substantially diminish the purchasing power of pension payments in relation to the purchasing power of the contributions' nominal value (see the Compounding Effect of Inflation section, above).

**Example: Devaluation of Pension Rights**

In 2020 a pensioner has a monthly pension of €3,000 (and an annual pension of €36,000). In the years 2020 to 2023, the average aggregate inflation in the eurozone was about 19.4 percent. Assuming the pension increases by 2 percent per year in 2021, 2022, and 2023, the monthly pension in 2023 would be €3,184 (€38,208 per year).

In this example, the retiree has lost purchasing power compared to his situation in 2020, because the 2023 pension is equivalent to €2,738 in terms of 2020 purchasing power (€32,856 per year).

To maintain purchasing power, the pension in 2023 would have to be €3,582 per month (€42,984 per year), without taking into account the effect of taxation on the net income.

Although this is a hypothetical example, it can be expected that common pensioners lost purchasing power during the last wave of inflation.

[19] In Germany, for example, members of various liberal professions, such as tax consultants, have the option of contributing to their own pension fund (rather than to the general pension scheme).

[20] Often, active employees are paying pension contributions for current pensioners, rather than investing for their own pension.

## Taxation of Consumption

### Overview

Consumption is taxed in different ways. While countries in the EU levy a VAT on goods and services at varying rates, other countries, such as the United States, have adopted a sales tax. Customs duties can be considered a form of consumption tax because they are ultimately borne by the final customer.

Consumption taxes all have one thing in common: They amplify the impact of inflation by embedding fiscal costs in the prices of goods and services.

### VAT

EU member states use VAT, a tax applied at each stage of production and distribution. Businesses charge VAT on sales (output tax) and reclaim VAT paid on purchases (input tax), with the net difference being the business's VAT liability. Ultimately, VAT is a burden on the final consumer, who bears the full cost of VAT because it cannot be reclaimed.

EU member states generally have a standard VAT rate, typically ranging from 17 percent to 27 percent, as well as reduced rates for essential items such as food, books, and medicines. Some countries even have super-reduced rates, such as 0 percent on children's clothing in Ireland. Also, some sectors (for example, healthcare and education) are exempt from charging VAT but cannot reclaim input VAT.

In the context of international trade, imports are usually subject to VAT at the destination country's rate. Companies can reclaim this VAT as input VAT. In contrast, exports are usually taxed at zero rate, ensuring that goods are only taxed in the destination country.

The United States has a sales tax system that is similar to VAT. However, sales tax is a one-tier tax levied only at the final point of sale to the consumer. Rates depend on the buyer's location (state, county, or city) and generally range between 8 percent and 10 percent.

Sales tax exemptions apply to necessities such as food, prescription drugs, and clothing, which may be exempt or taxed at reduced rates in some states. Overall, U.S. sales tax rates are lower than EU VAT rates. Exports are generally exempt from U.S. sales tax.

Both VAT and sales tax increase the final cost to the consumer proportionally, depending on the base price of the goods or services and the applicable tax rate. Consequently, inflation results in proportional increases in both taxes.

#### Example: VAT and Inflation

In January 2019 an individual resident in Germany purchased an item for €1,000. With a VAT rate of 19 percent, the total price including VAT was €1,190.

In December 2024 the individual purchased the same good. However, assuming the price increased in line with the CPI (cumulative inflation from 2019 to 2024 was 22.7 percent), the price would be €1,227. Therefore, the VAT would be €233, making the total price including VAT €1,450.

Thus, in this example, inflation would result in an additional VAT of €43.

### Customs Duties

Although they are primarily used as trade tools, customs duties (tariffs) function as targeted consumption taxes on imported goods, which raises the price for consumers. Tariffs are taxes levied on goods crossing international borders, typically on imports but occasionally on exports too.

There are several types of tariffs, including a percentage of the goods' value, a fixed amount per unit (for example, a set amount for a set quantity of a product), or a combination of the two. The applicable tariff rates usually depend on the product type, its origin, and trade agreements. Sometimes, tariffs are designed to apply lower rates up to a quota limit and higher rates above it.

The economic effect of tariffs on consumers is higher prices and reduced purchasing power. As such, tariffs are a driver of inflation.

