

# Bookkeeping Mistakes

- The Hidden Currency of Banking
- Time Symmetric Money
- Inflation from Random Transfer
- Wealth Concentration

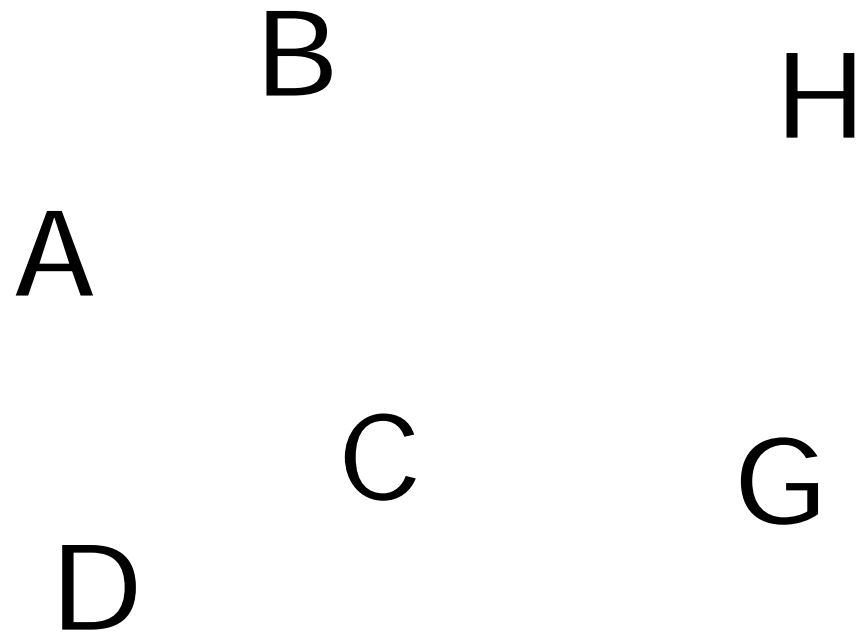
Dieter Braun

[www.bookkeepingmechanics.com](http://www.bookkeepingmechanics.com)

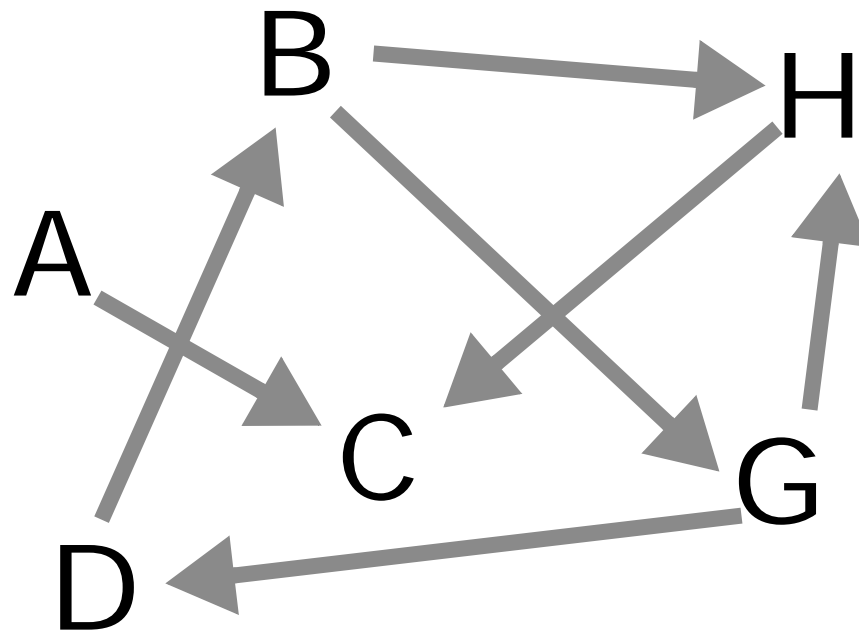
The Hidden Currency of Banking:

Why Interest is a  
Bookkeeping Mistake

# Social Networks of Money

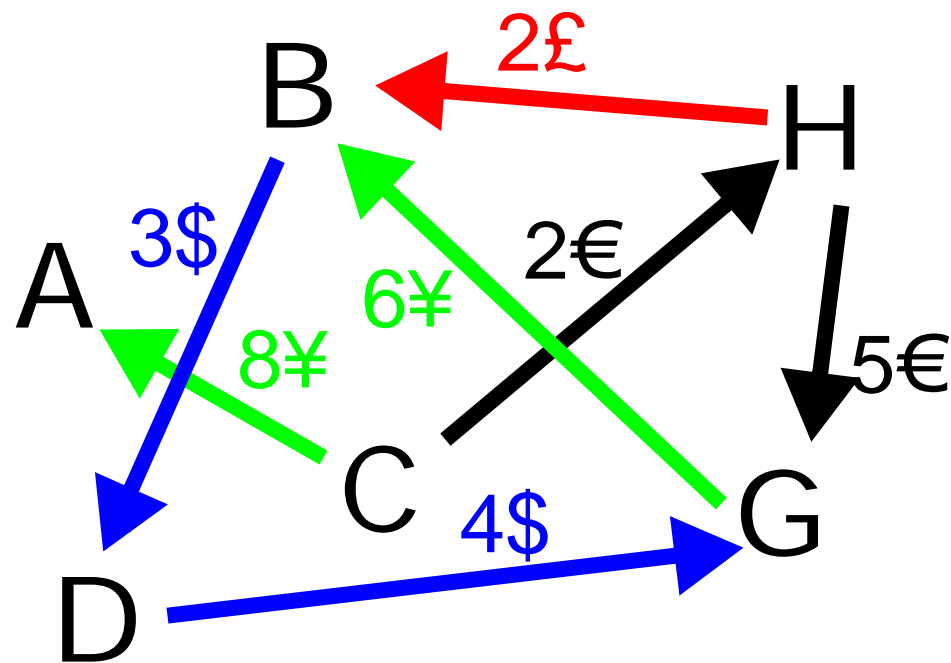


# Social Networks of Money



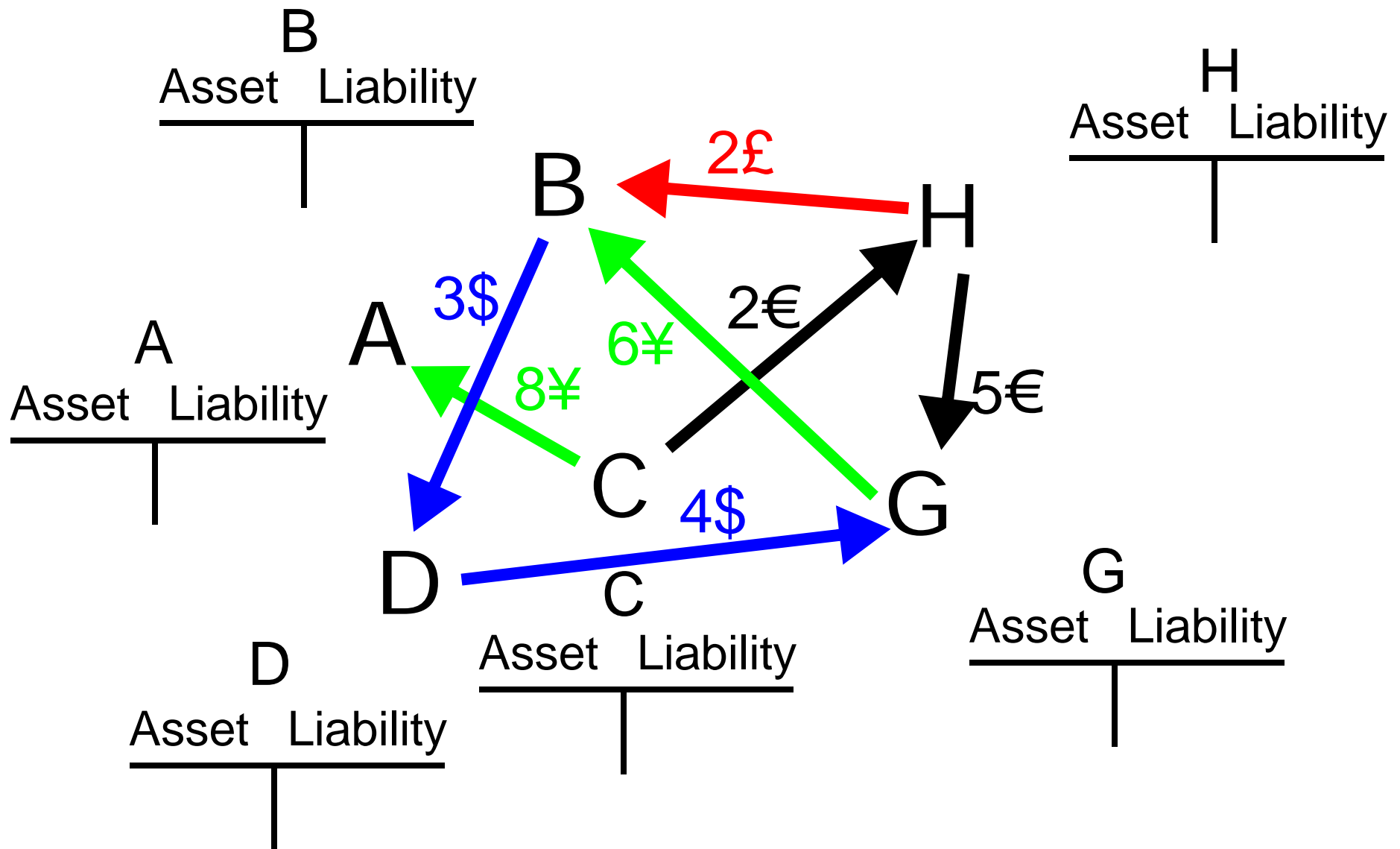
Transfer of Goods

# Social Networks of Money

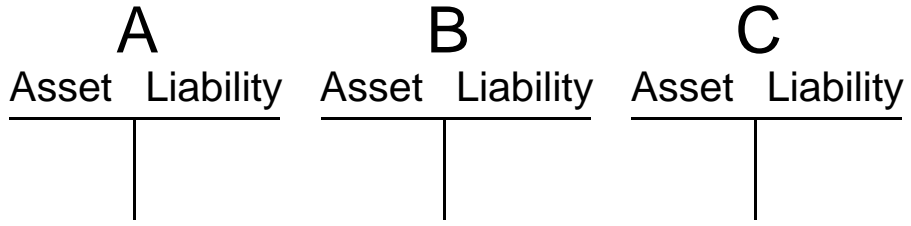


Transfer of Money

# Social Networks of Money are memorized by Bookkeeping



# Debt Relations



C

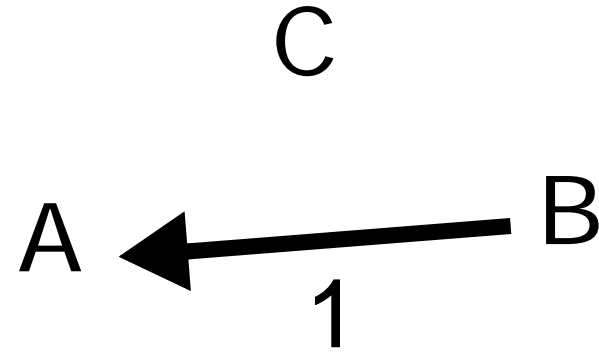
A

B

# Debt Relations

A		B		C	
Asset	Liability	Asset	Liability	Asset	Liability

A		B		C	
Asset	Liability	Asset	Liability	Asset	Liability
1			1		



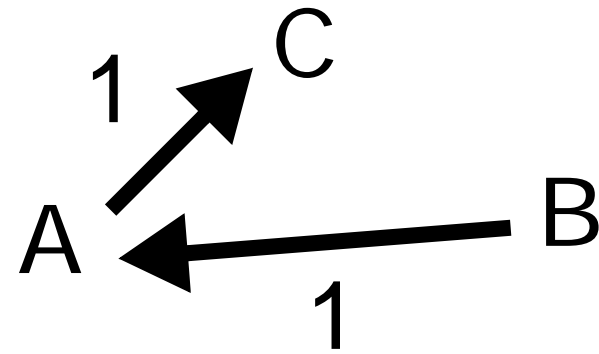
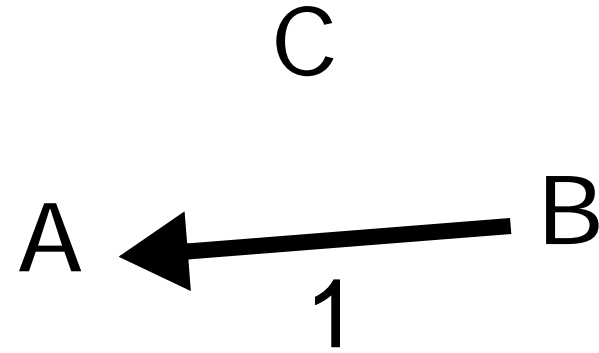


# Debt Relations

A		B		C	
Asset	Liability	Asset	Liability	Asset	Liability

A		B		C	
Asset	Liability	Asset	Liability	Asset	Liability
1			1		

A		B		C	
Asset	Liability	Asset	Liability	Asset	Liability
			1	1	



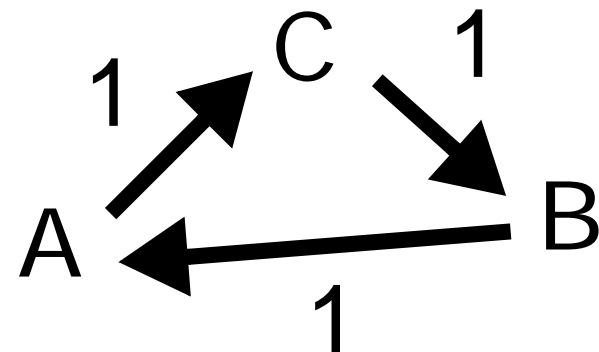
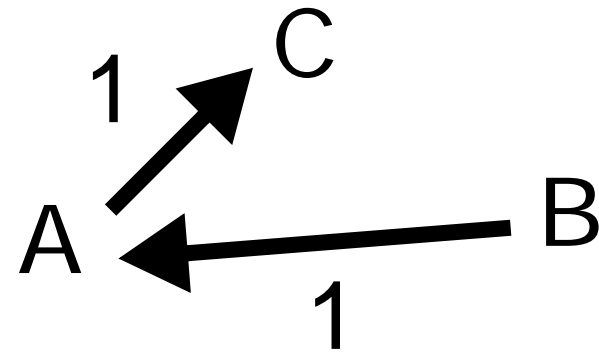
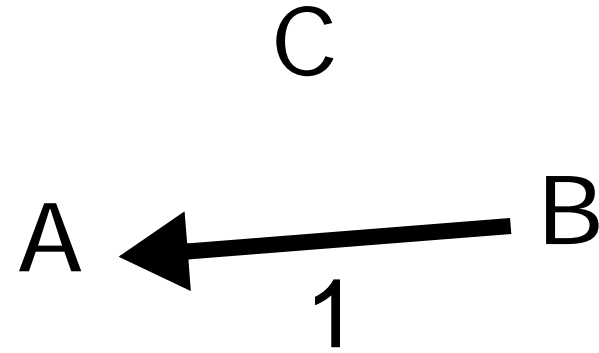
# Debt Relations

