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Berkeley Center for Law,
Business and the Economy



What is Money?

Gregory La Blanc

Commercial Bank

Balance Sheet

Loans	Deposits
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Commercial Bank

Balance Sheet

Cash	Deposits
Loans	Equity

Origins of Banking

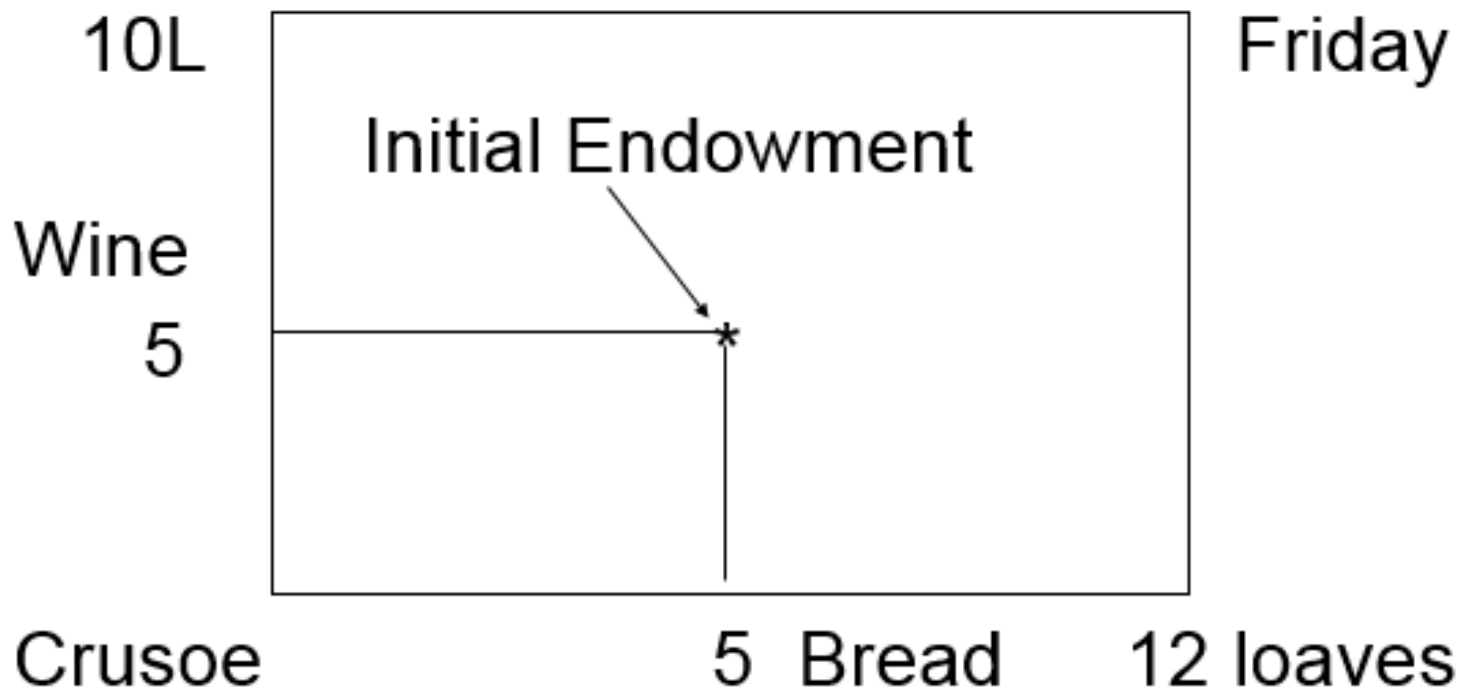
- Before banking there was money.
- What is money?
 - Medium of Exchange
 - Store of Value
 - Unit of Account

Origins of Money

- Why not barter?
- Simple economy
 - Two agents (Crusoe and Friday)
 - Two assets (bread and wine)
 - One period
- Would they need money?

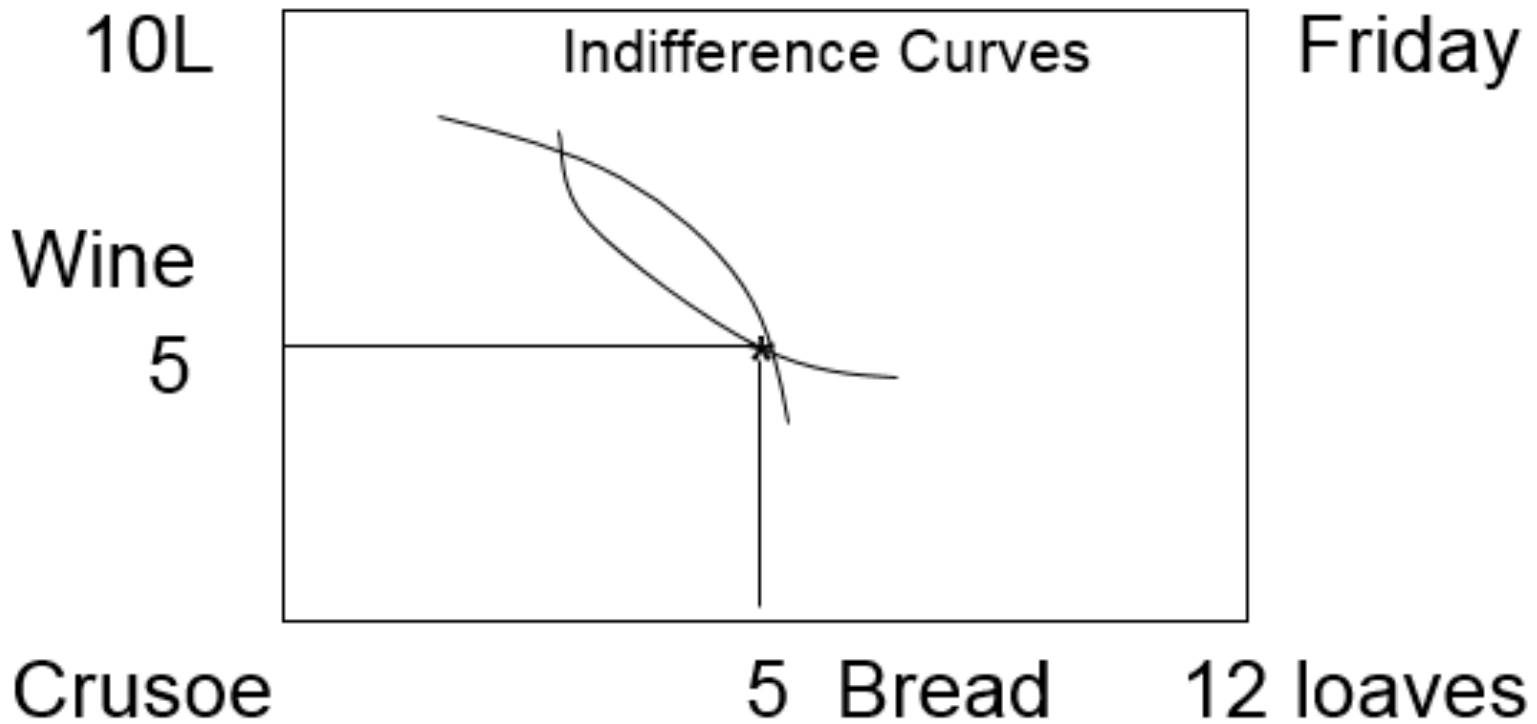
Barter

- Edgeworth Box



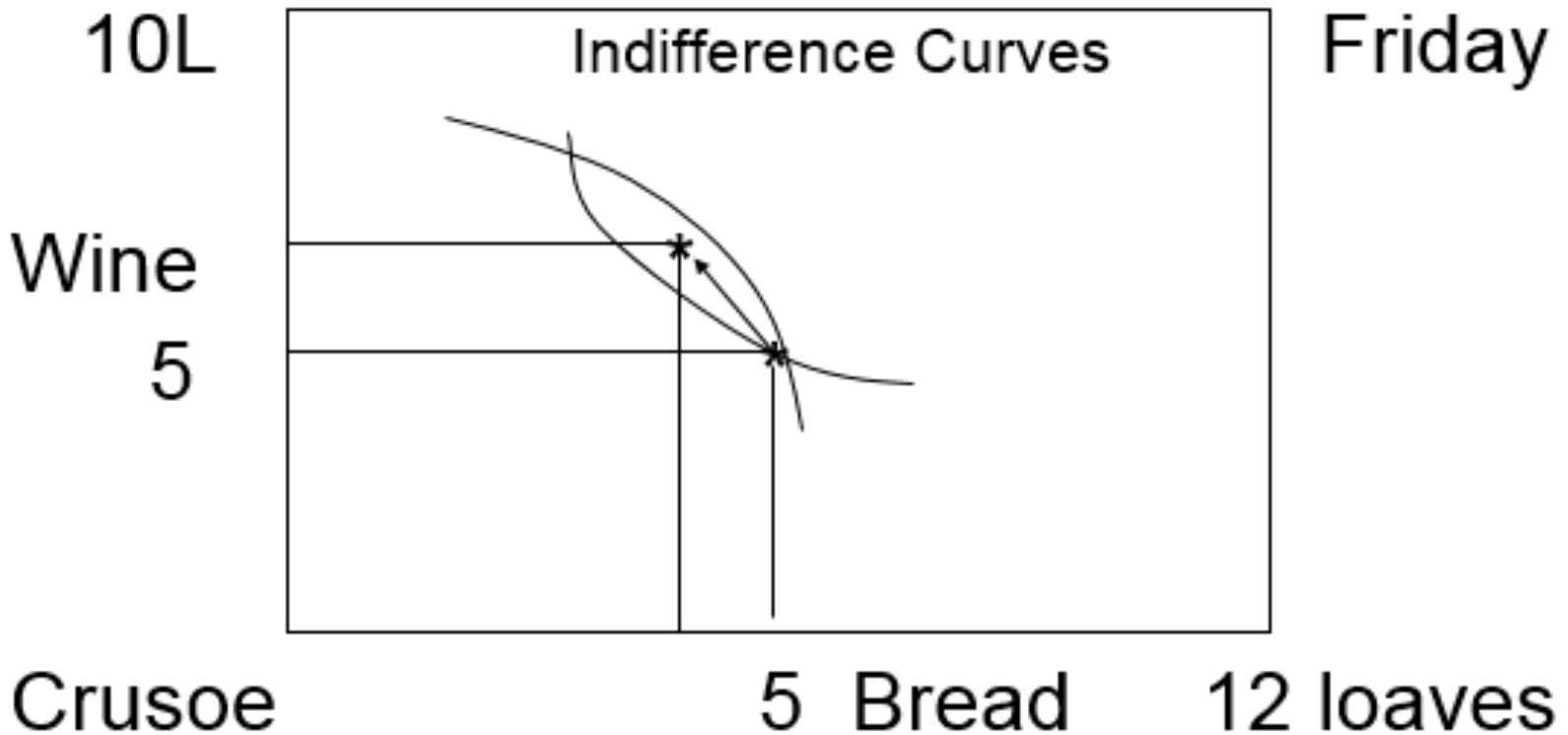
Barter

Is this an equilibrium?



Barter

Is this an equilibrium?



Barter

- In a world of barter, prices are denominated in other goods.
- So if Crusoe gives up one loaf of bread in exchange for 1.2 liters of wine,
- The price of a loaf of bread is 1.2L of wine
- The price of a liter of wine is $1/1.2 = 0.8333$ loaves of bread
- Like currency markets now

So why have money?

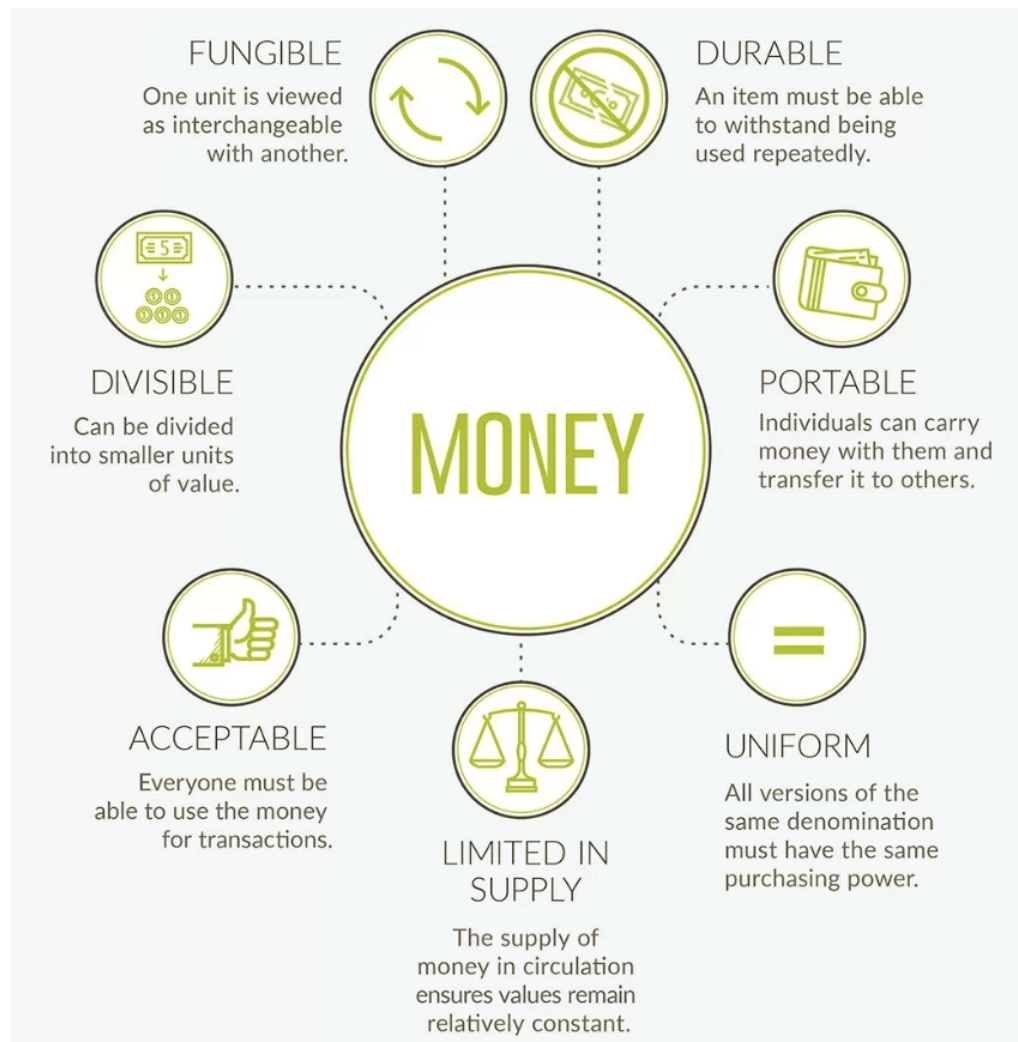
- Now imagine three people:

- Crusoe
- Friday
- Swift



- Swift harvests shells
- How many transactions may be required involving how many different goods to attain equilibrium?
- How many “exchange rates” will we have?

Commodity Money



Types of Commodity Money

- Gold, Silver, and precious metals



Types of Commodity Money

- Grains and other crops



Types of Commodity Money

- Shells (e.g. wampum)





Mackerel Economics in Prison Leads to Appreciation for Oily Fillets

Packs of Fish Catch On as Currency, Former Inmates Say; Officials Carp

By Justin Scheck

Updated Oct. 2, 2008 11:59 p.m. ET

When Larry Levine helped prepare divorce papers for a client a few years ago, he got paid in mackerel. Once the case ended, he says, "I had a stack of macks."

Mr. Levine and his client were prisoners in California's Lompoc Federal Correctional Complex. Like other federal inmates around the country, they found a can of mackerel -- the "mack" in prison lingo -- was the standard currency.




Larry Levine


"It's the coin of the realm," says Mark Bailey, who paid Mr. Levine in fish. Mr. Bailey was serving a two-year tax-fraud sentence in connection with a chain of strip clubs he owned. Mr. Levine was serving a nine-year term for drug dealing. Mr. Levine says he used his macks to get his beard trimmed, his clothes pressed and his shoes shined by other prisoners. "A haircut is two macks," he says, as an expected tip for inmates who work in the prison barber shop.

There's been a mackerel economy in federal prisons since about 2004, former inmates and some prison consultants say. That's when federal prisons prohibited smoking and, by default, the cigarette pack, which was the earlier gold standard.

