The Architecture of Money: From Flawed Models to Functional Infrastructure

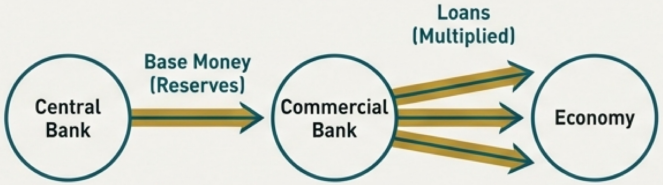
An institutional and dynamic view of money creation, credit, and settlement systems for the 21st century.

IFB
International Finance Bank
Banque Financière Internationale

The Dominant Neoclassical Model Failed Its Most Critical Test

The 2008 financial crisis emphatically confirmed that mainstream models are seriously at fault. The hyper-rational, stable system they described is in stark contrast to reality, leading to flawed policy.

The Textbook "Money Multiplier" Model



Core Logic

Deposits create loans (with a time lag).

Premise

Banks are simple intermediaries, lending out pre-existing funds. The central bank directly controls the money supply.

The Institutional Reality

> **"The Bank [of England] also dismisses the 'money multiplier' theory...the relationship between reserves and loans typically operates in the reverse way to that described in some economics textbooks."**
>
> (Source: Positive Money UK / Bank of England)

Core Logic

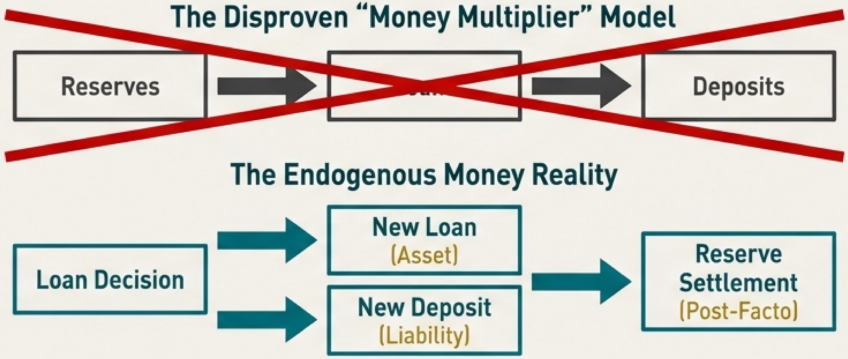
Loans create deposits (instantaneously).

Premise

Banks create new money when they lend, and seek reserves later to settle payments.

Endogenous Money Reverses the Causality: Credit Drives the System

A substantial body of empirical evidence, acknowledged by Post-Keynesian economists and even some neoclassical researchers, confirms that the textbook model is backward. Economic activity is driven by private credit creation.