#### Example: The Effect of Tariffs on Inflation

Suppose a country imposes a 25 percent tariff on imported steel to protect its domestic industry. If imported steel initially costs $800 per ton, the price would rise to $1,000 with the tariff.

Because tariffs are applied to the nominal value of imports, inflation directly affects them, exacerbating the impact on consumers.

### Selected Consumption Taxes

Consumption taxes are often levied on products and services that are perceived to have negative social, health, or environmental consequences.

Unlike broad-based taxes like VAT or sales taxes, these levies are generally designed to influence behavior, raise revenue, or address societal costs.

Depending on the jurisdiction, a variety of consumption taxes may be in place, with new ones on the horizon (for example, taxes on water consumption). While these taxes are all designed differently, the trend is for them to increase in line with the nominal price of the goods and services consumed.

In general, consumption taxes form part of the taxable base for VAT purposes (VAT is levied on the consumption tax). Therefore, consumption taxes generally increase the cost of VAT for consumers by the percentage levied in the relevant jurisdiction.

Below is a summary of selected consumption taxes.

#### *Alcohol Taxes*

Alcohol taxes can be levied on various types of alcohol, including beer, champagne, and spirits. They are designed to discourage excessive drinking and generate tax revenue.

They can be levied either on the alcohol content of a beverage or as a percentage of its price. Taxes on distilled spirits tend to be higher than those on lower-volume alcohol, such as beer.

#### *Tobacco Tax*

Tobacco taxes are among the most widely used types of excise tax in the world. They are designed to reduce smoking rates and generate tax revenue.

These taxes can take the form of a fixed amount per pack or cigarette, a percentage of the retail price, or graduated rates that impose higher taxes on cigarettes than on cigars or loose tobacco.

#### *Coffee Tax*

Coffee taxes are generally levied to raise revenue, because coffee is considered less harmful than alcohol or tobacco. They are usually levied on roasted coffee beans or instant coffee, for example, a certain amount per kilogram.

#### *Energy Tax*

The purpose of an energy tax is to promote energy efficiency, limit consumption, and fund the transition to a green economy. Electricity tax is usually charged per kilowatt-hour.

#### *Mineral Oil Tax*

Fuel taxes are generally levied on gasoline, diesel, and other petroleum products at a rate per liter or gallon. Fuel taxes are ostensibly intended to reduce dependence on petroleum fuels, fund infrastructure, and reduce pollution.

#### *Aviation Tax*

Aviation taxes can be designed in different ways, for example, as a passenger tax based on distance or class, or as a cargo tax based on the weight of the cargo (per ton). The purpose of aviation taxes is to address environmental impacts, generate tax revenue, and restrict air travel.

#### *Insurance Tax*

Insurance taxes are levied on insurance premiums, including life, property, and health insurance, to generate tax revenue rather than change behavior.

Consumption taxes can be designed in a variety of ways, but they tend to increase with inflation. For example, a tax defined as a percentage of the price of a product would automatically result in higher taxes as prices rise. Even a tax defined as a fixed amount per kilogram, liter, or kilowatt-hour is likely to be increased as the nominal value of the underlying goods increases.

### Excursus: The Taxation of Gasoline in Germany

The taxation of gasoline in Germany is a good example of an accumulation of consumption taxes.

While gasoline prices are quite volatile, let's consider the following assumptions based on a price per liter of gasoline of €0.60. (See Table 7.)

**Table 7. Composition of the Gasoline Price in Germany**

| | |
|---|---|
| Price excluding taxes | €0.60 (ca 35%) |
| + Mineral oil tax | €0.65 (ca 39%) |
| + Carbon ($CO_2$) tax | €0.16 (ca 10%) |
| **= Cost per liter** | **€1.41 (ca 84%)** |
| + VAT (19%, Germany) | €0.27 (ca 16%) |
| **Total costs per liter** | **€1.68 (100%)** |

In this case, we have a basic cost of €0.60 for the product, refining, and shipment, and a combined tax of €1.08 (= €0.65 + €0.16 + €0.27), which represents 64 percent of the cost of a liter to the consumer (€1.08 / €1.68 * 100), or 180 percent applied to the price of the good (€1.08 / €0.60 * 100).