A	B	C
Asset   Liability	Asset   Liability	Asset   Liability

A	B	C
Asset   Liability	Asset   Liability	Asset   Liability
1	1	

A	B	C
Asset   Liability	Asset   Liability	Asset   Liability
	1	1

A	B	C
Asset   Liability	Asset   Liability	Asset   Liability



# Debt Relations with Bank

A

Asset	Liability

B

Asset	Liability

C

Asset	Liability

Bank

Asset	Liability

A

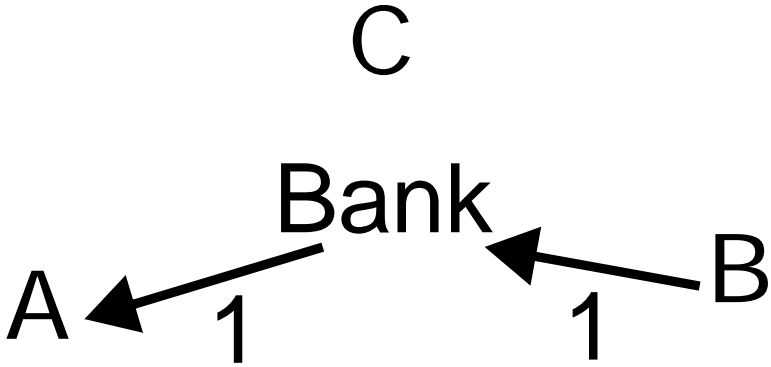
C  
Bank

B

# Debt Relations with Bank

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
1			1			1	1

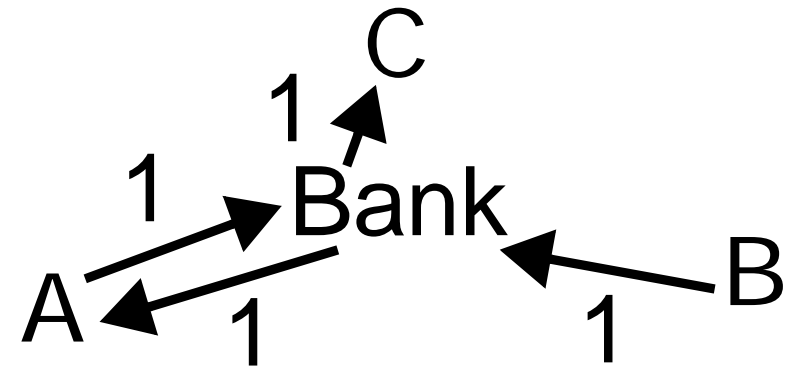
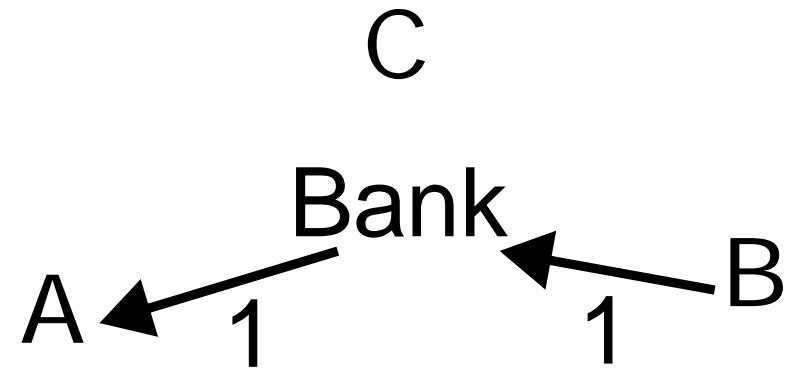


# Debt Relations with Bank

A	B	C	Bank
Asset   Liability	Asset   Liability	Asset   Liability	Asset   Liability

A	B	C	Bank
Asset   Liability	Asset   Liability	Asset   Liability	Asset   Liability
1	1		1   1

A	B	C	Bank
Asset   Liability	Asset   Liability	Asset   Liability	Asset   Liability
	1	1	1   1



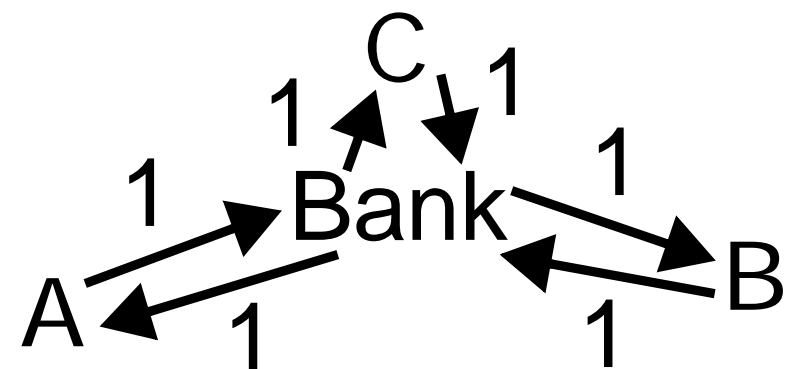
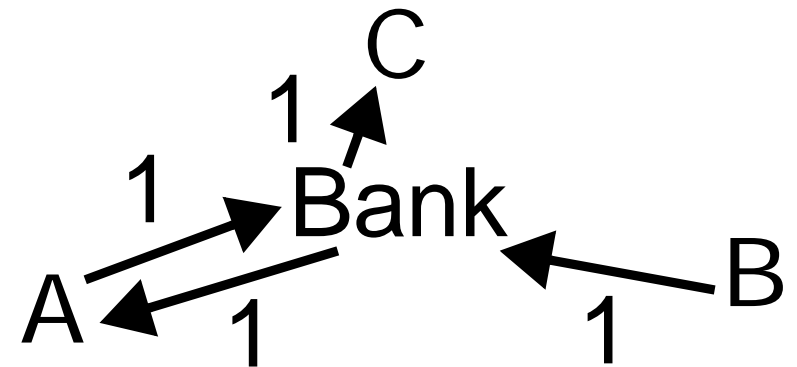
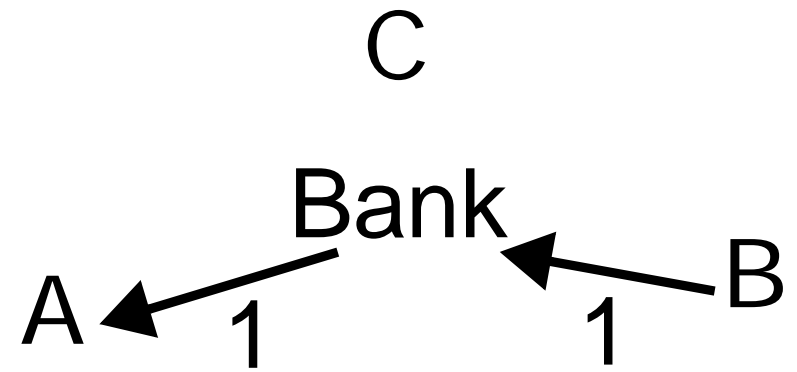
# Debt Relations with Bank

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
1			1			1	1

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
			1	1		1	1

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability



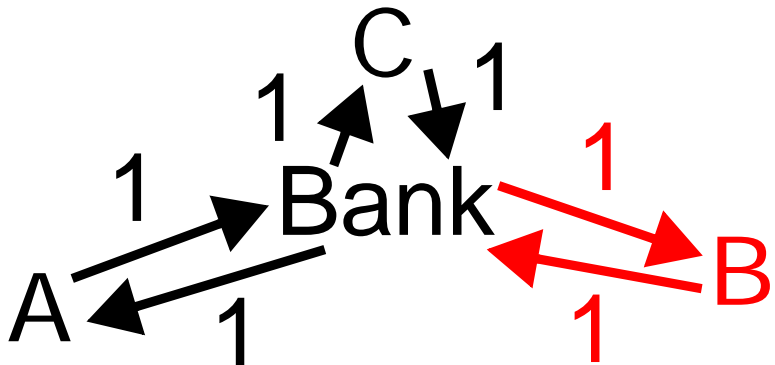
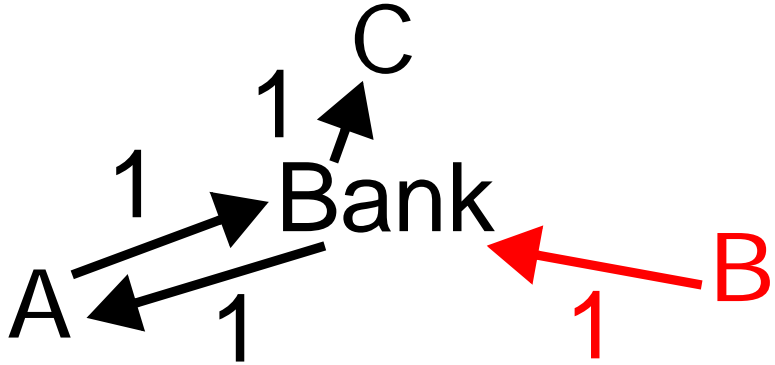
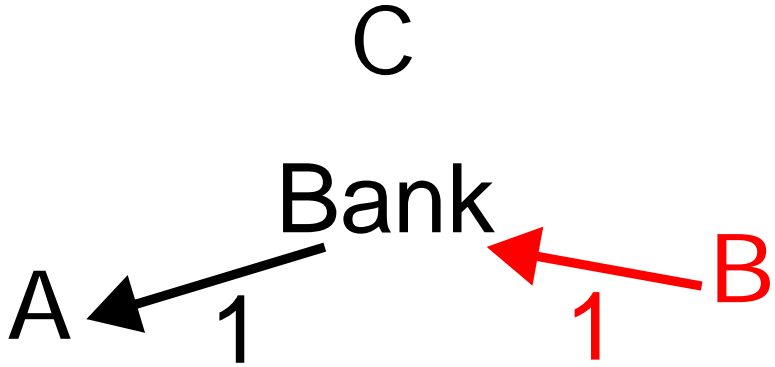
# Deposits : Credits = 1:1

