Be aware: This is the recovered redbook– not the original. As far as we (Ampltools.com) are aware everything was restored as it was shown online. But things could be missing? This book was recovered for historical purposes and not as/for financial advise.

Red Book

The Ampleforth Protocol

The Ampleforth *Red Book* is a sequenced list of foundational reading material on the Ampleforth protocol, and its units (Amples). Due their unorthodox nature, we felt it made sense to present a comprehensive view of what Amples are, how they can be traded, and how they fit into the broader economic landscape. Any interested reader will be able to follow the topics covered.

The first course discusses how to trade and interact with Amples, beginning with the protocol. The second course discusses current-generation cryptocurrencies in a broader economic context and the motivation for the Ampleforth solution.

Trading

The Ampleforth Red Book - Course I

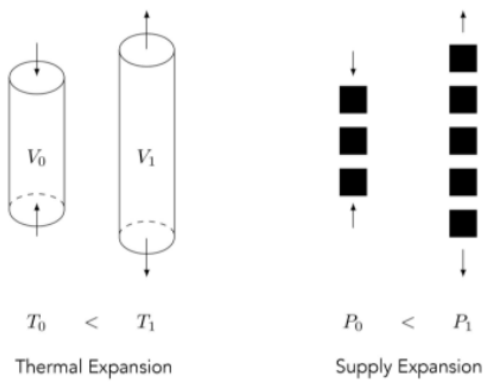
Thanks for taking the time to stop by. We are excited to get started with the first course of the Ampleforth Red Book: Trading.

Gains and losses in the Ampleforth network are attributed to *supply in addition to price*. As a result—**it will not be effective**—to trade Amples like a typical floating price token. More specifically, common technical analysis methods like *Simple Moving Average* will not paint the full picture.

The purpose of this course is to provide you with all the tools necessary to make informed decisions about how to trade Amples based on the mechanics of the Ampleforth protocol. Thanks in advance for following along. Click next below to get started with an overview.

1.1 Overview

The Ampleforth protocol propagates price-information into supply, much like how thermal expansion propagates nearby kinetic energy into a material's volume in the natural world.



The protocol achieves this by seeking a *price-supply equilibrium*, and will always enter a state of unrest until it finds one. As a result, the system alternates between two modes:

- **Dynamic**: In which supply is changing
- **Equilibrium**: In which supply remains static

Continue to learn about the desired output of price-supply equilibrium.

1.2 Desired Output

As an output, the Ampleforth protocol seeks to reflect demand changes in quantity rather than price. Let's walk through a simple example:

`Imagine Alice purchases` **`1 Ample`** `for` **`$1`**`.`
`Demand suddenly increases, and she now has` **`1 Ample`** `worth` **`$2`**`.`

In the case above, the system will seek a price-supply equilibrium, such that Alice ends up with `2 Amples each worth $1`. And the opposite is true when demand decreases. Continuing from the example above:

`Imagine Alice has` **`2 Amples`** `each worth` **`$1`**`.`
`Demand suddenly decreases, and she now has` **`2 Amples`** `each worth` **`$0.50`**`.`

Similarly in this case, the system will seek a price-supply equilibrium such that Alice ends up with `1 Ample worth $1`.

Now you may be asking, why bother? Whether Alice holds 1 Ample worth $2, or 2 Amples each worth $1, makes no difference in terms of net balance since `(1 x $2) = (2 x $1)`. But there are two key benefits to seeking price-supply equilibrium:

1. **It applies <u>countercyclical pressures</u>**
2. **It encourages a stable unit price**

We'll talk more about the importance of these benefits in course 2, which speaks to Ampleforth in a broader economic context.

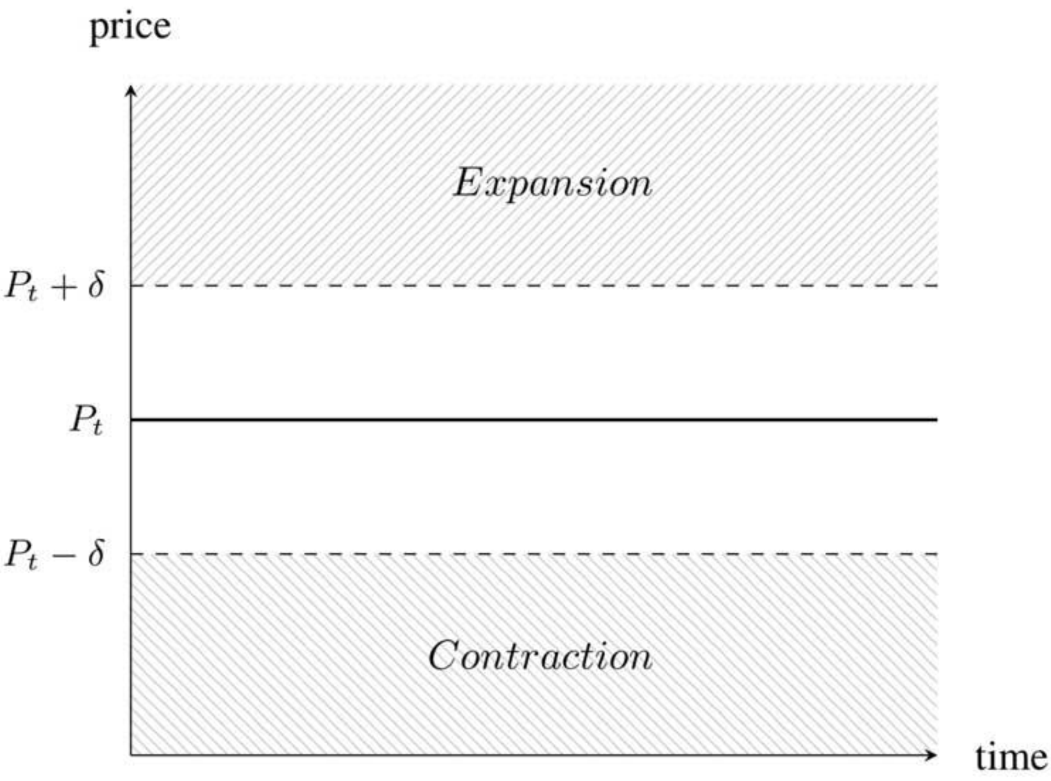
For now, remember that although commodity-monies like gold and silver are naturally fair and politically-independent, they cannot function as suitable alternatives to central-bank-money because they are *unable to respond efficiently to changes in demand*.

1.3 Protocol Rules

To achieve price-supply equilibrium, the protocol expands and contracts supply in one of two ways. Given a price target, P_t and price threshold, δ:

- *if* the exchange rate between `Amples` and its target is > $P_t + \delta$, the protocol responds by expanding to coin holders proportionally.