This is a good example of multiple consumption taxes being applied to the purchase of a good, with tax being levied on tax. This is because the VAT base includes the mineral oil tax and the carbon tax, the latter of which is expected to increase significantly in the EU in the coming years.

This means that inflation should have multiple effects on the price of petroleum — base cost, petroleum tax,[21] carbon tax,[22] and VAT applied on all these components.

When the base cost of mineral oil increased by 10 percent to €0.66, the pre-VAT cost amounted to €1.47. The total cost to the consumer, including VAT (€0.28), would be €1.75 (an increase of 4.2 percent in consumer costs).

Alternatively, if the carbon tax were to rise to €0.30, the pre-VAT cost per liter would be €1.55. Therefore, the total cost would be €1.85, including €0.29 of VAT (an increase in consumer costs of 10.1 percent).

## Taxation of Carbon Emissions

To address the alleged $CO_2$-related climate change, the EU and other countries around the world have introduced carbon taxes to discourage consumption.[23] The goal is to achieve net zero $CO_2$ emissions by 2050.[24] The EU employs carbon pricing mechanisms to mitigate greenhouse gas emissions, primarily via the EU emissions trading system (ETS) and the carbon border adjustment mechanism (CBAM).

The ETS is the world's largest carbon market, covering around 40 percent of EU emissions (power generation, manufacturing, and intra-EU flights). It works by requiring companies to surrender one allowance for every ton of $CO_2$ emitted.

Also, the EU reduces the cap on allowances annually to encourage decarbonization, creating incentives for industrial companies to relocate production outside of the EU. The price of the allowances fluctuates according to market dynamics, ranging from €60 to €100 per ton of $CO_2$ as of mid-2024.

The CBAM, which is being phased in from 2023 to 2026, imposes a carbon price on imports to prevent carbon leakage (the outsourcing of emissions). The carbon price under the CBAM is linked to the ETS's weekly average price. Importers pay the difference if the carbon price in their home country is lower. For example, if the ETS price is €90/ton $CO_2$ and the importer's home carbon price is €30/ton $CO_2$, the importer would pay the difference of €60/ton $CO_2$. Initially, the CBAM will focus on cement, iron and steel, aluminum, fertilizers, electricity, and hydrogen.

Several EU member states have also introduced additional carbon taxes that are not harmonized at the EU level. Sweden, for example, introduced a tax of €130 per ton of $CO_2$ in 2024, while France introduced a tax of around €45 per ton of $CO_2$ in sectors not covered by the ETS.

The price per ton of $CO_2$ under carbon taxes is expected to increase significantly in the EU over the next few years. Consequently, they will be a key driver of inflation.

[21] Mineral oil tax is fixed per liter but adjusted nominally on a regular basis.

[22] Carbon tax is set to increase significantly in the coming years.

[23] The atmosphere contains around 0.04 percent of $CO_2$ (see National Oceanic and Atmospheric Administration, "The Atmosphere" (last updated July 2, 2024)), which is said to be harmful for the climate in the long-term.

[24] As part of its green deal and climate law, the EU has committed to achieving "net zero greenhouse gas emissions" by 2050. This legally binding target aims to decarbonize the EU economy and balance remaining emissions with removals (e.g., through carbon sinks or capture technologies).

## Taxation of Ownership

### Overview

Property can be taxed in a variety of ways, including an all-encompassing wealth tax, a tax levied on real estate ownership, a car tax, and a dog tax.

A wealth tax may be levied either annually or as a one-off, typically in response to a specific crisis, such as a banking crisis or war.

In 2024 the EU published a feasibility study on creating a comprehensive European asset registry to track citizens' assets. This could facilitate the implementation of a (one-off) wealth tax.[25]

This section will focus on net wealth taxes and real estate taxes.

### Net Wealth Tax

Net wealth taxes are annual levies on the total net wealth of resident companies and individuals, that is, the market value of assets minus liabilities. The net wealth tax rate may be a flat or graduated rate, depending on the amount of total net wealth. Nonresident companies and individuals may be subject to a net wealth tax on their domestic assets (for example, real estate located in the relevant jurisdiction).