Prisoners need a proxy for the dollar because they're not allowed to possess cash. Money they get from prison jobs (which pay a maximum of 40 cents an hour, according to the Federal Bureau of Prisons) or family members goes into commissary accounts that let them buy things such as food and toiletries. After the smokes disappeared, inmates turned to other items on the commissary menu to use as currency



 **EurekAlert!**
The Global Source for Science News

 AAAS

HOME NEWS MULTIMEDIA MEETINGS PORTALS ABOUT

PUBLIC RELEASE: 22-AUG-2016

Ramen noodles supplanting cigarettes as currency among prisoners

AMERICAN SOCIOLOGICAL ASSOCIATION

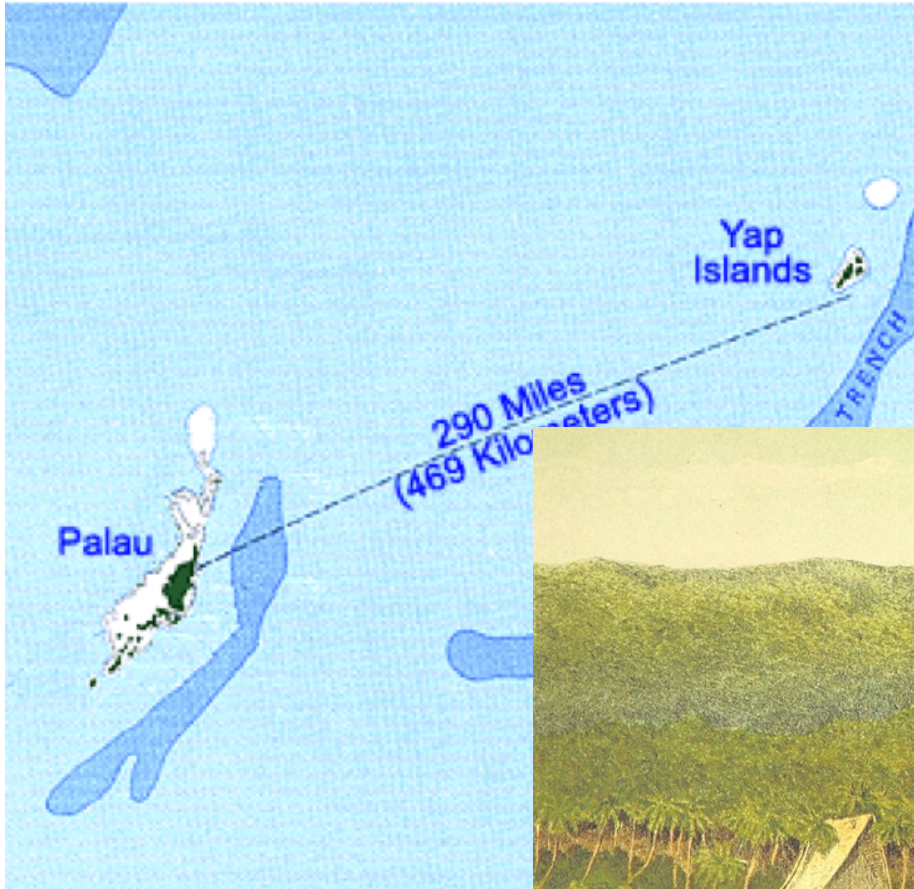






(c) 2006, Danka Ledgerwood





Drawbacks to Commodity Money

- May lack characteristics of liquidity
 - May be heavy and cumbersome
 - May be difficult to measure or evaluate on the spot
 - Costly to produce!

Limitations on Money

- Problem with paying with cash
 - Carrying cash around can be dangerous or difficult
 - Why not just pay with an IOU?
 - Let the seller come pick up the cash later.
 - If the seller trusts you to have the money later, you need not have it now.
 - Credit

Limitations on Money

- Problem with paying with cash
 - You don't have it.
- Instead you have cash coming in the future, or
- You have a positive NPV project, or
- You have some other valuable asset that could be sold

Origins of Credit

- Trade Credit

Illinois
Beaver
Hunter

Cincinnati
Store

New York
Merchant

London
Merchant

E



Origins of Credit

In a world without credit, all transactions would have to take place with cash

1. NY merchant pays cash to London merchant for gun.
2. Cincinnati merchant pays NY merchant cash for gun
3. Beaver hunter pays Cincinnati merchant cash for gun
4. Beaver hunter kills beaver
5. Cincinnati merchant pays cash to beaver hunter for pelt
6. NY merchant pays cash to Cincinnati merchant for pelt
7. London merchant pays NY merchant cash for pelt

What's wrong with this?

Origins of Credit

- Trade Credit Period 1

Illinois
Beaver
Hunter

Cincinnati
Store

New York
Merchant

London
Merchant



Trade Credit

Beaver
Guy

Cincinnati
Merchant

New York
Merchant

London
Merchant

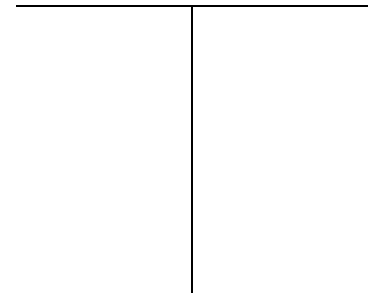
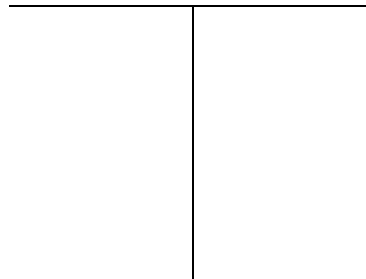
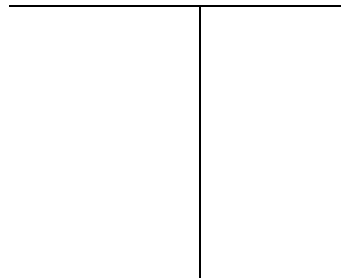
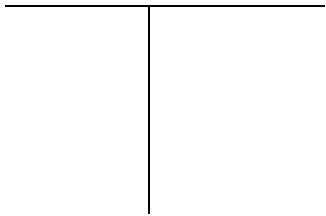
A/P

A/R

A/P

A/R A/P

A/R



Origins of Credit

- Trade Credit Period 2

Illinois	Cincinnati	New York	London
Beaver	Store	Merchant	Merchant
Hunter			

\Beaver pelts



IOUs

Trade Credit

- Who owes whom?

London Merchant

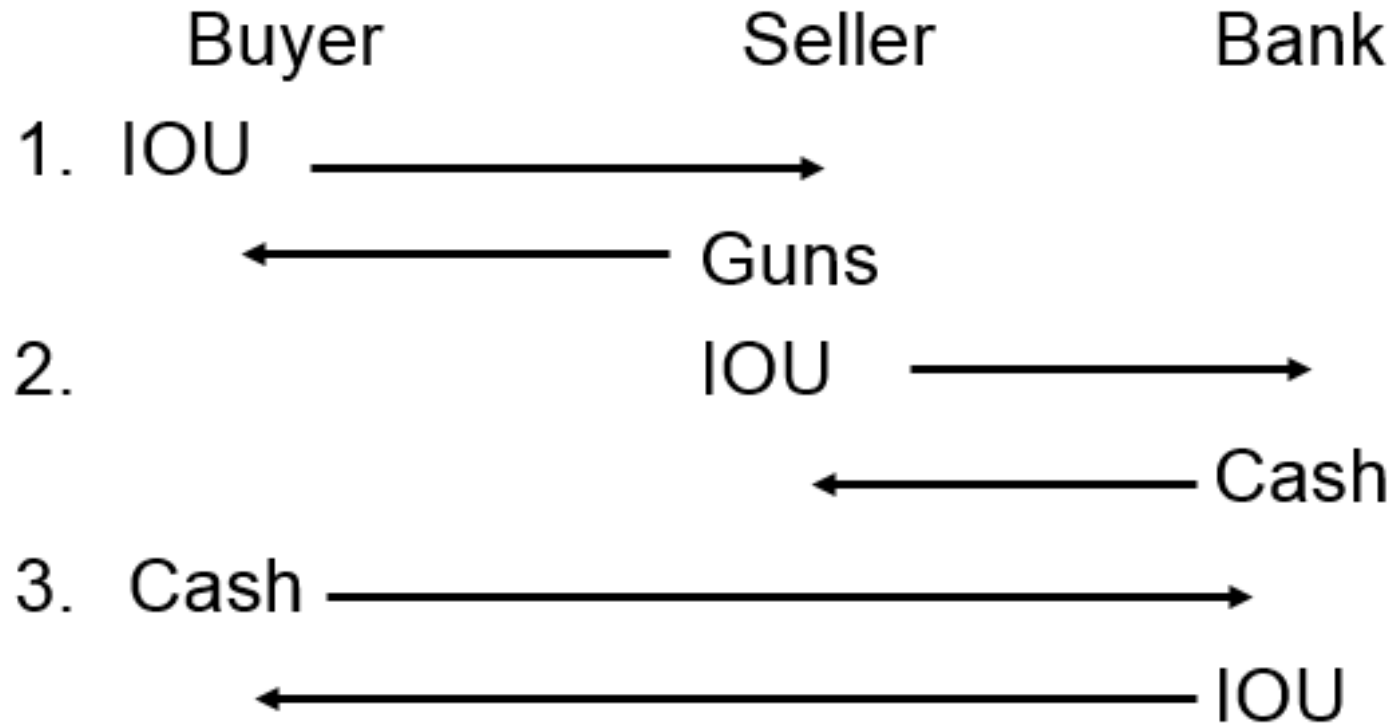
IOUS from
Beaver guy?

Limitations on trade credit

In order to provide trade credit the seller must know the buyer

Alternative: seller knows third party who knows seller.

Discounting



Letter of Credit

- Buyer is stranger to seller, but bank knows buyer, so bank vouches for buyer.
- Or can function like travelers checks

No. A 1828

£1000.00

Lettre de Crédit Circulaire.

Boston, E. U. le 9 avril, 1892.

Messieurs,

Nous prenons la liberté d'introduire auprès de vous et de recommander à vos attentions obligeantes M. Hon. George F. Hoar

Nous lui ouvrons en même temps un Crédit circulaire de Mille livres sterling £1000.00

dont vous voudrez bien lui fournir la Contrevaleur sous retenue de vos frais et contre ses traites sur Messieurs Baring Brothers & Co. L^{ds} Londres à vue, qui recevront tout accueil à présentation.

Veillez inscrire vos paiements au dos de la présente lettre, qui est valable jusqu'au 30 juin 1892. Agréez, Messieurs, l'assurance de notre parfaite considération.

Signature de l'accrédité
Geo. F. Hoar

Nillsen & Co
for themselves and as Attorneys for
Baring Brothers & Co. L^{ds}

CETTE LETTRE DOIT ÊTRE REMISE À LA MAISON QUI PAIERA LE SOLDE.

Date	Payee	Amount	Unit
1892 June 2	PAID BY BARING BROTHERS & CO ^{LD} L ^D	Fifty	pounds
14	do do	Fifty	pounds
21	do do	Fifty	pounds
27	do do	Fifty	pounds
July 8	BANK OF ENGLAND BIRMINGHAM	Fifty	pounds
18	York Union Bank & Co ^{LD}	Eleven	pounds
20	PAID BY BARING BROTHERS & CO ^{LD} L ^D	Fifty	pounds
21	do do do	Twenty	pounds
July 26	Hottinguer & Paris	fifty	pounds
Aug 1	" " " "	do	
6	BANQUE CANTONALE DE BERNE	fifty	pounds
12	PAID BY LOMBARD & CO ^{LD} GENOVA	fifty	pounds
Sept 5	Ed. Cuvillier & Co ^{LD} same	fifty	pounds
" 14	the same	fifty	pounds
" 23	Narich & Milan Society	20	
Le 1 OCT 92	PAYÉ par BANQUE COMMERCIALE D'AIX-LES-BAINS	Twenty	pounds
Oct 6	PAID BY HOTTINGUER & CO ^{LD} - PARIS	Twenty	pounds
8	PAID BY BARING BROTHERS & CO ^{LD} L ^D	Fifty	pounds
17	do do do	One hundred	pounds

Italia y R / Plata.
ederer.
Landis.

American Express Company
CONVERTIBLE LETTER OF CREDIT

This Travelers Letter of Credit is negotiable in local currency at any of the Offices or Bank Correspondents named on the accompanying list.

In addition the holder may obtain American Express Travelers Cheques at any American Express office, or at any Travelers Cheque Agency specifically indicated on the list of correspondents accompanying the Letter of Credit. A charge of one-fourth of one percent ($\frac{1}{4}$ of 1%) will be made for American Express Travelers Cheques secured against this Letter of Credit.

The Letter of Credit should not be destroyed. If exhausted, it will be taken up by the Office or Correspondent negotiating the final draft.

If any balance remains unused, the Letter of Credit should be surrendered to the holder's bank or nearest American Express office upon his return home.

(MADE IN U. S. A.)

Holder to give
holder of Circular
for
METRO TRUST COMPANY.
Signature of Holder

IMPORTANT

GUARD THIS LETTER OF CREDIT AGAINST LOSS OR THEFT AS YOU WOULD MONEY, but if you should lose it, notify the local police and our bank correspondent in the place where the loss occurred; and IMMEDIATELY TELEGRAPH the nearest American Express office, using the following form (see list with cable and street addresses below):

"Have lost my Travelers Letter of Credit No. _____ at (place) - balance not drawn against Credit (amount)?"

The holder should supplement the telegraphic advice with a complete report by mail giving full particulars.

**REGISTERED CABLE ADDRESSES OF CHIEF
AMERICAN EXPRESS OFFICES**

New York, 65 Broadway:

TREASAMEX,--New York.

Paris, 11 Rue Scribe:

AMEXCO,--Paris.

Hong Kong, 4 Des Voeux Road Central:

AMEXCO,--Hong Kong.

Bombay, 82-84 Esplanade Road, Fort:

AMEXCO,--Bombay.

(1756-7-35)