Key Insight 1: Empirical Validation

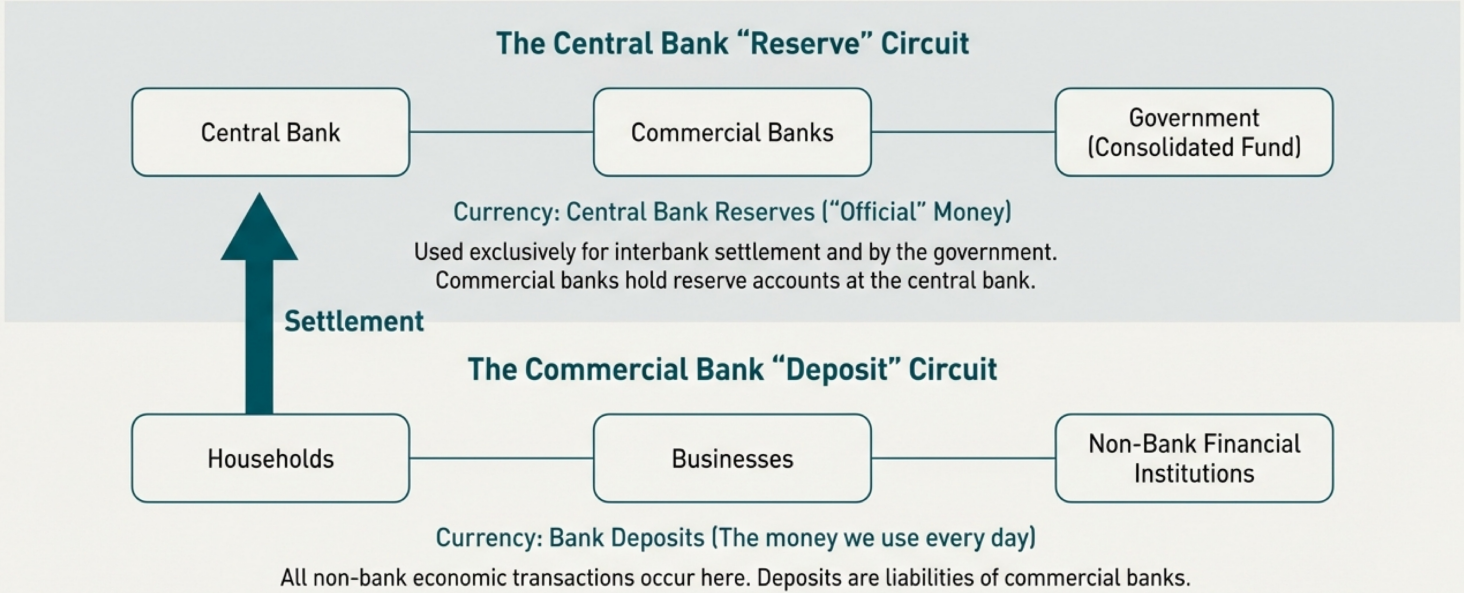
- "The classic causal mechanism of the "money multiplier" model...is the reverse of what is found in the actual data." - Steve Keen
- "The fact that the transaction component of real cash balances (M1) moves contemporaneously with the cycle while the much larger nontransaction component (M2) leads the cycle suggests that credit arrangements could play a significant role..." - Kydland and Prescott (1990)

Key Insight 2: The Core Mechanism

- The endogenous money approach begins with a bank making a loan. This act simultaneously creates an equivalent deposit in the borrower's account.
- The need to meet reserve requirements is a secondary step, fulfilled *after* the loan is made.

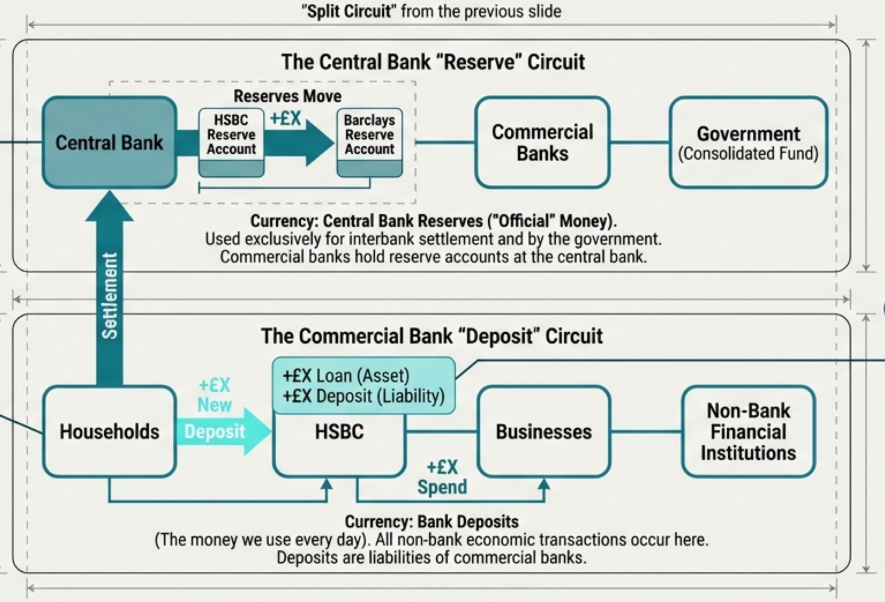
Understanding the Monetary System Requires a ‘Split Circuit’ View

The modern money system operates on two distinct but interconnected circuits. Conflating them is a primary source of confusion. This "split circuit" model is the foundational map for understanding money creation.



Mechanism 1: Commercial Banks Create New Deposits via Lending

This is the engine of endogenous money creation. When a commercial bank extends a loan, it doesn't lend out existing money. It creates a new loan asset and a new deposit liability simultaneously, "out of nothing."