- *if* the exchange rate between `Amples` and its target is < $P_t - \delta$, the protocol responds by contracting from coin holders proportionally.



Above the threshold ($P_t + \delta$) the protocol expands.
Below the threshold ($P_t - \delta$) the protocol contracts.

The price target, P_t, is set to the purchasing power of one 2019 US dollar as represented by CPI. And the price threshold δ is set to 5%.

Supply Smoothing

To avoid unnecessary overcorrection, the protocol grades supply changes as though they will distribute evenly over the course of 10 days. For example:

- *if* the exchange rate is `1.5 Amples : 1`, the price difference can be offset by increasing each wallet's balance by 50%.

  > Grading linearly over 10 days means in this case that the protocol will increase wallet quantities by **+50% / 10** on the first day.

- *if* the exchange rate is `0.5 Amples : 1`, this price difference can be offset by decreasing each wallet's balance by −50%.

  > Grading linearly over 10 days in this case means that the protocol will update wallet quantities by **−50% / 10** on day zero.

The supply change is recomputed and executed no more than once every 24 hours. This operation is stateless, meaning each day the protocol recomputes a supply target based on the latest price difference, and executes *as though* the change will occur evenly over the next 10 days without any memory of the previous day's supply change.

1.4 How Not to Trade Amples

⛔	As shown in the previous sections, Amples follow a set of rules that is unlike other assets. Specifically, price cannot always be used as a proxy for gains and losses, and trading only according to price is disadvantageous.
🎉	On the otherhand, traders using supply in addition to price as a proxy for gains and losses will be distinctly advantaged.

1.5 Thinking Fast & Slow

The Ampleforth protocol establishes a set of initial conditions and incentives for the network. And although the protocol propagates price information into supply, it's the actors that propagate supply information back into price.

Recall that the Ampleforth protocol programmatically sets supply targets, which is important because the promise of elastic supply needs to be strictly enforced. However, changing supply does not mean that traders will correspondingly adjust their bids.

In practice, traders will respond to supply changes based on how quickly or slowly they think others will respond, ultimately seeking to buy low and sell high.

Inductive Explanation

To illustrate, it helps to separate fast traders, FT, who operate on short trading windows from slow traders, ST, who operate on long trading windows. The total set of traders,T, is the combined set of fast and slow traders, $T = FT \cup ST$.

To a slow trader who typically holds for long periods and only occasionally buys and sells, whether demand-information is reflected in price or count makes no difference with respect to net balance.

But for a fast trader who benefits from near term trades, expansion and contraction events present gain opportunities. Consider the following example:

Slow Trader: Let's imagine Alice is a slow trader who buys and sells infrequently. She checks in at time, t0, and sees that she has 1 Ample worth $1.2. Later she checks in at t1, and sees that she now has 1.2 Amples each worth $1.

- *Alice* at t0:
  1 coin, worth $1.2/coin
- *Alice* at t1:
  1.2 coins, worth $1/coin

Since Alice's net balance at t0 and t1 are equivalent, there isn't any compelling reason for her to buy or sell before or after the state change. But for a fast trader, there is an additional state to consider:

Fast Trader (Expansion): Let's imagine Bob is a fast trader who buys and sells frequently. He checks in before expansion at state t0, again while the system is expanding at state t1, and finally after expansion at state t2.

- *Bob* at t0:
  1 coin, worth $1.2/coin
- *Bob* at t1:
  1.2 coins, worth $1.2/coin (sell opportunity)
- *Bob* at t2:
  1.2 coins, worth $1/coin

At t1, there's a limited opportunity for Bob to sell more units than he could have at t0 for the same price before other fast traders take advantage of the opportunity and drive the price back down. And the opposite is true in the event of contraction:

Fast Trader (Contraction): Let's imagine Charlie is a fast trader who buys and sells frequently. He checks in before contraction at state t0, again while the system is contracting at state t1, and finally after contraction at state t2.

- *Charlie* at t0:
  1 coin, worth 0.8/coin
- *Charlie* at t1:
  0.8 coins, worth 0.8/coin (buy opportunity)
- *Charlie* at t2:
  0.8 coins, worth 1/coin

Similarly, at t1 there's a limited opportunity for fast traders to purchase a greater percentage of the network from Charlie (should he be willing to sell) for the same price they could have at t0, before other fast traders take advantage of the opportunity and restore the price to its equilibrium value.

1.6 How to Trade Amples

As previously discussed, unlike current-generation cryptocurrencies, gains and losses in the Ampleforth network can be attributed to supply in addition to price. Thus it benefits traders to take both information signals into consideration, evaluating trades based on both the supply of units, S, and the price per unit, P, where market cap $M = P \times S$.

And unlike current-generation synthetics, the Ampleforth supply policy has three states:

- Expansion
- Contraction
- Equilibrium

Below, we'll identify the unique trading opportunities presented by the Ampleforth protocol across each of the three states, and then combine our findings into a predicted movement pattern.

Expansion

As discussed in the previous section, during expansion there is a window in time where fast traders have a profit opportunity to sell after the supply increases but before any price correction occurs. As long as there are enough traders who exploit this opportunity, price would correct downward creating general price and supply patterns like below:

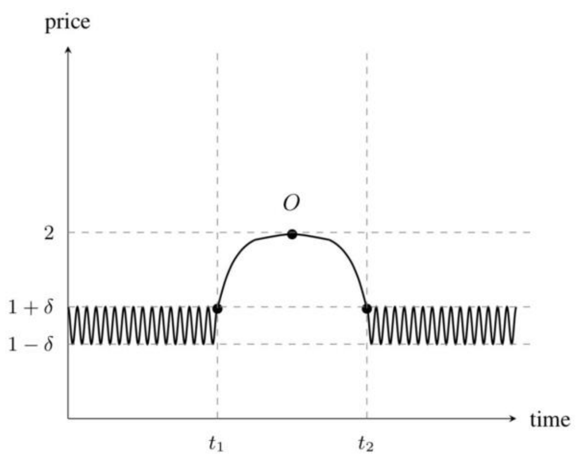


Figure 1: Price - Expansion Series

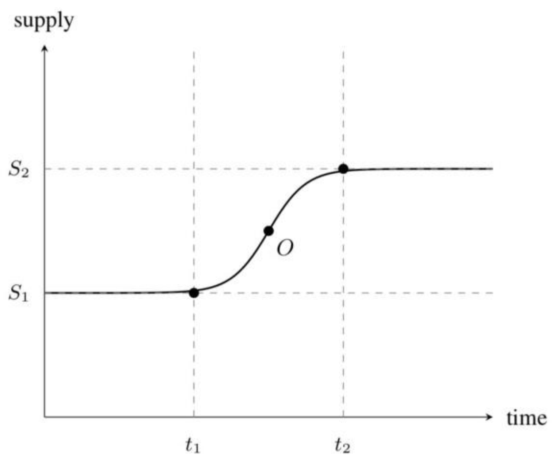


Figure 2: Supply - Expansion Series

As shown above, the price series (left) appears to end roughly as it begins; however the corresponding supply series (right) paints a different picture, ending higher than where it began. To best evaluate the unique profit opportunity created, we can look at the price × supply or market cap series below:

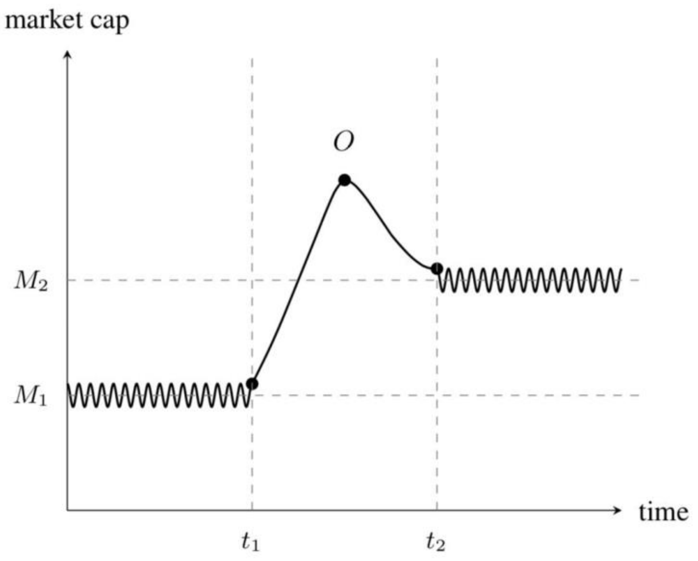


Figure 3: Market Cap - Expansion Series

Above we can see that while the system is expanding between $t_1 < t < t_2$, there is an opportunity for fast traders to sell more Amples at a higher price than at the next equilibrium point *M2*. This occurs because the system expands proportionally to holders when the nominal exchange rate of Amples is > the price target threshold, and continues to expand daily until the price target returns.

A trader looking only at price cannot differentiate between selling at $t < O$ and $t > O$ because by all appearances the price series chart is symmetric. Conversely, a trader looking at price × supply sees an asymmetric opportunity and can capitalize on it.

Contraction

The activity on contraction is very much like expansion. As long as enough traders value the opportunity to buy more of the network for a cheaper price, price would correct upward, creating general price and supply patterns like:

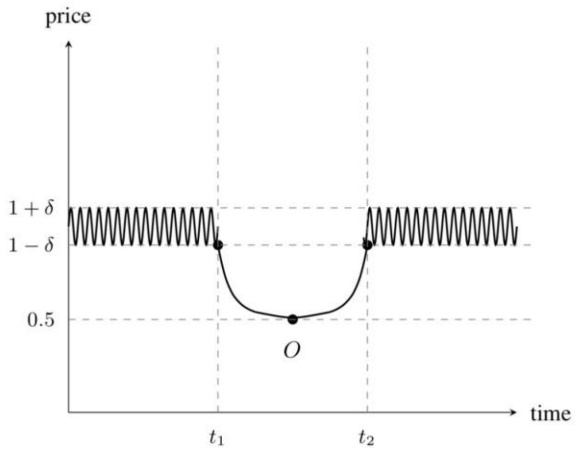


Figure 4: Price - Contraction Series

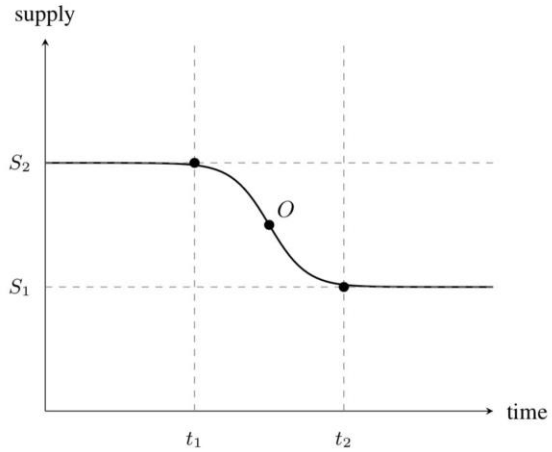


Figure 5: Supply - Contraction Series

Again in this case the price series (left) appears to end roughly as it begins; whereas the corresponding supply series (right) paints a different picture, ending lower than where it began. To evaluate the unique profit opportunity created, we can similarly look at the price × supply or market cap series below:

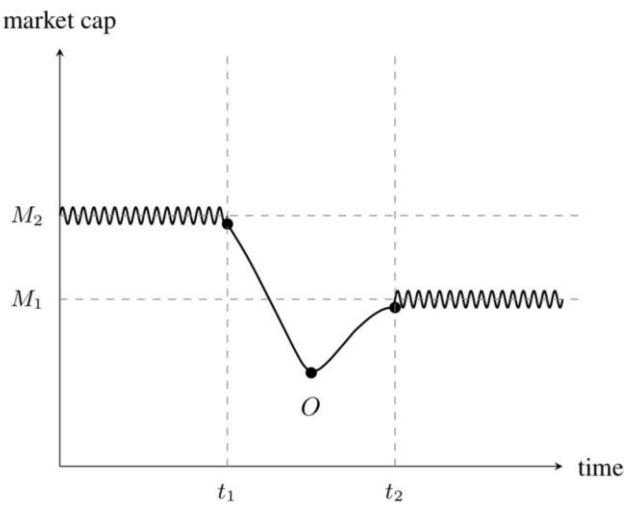


Figure 6: Market Cap - Contraction Series

Above we can see that while the system is contracting between t_1 and t_2, fast traders can buy more Amples at a lower price than at the next equilibrium point M1. This occurs because the system contracts proportionally from holders when the nominal exchange rate of Amples is < the price target threshold, and continues to contract daily until the price target returns.

Similar to the expansion case, a trader looking only at price cannot differentiate between buying at t < 0 and t > 0 because the price series chart is symmetric. Conversely, a trader looking at price × supply sees an asymmetric opportunity and can again capitalize on it.