Bill of Exchange

Seller doesn't know Buyer

Sellers bank doesn't know buyer

Buyers bank doesn't know seller, but

Buyers bank knows sellers bank

Bill of Exchange

• Buyer

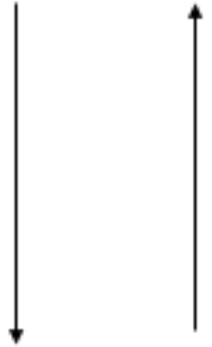
—
Seller

IOU

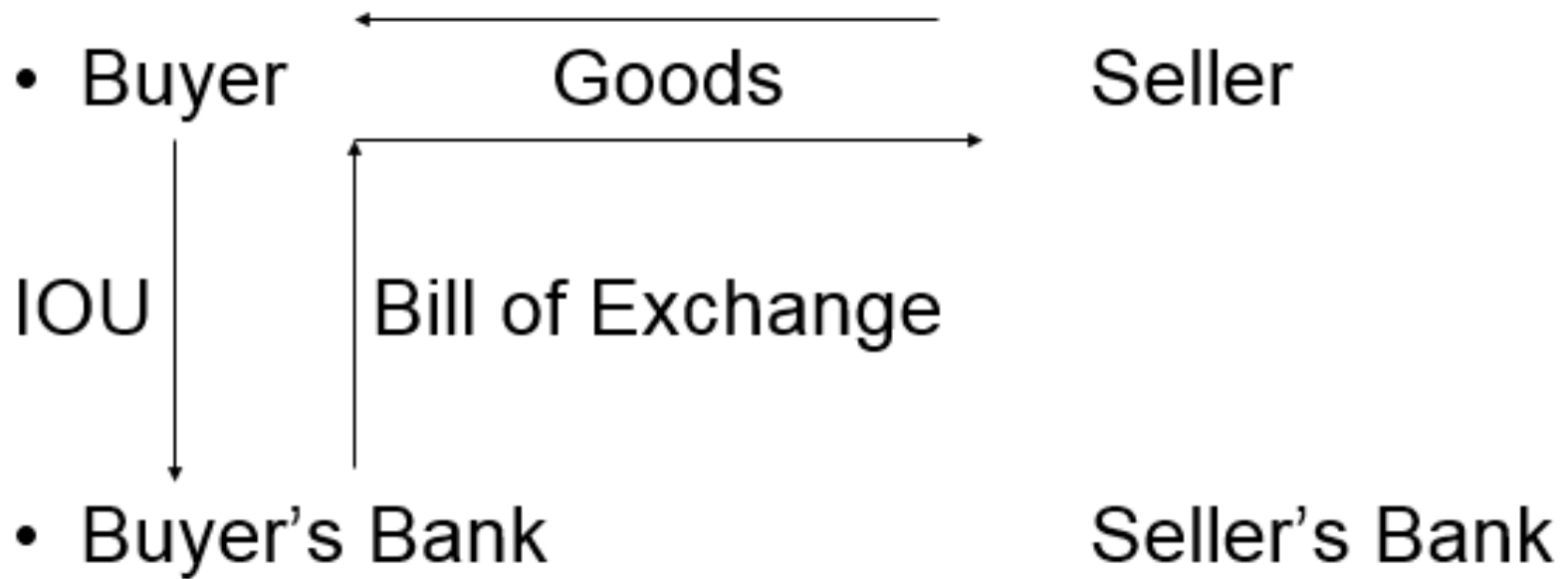
Bill of Exchange

• Buyer's Bank

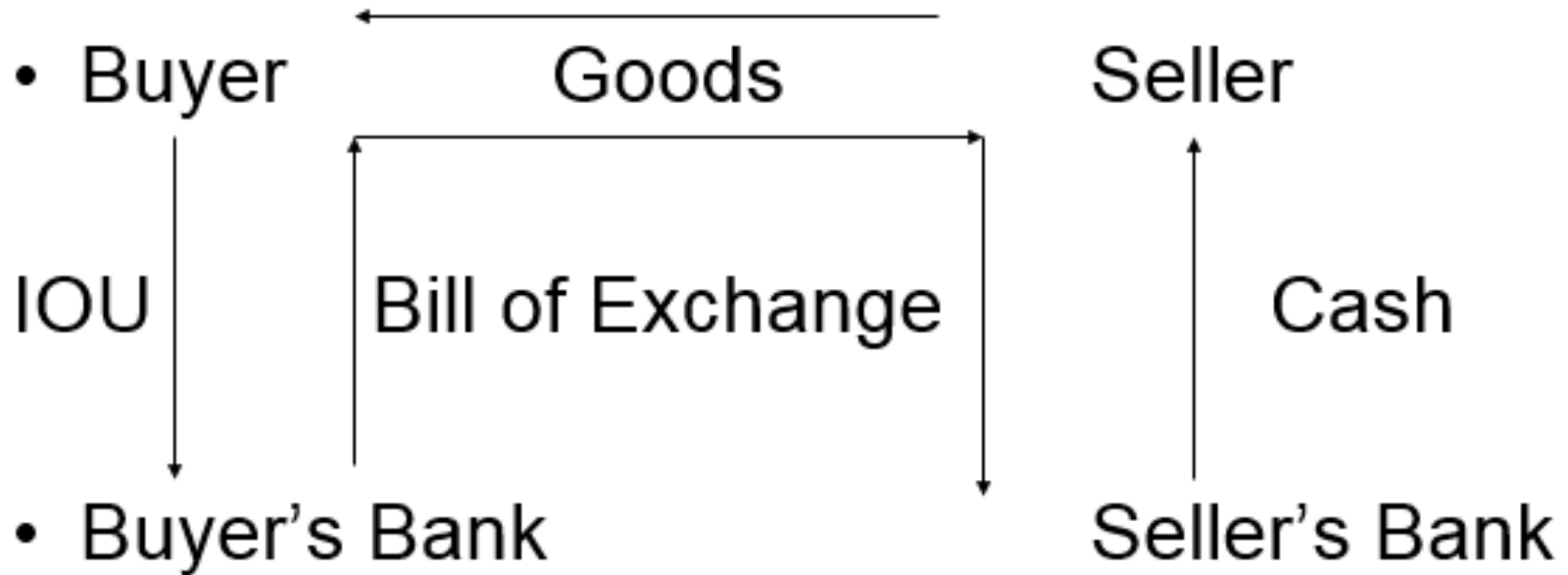
Seller's Bank



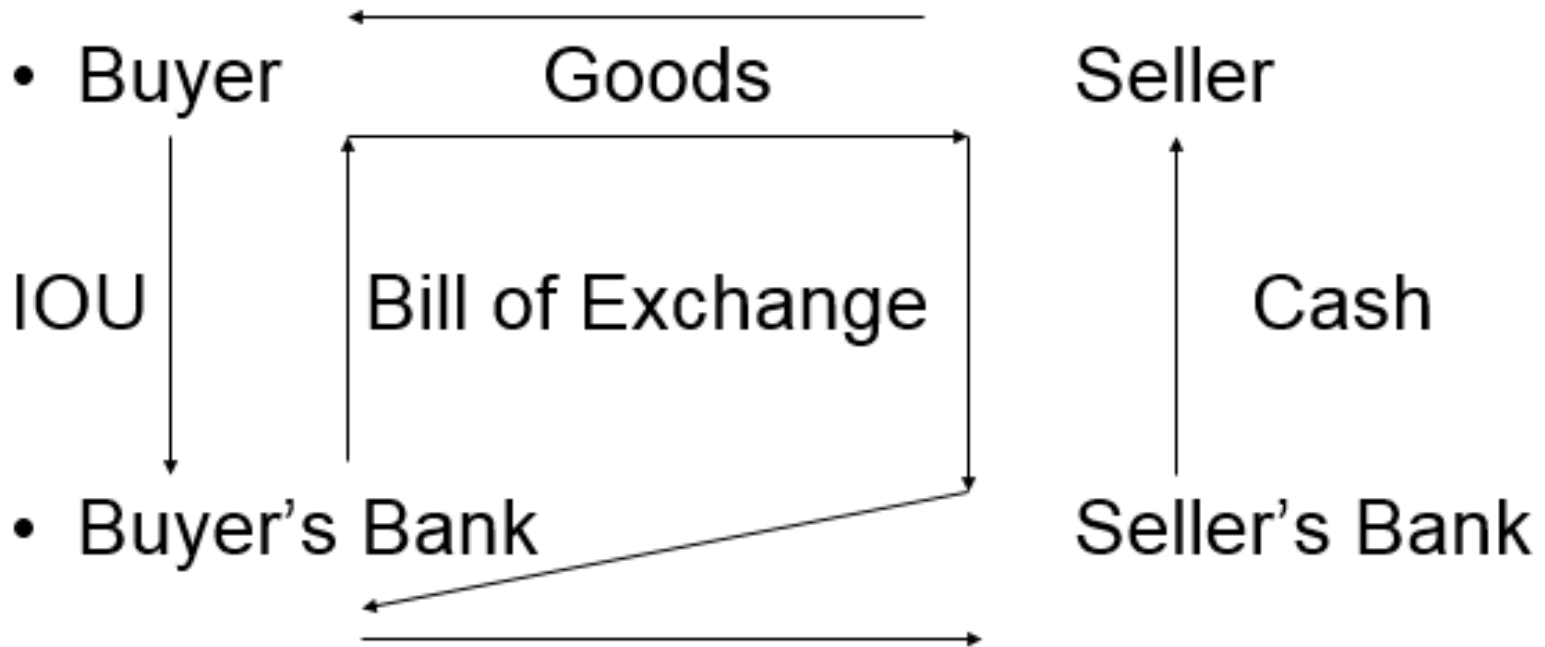
Bill of Exchange



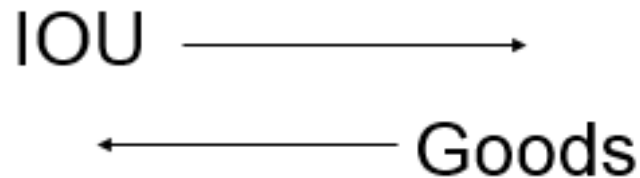
Bill of Exchange



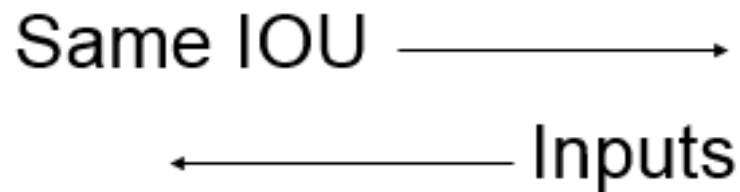
Bill of Exchange



1. Buyer Final Goods Producer



2. Input provider



No need for bank.

Origins of Banking

- Goldsmith as safe deposit



Origins of Banking

- Safe Deposit Model: why store?
 - Goldsmith issues warehouse receipts
- In colonial America: tobacco
- Today: Brinks
- Is the receipt an asset?
- What does the warehouse balance sheet look like?
- How does the warehouse make money?





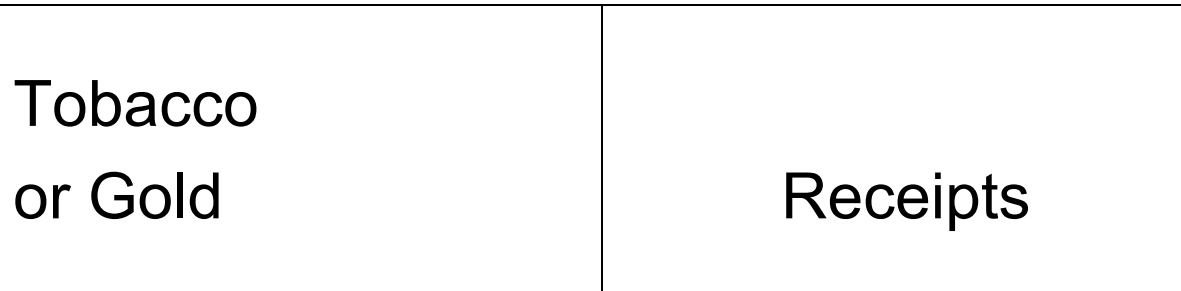
JP/2013

TruckTrailers.blogspot.com



Origins of Banking

- If commodity is fungible, warehouse receipt represents a claim. i.e. it becomes a financial asset
- Warehouse B/S



Origins of Banking

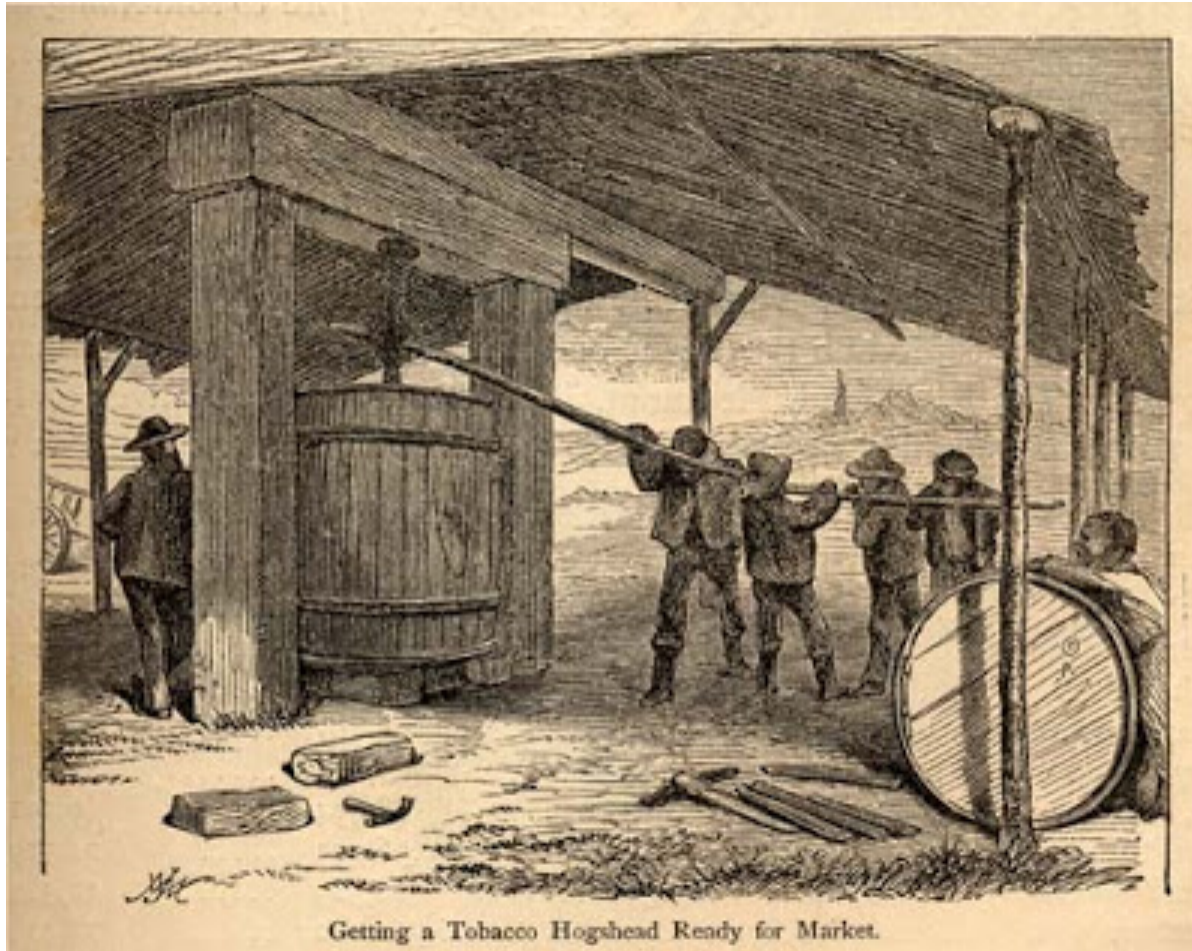
- Why would anyone ever ask for their stuff back?
- If their stuff is gold, they may need the gold for cash transactions.

Origins of Banking

- What is the likelihood of all customers asking for their stuff back on the same day?
- Depends on the covariance of withdrawal behavior among depositors
- How else can the warehouse make money?

Receipts as Money

- The receipt is an IOU
- If the bank has good credit, the receipts will become a medium of exchange
- The receipts may become more liquid than the commodity



James R I V E R. No.
Shoccoe's Warehouse, the 12 Day of *Feb^r* 1773
R E C E I V E D of *Joyce Rice* four hundred seventy three
Pounds of *Am^o* Transfer *Tob^o* Tobacco,

to be delivered on Demand to him or his Order, according to the Directions of
the Act of Assembly " For amending the Staple of Tobacco, and preventing
Frauds in his Majesty's Customs." Witness our Hands,

473

Robt. Burnton
James Page

Origins of Banking

- Warehouse Balance Sheet

Gold 100	Receipts 90 Equity 10
----------	--------------------------

Origins of Banking

- What happens when a loan is made?
- Warehouse Balance Sheet

	Gold 100	Receipts 90
		Equity 10
	Loan 10	Receipts 10
Total	110	110

Fractional Reserve Banking

- As long as the receipts circulate, the bank will never have to dip into its gold pile.
- If the borrower gives the receipt to someone who wants to redeem it for gold, then the reserve will be reduced
- Does the bank collect storage fees?
- Does the bank pay interest?

Origins of Banking

- How does the warehouse make money now?

- Income Statement

Interest Income

- Loan Losses

-Op. Exp.

Origins of Banking

- Key questions:
 - How to structure liabilities? Demand deposits or timed deposits
 - How to structure assets? Callable loans or timed loans?
 - How many loans should be made? i.o.w. How big should the balance sheet be?
 - What percentage of liabilities should be held in “ready cash”?

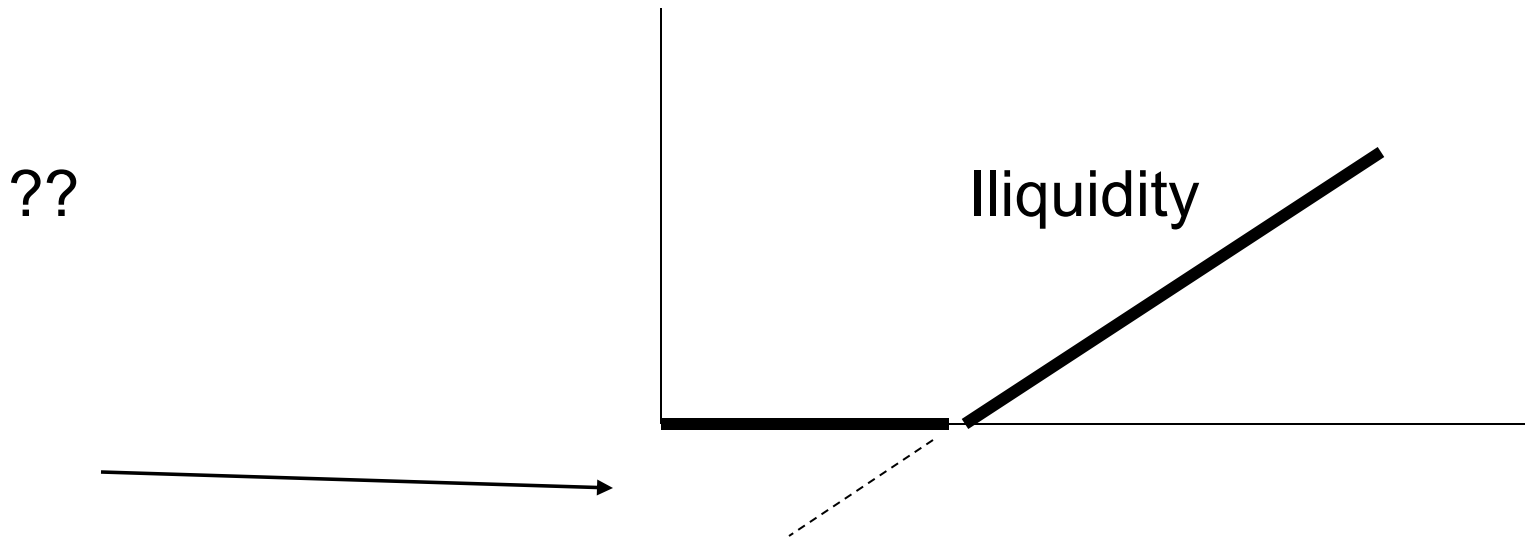
Credit as Money

- Warehouse receipt is a financial asset to the holder
- It's a liability to the issuer
- The holder is a creditor
- The issuer is a debtor
- Value of transaction media is a function of the creditworthiness of the issuer
- Why does the holder not charge interest?