3 Step 3: Interbank Settlement (Reserve Circuit)

HSBC transfers the newly acquired reserves to Barclays, and the transaction is settled.

1 Step 1: Credit Creation (Deposit Circuit)

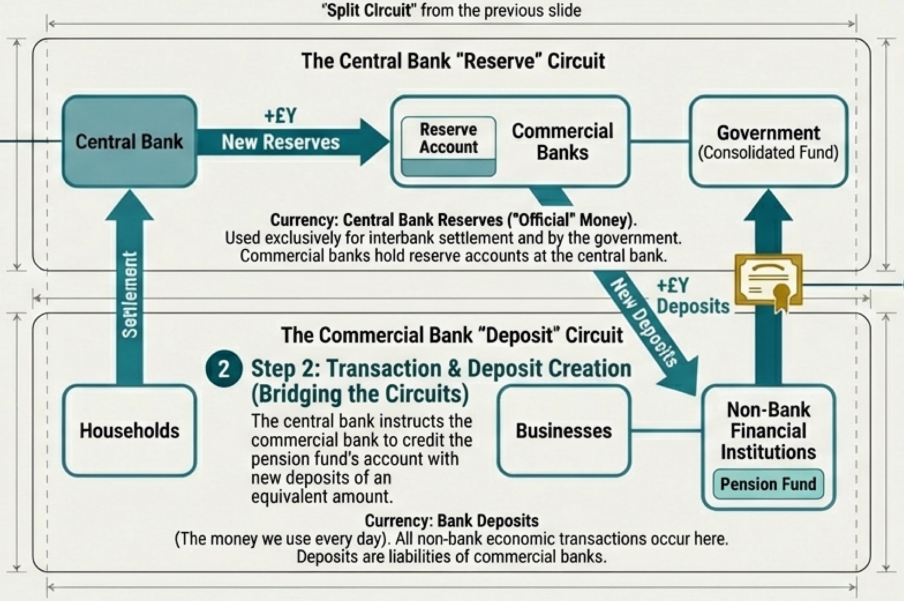
A household requests a loan. The bank approves, creating a new deposit and a new loan asset at the same time.

2 Step 2: Reserve Requirement (Reserve Circuit)

The household spends the money. This creates an interbank imbalance, forcing HSBC to acquire reserves from the central bank.

Mechanism 2: Central Banks Create New Deposits via Asset Purchases (QE)

During periods of crisis or unconventional policy, central banks can create new money to purchase assets from the non-bank private sector. This process directly injects new deposits into the system, bypassing the loan creation channel.



1 Step 1: Reserve Creation (Reserve Circuit)

The central bank decides to buy government bonds from a pension fund. It creates new reserves "out of nothing" to finance the purchase.

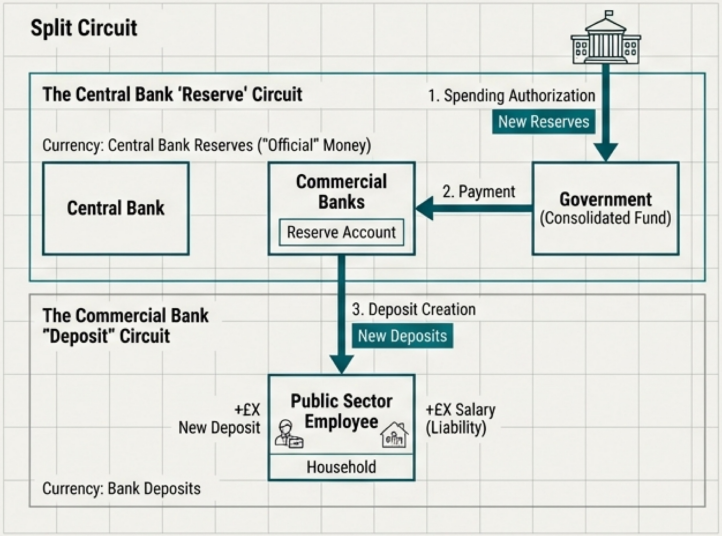
3 Step 3: Asset Transfer

The pension fund transfers ownership of the bonds to the central bank, completing the swap of assets for newly created money.