Net wealth tax laws may provide for certain tax exemptions, like qualifying participation under a participation exemption regime, or a tax-free allowance.

Net wealth taxes are rare in the Western world today. Most OECD countries abolished them between 1990 and 2010 because of capital flight, high administrative costs (complex valuations), relatively low tax revenues, and compliance burdens.

However, in recent years there have been some debates, for example in Germany,[26] about one-off net wealth taxes in the face of high public debt and deficit spending by governments.

As asset price inflation increases the value of assets, the tax base for wealth taxes can only grow over time. When the net wealth tax system provides for progressive tax rates, inflation tends to raise the average net wealth tax rate. Further, if a tax-free allowance is introduced, it usually remains unchanged for years, if not decades. Consequently, the allowance's purchasing power will erode over time.

### Real Estate Tax

Real estate taxes (commonly called property taxes) are annual levies imposed on property owners, primarily based on the value of their land and structures. While taxes may apply separately to land value and buildings, most systems tax the total value of the real property.

There are several ways in which the value of a property can be determined, such as market value (which is periodically reassessed), acquisition cost (with capped annual increases), or the rental income potential of a property. The tax rates may either be flat or progressive and vary among jurisdictions.[27]

Property tax laws may provide for tax exemptions (for example, a primary residence exemption) or reduced tax rates for certain types of land or property.

Because real estate prices rise over time with inflation, property taxes tend to rise too. When the property tax system provides for progressive tax rates, inflation would tend to increase the average property tax rate. Further, if a tax-free allowance is introduced, it usually remains unchanged for years, if not decades. Consequently, its purchasing power will erode over time.

## Taxation of the Transfer of Ownership

### Overview

The transfer of real estate ownership is generally subject to a real estate transfer tax. In recent years, some countries have also considered introducing a financial transaction tax (FTT), which would levy a small percentage on the trading of financial instruments, such as stocks, bonds, and derivatives.

### Real Estate Transfer Tax

Real estate transfer taxes (RETTs) are levied on the transfer of property and are a common source of revenue for governments worldwide. Although

[25] European Commission, "Feasibility Study for a European Asset Registry in the Context of the Fight Against Money Laundering and Tax Evasion: Executive Summary" (2024).

[26] Germany has a law that allows for a one-off wealth tax in the event of a major crisis (*Lastenausgleich*).

[27] Real estate tax rates may be set at a federal or state level, for example.

tax systems vary, most adhere to fundamental design principles.

RETTs are generally levied on the transfer of legal title to real property, including land, buildings, or interests in property-owning entities, by sale, gift, or inheritance.

The taxable basis is typically the market value of the property at the time of the transaction. Tax rates can range from 0.5 percent to over 10 percent and can be either flat or progressive (graduated based on property value or type). A tax exemption may be available for first-time buyers, transfers between family members, or corporate reorganizations.

As real estate prices rise over time because of inflation, the RETT also tends to rise following the taxable basis. When the RETT system provides for progressive tax rates, inflation would tend to increase the average RETT rate. Further, if a tax-free allowance is introduced, it usually remains unchanged for years, if not decades. Consequently, its purchasing power erodes over time.

#### FTT

An FTT is imposed on specific financial transactions, such as the trading of stocks, bonds, derivatives, currencies, and other financial instruments.

Although it is usually a flat tax, ranging from 0.01 percent to 1 percent, some jurisdictions have adopted tiered rates (for example, higher rates for riskier instruments such as derivatives).

An FTT may provide tax exemptions (for example, for pension funds or central banks), be limited in geographic scope (for example, domestic transactions versus cross-border trades), or exempt small trades (for example, transactions below a certain threshold) to exclude retail investors. Asset price inflation directly affects an FTT by increasing market prices and thus the FTT's tax base.

### Taxation of the Transfer of Wealth

#### Overview

In many countries, the transfer of wealth between family members or unrelated individuals, whether through gifts or inheritance, is subject to gift or inheritance tax.

To prevent individuals from avoiding tax by transferring wealth before death, many jurisdictions combine these levies into a single framework, treating lifetime gifts and inheritances similarly under the tax law.