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
1			1			1	1

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
			1	1		1	1

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability



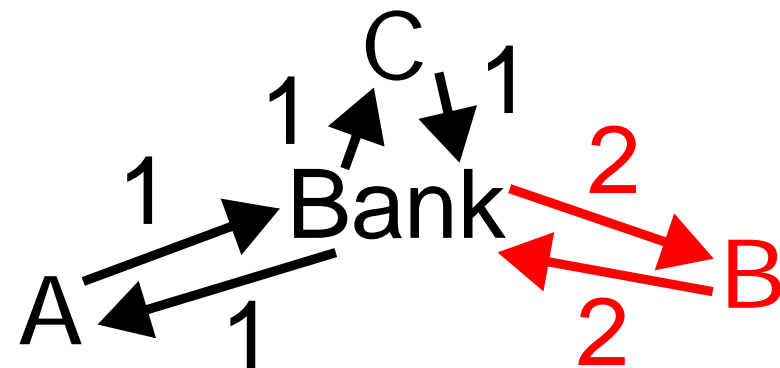
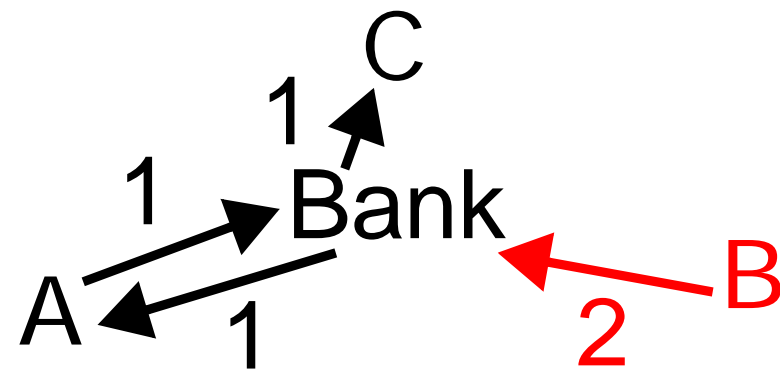
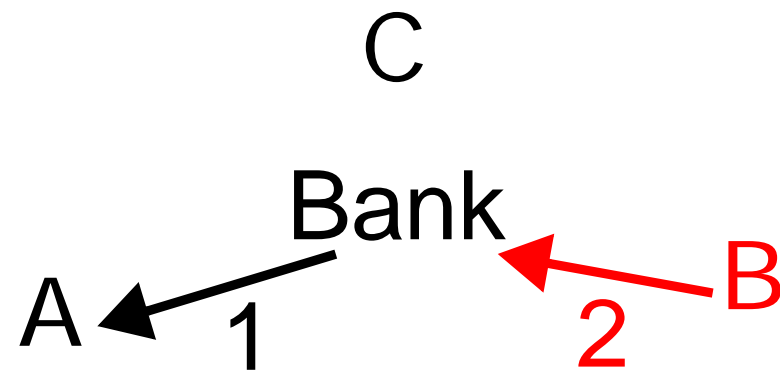
# Deposits : Credits = 1:2

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
1			2			2	1

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
			2	1		2	1

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability





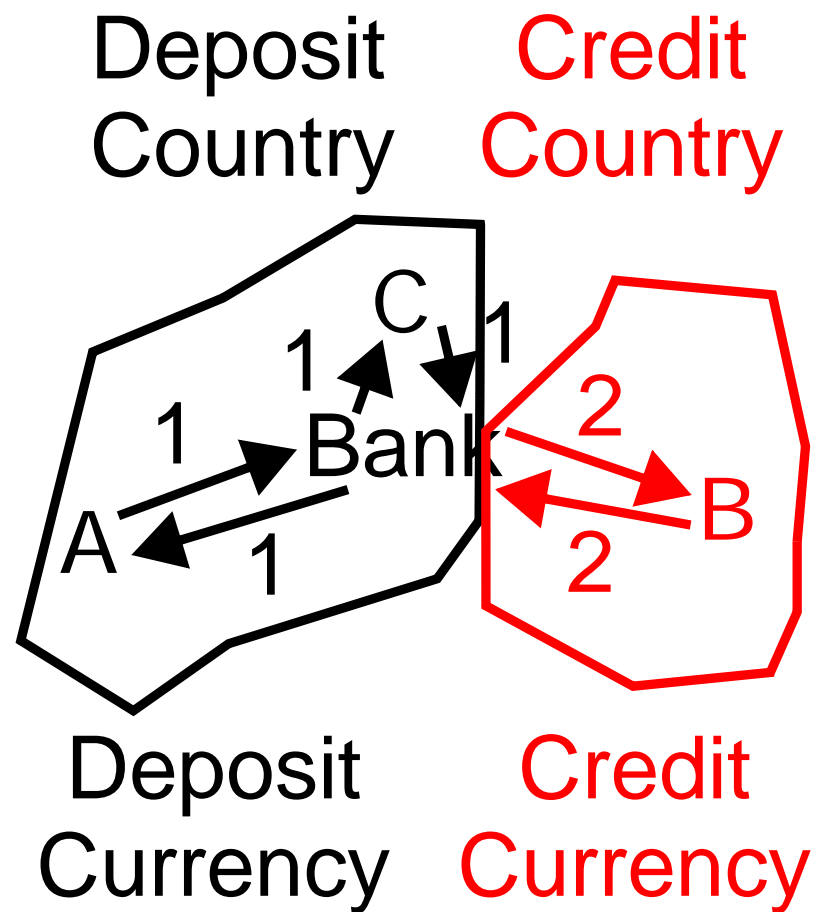
# Deposits : Credits = 1:2

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
1			2			2	1

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
			2	1		2	1

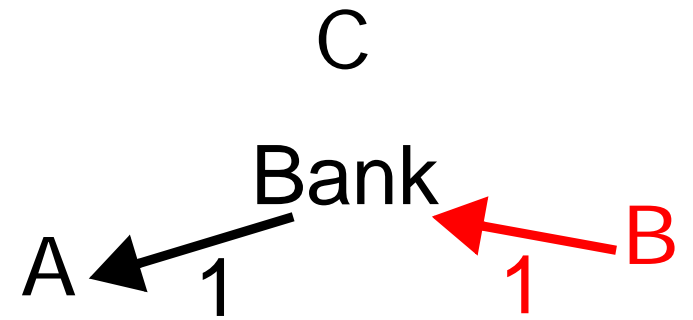
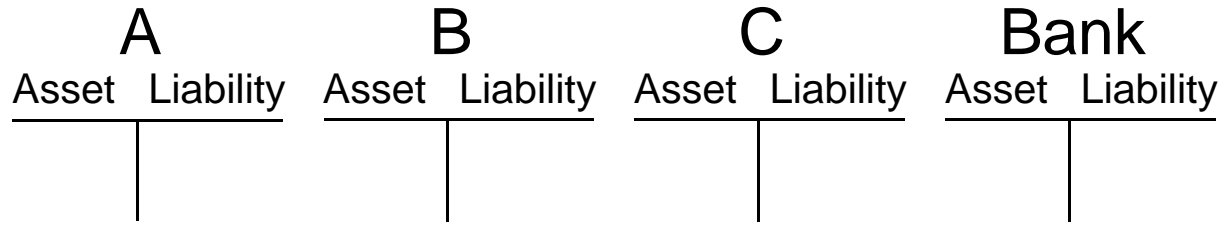
A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability



# Conclusions

Banks define two currencies: Deposits and Credits with free floating exchange rate.

