

## The Natural Rate of Interest Is Zero

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and  
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This paper argues that the natural, nominal, risk free rate of interest is zero under relevant contemporary institutional arrangements. However, as Spencer Pack reminded us, “[n]atural and nature are complex words, fraught with ambiguity and contradiction” (1995, 31). The sense in which we wish to employ the term *natural* here does not imply a “law of nature,” which may be why “[Alfred] Marshall replaced the evocative label ‘natural’ with the more prosaic ‘normal’” (Eatwell 1987, 598). Marshall may have clarified it the best when he wrote that “normal results are those which may be expected as the outcome of those tendencies *which the context suggests*” ([1920] 1966), 28, emphasis added). In this case, it is of the utmost importance to first clarify the context, to which we now turn.

### ***State-Issued Currency***

The primary, defining institutional arrangement characterizing the relevant context is that of a “tax-driven” state currency and flexible exchange rates. By *state currency* we mean to indicate there is a government that taxes and has a monopoly of issue. A *flexible exchange rate* is commonly referred to as a “fiat” currency, in other words, a state-issued currency convertible only into itself (Keynes 1930), as opposed to a fixed exchange rate policy such as a gold standard or other convertibility to any other commodity or currency fixed by the state of issue (such as currency boards, pegged curren-

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cies, or monetary unions). Examples of such monetary systems currently include the United States, Japan, and most of the world's industrial economies, including the Eurozone, although the individual nations are no longer issuers of their currency.

There is a long tradition of analysis of state currency, or "state money," referred to by Charles Goodhart as the "cartalist" (or chartalist) school of monetary thought and which he has contrasted with the "metallist" (Mengerian, monetarist) tradition (1998). While authors such as Joseph Schumpeter (1954) passed down a view of chartalism with a misplaced emphasis on "legal tender" laws, resulting in something of a "legal" or "contractual" version of chartalism, Goodhart has made clear that the fundamental insight is that *the power of the state to impose a tax liability payable in its own currency is sufficient to create a demand for the currency and give it value*. Recent research into the history of economic thought has revealed substantial evidence of past support for this thesis regarding tax-driven money: we now know that, throughout history, many more economists understood the workings of tax-driven money, and many if not most currencies in history were in fact tax-driven, contrary to what was previously thought to be the case (see, e.g., Wray 1998, 2004; Bell and Nell 2003; Forstater forthcoming).

The idea of a tax-driven currency was once common knowledge. It can be found in the writings of economists and others going back to Adam Smith and beyond. Smith well understood that taxation is the key to understanding the value of state money (in fact, he used the American colonies' issue of paper money as an example—see Smith [1776] 1937, 311–312). So did a diverse array of economists that came after him, including John Stuart Mill, William Stanley Jevons, Phillip H. Wicksteed, and John Maynard Keynes, among many others (see Forstater forthcoming).

A key distinction is that between the government as *issuer* of a currency and the nongovernment agents and sectors as *users* of a currency. Households, firms, state and local governments, and member nations of a monetary union are all currency *users*. A State with its own national currency is a currency *issuer*. The issuer of a national currency operates from a different perspective than a currency user. Operationally, government spending consists of crediting a member's bank account at the government's central bank or paying with actual cash. Therefore, unlike currency users, and counter to popular conception, the issuer of a currency is not revenue constrained when it spends. The only constraints are self-imposed (these include no-overdraft provisions, debt ceiling limitations, etc.). Note that if one pays taxes or buys government securities with actual cash, the government shreds it, clearly indicating operationally government has no use for revenue per se.