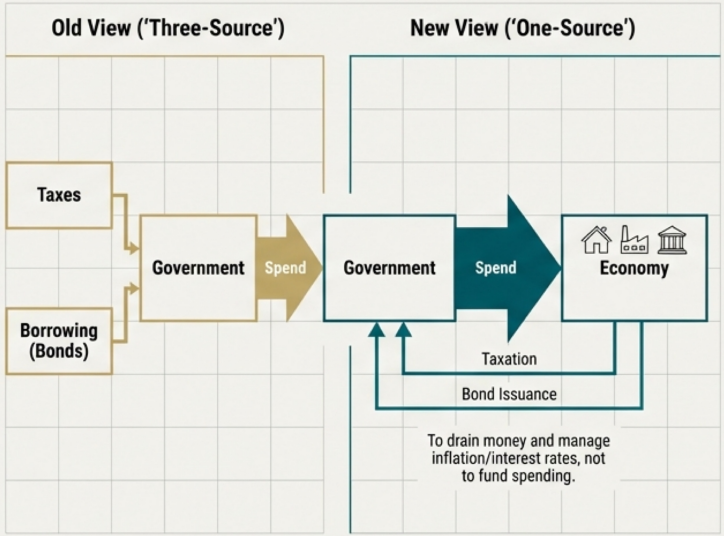
Mechanism 3: Governments Can Create New Deposits via Spending

Contrary to the view of government as a simple borrower, analysis of UK institutions suggests the state can create money in the very act of spending. This turns the conventional 'tax and borrow first, then spend' sequence on its head.

Part 1: The Process Flow



Part 2: The Conceptual Shift



From Static Mechanisms to a Dynamic System Model

To understand how these **creation mechanisms interact** and affect the real economy, we must move beyond static diagrams to dynamic modeling. This approach, pioneered by Steve Keen, uses systems of differential equations derived from accounting matrices to simulate financial flows over time.

Equilibrium modeling, used in neoclassical economics, was a simplification born of necessity. Modern computational power allows for explicitly dynamic models that better replicate the “perpetual motion and change” of a real economy.

Methodology Snapshot: Financial Flows Matrix

	Firms	Workers	Banks
Consumption			
Wages	→ -D from Firm Deposit, +D to Worker Deposit →		
Pay Interest on Loan	→ -B from Firm Deposit, +B to Bank Income →		
Loan Repayment			

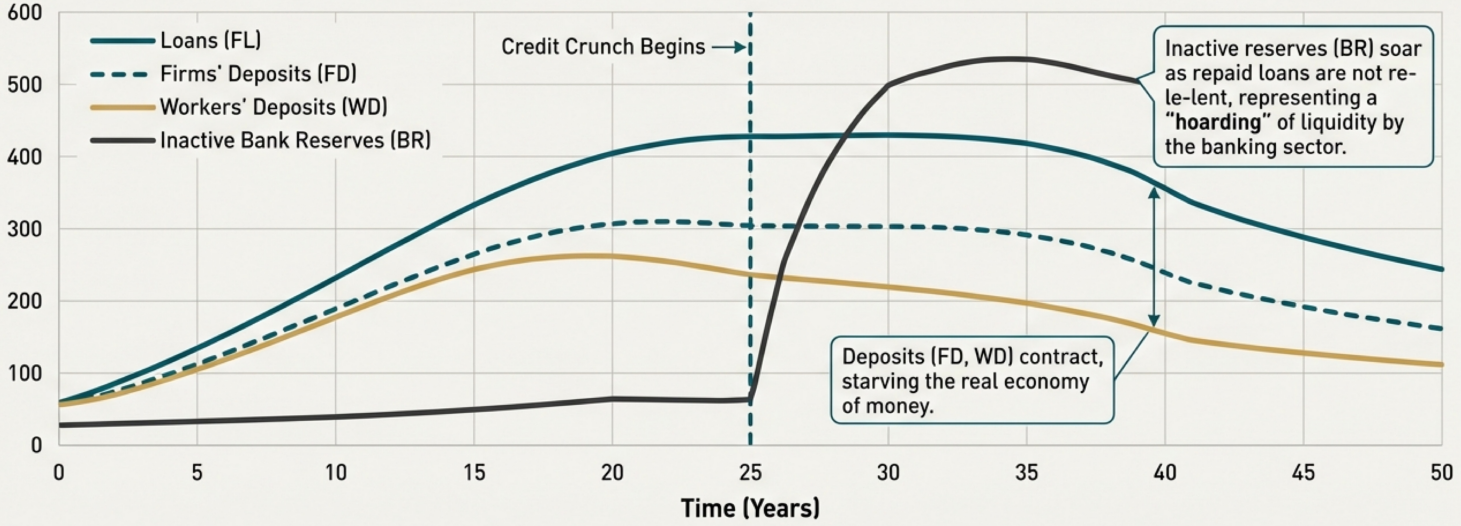
$$\begin{cases} \frac{d(D_{Firms})}{dt} = -Wages - Interest_B \\ \quad + Consumption - Investment + Loan \\ \frac{d(D_{Workers})}{dt} = +Wages - Consumption \\ \frac{d(B_{Income})}{dt} = +Interest_B - Costs \end{cases}$$