# Deposits and Credits

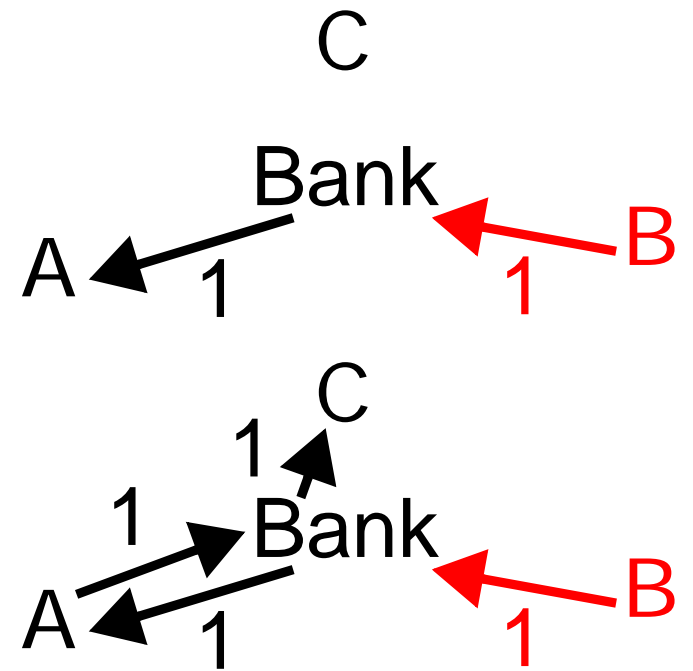


# Deposits and Credits

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
1			1			1	1

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
			1	1		1	1



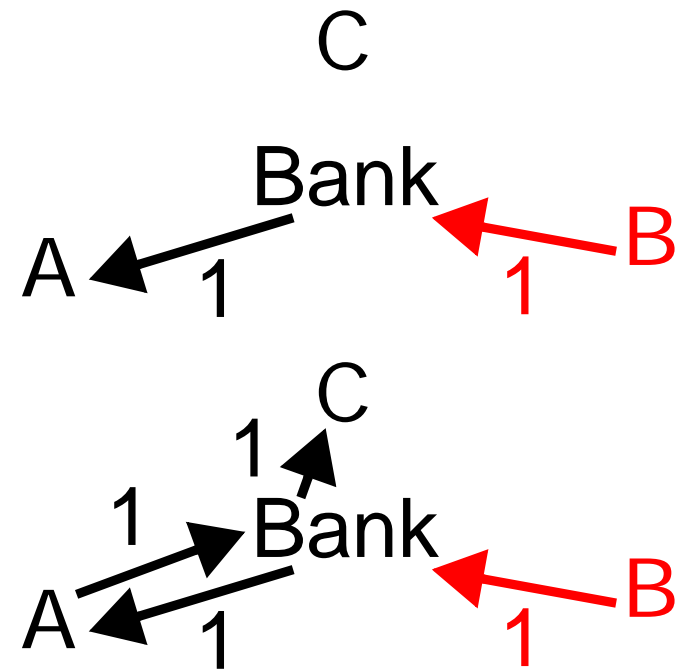
# Debt Relations with Bank

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
1			1			1	1

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
			1	1		1	1

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
			3	2		3	2



**INTEREST**  
 Deposit:  $100\%/\Delta t$   
 Credit:  $200\%/\Delta t$

# Debt Relations with Bank

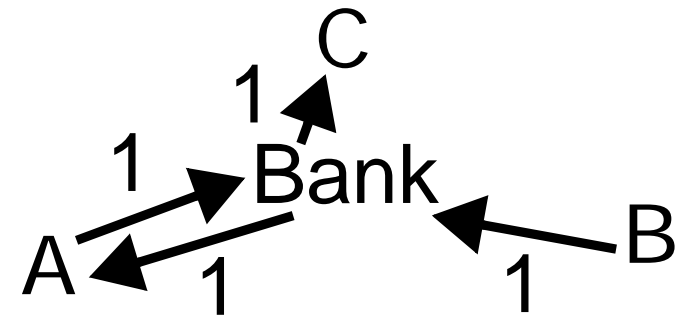
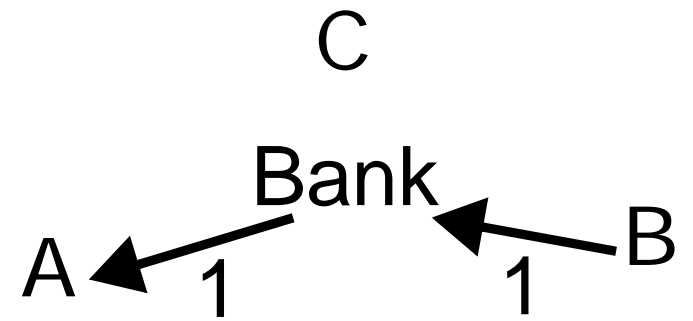
A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
1			1			1	1

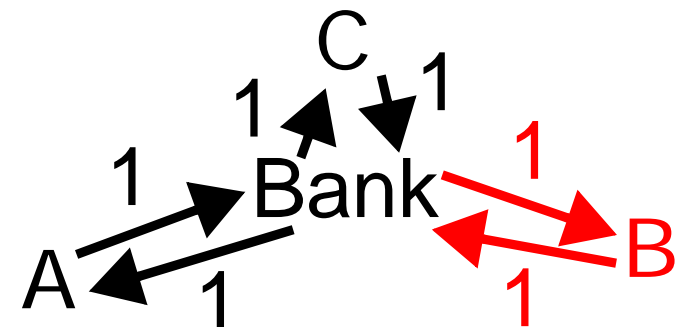
A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
			1	1		1	1