When the U.S. government makes payment by check in exchange for goods and services (including labor), or for any other purpose, the check is deposited in a bank account. When the check "clears," the Fed (i.e., government) credits the bank's account for the amount of the check. Operationally, "revenue" from taxing or borrowing is not involved in this process, nor does the government "lose" any ability to make future payments per se by this process. Conversely, when the U.S. government receives a check in

payment for taxes, for example, it debits the taxpayer's account to the amount of the check. While this reduces the taxpayer's ability to make additional payments, it does not enhance the government's ability to make payments, which is in any case operationally infinite. In the case of direct deposit or payment by electronic funds transfer, the government simply credits or debits the bank account directly and, again, without operational constraint. The government of issue in such circumstances may be thought of as a "scorekeeper." As in most games, there is no reason for concern that the scorekeeper will run out of points. On the other hand, nongovernment agents can only spend when in possession of sufficient funds from current or past income, or from borrowing. They are indeed revenue constrained—their checks will "bounce" if there are not sufficient funds available.

Given that a government of issue is not revenue constrained, taxation and bond sales obviously must have other purposes (see Bell 2000). As we have already seen, taxation (and the declaration of what suffices to settle the tax obligation) serves to create a notional demand for the government's (otherwise worthless) currency. The process can be viewed in three stages:

1. The government imposes a tax liability payable in its currency of issue.
2. Faced with this need for units of the government's currency, taxpayers offer goods and services for sale, asking in exchange units of the currency.
3. The government "issues" its currency—spends—in exchange for the goods and services it desires.

The nongovernment sector will be willing to sell sufficient goods and services to the government to obtain the funds needed to pay tax liabilities and satisfy any desire to net save (financial assets) in that unit of account. Note that, from inception, and as a point of logic, in order to actually collect taxes, the government, as the monopoly issuer of the currency, must, logically, spend (or lend) first. Note that it would be logically impossible for the government to collect more than it spends (or run a budget surplus) unless it had already previously spent more than it collected (past budget deficits). Thus the normal budgetary stance to be expected under these institutional arrangements is a budget deficit.

The government budget deficit is also "normal" in the sense that it is the mirror image of the nongovernment surplus in the basic macroeconomic accounting identity:

$$\text{Government deficit} = \text{Nongovernment surplus}$$

where nongovernment surplus includes both the domestic (or resident) private sector and the foreign (nonresident) sector, which includes foreign firms, households, and governments. It is therefore equivalent to the well-known identity:

$$(G - T) = (S - I) + (M - X)$$

Government budget deficit = Domestic private sector surplus + foreign sector surplus

where the foreign sector surplus is another way of expressing the trade deficit. The government budget deficit permits both the domestic private sector and the foreign sector to “net save” in the government’s unit of account. Only a domestic government budget deficit permits the domestic private sector and foreign sector to actualize their combined desired net saving.

We are now in a position to demonstrate our proposition: the natural rate of interest is zero. First, to reiterate the argument thus far: Under a state money system with flexible exchange rates, the monetary system is tax driven. The federal government, as issuer of the currency, is not revenue constrained. Taxes do not finance spending, but taxation serves to create a notional demand for state money. Spending logically precedes tax collection, and total spending will normally exceed tax revenues. The government budget, from inception, will therefore normally be in deficit, which also allows the nongovernment sector to “net save” state money (this in fact has been observed in all state currencies).

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If spending is not revenue constrained, why does the government (conceived here as a consolidated Treasury and Central Bank) borrow (sell securities)? As spending logically precedes tax collection, the government must likewise spend sufficiently before it can borrow. Thus, government spending must also, as a point of logic, precede security sales. To cite a “real world” example, market participants recognize that when Treasury securities are paid for, increasing Treasury balances at the Fed, the Fed does “repos” on the same day; the Fed must “add” so the Treasury can get paid.

Since the currency issuer does not need to borrow its own money to spend, security sales, like taxes, must have some other purpose. That purpose in a typical state money system is to manage aggregate bank reserves and control short-term interest rates (overnight interbank lending rate, or Fed funds rate in the United States).