Liquidity Demand

- Why does the issuer of the warehouse receipt not pay interest to the holder?
- Liquidity premium in lieu of interest

Interest Charged



Liquidity Creation

- What makes a debt instrument useful as transaction medium?
- What about other receipts?
 - Best Buy gift cards
 - Postage Stamps
 - Subway Tokens
 - Casino Chips
 - Mobile Phone minutes





IOUs as medium of exchange

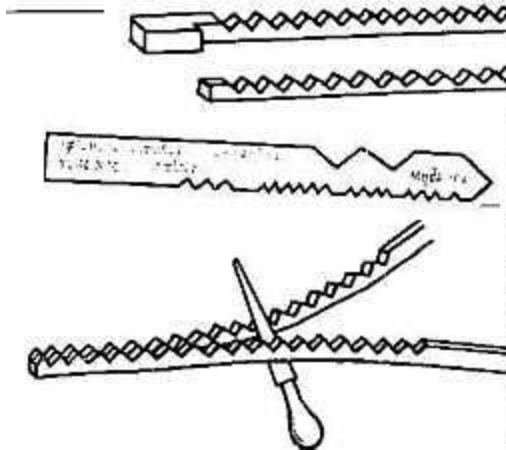
If Debtor is well known, IOUs may circulate
Company Town





Tax Receipts

- Tallies as receipts, tallies as IOUs



CC

Government

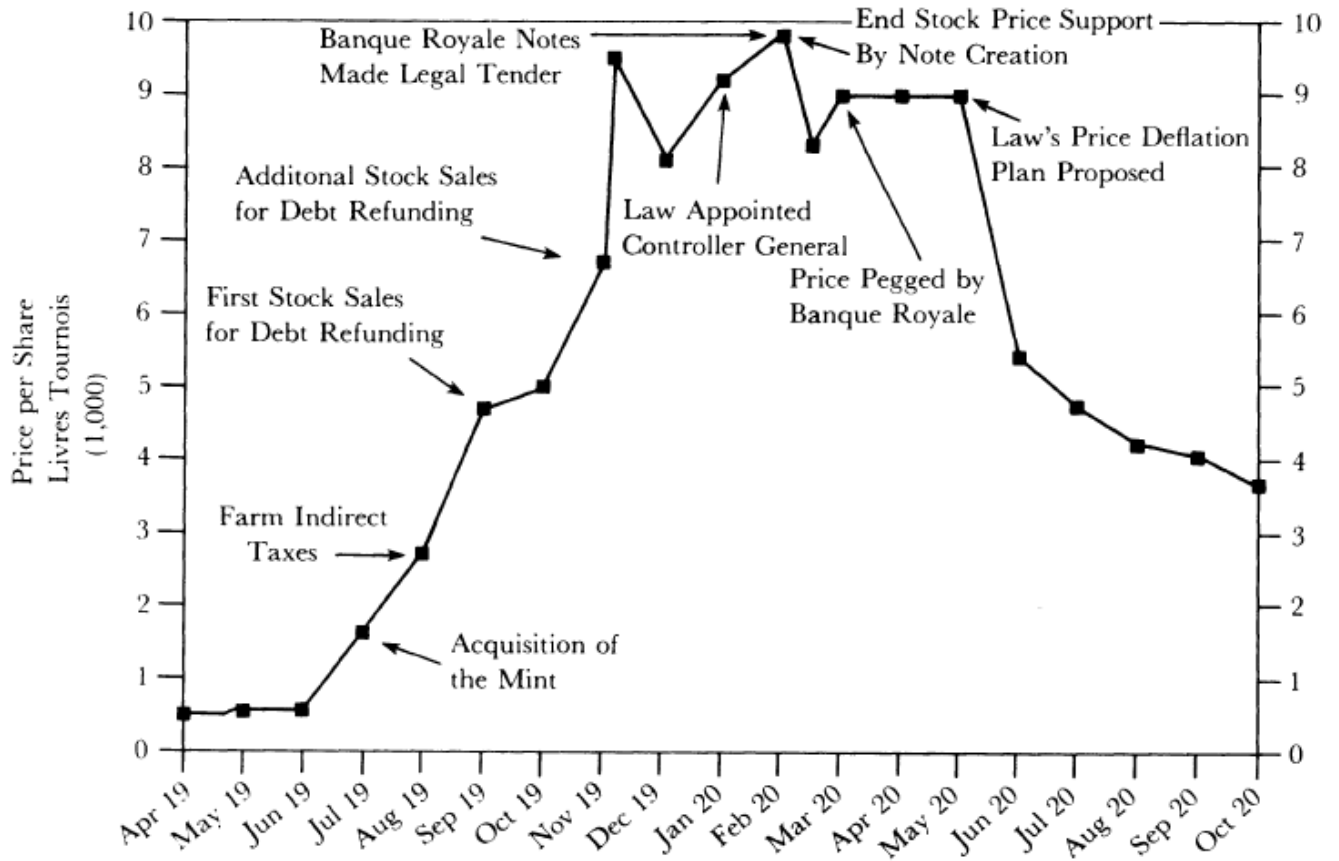
Taxes Receivable

Debt

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Compagnie des Indes Stock Price



Bank of England



SEALING OF THE BANK OF ENGLAND CHARTER. 1694.
SIR JOHN HOUBLON,
Governor.

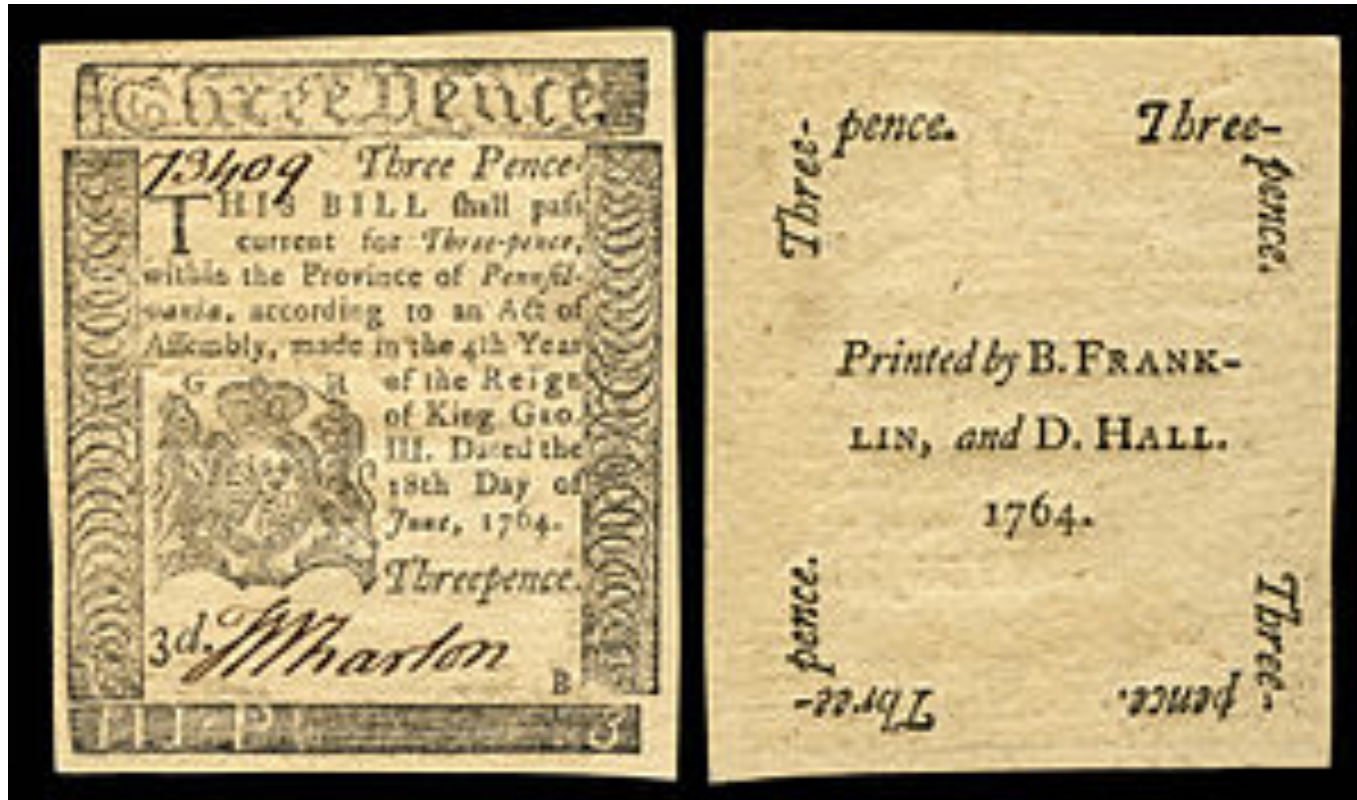
SIR JOHN SOMERS,
Lord Keeper.

MR. MICHAEL GODFREY
Deputy Governor.

Bank of England



Colonial notes



National Banking Act



Patacones





STATE OF CALIFORNIA WARRANT NUMBER [REDACTED]

THE TREASURER OF THE STATE WILL PAY OUT OF THE FUND NO. FUND NAME
 IDENTIFICATION NO. TAX YEAR 1730 0027 TAX RELIEF & REFUND ACC

STATE INCOME TAX REFUND

This REGISTERED WARRANT will be honored on or after 10/02/2009 unless it's approved for earlier redemption pursuant to Gov. Code Section 17221.5

ISSUE DATE
 MO. | DAY | YR. DOLLARS CENTS
 07 | 08 | 2009 \$*****28.18

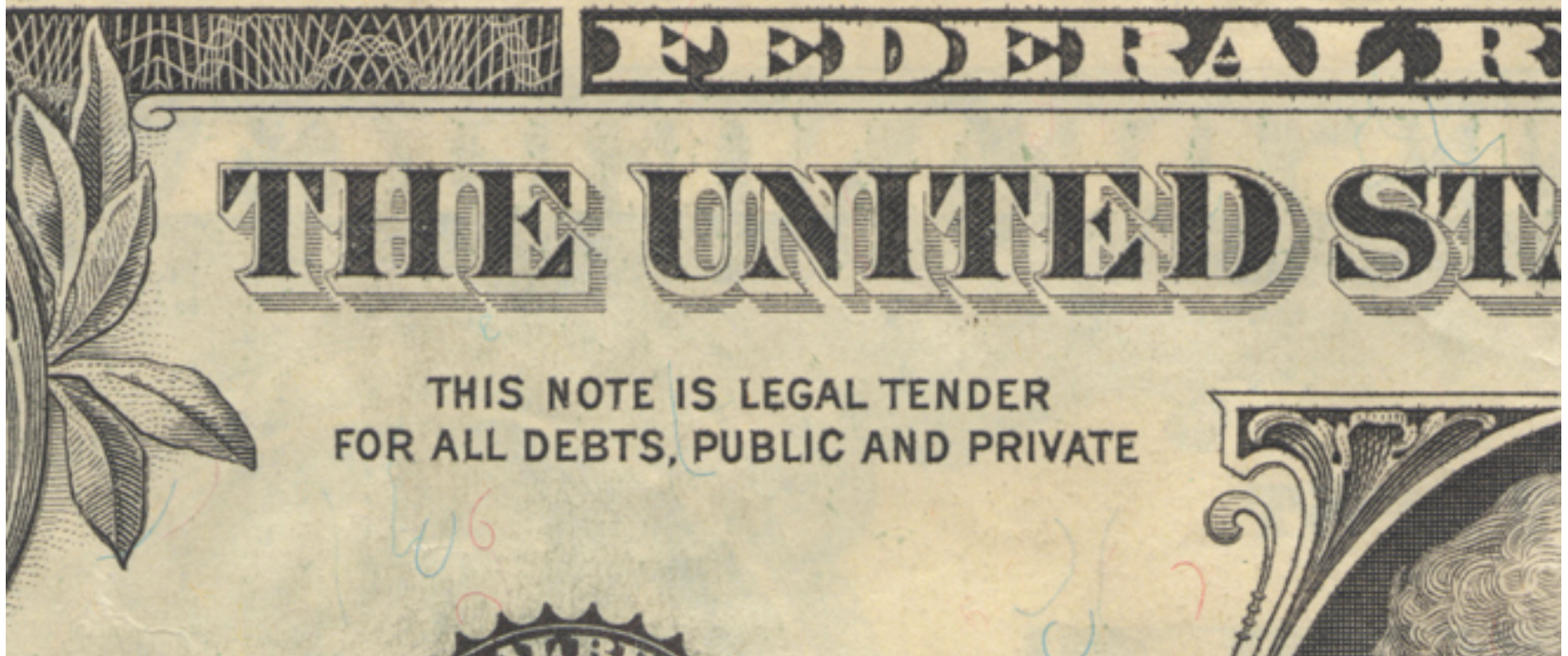
PROBLE IN SUCH COIN OR CURRENCY OF THE U.S.A. AS AT TIME OF PAYMENT IS LEGAL TENDER FOR PAYMENT OF PUBLIC & PRIVATE DEBTS.