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
			3	2		3	2

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
			2	1		2	1



**INTEREST**  
 Deposit: 100%/Δt  
 Credit: 200%/Δt



# Deposits : Credits = 1:1

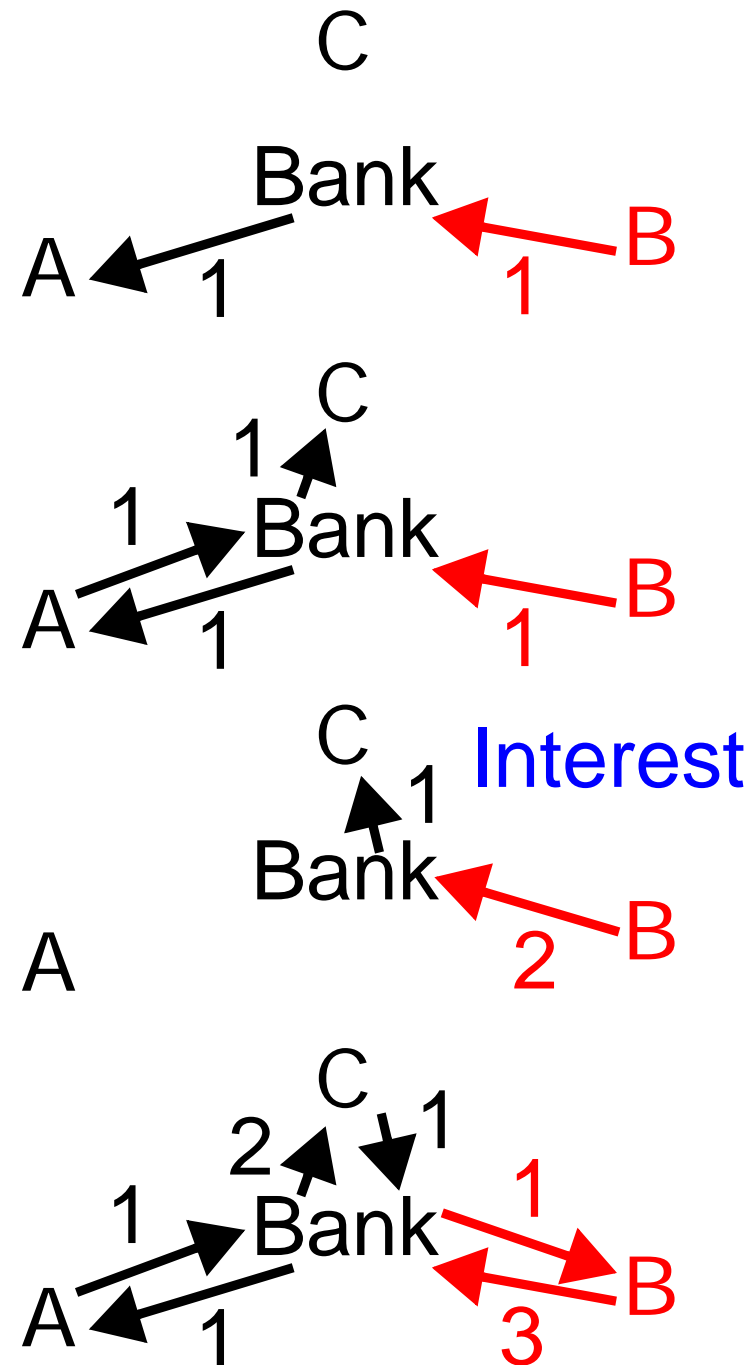
A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
1			1			1	1

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
			1	1		1	1

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
			3	2		3	2

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
			2	1		2	1



Deposits : Credits = 1:1 => **2:3**

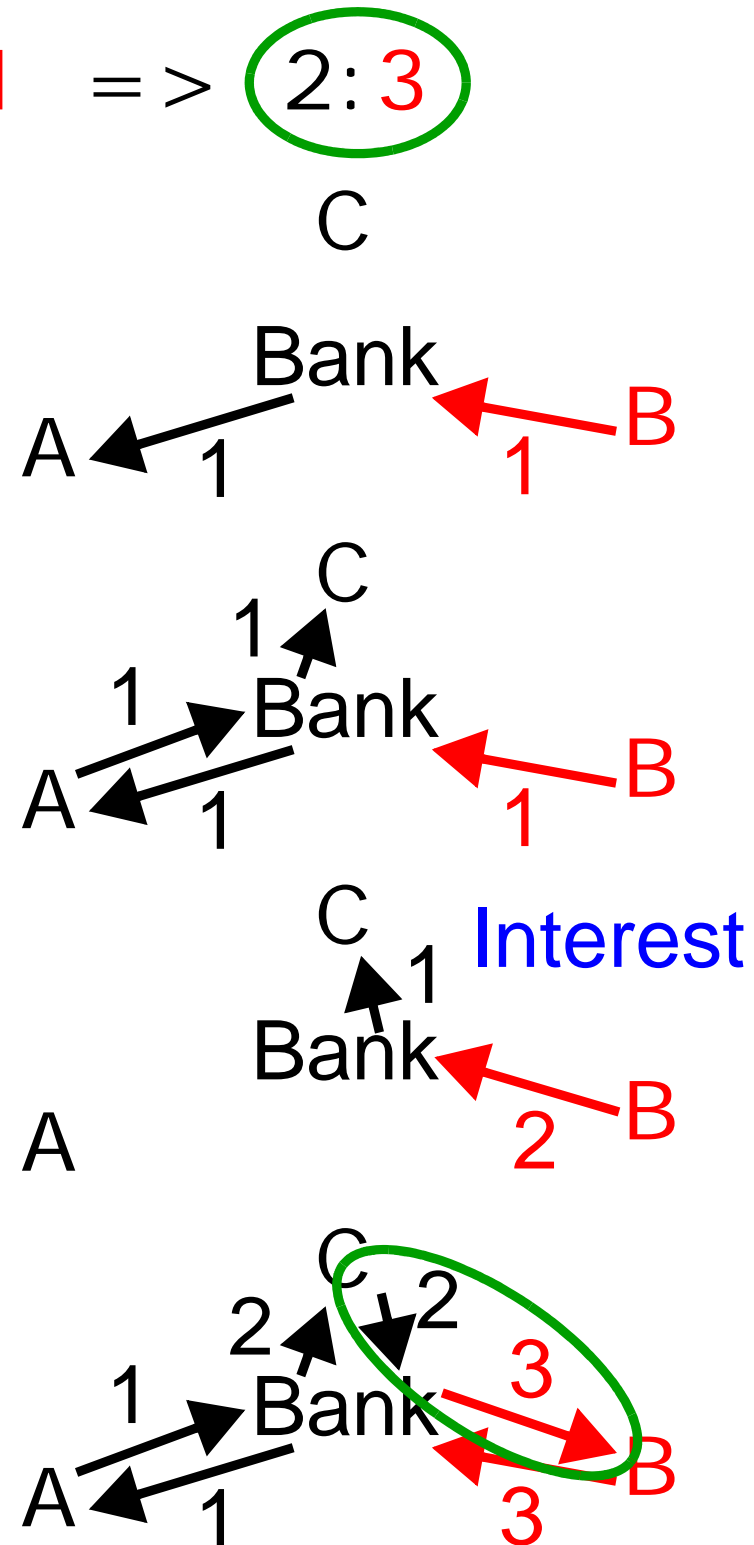
A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
1			1			1	1

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
			1	1		1	1

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
			3	2		3	2

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability



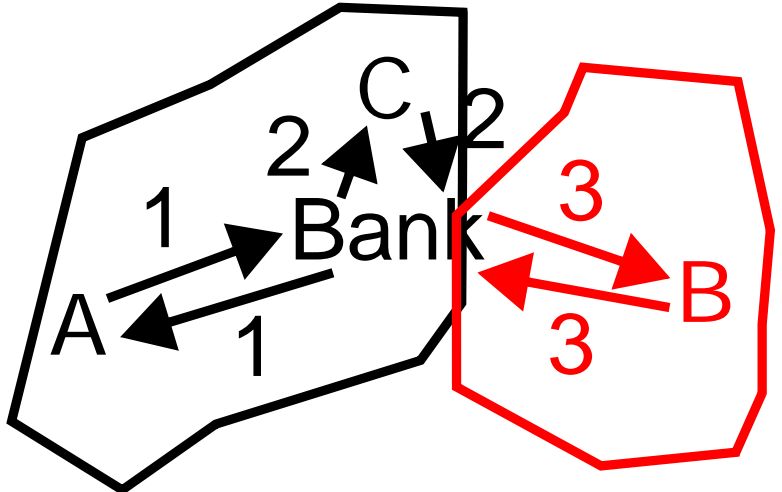


# Interest is Differential Inflation

**INTEREST**  
 Deposit: 100%/Δt  
 Credit: 200%/Δt

Deposit Country      Credit Country

A		B		C		Bank	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
			1	1		1	1
			3	2		3	2



**Interest:**

100%      200%  
 Inflation      Inflation

# Conclusions

Banks define two currencies: Deposits and Credits with free floating exchange rate.

Interest is compensated by a rate change.  
=> Banks cannot profit from interest.