In the contemporary economy, government “money” includes currency and central bank accounts known as member bank reserves. Government spending and lending adds reserves to the banking system. Government taxing and security sales drain (subtract) reserves from the banking system. When the government realizes a budget deficit, there is a net reserve add to the banking system. That is, government deficit spending results in net credits to member bank reserve accounts. If these net credits lead to excess reserve positions, overnight interest rates will be bid down by the member banks with excess reserves to the interest rate paid on reserves by the central bank (zero percent in the case of the USA and Japan, for example). If the central bank has a positive target for

the overnight lending rate, either the central bank must pay interest on reserves or otherwise provide an interest-bearing alternative to non-interest-bearing reserve accounts. This is typically done by offering securities for sale in the open market to drain the excess reserves. Central Bank officials and traders recognize this as “offsetting operating factors,” since the sales are intended to offset the impact of the likes of fiscal policy, float, and so forth on reserves that would cause the Fed funds rate to move away from the Fed’s target rate.

Our main point is, in nations that include the USA, Japan, and others where interest is not paid on central bank reserves, the “penalty” for deficit spending and not issuing securities is not (apart from various self-imposed constraints) “bounced” government checks but a zero percent interbank rate, as in Japan today.

The overnight lending rate is the most important benchmark interest rate for many other important rates, including banks’ prime rates, mortgage rates, and consumer loan rates, and therefore the Fed funds rate serves as the “base rate” of interest in the economy. In a state money system with flexible exchange rates running a budget deficit—in other words, under the “normal” conditions or operations of the specified institutional context—without government intervention either to pay interest on reserves or to offer securities to drain excess reserves to actively support a nonzero, positive interest rate, the natural or normal rate of interest of such a system is zero.

This analysis is supported by both recent research and experience. Japan’s experience in the 1990s shows clearly that large government budget deficits as a proportion of GDP (in the neighborhood of 7 percent) and a debt/GDP ratio of 140 percent do not drive up interest rates, as conventional wisdom would have it. In fact, the overnight rate has stayed at near zero for nearly a decade. In addition, Scott Fullwiler (2004) has demonstrated that concerns about technological change in financial markets and other recent developments such as financial deregulation disrupting the interest rate channel of monetary policy are misplaced. On the contrary, since the 1990s, market rates have become even more closely linked to the Fed funds rate:

The fact that banks are obligated to use reserve balances to settle their customers’ tax liabilities ensures that a non-trivial demand for reserve balances will exist, which itself ensures that the federal funds rate target will remain “coupled” to other interest rates. (Fullwiler 2004)

That the natural rate of interest is zero is also supported by recent experimental evidence. L. Randall Wray (2001) has reported on a community service program run in the Economics Department at the University of Missouri—Kansas City. Students are “taxed” in the department’s own currency and must perform community service to obtain units of that currency. The department’s “treasury” could offer interest-earning “bonds,” purchased by students with excess (non-interest-bearing) units of the school’s currency, but the rate of interest offered is entirely up to the discretion of the departmental treasury. If the treasury did not offer interest-earning bonds, the base rate on the currency would be zero:

[T]he “natural base interest rate” is zero on . . . hoards created through deficit spending. . . . [U]nless the Treasury chooses to intervene to maintain a positive base rate (for example, by offering interest on bonds), deficits necessarily imply a zero base rate. (Wray 2001, 50)

Note that deficits with the department’s currency are “natural” in the sense that they result from the student demand to net save units of that currency.

The central bank clearly controls short-term interest rates in a state currency with flexible exchange rates, and there are a number of good reasons for setting the overnight rate at its natural or normal rate of zero and allowing markets to factor in risk to determine subsequent credit spreads (see Mosler 2004). The Japanese experience has already demonstrated that this does not cause inflation or currency depreciation. If anything, lower rates support investment, productivity, and growth. While changing rates can have important distributional or micro effects (and that can spur employment and output growth, such as shifting income from “savers” to working people), the net income or macro effect is zero since for every dollar borrowed from the banking system there is a dollar saved, as the Fed clearly recognizes in its literature. Additionally, it can be argued that asset pricing under a zero interest rate policy is the “base case” and that any move away from a zero rate policy constitutes a (politically implemented) shift from this “base case.”