Equilibrium

Within the threshold band of the price target, the supply policy does not intervene and supply remains constant. This would generate a price and supply pattern like below:

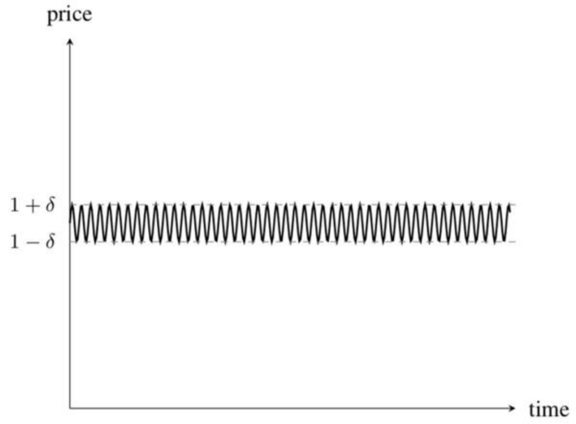


Figure 7: Price - Equilibrium Series

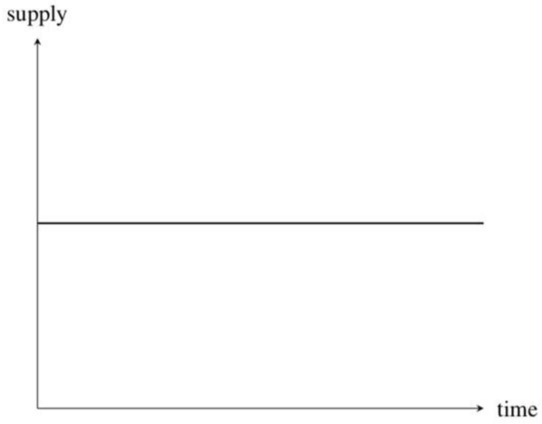


Figure 8: Supply - Equilibrium Series

Predicted Output

Combining all these together suggests a potential price and supply movement pattern like below:

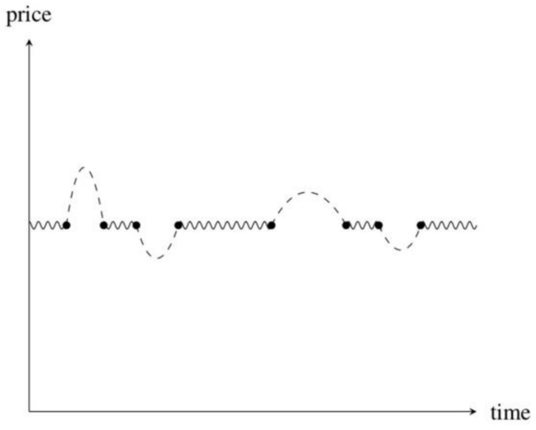


Figure 9: Price - Volatility Fingerprint

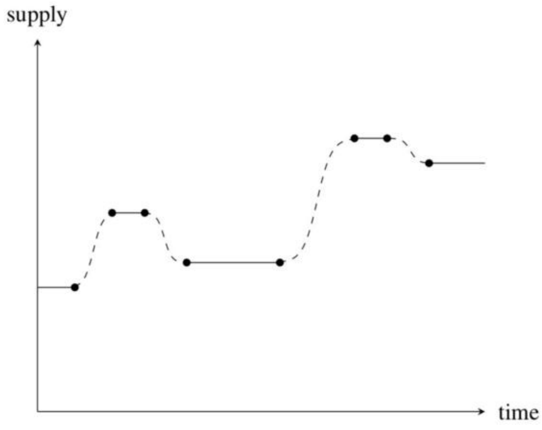


Figure 10: Supply - Volatility Fingerprint

Where the price curve (above left) trades around the exchange rate target, with deviation during dynamic (dotted) periods. And a market cap movement pattern like below:

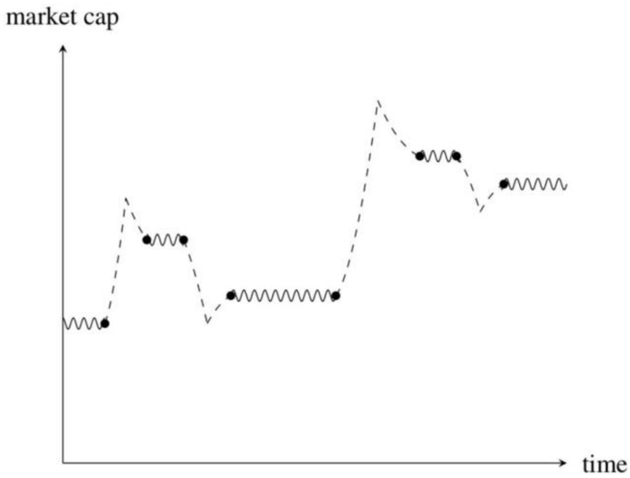


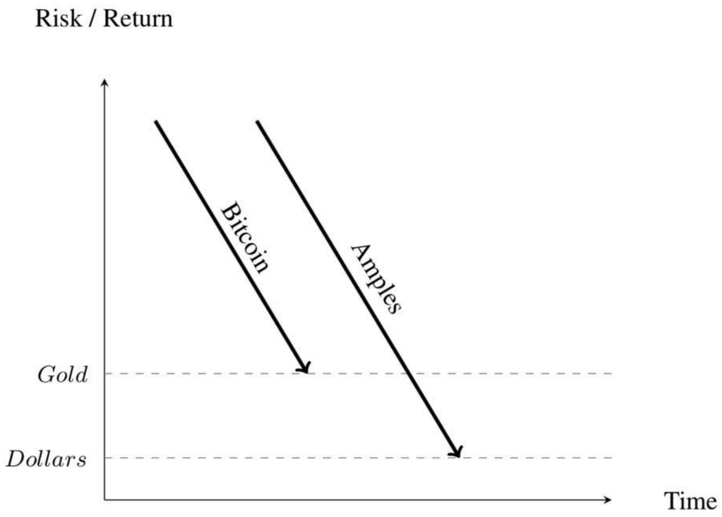
Figure 11: Market Cap - Volatility Fingerprint

Where the price × supply, or market cap curve, is step-function-like, alternating between dynamic (dotted) states and equilibrium states. In practice, when transitioning into and out of dynamic states, we expect that effective traders will attempt to predict where the next equilibrium market cap will land, deriving their optimal buy and sell targets from these predictions and updating them as the market discovers the actual equilibrium point.

1.7 The Evolution of Risk & Reward

It's helpful to think of cryptocurrencies in their current state as fungible digital-assets. And like other emerging assets, they have risk & reward profiles that change over time.