The Dynamic Model Realistically Simulates a 'Credit Crunch'

By altering key financial parameters within the model—such as the time lag in loan repayment (τ_L), reserve relending (τ_R), and new money creation (τ_M)—we can simulate a sudden seizure in credit markets.

At the 25-year mark, the model's parameters are changed by 33% to reflect increased bank risk aversion and deleveraging.

Result: Composition of Bank Balance Sheets During a Simulated Credit Crunch



Policy Testbed: Fiscal Stimulus Outperforms Quantitative Easing

The model allows us to compare the real-world effects of two distinct policy interventions:

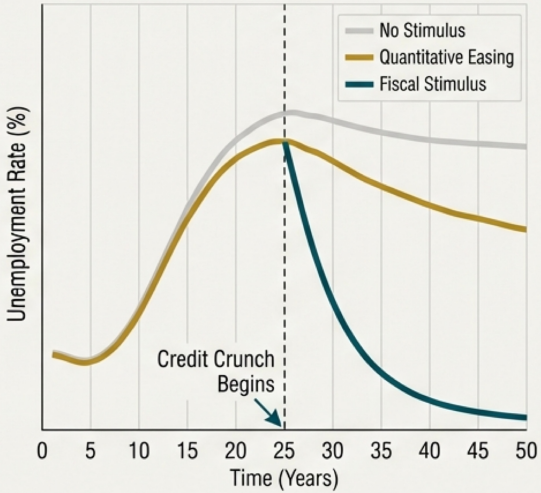
1. **Quantitative Easing:** An injection of funds into bank reserves.
2. **Fiscal Stimulus:** An equivalent injection directly into firms' deposit accounts.

The Conventional Logic:

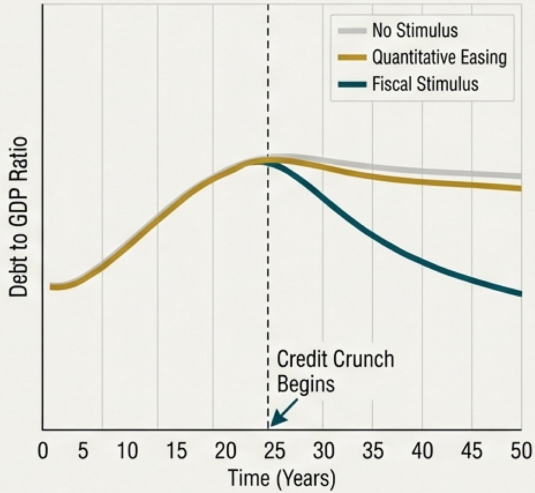
"...a dollar of capital in a bank can actually result in eight or ten dollars of loans... a multiplier effect that can ultimately lead to a faster pace of economic growth."
- Barack Obama, 2009.

Our model predicts this is ineffective when banks are unwilling to lend.