John Chiang
 JOHN CHIANG
 CALIFORNIA STATE CONTROLLER

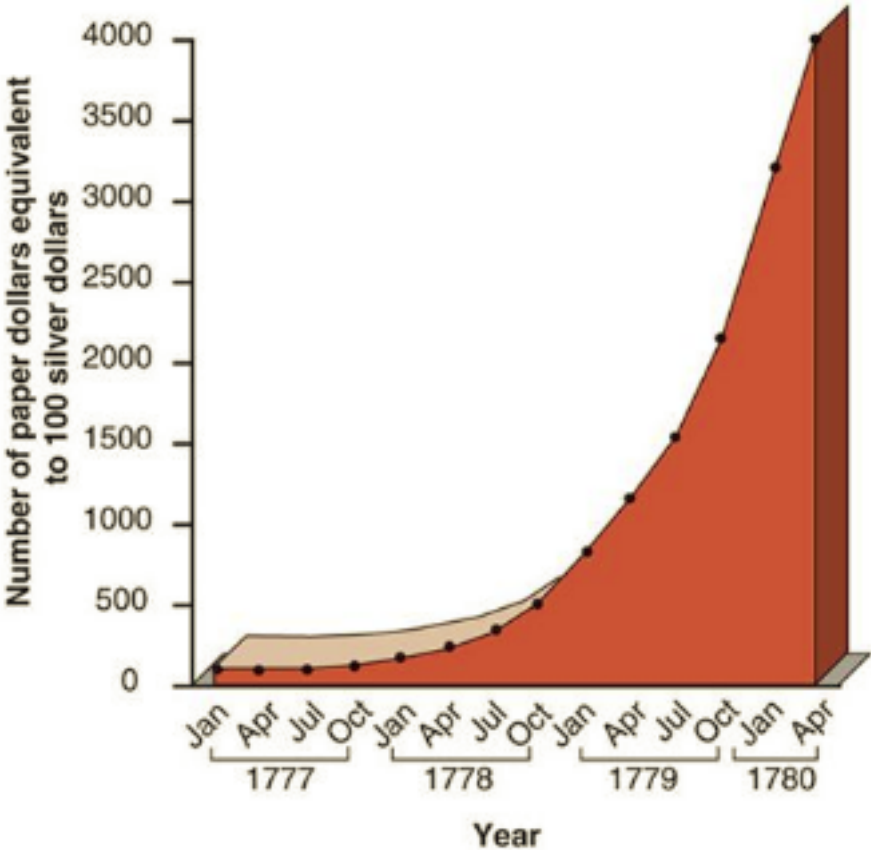
Fiat Money

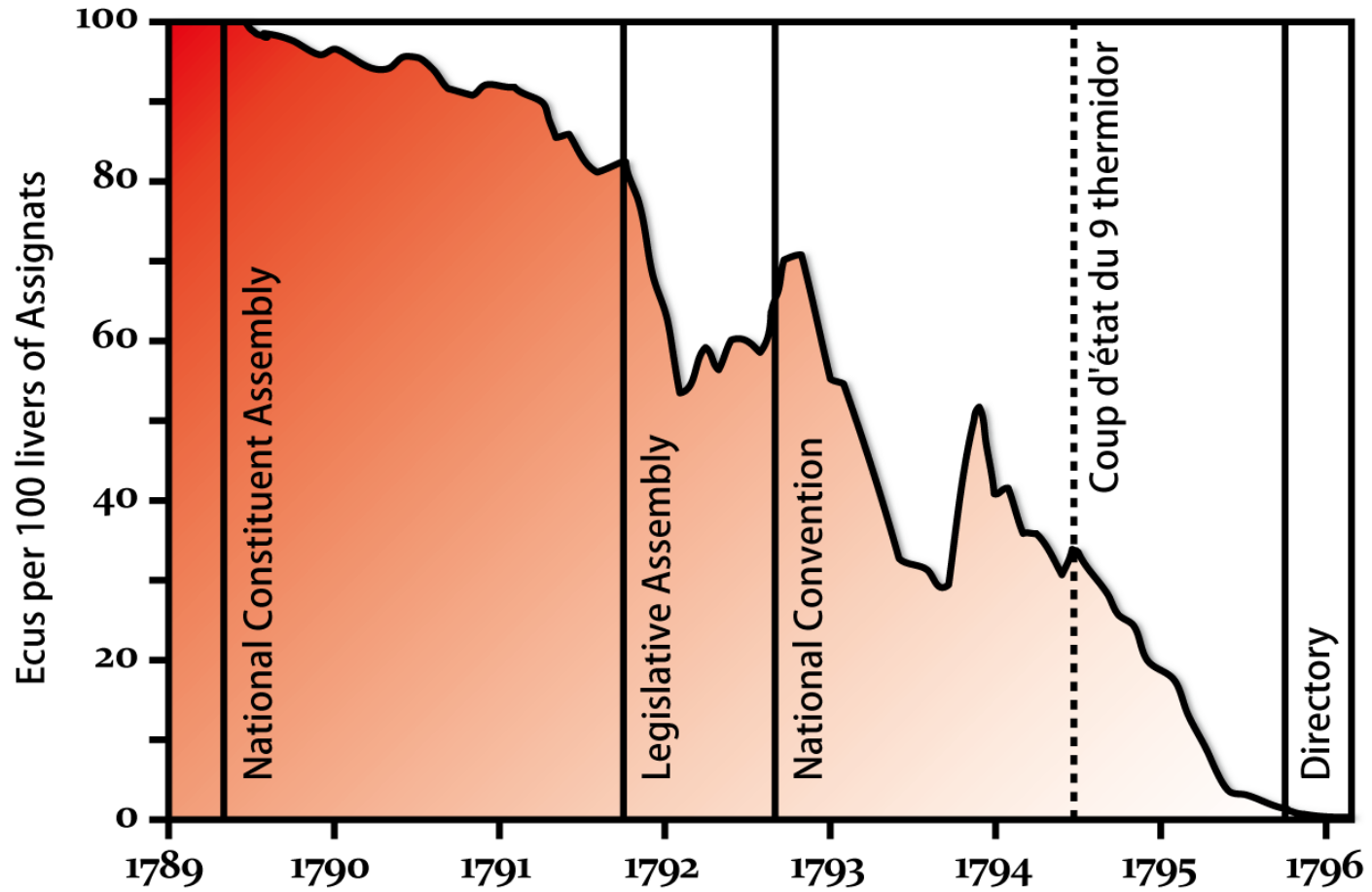
“The Congress shall have Power To...coin Money, regulate the Value thereof, and of foreign Coin....”

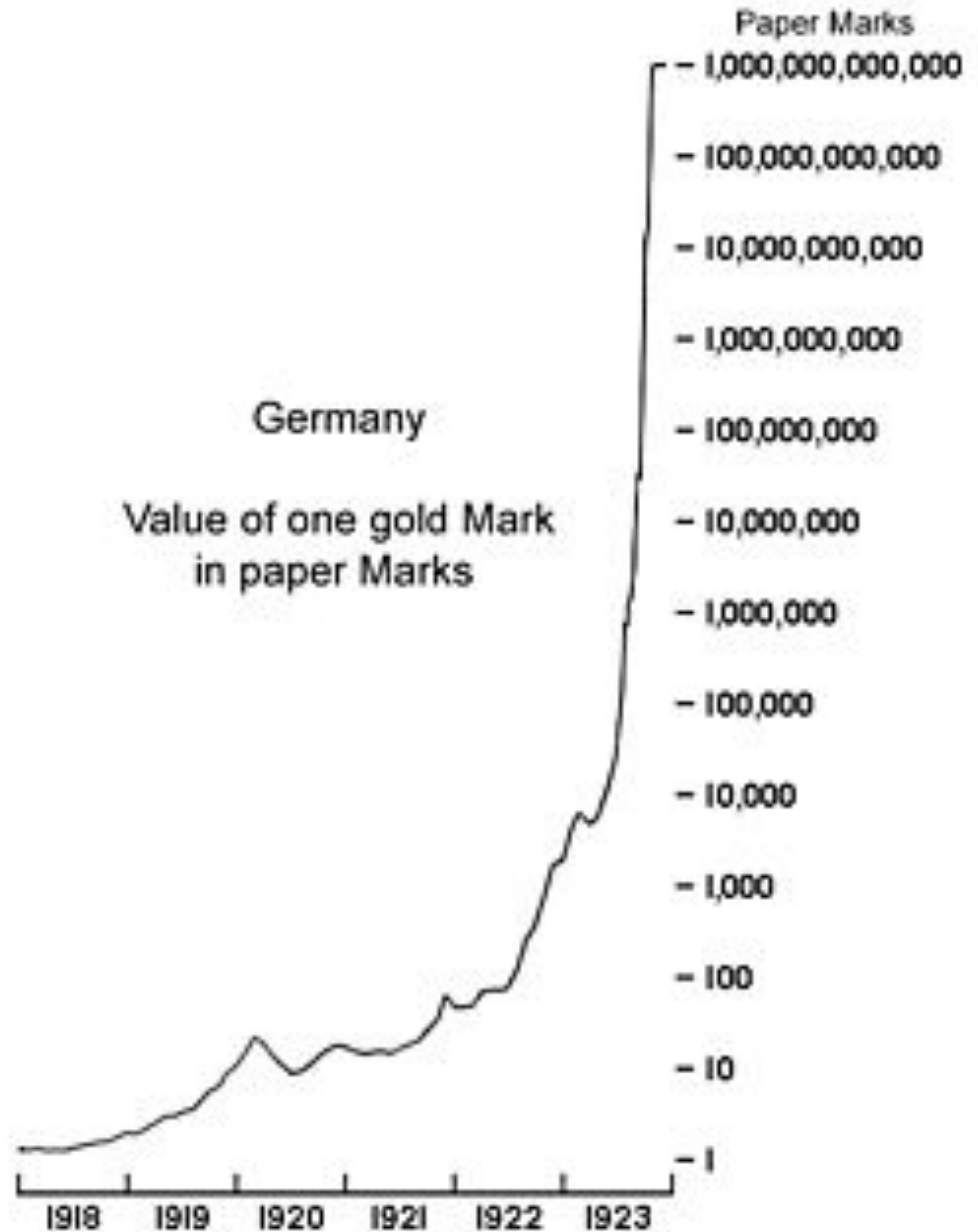
ARTICLE I, SECTION 8, CLAUSE 5



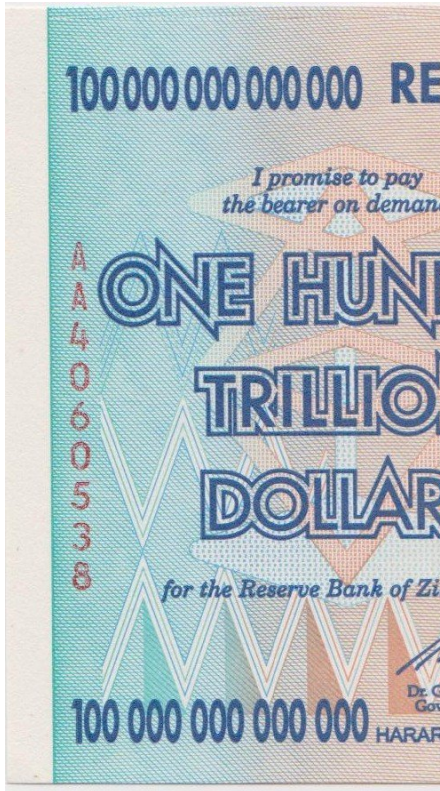
Continental





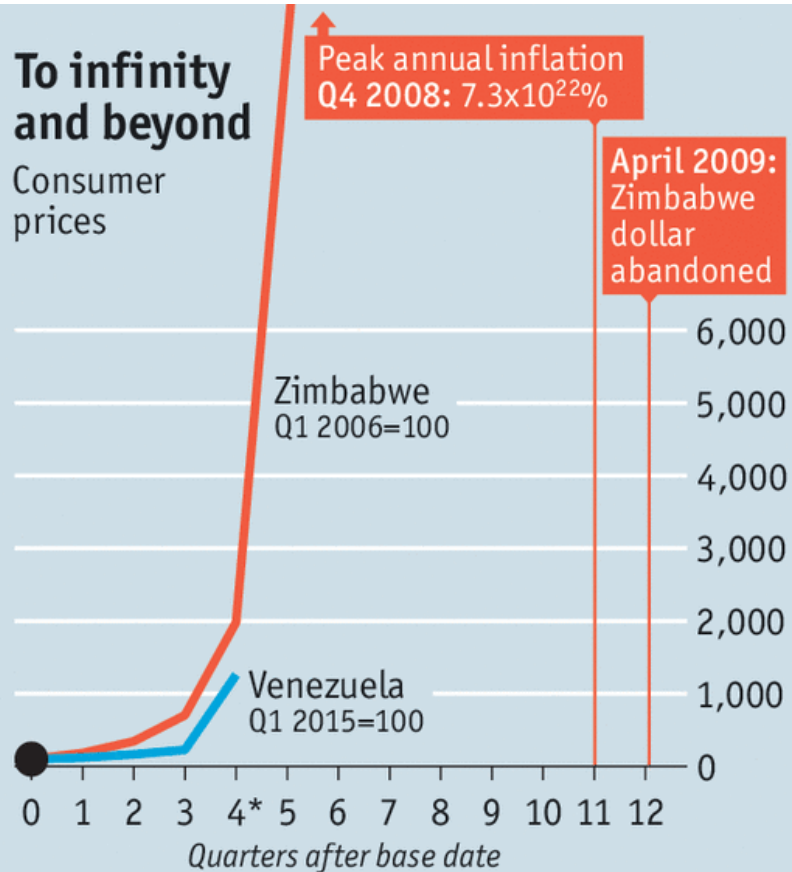






To infinity and beyond

Consumer prices



Sources: Economist Intelligence Unit; IMF *2016 estimate (Venezuela only)

Economist.com



The Fall in the Value of the Venezuelan Bolívar



Source: Reuters Venezuela

Prepared by Prof. Steve H. Hanke, The Johns Hopkins University

Note: For the purpose of illustrating the declining value of the Venezuelan bolívar relative to the U.S. dollar, the y-axis is inverted.



Choice in Currency

A WAY TO STOP INFLATION

F. A. HAYEK

Nobel Laureate 1974

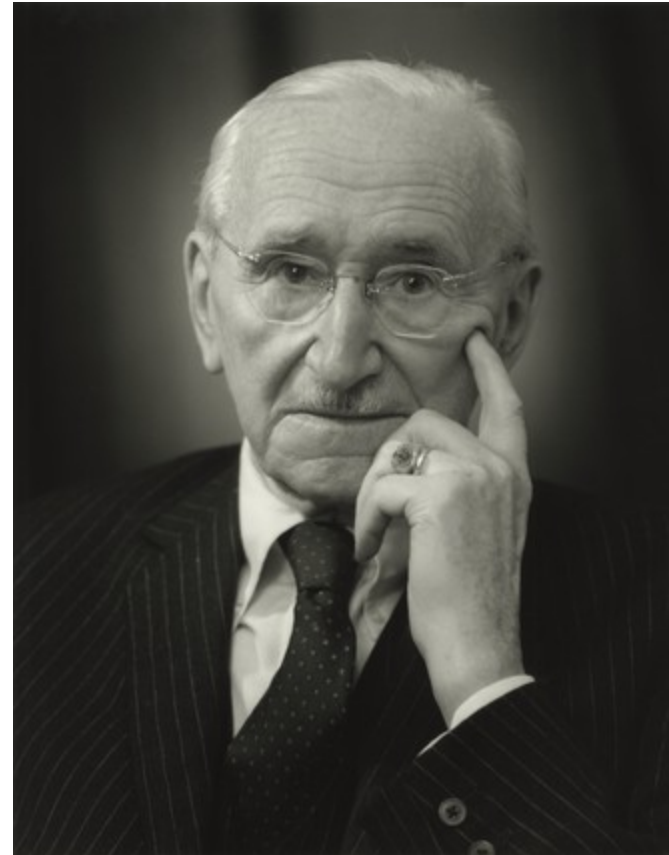
with Commentaries by

IVOR F. PEARCE • HAROLD B. ROSE
DOUGLAS JAY • SIR KEITH JOSEPH

Published by

THE INSTITUTE OF ECONOMIC AFFAIRS
1976

Web Edition prepared in 2007. There may be minor differences from the original.



[1]

Free Banking Period



Bank Note Reporters

South Berwick Bank , South Berwick, [W. A. Hayes, Pres., Chas. E. Norton, Cash.]	do
Thomaston Bank , Thomaston, [Richd. Robinson, Pres., J.D. Barnard, Cash.]	do
Ticonic Bank , Waterville, [Timothy Boutelle, Pres., Augus. Perkins, Cash.]	do
Union Bank , Brunswick, (Closed)	—
[The time for redeeming the notes of this bank expires June 1st, 1845.]	
Waldo Bank , Belfast, [James White, Cash.]	‡
5's, altered from the broken Globe Bank, signed Howard, cashier.	
5's, lett. L, dated Belfast, Oct. 1st, 1837, pay to C. Goshman, C. O. Alden, Cash., R. C. Johnson, Pres. General appearance light and coarse.	
Washington Co. Bank , Calais. (closed)	—
Westbrook Bank of , Westbrook, [S. Jordan, Pres., A. G. Forbes, Cash.]	3
York Bank , Saco, [Jonathan King, Pres., H. D. Thatcher, Cash.]	‡
5's, lett. L, pay to F. Lord, dated May 6, 1832, signed Henry S. Thatcher, Cash., Jona. King, Pres. Dark impression.	
5's, lett. A, pay to Elijah Perkins, dated Mar. 12, 1839, patent check plate on the back—same office as the above.	