Thus far, digital-assets like Bitcoin have been uncorrelated with equities, commodities, precious metals, currencies, and other macro indicators—making them uniquely useful for portfolio construction. But over time, as market adoption increases, both risk and reward naturally decrease:

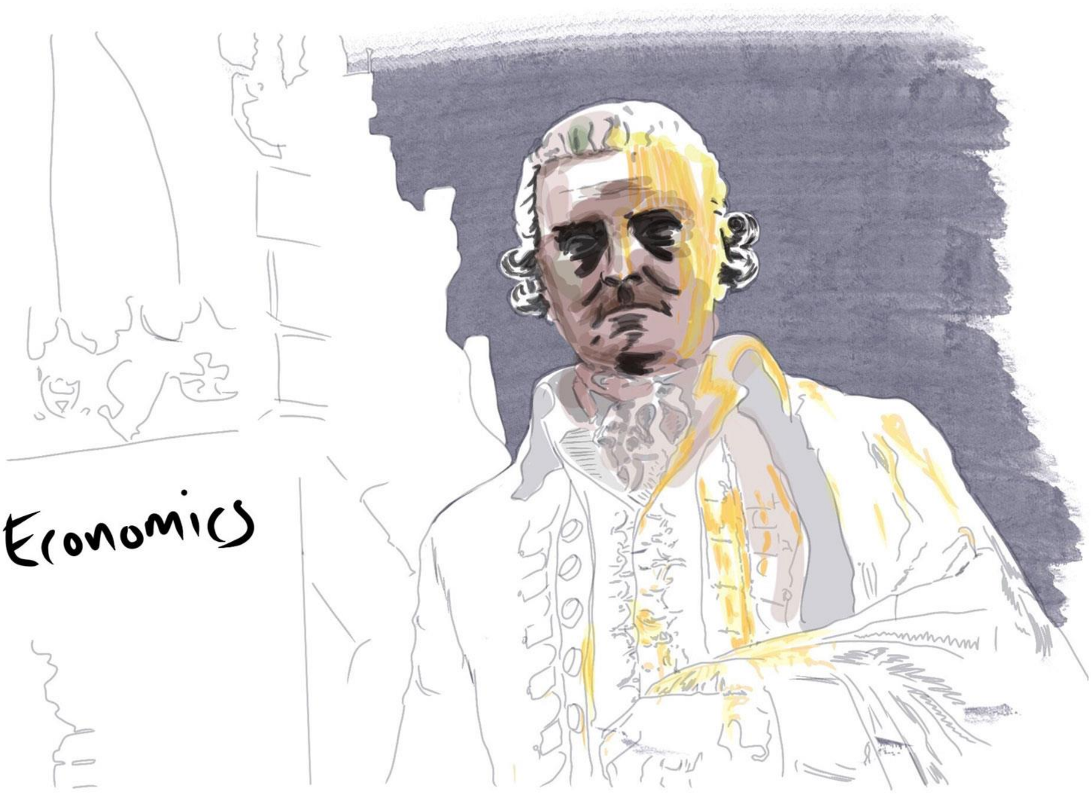


This effect, makes Bitcoin an increasingly viable alternative to commodity-monies like gold and silver, as it navigates the risk / reward line downwards.

Like Bitcoin, Amples also evolve in utility alongside risk and reward. However, in their final state, Amples evolve into a fair and politically-independent commodity-money that can be used as an alternative to central-bank-money, rather than a digital-silver or digital-gold.

Economics

The Ampleforth Red Book - Course II



Welcome to the second course of the Ampleforth Red Book, *Economics*. Please note, this material builds upon an understanding of the Ampleforth protocol introduced in course 1.

The topic of money is near and dear to many, but is also too often misunderstood. The purpose of this course is to provide the necessary context to understand how Amples fit into the broader economic landscape as a digital-asset.

Here we'll view Amples through the lens of Friedman, Keynes, Hayek, and other helpful economists we've discovered along the way. Click next below to get started with an introduction to the debate between rules and discretion.

2.1 Rules vs. Discretion

*** Parts of this entry have been adapted from a post on rules vs. discretion by Jason Buol and Mark Vaughan, published by the Federal Reserve Bank of St. Louis.*

The debate between rules and discretion in economic policy was first introduced in 1936 by Henry Simons in a paper titled *Rules Versus Authorities In Monetary Policy*.

Later, Milton Friedman extended the argument, noting that real-world policy-makers have imperfect information and imperfect tools; so, even the best-intentioned attempts to combat fluctuations could end up destabilizing the economy. Today, the topic continues to be heavily disputed.

`>> Ampleforth is a rules-based policy`

In this section, we'll briefly summarize the advantages and disadvantages of both rules-based and discretion-based systems, and then describe Amples in context.

Flood Example

Let's start with the example of a discretionary flood policy:

Policy-makers do not want people to build homes in floodplains. To discourage such building, they announce that anyone suffering flood damage is on his own—no disaster relief will be forthcoming.

People ignore these warnings and build anyway. Then, the rain comes, the water rises and the homes flood.

The media carry heart-wrenching footage of rooftops poking out of roiling currents. Following a public clamor, policy-makers announce a bailout—100 percent compensation for flood-related damage.

This result offers the worst of both worlds—homes are destroyed by floodwater, and victims who ignored warnings are indemnified with taxpayer funds.

After the floodwater has receded and the disaster checks have gone out, the cycle starts all over again. How can policy-makers avoid this trap?

Discretionary Monetary Policy

In a discretionary framework, policy-makers have wide latitude to design the best policy response for the given circumstances. In the flooding example, discretion means that policy-makers are free to craft disaster-relief policy as they see fit in each period.

Today, before flooding has occurred, they can try to discourage floodplain construction by forswearing disaster relief. Tomorrow, if flooding occurs, they can renege and provide generous compensation for damages.

Proponents of discretionary policy note that such flexibility allows policy-makers to respond to unforeseen scenarios. Suppose, for example, a river that seldom floods rises above its banks and sweeps away homes. Under a discretionary regime, policy-makers would have the flexibility to bail out innocent victims. Under a “no bailout, period” rule, all flood victims would be on their own.

Rules-based Monetary Policy

In a rules framework, policy responses must follow a pre-specified plan. The plan can be non-activist in nature—the rule may force policy-makers to pursue the same course of action in all circumstances.

Or the plan can be activist in nature—the rule may direct policy-makers to respond to different circumstances in different pre-determined ways. The common denominator is that rules are supposed to constrain policy-makers’ actions in advance. In the flooding example, a non-activist rule might say: “no flood relief, period.”

An activist rule might limit flood relief per victim to 10 percent of the pre-flood value of damaged property—no matter where it is located (floodplain or no floodplain). This rule allows a policy response to the flood, thereby making it activist in nature, but that response is pre-defined.

General Comparison

Thinking about the tradeoffs between rules and discretion-based policies, in a classic 1977 paper Economists Finn Kydland and Edward Prescott introduced a distinction between time-inconsistent and time-consistent policy.