#### Taxation of Gifts

Gift taxes are levied on the transfer of property during the lifetime of a resident donor or beneficiary. Gift taxes may also apply to the transfer of domestic property, even if the donor and beneficiary are not residents, such as real estate located within the jurisdiction.

As previously mentioned, many jurisdictions combine gift and estate taxes within a single framework, treating lifetime gifts and inheritances similarly to prevent individuals from avoiding estate taxes by transferring wealth before death.

Gift tax rates may vary depending on the nominal value of the gift and the degree of kinship between the donor and beneficiary. Generally, the more distant the relationship, the higher the tax rate unless a flat rate applies.

Gift tax systems may allow for exemptions, such as specified amounts available periodically, which vary according to the relationship between the donor and recipient.

When considering the impact of inflation on gift taxes, asset price inflation initially increases the nominal value of the gift. If the gift tax system uses progressive tax rates rather than a flat rate, inflation tends to further increase the average tax rate, as tax brackets usually remain unchanged for extended periods.

Further, gift tax exemptions are usually introduced once and remain unchanged for years, if not decades. Consequently, the purchasing power of the nominal exemption amounts will erode over time.

#### Example: Gift Tax in Germany

It is assumed that a German resident individual transfers cash of €1 million to his niece, who is resident in Germany.

Tables 8 and 9 detail the gift tax rates and exemptions applicable in Germany.

**Table 8. Gift Tax Rates**

| Amount of the Gift | Tax Class I | Tax Class II | Tax Class III |
|---|---|---|---|
| Up to €75,000 | 7% | 15% | 30% |
| Up to €300,000 | 11% | 20% | 30% |
| Up to €600,000 | 15% | 25% | 30% |
| Up to €6,000,000 | 19% | 30% | 30% |
| Up to €13,000,000 | 23% | 35% | 50% |
| Up to €26,000,000 | 27% | 40% | 50% |
| Above €26,000,000 | 30% | 43% | 50% |

**Tax classes:**

**Tax class I:** Very close family members such as spouses, children, stepchildren, and adopted children, as well as grandchildren and great-grandchildren.

**Tax class II:** Siblings, nephews and nieces, stepparents, parents-in-law, grandparents, great-grandparents, and divorced spouses.

**Tax class III:** Far-away relatives and people who are not relatives.

**Table 9. Tax Exempt Amounts — Gift Tax**

| Relationship | Tax Exempt Amount of Gifts Every 10 Years |
|---|---|
| Spouse/Registered partner | €500,000 |
| Children (biological, adopted, stepchildren) | €400,000 |
| Grandchildren (if the children of the donor are no longer alive) | €400,000 |
| Grandchildren (if the children of the donor are still alive) | €200,000 |
| Great-grandchildren | €100,000 |
| Children/Grandchildren gift to their parents/grandparents | €20,000 |
| All other people (e.g., siblings) even if not related | €20,000 |

The niece falls within tax class II. Moreover, the niece should benefit from an exemption of €20,000. Thus, the amount of €980,000 should be taxable.

The gift tax liability is determined as shown in Table 10.

**Table 10. Determination of the Gift Tax (Tax Brackets)**

| | |
|---|---|
| €75,000 taxable at 15% | = €11,250 |
| + €225,000 taxable at 20% | = €45,000 |
| + €300,000 taxable at 25% | = €75,000 |
| + €380,000 taxable at 30% | = €114,000 |
| **= Total gift tax** | **€245,250** |

As a result, the niece must pay gift tax of €245,250. The marginal tax rate is 30 percent, while the average tax rate is about 25 percent (€245,250 / €980,000 * 100).

### Taxation of Inheritance

Inheritance taxes are levied when a resident dies or when a resident beneficiary inherits property. They may also be levied on the transfer of domestic property, even if neither the testator nor the beneficiary are residents, for example, if the real estate is located within the jurisdiction.

Inheritance tax rates may vary depending on the value of the inheritance and the relationship between the testator and beneficiary. They are often progressive. Generally, the more distant the relationship, the higher the tax rate (unless a flat rate applies).

When considering the impact of inflation on inheritance taxes, asset price inflation initially increases the nominal value of the inheritance. If the inheritance tax system is progressive rather than applying a flat rate, inflation tends to further increase the average tax rate (as tax brackets usually remain unchanged for extended periods).