Ithaca Dollars



FRED

— Asset-backed Commercial Paper Outstanding

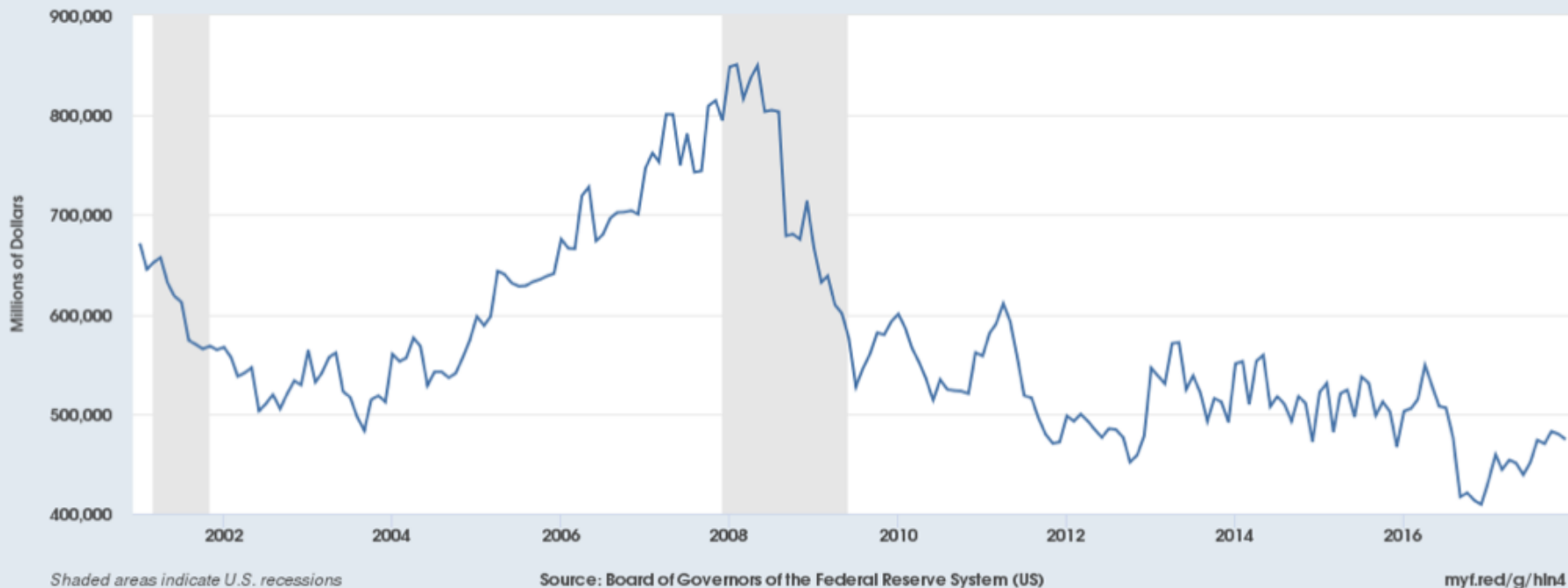


Shaded areas indicate U.S. recessions

Source: Board of Governors of the Federal Reserve System (US)

myf.red/g/

FRED — Financial Commercial Paper Outstanding



Bitcoin: A Peer-to-Peer Electronic Cash System

Satoshi Nakamoto
satoshin@gmx.com
www.bitcoin.org

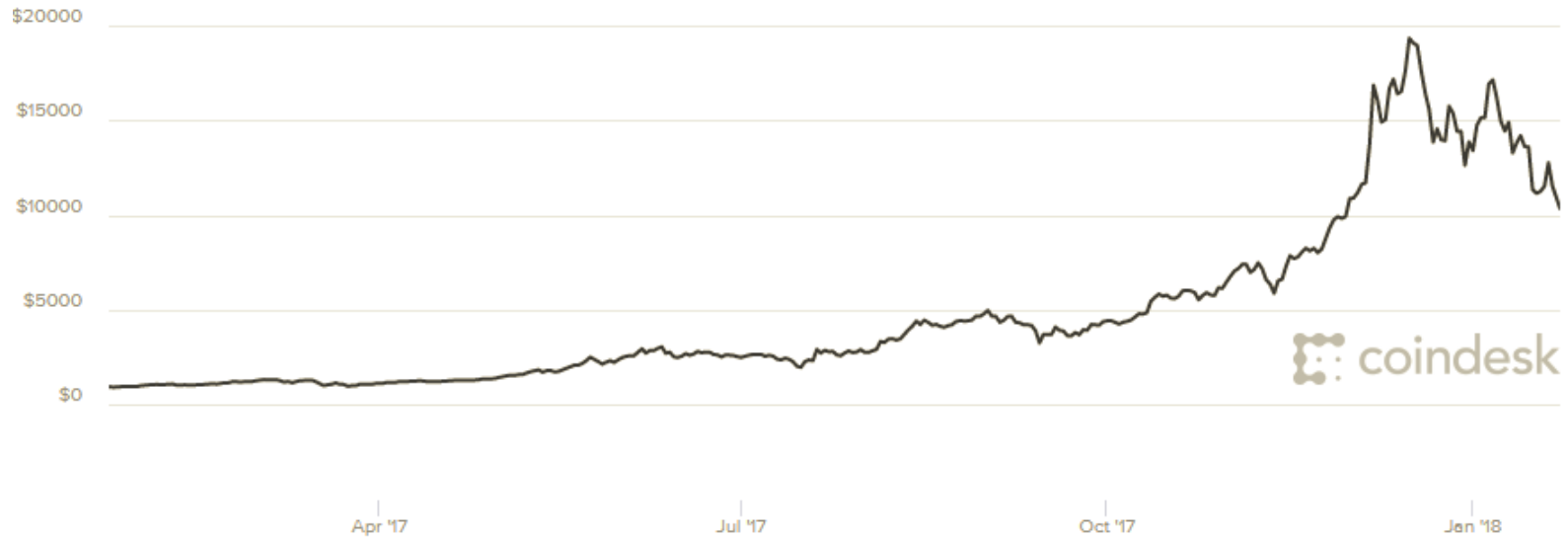
Abstract. A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to prevent double-spending. We propose a solution to the double-spending problem using a peer-to-peer network. The network timestamps transactions by hashing them into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing the proof-of-work. The longest chain not only serves as proof of the sequence of events witnessed, but proof that it came from the largest pool of CPU power. As long as a majority of CPU power is controlled by nodes that are not cooperating to attack the network, they'll generate the longest chain and outpace attackers. The network itself requires minimal structure. Messages are broadcast on a best effort basis, and nodes can leave and rejoin the network at will, accepting the longest proof-of-work chain as proof of what happened while they were gone.

Bitcoin (USD) Price

Closing Price OHLC

1h 12h 1d 1w 1m 3m **1y** All

Jan 22, 2017 to Jan 22, 2018 [Export](#)



\$10,336.26 ▼ **-10.30%**

Today's Open	\$11,522.86	Change	▼ \$-1,186.60
Today's High	\$11,868.72	Market Cap	\$0.174T
Today's Low	\$10,050.79	Supply	16,819,775

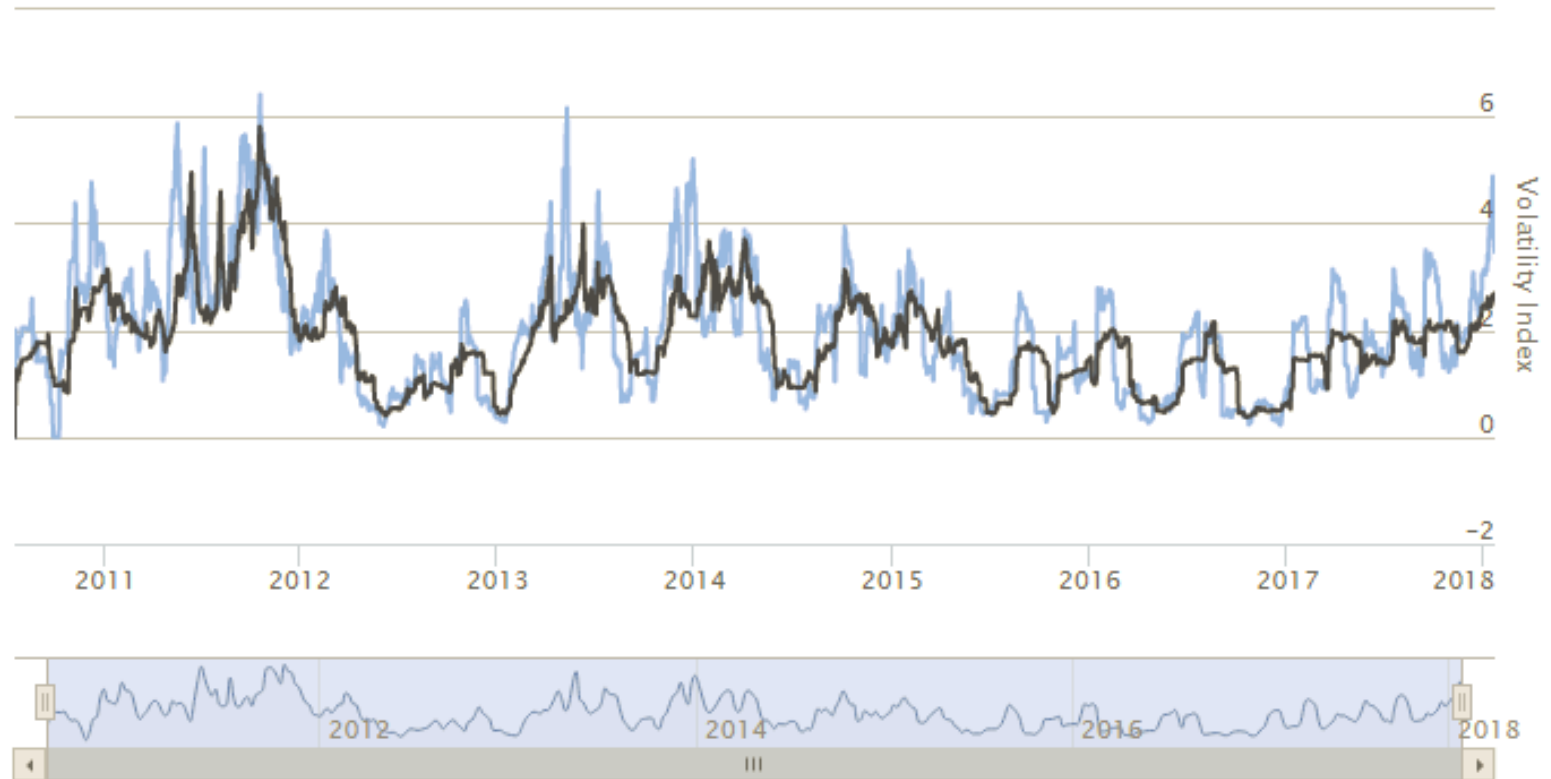
Bitcoin Volatility

.BVOL24H Index Historical Values



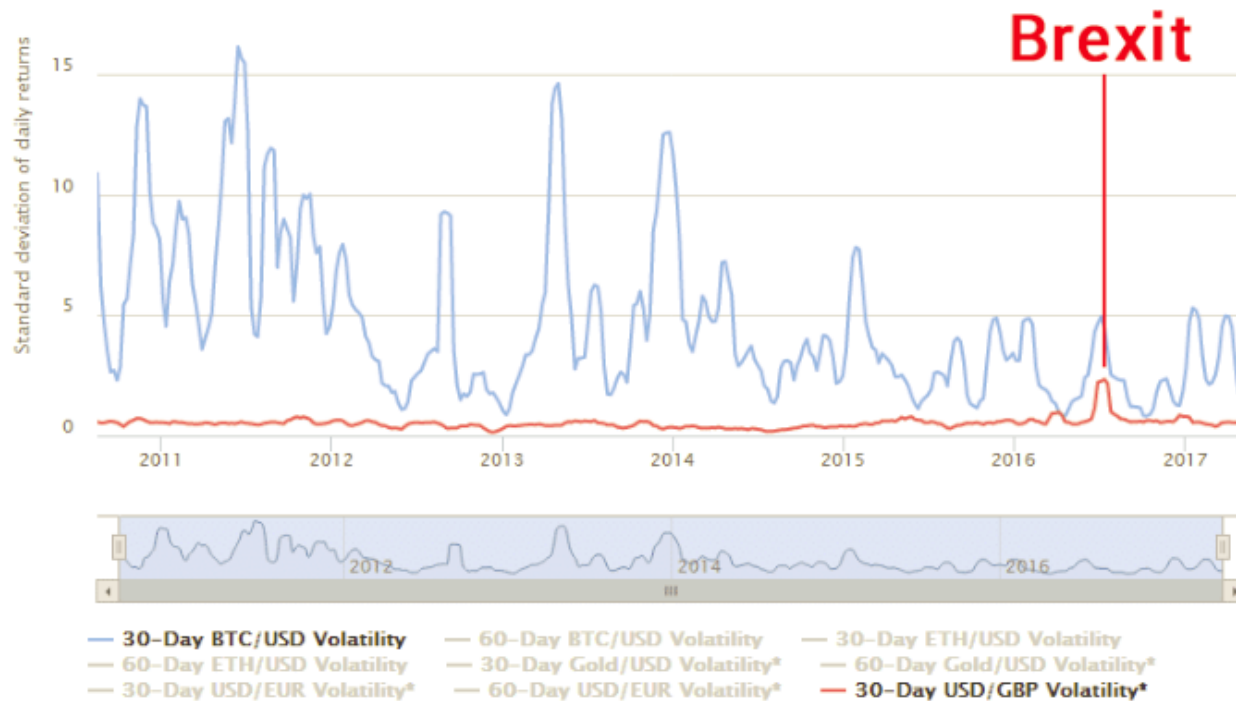
Bitcoin Price Volatility (measured by % of change)

Zoom 1m 3m 6m YTD 1y **All**



Bitcoin Volatility Time Series Charts

Zoom 1m 3m 6m YTD 1y All From Aug 16, 2010 To May 10, 2017



BTC (blue line) and Pound (red line) volatility compared.

1	S&P 500				Bitcoin			
2	Date	Close	Change	% Change	Date	Close	Change	% Change
3	Mar 28, 2017	\$2,358.57			Apr 10, 2017	\$1,213.37		
4	Mar 29, 2017	\$2,361.13	2.56	0.11	Apr 11, 2017	\$1,224.50	11.13	0.91
5	Mar 30, 2017	\$2,368.06	6.93	0.29	Apr 12, 2017	\$1,215.83	-8.67	-0.71
6	Mar 31, 2017	\$2,362.72	-5.34	-0.23	Apr 13, 2017	\$1,178.28	-37.55	-3.19
7	Apr 03, 2017	\$2,358.84	-3.88	-0.16	Apr 14, 2017	\$1,176.00	-2.28	-0.19
8	Apr 04, 2017	\$2,360.16	1.32	0.06	Apr 15, 2017	\$1,178.80	2.80	0.24
9	Apr 05, 2017	\$2,352.95	-7.21	-0.31	Apr 16, 2017	\$1,179.00	0.20	0.02
10	Apr 06, 2017	\$2,357.49	4.54	0.19	Apr 17, 2017	\$1,194.98	15.98	1.34
11	Apr 07, 2017	\$2,355.54	-1.95	-0.08	Apr 18, 2017	\$1,201.27	6.29	0.52
12	Apr 10, 2017	\$2,357.16	1.62	0.07	Apr 19, 2017	\$1,209.40	8.13	0.67
13	Apr 11, 2017	\$2,353.78	-3.38	-0.14	Apr 20, 2017	\$1,233.65	24.25	1.97
14	Apr 12, 2017	\$2,344.93	-8.85	-0.38	Apr 21, 2017	\$1,246.00	12.35	0.99
15	Apr 13, 2017	\$2,328.95	-15.98	-0.69	Apr 22, 2017	\$1,239.63	-6.37	-0.51
16	Apr 17, 2017	\$2,349.01	20.06	0.85	Apr 23, 2017	\$1,244.98	5.35	0.43
17	Apr 18, 2017	\$2,342.19	-6.82	-0.29	Apr 24, 2017	\$1,253.94	8.96	0.71
18	Apr 19, 2017	\$2,338.17	-4.02	-0.17	Apr 25, 2017	\$1,277.77	23.83	1.86
19	Apr 20, 2017	\$2,355.84	17.67	0.75	Apr 26, 2017	\$1,292.54	14.77	1.14
20	Apr 21, 2017	\$2,348.69	-7.15	-0.30	Apr 27, 2017	\$1,337.96	45.42	3.39
21	Apr 24, 2017	\$2,374.15	25.46	1.07	Apr 28, 2017	\$1,343.80	5.84	0.43
22	Apr 25, 2017	\$2,388.61	14.46	0.61	Apr 29, 2017	\$1,349.97	6.17	0.46
23	Apr 26, 2017	\$2,387.45	-1.16	-0.05	Apr 30, 2017	\$1,362.40	12.43	0.91
24	Apr 27, 2017	\$2,388.77	1.32	0.06	May 01, 2017	\$1,418.86	56.46	3.98
25	Apr 28, 2017	\$2,384.20	-4.57	-0.19	May 02, 2017	\$1,460.07	41.21	2.82
26	May 01, 2017	\$2,388.33	4.13	0.17	May 03, 2017	\$1,513.71	53.64	3.54
27	May 02, 2017	\$2,391.17	2.84	0.12	May 04, 2017	\$1,548.51	34.80	2.25
28	May 03, 2017	\$2,388.13	-3.04	-0.13	May 05, 2017	\$1,551.90	3.39	0.22
29	May 04, 2017	\$2,389.52	1.39	0.06	May 06, 2017	\$1,578.47	26.57	1.68
30	May 05, 2017	\$2,399.29	9.77	0.41	May 07, 2017	\$1,589.57	11.10	0.70
31	May 08, 2017	\$2,399.38	0.09	0.00	May 08, 2017	\$1,644.80	55.23	3.36
32	May 09, 2017	\$2,396.92	-2.46	-0.10	May 09, 2017	\$1,718.21	73.41	4.27
33	May 10, 2017	\$2,398.04	1.12	0.05	May 10, 2017	\$1,777.05	58.84	3.31
34		Average	1.32	0.05		Average	18.79	1.25
35		Std. Dev.	8.95	0.38		Std. Dev.	24.22	1.62
36								
37								
38								