A time-inconsistent policy may make the public happy in the short run but will ultimately fail to produce the long-run policy goal. A time-consistent policy, in contrast, nails the long-run policy goal but does not make people happy in the short run.

For example, the long-run goal of flood policy is to prevent building in floodplains. In the short run, however, compassion dictates bailing out victims—even those who failed to heed warnings.

Bailouts today are time-inconsistent—they implicitly encourage floodplain construction—because people learn to watch what policy-makers do (bail out victims) and ignore what policy-makers say (build at your own risk).

If, somehow, threats of no relief could be made credible, people would think twice before tempting Mother Nature. And no floodplain construction today means no need for flood relief tomorrow—a time-consistent outcome.

In 2003 Ben Bernanke introduced the concept of "constrained discretion" claiming that there exists a middle ground that allows policy-makers to respond to shocks while keeping inflation low and stable.

Ampleforth

As stated above, the Ampleforth network employs a strict rules-based policy. However unlike the policies investigated in the classic rules vs. discretion debates, Amples live outside the central-banking system and can co-exist with existing policies.

External References

- *H. Simmons, (1936), Rules Versus Authorities In Monetary Policy, The Journal Of Political Economy*

- *F. Kydland, E. Prescott (1977), Rules Rather than Discretion: The Inconsistency of Optimal Plans, The Journal of Political Economy*
- *J. Buol, M. Vaughan (2003), Rules Vs. Discretion: The Wrong Choice Could Open the Floodgates, Federal Reserve of St. Louis Regional Economist*
- *B. Bernanke (2003), "Constrained Discretion" and Monetary Policy, The Federal Reserve Board*

2.2 Inside vs. Outside Money

"Neither borrower, nor lender be" — *William Shakespeare*

In 1960, Gurley and Shaw published *Money in a Theory of Finance*—a book attempting to develop a theory of finance that encompassed both money and banking. In it, they stressed a distinction between inside and outside monies.

`>> Amples are an outside money`

Below, we'll quickly outline the difference between the two, and then describe Ampleforth in context.

Inside Money

Short for *inside the private sector*, inside money is an asset backed by any form of private credit, an "IOU" that circulates as a medium of exchange.

In monetary economics, inside money is money issued by private intermediaries (e.g. commercial banks) in the form of debt. And in today's economy, most of the circulating money is inside money.

This money is typically in the form of demand deposits or other deposits, and hence is part of the money supply. The money, which is an asset of the depositor coincides with a liability of the bank.

Outside Money

Short for *outside the private sector*, outside money is either of a fiat nature (unbacked) or backed by some asset that is not in zero net supply within the private sector of the economy.

Outside money is a net asset for the private sector. Some traditional examples include: paper dollars & coins, Federal Reserve Deposits and Gold.

General Comparison

Whether one is better is better than the other is a topic of active debate, but there is strong reason to believe that there should optimally be a mix of both. Modern theory continues to ask:

1. When is outside money most valued?
2. Under which circumstances does inside money arise?
3. Are inside and outside money substitutes or complements?
4. Under which circumstances can they coexist?
5. Are they both needed to achieve efficient outcomes?

Inside monies intrinsically carry a risk of default. This means that to be feasible, inside monies require continual enforcement, such as from extremely powerful centralized authorities, or strong bilateral commitments.

On the other hand, outside money is valuable in a world of imperfect information and imperfect trust, where constant enforcement would be undesirable and inefficient.

Ampleforth

The Ample does not represent a circulating credit-debt relationship or IOU within any given economy, *it is an outside money*. The protocol does not maintain balances, does not retake custody of tokens on contraction, and does not issue new tokens through itself or any intermediary upon expansion. Instead, it absorbs nominal exchange rate information and reflects that information as a global coefficient of expansion.

External References

- *J. Gurley, E. Shaw (1960), Money in a Theory of Finance, Journal of Politiccal Economy*
- *J. Bullard, B. Smith (2001), The Value of Inside and Outside Money, Federal Reserve of St. Louis*
- *R. Lagos, Inside and Outside Money (2006), Federal Reserve Bank of Minneapolis and New York University*

2.3 Synthetic Commodity Money

The search for an "ideal" base money has long preoccupied monetary economists, and in 2015 George Selgin published a particularly relevant article in the Journal of Financial Stability titled *Synthetic Commodity Money*.

He was investigating the possible use of current-generation cryptocurrencies for monetary reform, and noted that base-monies conventionally fall into one of two categories: "commodity" money and "fiat" money.

Selgin observed that cryptocurrencies like Bitcoin, break this conventional dichotomy resembling *both* "fiat" and "commodity" monies. Specifically, these digital assets:

- Resemble **fiat-money** in having no non-monetary use
- Resemble **commodity-money** in being absolutely scarce

Finally he concluded that the categorization to-date excludes a class of potential base-monies with characteristics that can make them *especially capable* of supplying the foundation for monetary regimes that are both macro-economically stable and constitutionally robust.

For this reason, Selgin introduced a new classification: Synthetic Commodity Money.

`>> Amples are a synthetic commodity-money`

Below we'll talk about the advantages and disadvantages of both fiat and commodities as base-monies, and then discuss synthetic commodity-monies in context.

Fiat Money

"Money is too important to be left to the central bankers." - Friedman (1962)

Fiat money is generally understood to consist of paper notes, or central bank deposits readily convertible into paper notes, that are useful only as a media of exchange.

Since paper monies command value far exceeding their marginal cost of production (ie: the cost of the underlying ink and paper itself) it follows that the scarcity of fiat money is not a "natural" scarcity, but one that is contrived.

As Friedman observed, because the marginal cost of producing say a $1000 bank note is no higher than that of producing a $1 bank note, “it is not clear that there is any finite price level” that will constitute an equilibrium and competition would tend to drive its value to zero.

For this reason, fiat money does not lend itself to competition, and its value needs to be sustained by "monopolistic provision."

The advantage of fiat money is that because it's so inexpensive to manufacture it can be managed—not only to preserve its purchasing power over time—but also to achieve the greatest possible degree of overall macroeconomic stability.

The disadvantage of fiat money relative to commodity money as a base-money, is that its scarcity is contingent (ie: a matter of deliberate policy only). There is no guarantee that it will be properly managed, and market forces (distinct from political ones) offer no check against mismanagement.

Commodity Money

Balance is too important to be "sacrificed ... to the operation of blind forces." - Keynes (1936)

Commodity-monies—being naturally scarce and politically-independent—are resistant to mismanagement. But they are not without drawbacks of their own. In particular, they are vulnerable to supply shocks.

In the case of metallic moneys such shocks might consist either in the discovery of new relatively high-yield ore or of lower-cost means for extracting minerals from known sources.