Further, inheritance tax exemptions are typically introduced once and remain unchanged for years, if not decades. Consequently, the purchasing power of the nominal exemption amounts will erode over time.

#### Example: Inheritance Tax in Germany

Let us assume that a German resident individual transfers his assets of €3 million to his daughter upon his death.

Tables 11 and 12 detail the inheritance tax rates and exemptions applicable in Germany.

**Table 11. Inheritance Tax Rates**

| Amount of the inheritance | Tax Class I | Tax Class II | Tax Class III |
|---|---|---|---|
| Up to €75,000 | 7% | 15% | 30% |
| Up to €300,000 | 11% | 20% | 30% |
| Up to €600,000 | 15% | 25% | 30% |
| Up to €6,000,000 | 19% | 30% | 30% |
| Up to €13,000,000 | 23% | 35% | 50% |
| Up to €26,000,000 | 27% | 40% | 50% |
| Above €26,000,000 | 30% | 43% | 50% |

**Tax classes:**

**Tax class I:** Very close family members such as spouses, children, stepchildren, and adopted children, as well as grandchildren and great-grandchildren.

**Tax class II:** Siblings, nephews and nieces, stepparents, parents-in-law, grandparents, great-grandparents, and divorced spouses.

**Tax class III:** Far-away relatives and people who are not relatives.

**Table 12. Tax Exempt Amounts — Inheritance Tax**

| Relationship | Tax Exempt Amount |
|---|---|
| Spouse/Registered partner | €500,000 |
| Children (biological, adopted, stepchildren) | €400,000 |
| Grandchildren (if the children of the donor are no longer alive) | €400,000 |
| Grandchildren (if the children of the donor are still alive) | €200,000 |
| Great-grandchildren, parents, and grandparents | €100,000 |
| All other people (e.g., siblings) even if not related | €20,000 |

In this case, an exemption of €400,000 applies. Hence, the amount of €2.6 million should be taxable.

The inheritance tax liability is determined as shown in Table 13.

**Table 13. Determination of the Inheritance Tax (Tax Brackets)**

| | |
|---|---|
| €75,000 taxable at 7% | = €5,250 |
| + €225,000 taxable at 11% | = €24,750 |
| + €300,000 taxable at 15% | = €45,000 |
| + €2,000,000 taxable at 19% | = €380,000 |
| **= Total gift tax** | **€455,000** |

As a result, the daughter must pay an inheritance tax of €455,000. The marginal tax rate is 19 percent, while the average tax rate is about 17.5 percent (given a tax base of €2.6 million).

## Conclusion

Fiat currencies have no intrinsic value and are designed to decrease in value when the supply of currency increases, either through central banks expanding credit or commercial banks expanding lending (fractional reserve banking).

Many central banks aim for an annual inflation rate of 2 percent, as measured by the CPI. However, even this level of inflation would have a devastating cumulative effect on the purchasing power of a fiat currency over time.

A real-life example of the long-term effects of a fiat currency is that the purchasing power of the U.S. dollar has fallen by over 96 percent since the establishment of the Federal Reserve in 1913 and by around 86 percent since Nixon abandoned the Bretton Woods system in August 1971.

Given how the CPI measures inflation, it is reasonable to assume that CPI figures systematically understate true inflation levels. These effects build up over time, resulting in much higher real inflation in the long term. Therefore, the loss of purchasing power is likely to be greater than the official CPI figures suggest.

Countries around the world have introduced various taxes, levying them on virtually every aspect of life, including economic activity, investment, pensions, consumption, carbon emissions, ownership, and transfers of ownership or wealth.

Inflation of fiat currency systematically amplifies tax burdens by inflating nominal values (income, prices, wealth, etc.) while eroding purchasing power. This silent tax consists of various components, such as progressive tax rates and the erosion of the purchasing power of tax-exempt amounts, and compounds over time. The greater the level of inflation, the greater its impact on taxation.

Ultimately, as Milton Friedman observed, "inflation is taxation without legislation," a mechanism that enables governments to reduce real debt and spending obligations while permitting deficit spending and avoiding explicit tax hikes. ■