### ***Interest Rates under a Fixed Exchange Rate Regime***

While this paper focuses on a floating exchange rate regime, a brief summary of interest rate determination in a fixed exchange rate regime offers context as well as contrast to the prior discussion.

Inherent in a fixed exchange rate is the risk of a government’s not honoring its legally binding conversion features. Historical examples of this type of default in fixed exchange rate regimes abound, and recent examples include Argentina’s and Russia’s failing to honor conversion of their currencies into U.S. dollars at their central banks. History is also filled with examples of default under various gold standards, with the USA itself technically defaulting in 1934 when it both devalued the U.S. dollar versus gold and permanently suspended domestic convertibility. Bondholders were subject to this default as well since the U.S. dollars they received at maturity were subject to the new terms and conditions.

Market forces translate this default risk into a term structure of interest rates. Default risk is a function of maturity and creditworthiness, with the “risk free” rate being the return on holding the object of conversion itself. So in contrast to a floating exchange rate regime, where the term structure of interest rates is necessarily a political decision generally reserved for the central bank, with a fixed exchange rate regime the term structure of rates is a function of market forces.

In the case of a gold standard, the risk free rate is negative, as it is the storage charge of holding physical gold. In fact, for all practical purposes, there is no such thing as “risk free,” as physical gold can be stolen or otherwise lost even with the most sophisticated security techniques. In the case of conversion into another government’s currency, such as the U.S. dollar, the “risk free” rate is the risk free rate of U.S. dollar deposits, which is the rate on U.S. Treasury securities or deposits at U.S. government-insured institutions. This is the case today in Hong Kong, for example, where the risk free rate is that of the risk free rate of the U.S. dollar.

With a fixed exchange rate, governments that spend by issuing currency and not borrowing risk having those outstanding units of currency converted to the reserve currency (or gold, as the case may be) at the central bank. Therefore government borrowing functions to protect central bank reserves and keep the government from defaulting on its legal conversion requirements. Since holders of the currency have the option of conversion to the reserve currency at the central bank, government securities can be thought of as “competing” with the conversion option, with market forces determining the indifference levels. This explains the very high interest rates paid by governments with perceived default risk in fixed exchange rate regimes, in contrast to the ease a nation such as Japan has in keeping rates at zero in a floating exchange rate regime, despite deficits that would undermine a fixed exchange rate regime.

In recent history, today’s central bank systems with floating exchange rate policies have followed fixed exchange rate (mostly gold standard) regimes. We suggest that policy makers used interest rate data collected under these fixed exchange rate regimes as well as their experience of using interest rates for reserve management and macroeconomic policy under fixed exchange rate regimes to guide them after shifting to floating exchange rates. The various correlations between interest rates and economic variables were assumed to continue under the new floating exchange rate regime, including the current notion of “real rates” versus “inflation,” and so on.

Mainstream analysis of the U.S. “twin deficits” is but one example of being “out of paradigm” with respect to exchange rate policy. One reads daily of the USA facing a day of reckoning due to “borrowing from abroad” to fund its imports. While this may have had much validity under fixed exchange rate arrangements, with floating exchange rates a current account deficit is instead the result of nonresidents realizing savings desires of U.S. dollar financial assets. There is no “funding risk” for the USA nor are U.S. interest rates per se a function of the trade balance.

### ***Conclusion***

Under a state currency system with floating exchange rates, the natural, nominal, risk free rate of interest is zero. As many other key rates of interest in the economy continue to follow the Fed funds rate very closely, this will serve as the base rate in the economy, with markets determining the credit spreads through risk assessment.

Furthermore, there are a number of reasons why allowing the rate of interest to settle at its natural rate of zero makes good economic sense. The conventional wisdom of a fixed exchange rate system does not apply to floating rates, and this may be the source of much of the confusion today.

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