In the absence of positive innovations to supply, on the other hand, the wearing-down of outstanding coins and rising marginal extraction costs will, in a growing economy, result in secular deflation. Changes in the nonmonetary demand for an ordinary commodity can also destabilize a monetary regime based upon that commodity.

Finally, commodity-monies are costly. Friedman regarded the fact that a commodity standard “requires real resources to add to the stock of money” as the “fundamental defect” of such a standard.

Synthetic Commodity Money

According to Selgin, the distinguishing characteristic of synthetic commodity money, relative to other kinds of base-monies, is that by resorting to it, we can avoid leaving the management of money either to central-bankers or blind forces of nature.

1. Like fiat, a synthetic commodity standard is free from the cost disadvantages of a commodity standard.

2. Because synthetic commodities enforce absolute scarcity, they are not subject to supply-distortions stemming from either from raw-material discoveries or technical innovations.

3. Because synthetic commodities have no alternative non-monetary uses, like fiat they are not subject to price distortions from non-monetary demand.

4. Like that of genuine commodity-money, the supply of a synthetic commodity-money is not subject to politically motivated changes.

General Remarks

Selgin reiterates that there's **no reason** to believe that fixed-supply synthetic commodity monies like Bitcoin would be free from the deflationary problems affecting genuine commodity-standards.

However, he states that these "shortcomings of a Bitcoin standard raise the intriguing possibility that one might create a synthetic commodity money based upon a more macro-economically friendly production protocol—one that might achieve outcomes similar to those that might also be achieved by a perfectly enforced monetary rule. Such a money might, for example, bear a perfectly elastic supply schedule, so as to preserve a stable purchasing power." (Selgin 2015)

Ampleforth

As stated above Amples are a synthetic commodity-money; however unlike Bitcoin, Amples take advantage of low production costs, expanding and contracting in response to demand to be macroeconomically friendly.

Specifically, Amples introduce an equillibrium price that is unrelated to cost-of-production.

External References

- *G. Selgin (2015), Synthetic Commodity Money, Journal of Financial Stability.*
- *M. Friedman (1962), In Search of a Monetary Constitution, Harvard University Press.*
- *J.M. Keynes (1936), The General Theory of Employment, Interest, and Money.*

2.4 Countercyclical Pressures

In this section we'll discuss countercyclical pressures and their role in macroeconomic friendliness. But before jumping in, we need to quickly disambiguate between the use of procyclical and countercyclical terminology in *business cycle theory* and *economic policy making*. In this entry we're referring to cycles in *economic policy making*, where:

- **Procyclical**: Refers to any aspect of economic policy that could magnify economic or financial fluctuations
- **Countercyclical**: Refers to any aspect of economic policy that could counteract economic or financial fluctuations

`>> Ampleforth applies countercyclical pressure`

Below, we'll first talk about the countercyclical pressures present in natural commodity-monies, then outline their limitations with respect to supply and demand shocks, and finally discuss Ampleforth in context.

Natural Countercyclical Pressures

Let's start by walking through the example of a strict commodity standard as presented by Friedman from *Commodity-Reserve Currency (1951)* in the *Journal of Political Economy*.

When Prices Fall

When the price of goods relative to a monetary commodity falls—and the purchasing power of a commodity increases—two things tend to happen:

1. The rate of production increases.
2. The non-circulating supply gets increasingly used for monetary purposes.

Taking gold as an example, when the price of goods relative to the metal falls, the marginal cost of producing additional gold also falls. This tends to encourage faster production introducing more gold into the system.

Moreover, when the price of goods relative to gold falls, it becomes enticing to circulate fractions of the existing gold stock that are typically considered non-monetary (like jewelry) as a media of exchange.

Both of these effects are *countercyclical* and serve to **limit falling prices**.

When Prices Rise

Similarly, when the price of goods relative to a monetary commodity rises—and the purchasing power of a commodity falls—two things tend to happen:

1. The rate of production decreases.
2. The circulating supply gets increasingly used for non-monetary purposes.

Again, looking at gold as an example, when the price of goods relative to the metal rises, the marginal cost of producing additional gold increases. This tends to decrease production and slows the introduction of gold into the system.

Moreover, when the price of goods relative to gold rises, it becomes enticing to convert existing gold stock that is used as a media of exchange, into non-monetary uses like jewelry.

Both of these effects are *countercyclical* and serve to **limit rising prices**.

Virtues & Vices

Because the rate of output of the currency commodity is generally a small fraction of the existing stock, considerable movements in the price level can take place even in the absence of changes in technological conditions. As Friedman notes, the virtues of commodity-money are:

1. They are automatic and impersonal, not the product of deliberate policy.
2. They are invulnerable to runaway inflation.

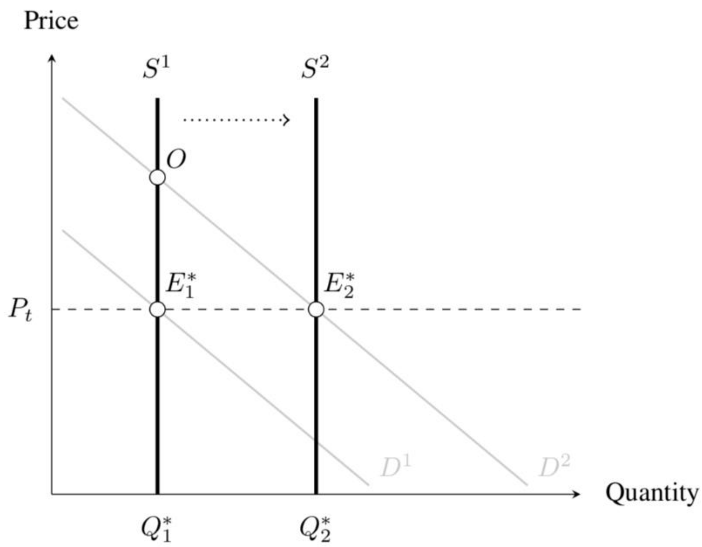
And the vices of commodity-money are:

1. They are not flexible enough to prevent swings in price.
2. The physical cost of production makes them vulnerable to moderate inflation and runaway deflation.

For this reason, Keynesian economics advocates using automatic and discretionary countercyclical policies, which rely on low production costs and strong central enforcement, to lessen the impact of business cycles.

Ampleforth

As a synthetic commodity-money, Ampleforth benefits from certain qualities of commodity-money and certain qualities of fiat. One key property we take advantage of is low production costs. Unlike natural commodity-monies, Amples automatically expand and contract in response to demand with near-perfect elasticity.