Std.Dev.of Bitcoin Average % Change / Std.Dev.of S&P % Change
4.26

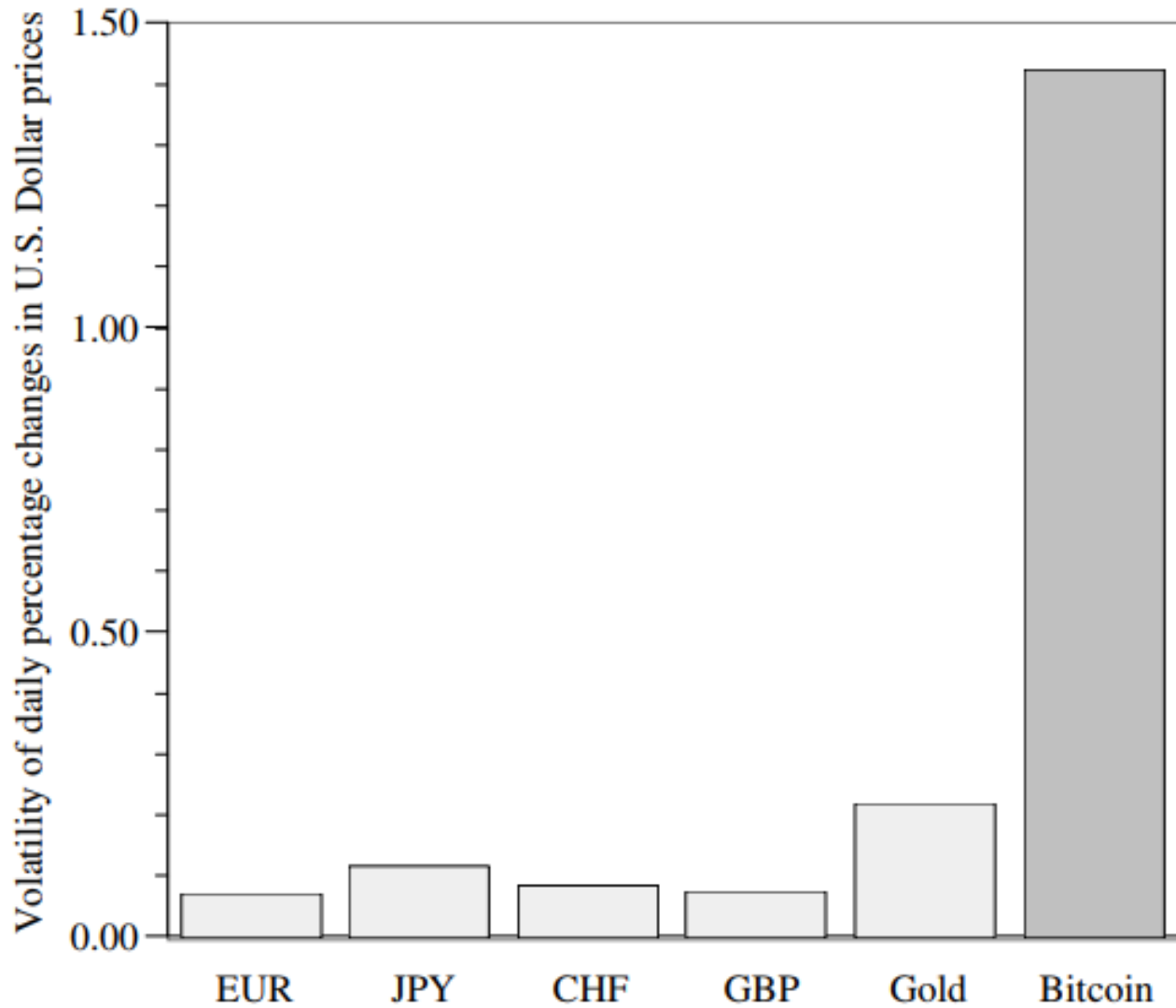


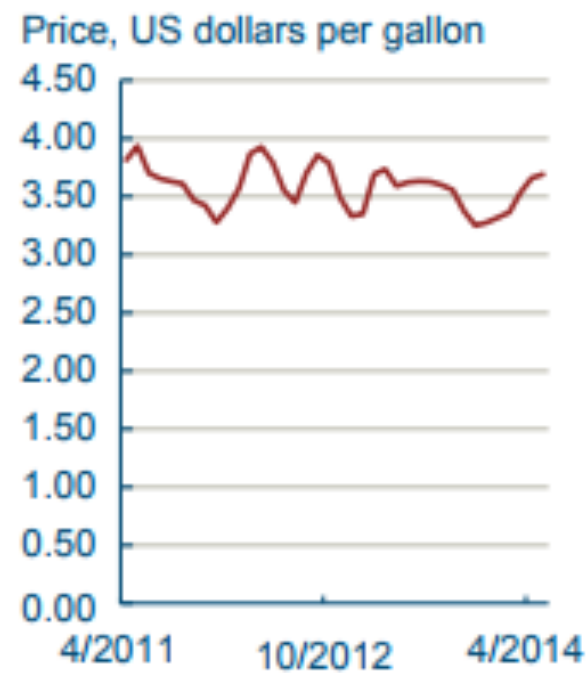
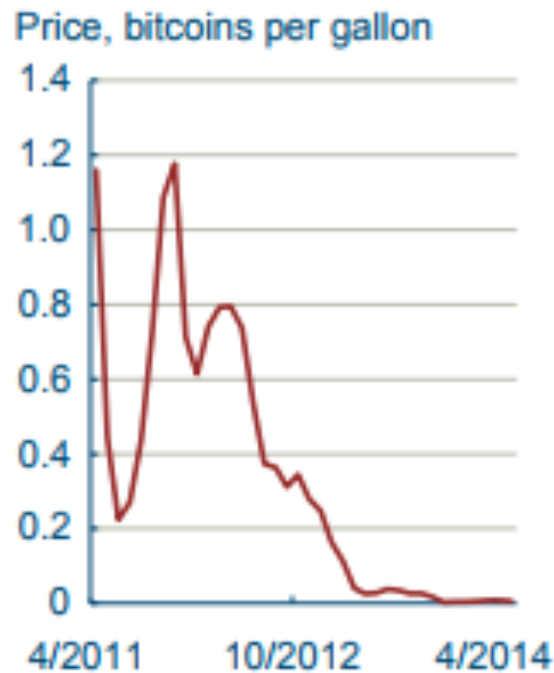
Table 1

Correlation matrix of daily changes in exchange rates, bitcoin, and gold

The table shows simple correlations of the percentage changes in daily exchange rates for pairs of currencies, with all exchange rates measured against the U.S. dollar. In addition, the table shows correlations between each currency and the percentage change in the daily London gold price as measured in U.S. dollars at 3 p.m. Correlations are calculated for the period from July 19, 2010 up to March 21, 2014.

	EUR	JPY	CHF	GBP	Gold	Bitcoin
EUR	1.00	0.18	0.61	0.64	0.20	-0.05
JPY		1.00	0.33	0.20	0.07	0.01
CHF			1.00	0.42	0.19	-0.04
GBP				1.00	0.21	-0.02
Gold					1.00	-0.06
Bitcoin						1.00

Price of Gasoline Since April 2011, US Dollars and Bitcoins



Sources: Bureau of Labor Statistics; Quandl.

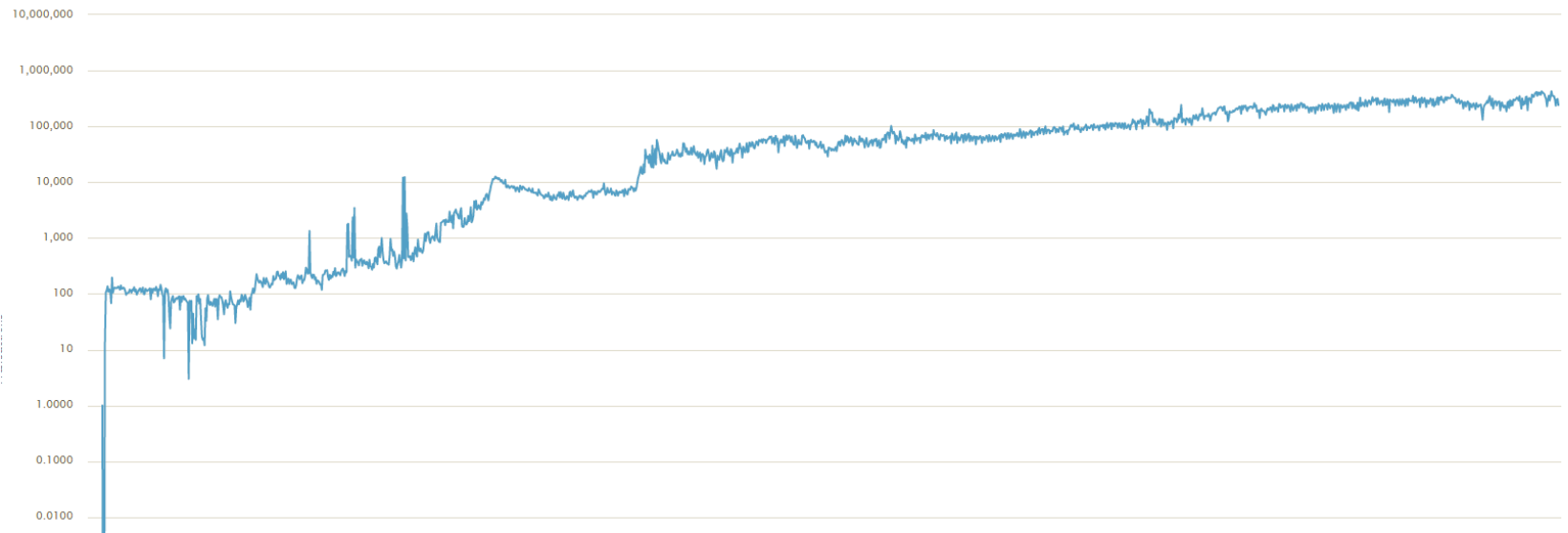
Acceptance




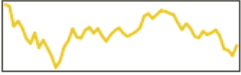


















Confirmed Transactions Per Day

The number of daily confirmed Bitcoin transactions.

Source: blockchain.info



Coincap

All ▾		Coins ▾	Tokens ▾	USD ▾	Next 100 →		View All
#	Name	Market Cap	Price	Volume (24h)	Circulating Supply	Change (24h)	Price Graph (7d)
1	 Bitcoin	\$181,699,259,880	\$10,802.50	\$10,434,200,000	16,820,112 BTC	-7.40%	
2	 Ethereum	\$96,357,566,162	\$991.85	\$3,779,820,000	97,149,823 ETH	-6.20%	
3	 Ripple	\$51,312,319,002	\$1.32	\$2,669,100,000	38,739,142,811 XRP *	-5.49%	
4	 Bitcoin Cash	\$27,469,773,415	\$1,622.90	\$686,321,000	16,926,350 BCH	-9.36%	
5	 Cardano	\$14,540,990,095	\$0.560842	\$505,132,000	25,927,070,538 ADA *	-8.33%	
6	 Litecoin	\$9,757,181,109	\$177.80	\$491,532,000	54,876,358 LTC	-7.25%	
7	 NEM	\$8,693,081,999	\$0.965898	\$71,866,800	8,999,999,999 XEM *	-10.07%	
8	 Stellar	\$8,338,074,044	\$0.466652	\$434,034,000	17,867,863,083 XLM *	-0.16%	
9	 EOS	\$8,324,349,024	\$13.39	\$2,823,930,000	621,540,123 EOS *	-1.55%	
10	 NEO	\$7,898,345,000	\$121.51	\$324,260,000	65,000,000 NEO *	-8.70%	