Simulation Result: Unemployment

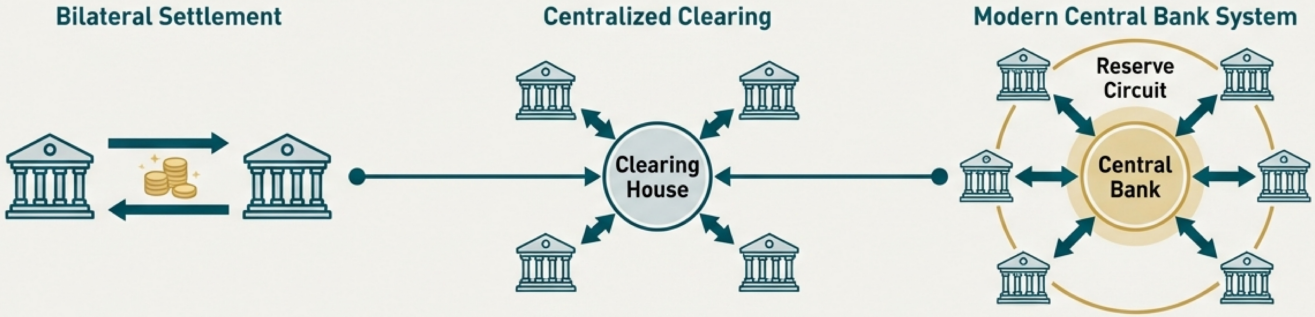


Simulation Result: Private Debt-to-GDP



From Creation to Settlement: The System's Plumbing

Money creation is only the first step. For money to be useful, it must move. The efficiency and safety of the entire economy depend on the infrastructure for interbank clearing and settlement—the plumbing of the financial system.



The Modern Central Bank's Dual Role

A central bank is not just a lender of last resort for policy purposes. It is the operator of the ultimate settlement system, standing at the center of the network. This infrastructural role is fundamental to both financial stability and monetary policy implementation.

The Current Infrastructure Relies on Two Settlement Models

Today's payment systems primarily use two different methods for settling interbank obligations: Deferred Net Settlement (DNS) and Real-Time Gross Settlement (RTGS). Each has distinct trade-offs in terms of speed, risk, and liquidity efficiency.

Feature	DNS (Deferred Net Settlement)	RTGS (Real-Time Gross Settlement) - e.g., FedWire	Comments
Speed	Batch-based; delayed	Real-time	RTGS gives immediate access to funds, eliminating delays.
Risk	**Counterparty Risk**	Settlement is final & irreversible	DNS creates risk that a participant could fail before end-of-day settlement. RTGS eliminates this settlement risk.
Liquidity	**High efficiency** (payments are netted)	**Low efficiency** (requires access to liquidity for gross payments)	Netting in DNS reduces the total amount of liquidity banks need to hold. RTGS requires more liquidity.
Cost	Lower	Higher	The need for more liquidity and the real-time infrastructure of RTGS typically results in higher costs.
Interoperability	Low (Complex, fragmented)	High	A centralized RTGS system like FedWire provides high interoperability across its large network of member banks.

The Next Evolution: A 24x7x365 Real-Time Settlement System

A 24-hour settlement window is a necessary, but not sufficient, condition for solving many problems in large-value payments. The current system's limited operating hours create unnecessary risks and costs.

The Problem



- Increased settlement risk
- Increased capital and operational costs
- Inefficiencies in repo and securities markets
- Delays for end-users

The Opportunity

- FX trade settlements
- Repo and Overnight Repo markets
- Securities Lending
- Trade Finance
- Extended hour margin movements
- Large-value retail payments (e.g., mortgages)

The Path Forward Is Incremental, Accessible, and API-Driven

A complete overhaul of the payment system is risky and unnecessary. The most practical path forward is to enhance the existing RTGS infrastructure, focusing on accessibility and modern, open interfaces.

Roadmap

1



Enhance, Don't Replace

Extend the current FedWire RTGS system to avoid the disruption, cost, and adoption challenges of a new network.

2



Avoid Distractions

Do not pursue a blockchain/DLT solution. Benefits can be achieved with existing technology without the added complexity and risk.

3



Expand Accessibility

Re-examine eligibility for central bank accounts to allow greater participation and spur innovation from non-bank agents.

4



Prioritize a Robust API Ecosystem

Provide a comprehensive set of APIs as the primary interface to empower private sector innovation.

Core API Functions Required

- Balance Check (real-time master and collateral accounts)
- Funding / De-funding / Settlements
- Historical Transaction Reports
- Queue Management

The Integrated Architecture of Modern Money

A robust understanding of the monetary system requires moving beyond single-domain thinking. We must integrate insights from heterodox theory, dynamic modeling, and institutional analysis of the underlying infrastructure. The stability and efficiency of 21st-century finance depend on modernizing both our models and our rails in tandem.