Time Symmetric Money

Credit without  
Money Creation or Interest

Quantity of Money  
proportional to  
Number of Persons

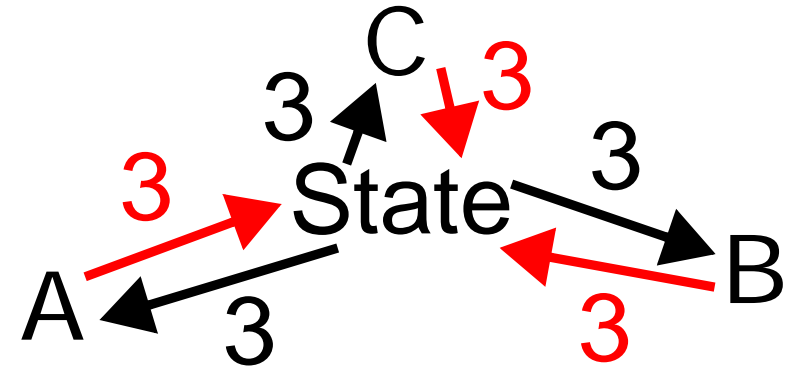
# Money Creation with Birth Termination with Death

Quantity of Money  
proportional to  
Number of Persons

# Money Creation with Birth Termination with Death

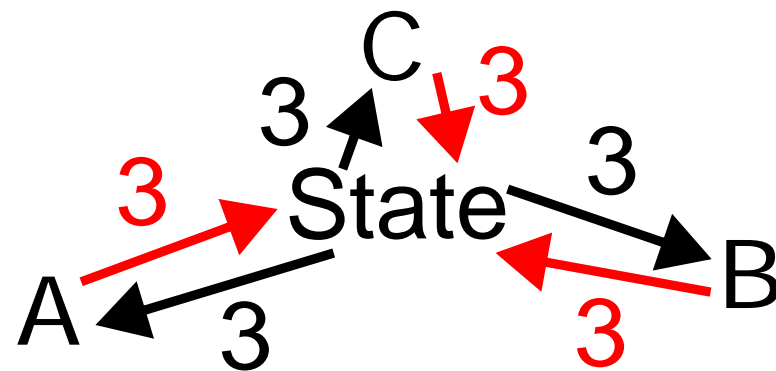
A		B		C		State	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
3	3	3	3	3	3	9	9

No Transfer of Wealth



# Money Creation with Birth Termination with Death

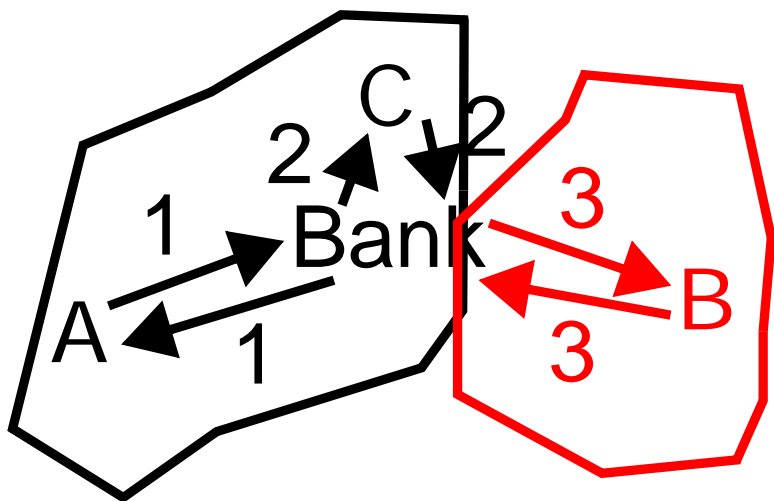
A		B		C		State	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
3	3	3	3	3	3	9	9



Before:

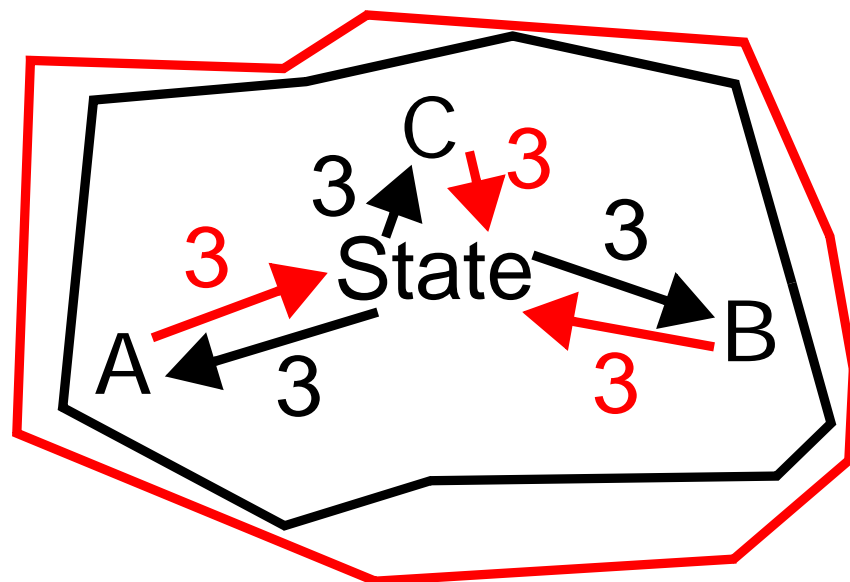
Deposit  
Country

Credit  
Country



Now:

“Entangled” Currency



# Transfer by giving Deposits

A	
Asset	Liability
3	3

B	
Asset	Liability
3	3

C	
Asset	Liability
3	3

State	
Asset	Liability
9	9

C

A

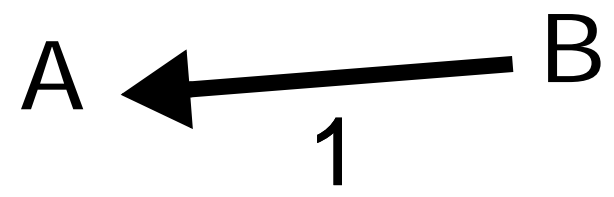
B



# Transfer by giving Deposits

A		B		C		State	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
3	3	3	3	3	3	9	9

C



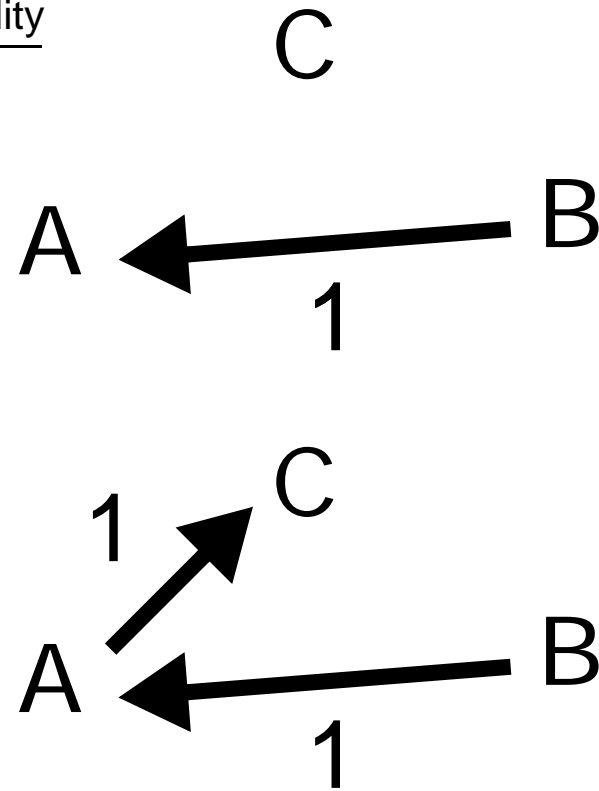
A		B		C	
Asset	Liability	Asset	Liability	Asset	Liability
4	3	2	3	3	3

# Transfer by giving Deposits

A		B		C		State	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
3	3	3	3	3	3	9	9