Bitcoin Energy Consumption Index

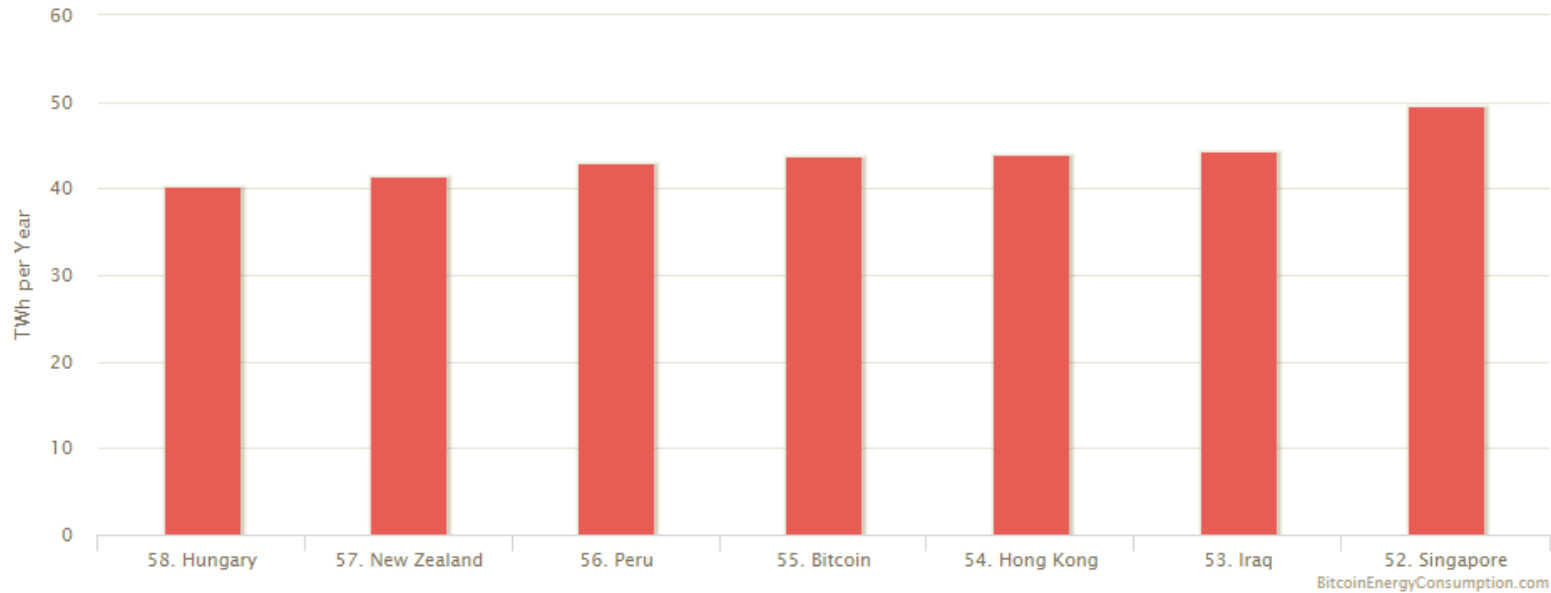
Bitcoin Energy Consumption Index Chart



Click and drag in the plot area to zoom in

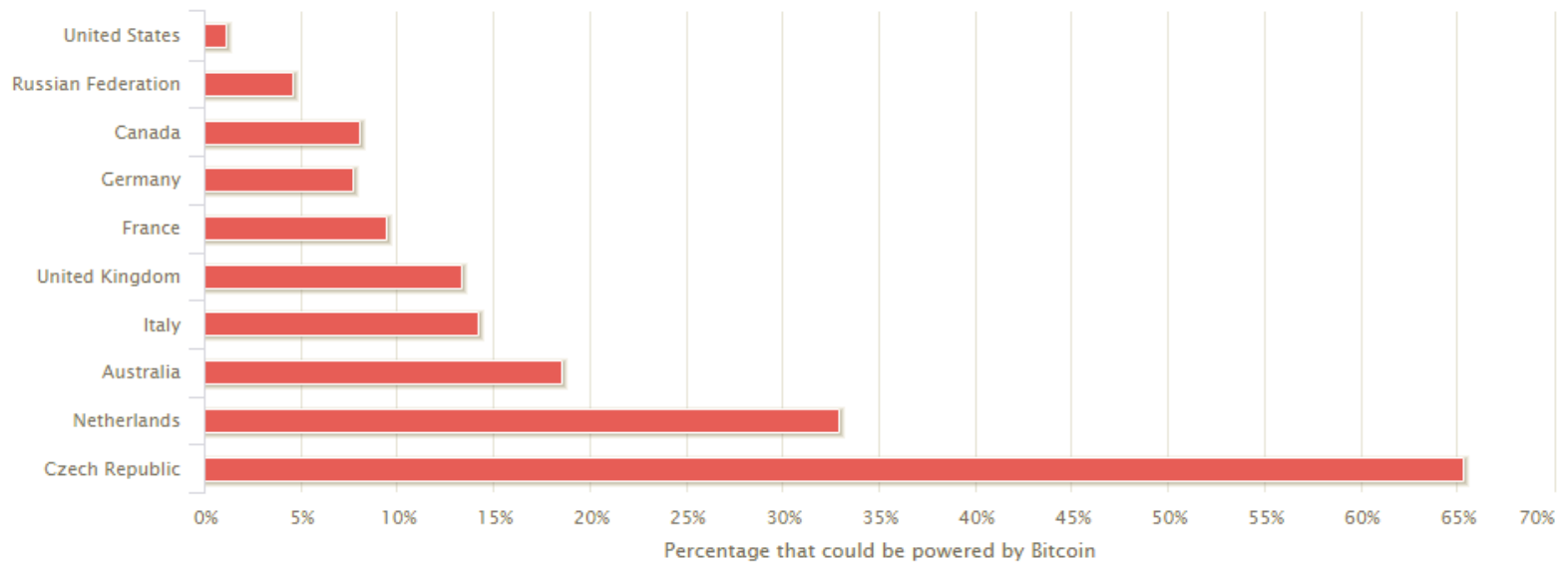


Energy Consumption by Country Chart



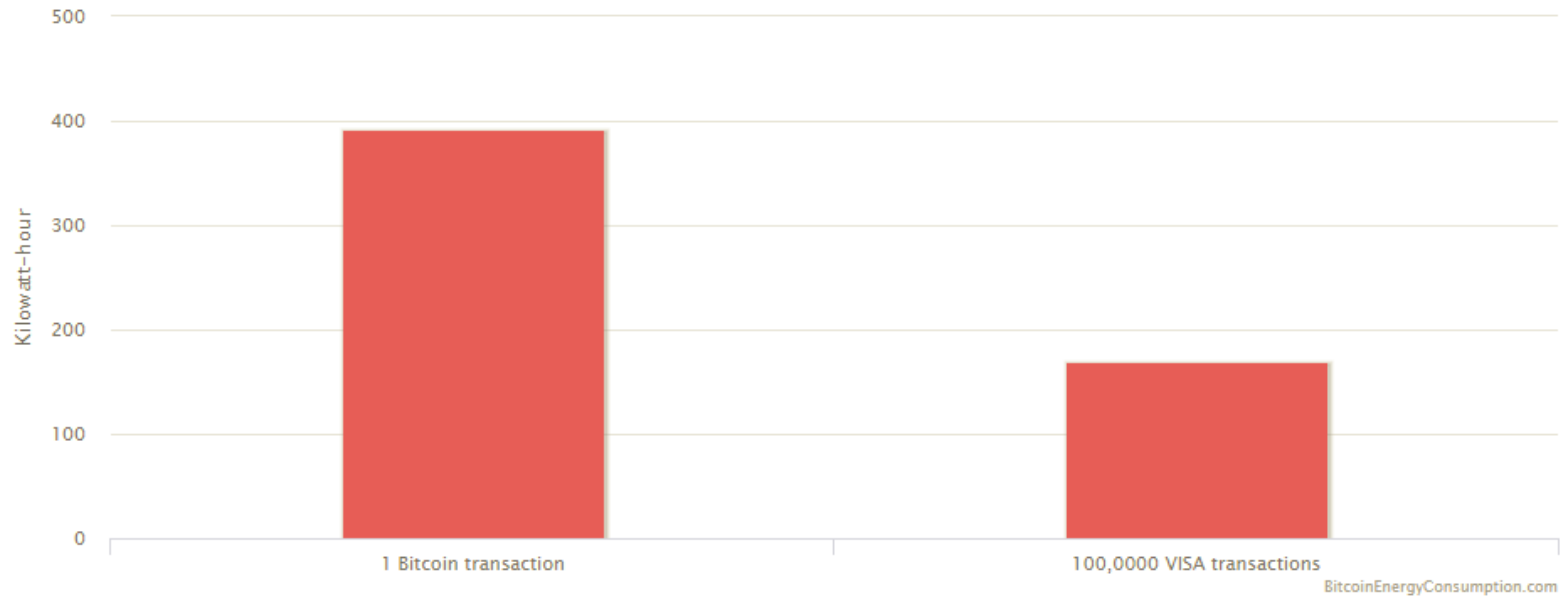
Apart from the previous comparison, it is also possible to compare Bitcoin's energy consumption to some of the world's biggest energy-consuming nations. The result is shown hereafter.

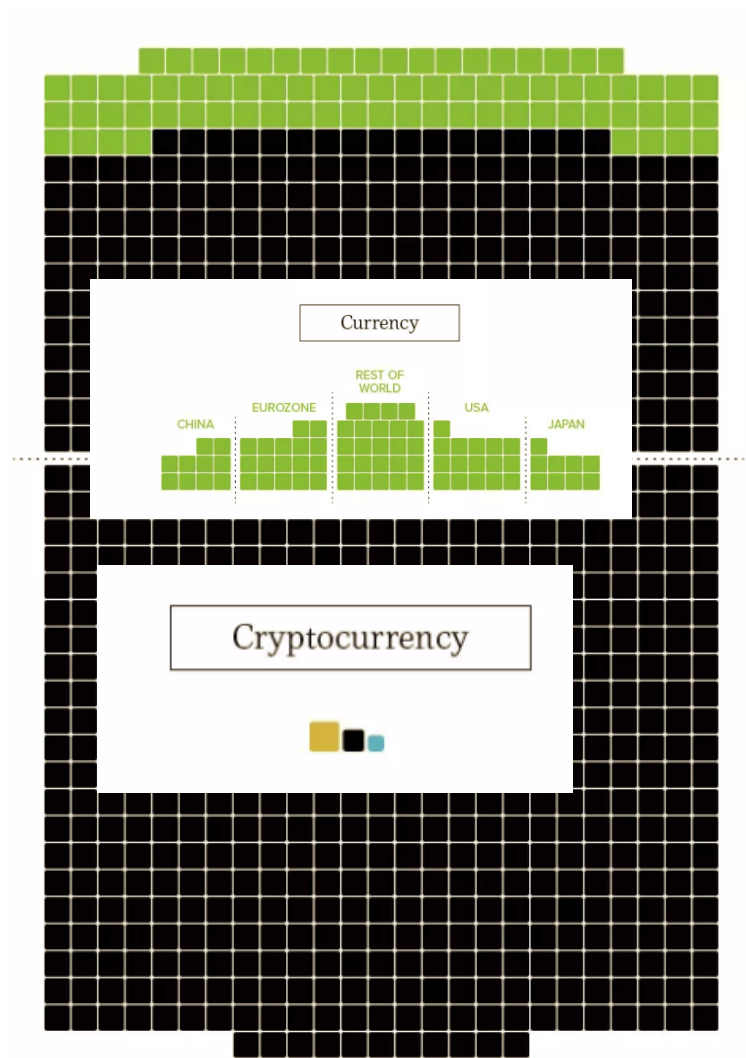
Bitcoin Energy Consumption Relative to Several Countries



BitcoinEnergyConsumption.com

Bitcoin network versus VISA network average consumption





Narrow Money

The total value of the world's easily accessible money is roughly \$2.6 trillion.

Coins & Bank Notes

The total value of all of the world's coins and banknotes is roughly **\$7.6 trillion.**

Cryptocurrency

The world's fastest growing asset class is cryptocurrency - but even Bitcoin looks tiny in the grand scheme of things, when compared to other global markets.

BITCOIN
\$100B

THE REST
\$45B

ETHEREUM
\$28B

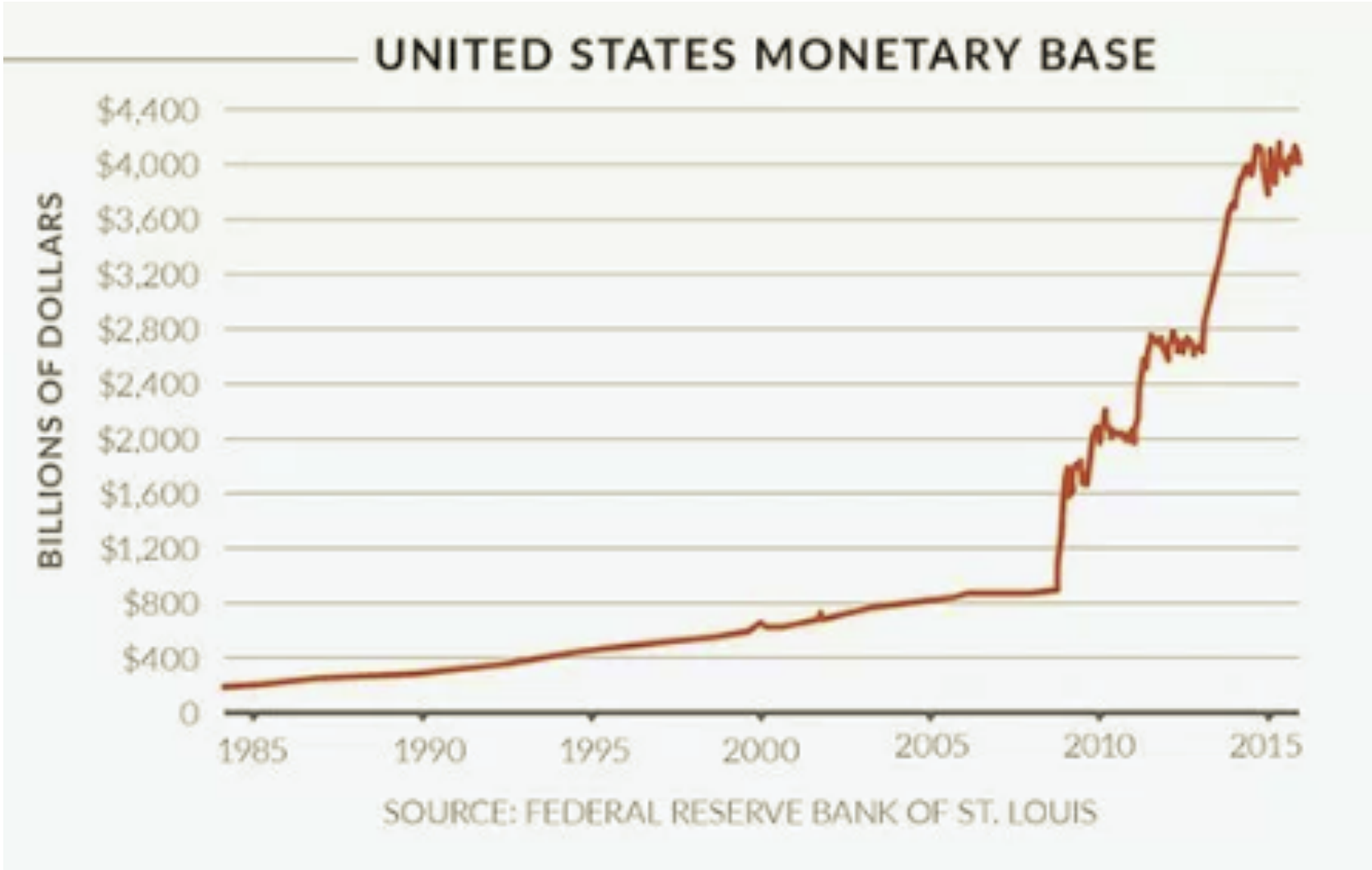
0% Physical



92% Non-Physical



Bitcoin Market Cap



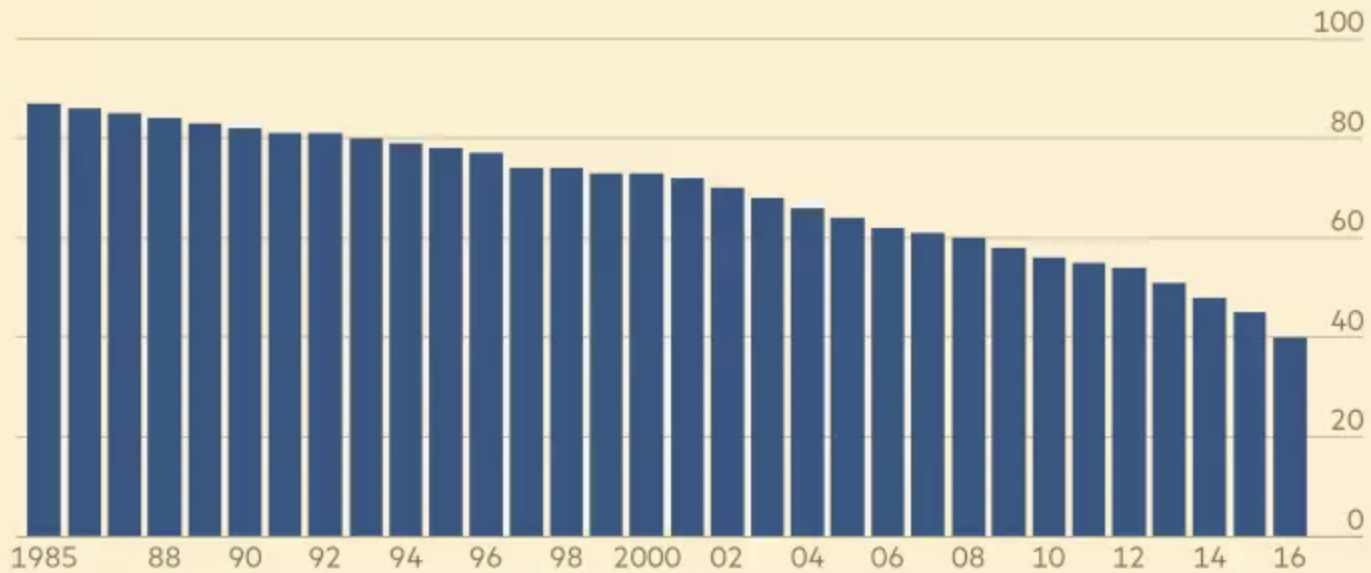
$$M\bar{V} = P\bar{Q}$$

In the long run, the price level (P) moves in proportion to the money supply (M).

This is the “Quantity Theory of Money.”

Pros:	Cons:
Low transaction costs	Currently volatile value
International transferability and convertibility	Limited adoption by retailers
Protection from some political risk and inflation (if not rapid price changes)	Combined with other software, anonymity can be used for illegal purposes
Basic alternative digital currency problems of supply growth and double payment/verification solved	Lack of trusted intermediaries to challenge unauthorized transactions and fraud
	Potential to expose a user's transaction history to the public
Operation is outside the banking system — immune to bank failures, but not protected by deposit insurance	Uncertainty about the cryptocurrency's security and operational resiliency
	Inadequate mass-market understanding

Cash payment As a % of all payments



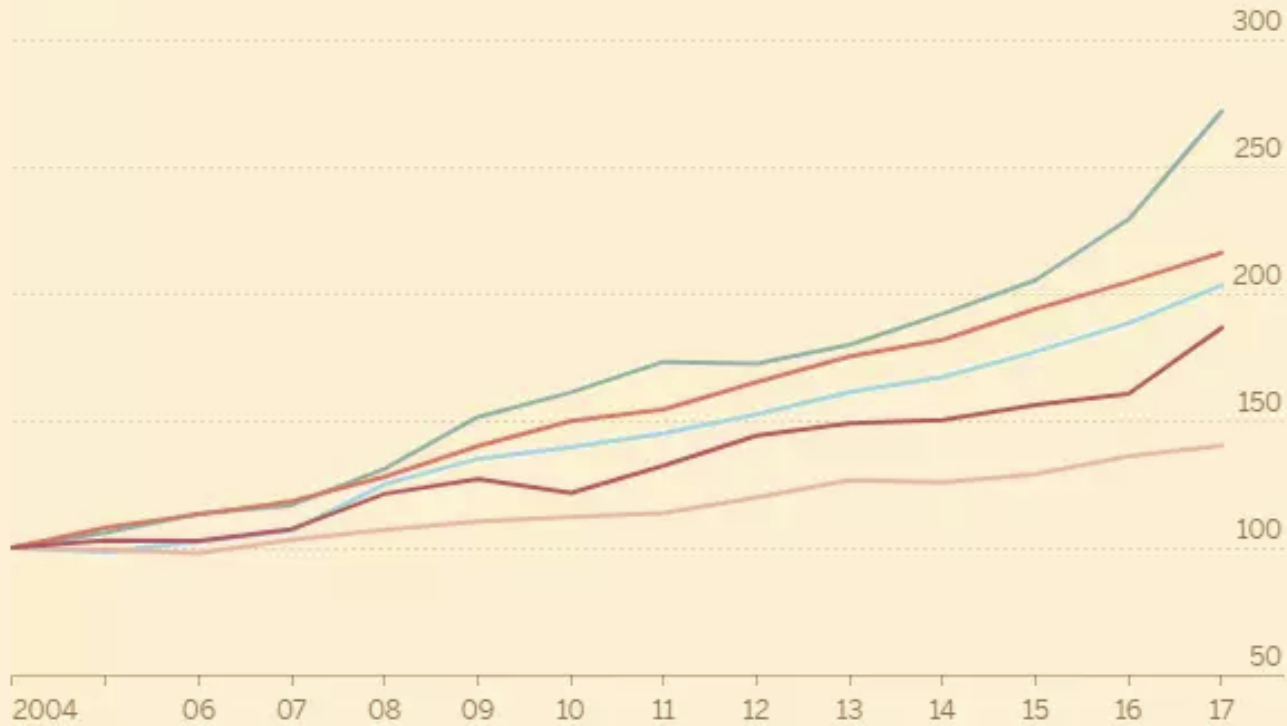
Source: UK Finance

FT

Value of Bank of England notes in circulation

Index, 2004=100

- £5
- £10
- £20
- £50
- Total



Figures relate to the end of February

Source: Bank of England

FT