Like fiat the network can expand and contract to absorb shocks. However unlike fiat the countercyclical pressures present in Ampleforth are market-driven, rules-based, and non-dilutive for token holders.

External References

- *M. Friedman (1951), Commodity-Reserve Currency, Journal of Political Economy.*
- *J.M. Keynes (1936), The General Theory of Employment, Interest, and Money.*

2.5 Triffin's Dilemma

"Providing reserves and exchanges for the whole world is too much for one country and one currency to bear." — *Henry H. Fowler, U.S. Secretary of the Treasury*

On October 28th, 1959, Yale Economist Robert Triffin stood in front of a Congressional Joint Economic Committee hearing to testify on the sequence of events that brought us to a point where the nature of domestic economic policies and international monetary policy "have become inextricably intertwined."

Professor Triffin would then present evidence from his paper "The Gold Shortage, the Dollar Glut and the Future of Convertibility", arguing that the US had an innate conflict arising from attempting to balance domestic and international monetary policy objectives. This conflict eventually became known as Triffin’s Dilemma.

`>> Amples are not subject to Triffin's Dilemma`

In this section, we'll talk about the origin of Triffin's dilemma, how it continues to affect us today, and then discuss Ampleforth in context.

Example - Two Cups, One Jug

Let's start with the illustrative example of two cups and one jug:

> Imagine you are holding a jug that only has enough water to fill one cup entirely, but you need to fill two.
>
> It is impossible to keep everyone happy without sacrifice, if you spread the water out into both cups, neither cup is full. In order to ensure the fullness of one cup, the other cup must be empty — voila! The Triffin Dilemma.

Bretton Woods

Under the Bretton Woods system dollars were convertible to gold at a fixed exchange rate. Triffin identified that eventually the Bretton Woods System would create too much strain on the US dollar and eventually collapse, which happened in 1971.

In this original context, the dilemma arose because the US had provided a steady supply of dollars to the world, which was elastic to growing demand (e.g., in order to provide foreign aid to post-war Europe and developing countries).

However, because the supply of gold is “absolutely scarce” by the early 1960s US monetary liabilities owed to foreigners exceeded total US gold holdings.

If the US refused to continue to provide foreign countries with dollars, trade would stagnate and the world economy would enter a deflationary spiral; but, if the United States continued to print an unlimited supply of dollars, the confidence that it could convert them into gold would erode domestic and international confidence in the currency itself, this was Triffin's original dilemma.

The Remaining Problem Today

Today we no longer have fiat money backed by gold, but Triffin’s Dilemma lives on in the form of an ongoing conflict between near-term domestic interests and long-term global interests.

As the rate of growth in emerging market economies outpaces the growth of the US, the foreign economy demand for safe dollar-denominated assets outstrips the growth in supply.

This asymmetry between supply and demand, allows the US to rely on easy credit in normal times and very expansionary macroeconomic policies in times of crisis. Moreover, neither countries in surplus nor countries in deficit are incentivized to adjust their behaviors. From this, we’ve seen excessive US indebtedness and risks magnified to disastrous proportions.

The historically increasing demand for dollar-denominated safe assets has encouraged the US to issue more and more short-run assets, leading to leverage, risk-taking and asset-price booms.

Most recently, these capital inflows into the US favoured leverage and the formation of a credit bubble in the run-up to the 2008 meltdown, creating a magnified boom-bust cycle.

General Remarks

There is quite a lot of literature and debate around the topic of whether we can ever escape the Triffin Dilemma as it has haunted us for almost a century.

One suggestion that stands out surrounds a true multi-polar currency system. In such an international monetary system, there would be credible alternatives, or challengers, to the US dollar.

And through the forces of free markets and competition, the monetary policy discipline of the US would inevitably be improved.

Ampleforth

Synthetic commodity monies, like Amples, are not subject to any conflict between near-term domestic and long-term global interests.

External References

- *L. Smaghi (2011), The Triffin Dilemma Revisited, European Central Bank.*
- *R. Triffin (1959), Employment, Growth, and Price Levels, Hearing Before the Joint Economic Committee Congress of the United States.*
- *B. Bernanke (2005), The Global Saving Glut and the U.S. Current Account Deficit, Homer Jones Lecture, St. Louis, Missouri.*
- *Bretton Woods The Next 70 Years, Jan 10th 2019 by Joseph E. Stiglitz, Lorenzo Bini Smaghi, Benoit Coeuré, Barry Eichengreen, Jacob Frenkel, Michael Bordo, Jean Claude Trichet, Christine Lagarde*

2.6 Denationalisation of Money

In 1976, Friedrich Hayek authored an important paper titled: “The Denationalisation of Money” in which he depicted a world where money, like banking, is denationalized. He believed that unlike law and language, money had not been allowed to evolve due to sovereign influences suppressing competition.

And he predicted that if governments were to allow for it, currencies would naturally evolve to compete on increased stability, resulting in the best macroeconomic outcome. Specifically, he proposed two solutions.

- Practical Solution - Open the free trade of money
- General Solution - Allow the issuance of independent money

Whether purely market driven monetary systems will produce optimal outcomes still remains unclear. In this section we'll first talk about what Hayek proposed, and then discuss Amples in context.

`>> Amples are a Hayekian money`

Practical Solution

Hayek's rationale for opening up the free trade of money, what he called the practical approach to denationalisation, is that it introduces competition between sovereign monies.

If the citizens of one state could simply choose to use the currency of any other state—should they be unhappy with domestic options—this would leave little excuse for the mismanagement of discretionary monetary policies.

Effectively sovereign monies would have to compete with one another. This would have the effect of **lifting the floor** of money quality to that of the best sovereign currency.

General Solution

Hayek's rationale for allowing the issuance of sovereign-independent monies, what he called the general approach to denationalisation, is that it introduces competition between private monies and sovereign monies.

Sovereign-independent monies, lack government mandate, and cannot be forced upon people. Thus, they would have to compete on stability in the open market.

This would have the effect of **raising the ceiling** of money quality, pushing the limits of even the best sovereign currencies.

Hayek went on to provide an example of a fictional currency, *the ducat*, the supply of which would expand and contract with the sole purpose of maintaining stable purchasing power against a basket of commodities—and he believed that there would be continuous demand for such a currency.

General Remarks

Today, the extreme interpretation of leaving monetary policy entirely up to competitive forces is generally regarded as impractical. However modern theorists have reason to believe an optimal macroeconomic outcome requires sovereign monies co-existing with Hayekian monies.

Ampleforth

Amples are a synthetic commodity money and Hayekian money falling under the general solution framework.

External References

- *F.A. Hayek (1976), "The Denationalisation of Money." Hobart Paper Special, Institute of Economic Affairs, London*
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