A		B		C	
Asset	Liability	Asset	Liability	Asset	Liability
4	3	2	3	3	3

A		B		C	
Asset	Liability	Asset	Liability	Asset	Liability
3	3	2	3	4	3



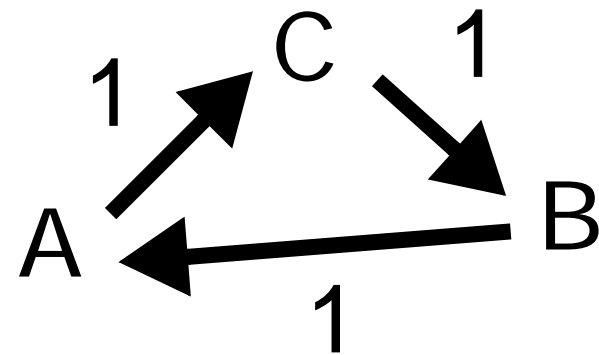
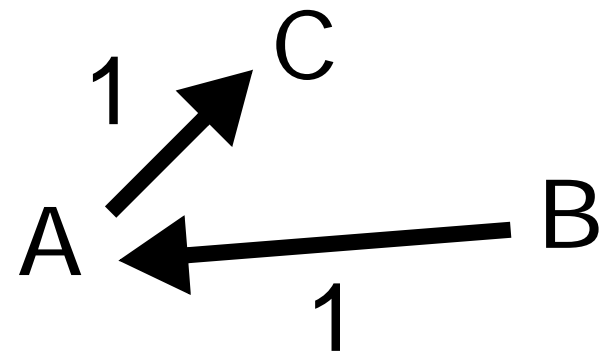
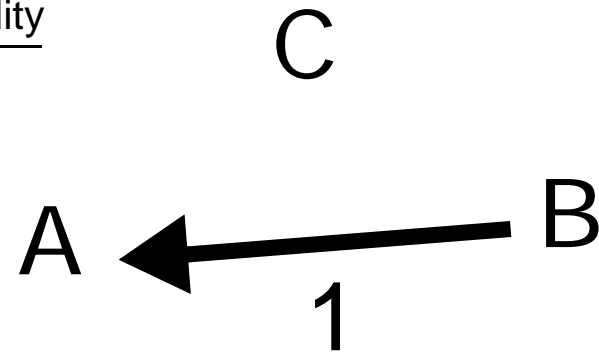
# Transfer by giving Deposits

A		B		C		State	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
3	3	3	3	3	3	9	9

A		B		C	
Asset	Liability	Asset	Liability	Asset	Liability
4	3	2	3	3	3

A		B		C	
Asset	Liability	Asset	Liability	Asset	Liability
3	3	2	3	4	3

A		B		C	
Asset	Liability	Asset	Liability	Asset	Liability
3	3	3	3	3	3



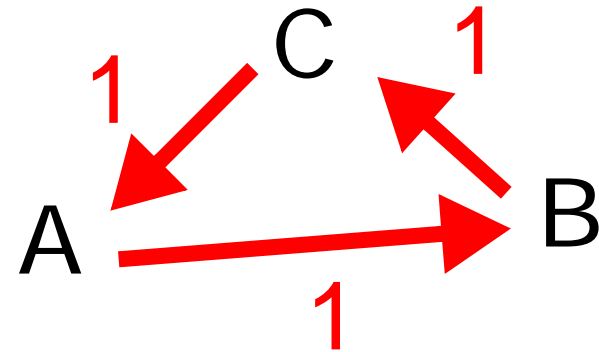
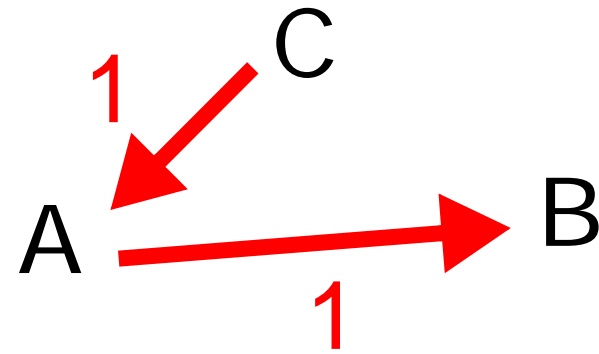
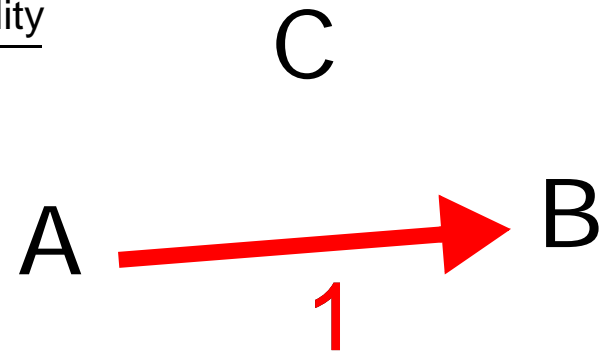
# Transfer by receiving Credits

A		B		C		State	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
3	3	3	3	3	3	9	9

A		B		C	
Asset	Liability	Asset	Liability	Asset	Liability
3	2	3	4	3	3

A		B		C	
Asset	Liability	Asset	Liability	Asset	Liability
3	3	3	4	3	2

A		B		C	
Asset	Liability	Asset	Liability	Asset	Liability
3	3	3	3	3	3



# Two-fold Choice in Transactions

Transfer money  
from A to B:

Give deposits  
A  $\xrightarrow{1}$  B

Receive credits  
A  $\xleftarrow{1}$  B

# Two-fold Choice in Transactions

Transfer money  
from A to B:

Give deposits  
A  $\xrightarrow{1}$  B

Receive credits

A  $\xleftarrow{1}$  B

Transfer of liquidity: "Credit"

Give deposits  
and credits

A  $\xrightarrow{1}$  B  
 $\xrightarrow{1}$

# Two-fold Choice in Transactions

Transfer money  
from A to B:

Give deposits  
A  $\xrightarrow{1}$  B

Receive credits

A  $\xleftarrow{1}$  B

Transfer of liquidity: "Credit"

Give deposits  
and credits

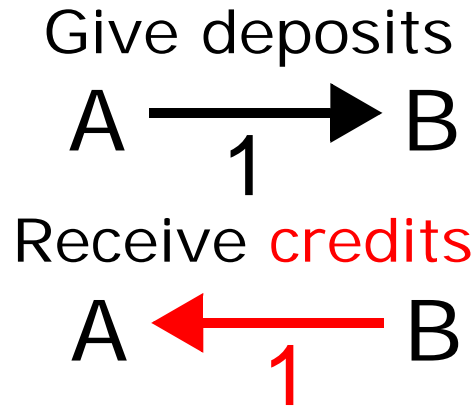
A  $\xrightarrow{1}$  B  
 $\xrightarrow{1}$

Less trust  
towards B

A  $\xrightarrow{0.9}$  B  
 $\xrightarrow{1.1}$

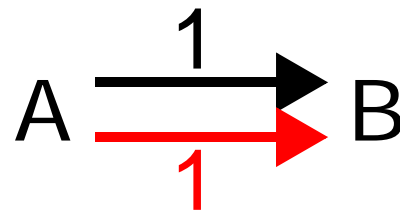
# Two-fold Choice in Transactions

Transfer money  
from A to B:

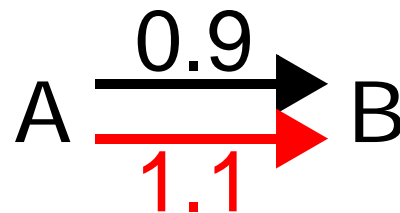


Transfer of liquidity: "Credit"

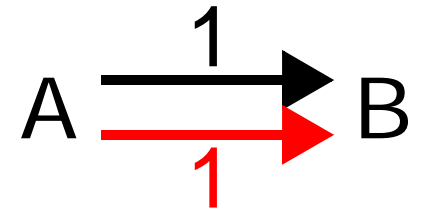
Give deposits  
and credits



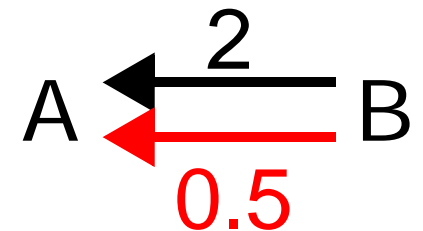
Less trust  
towards B



Trade over  
Time:



later:

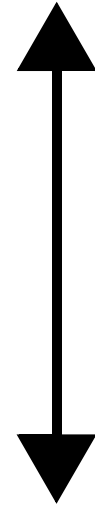




# Money and Credit

## Value pricing Now and in the Future

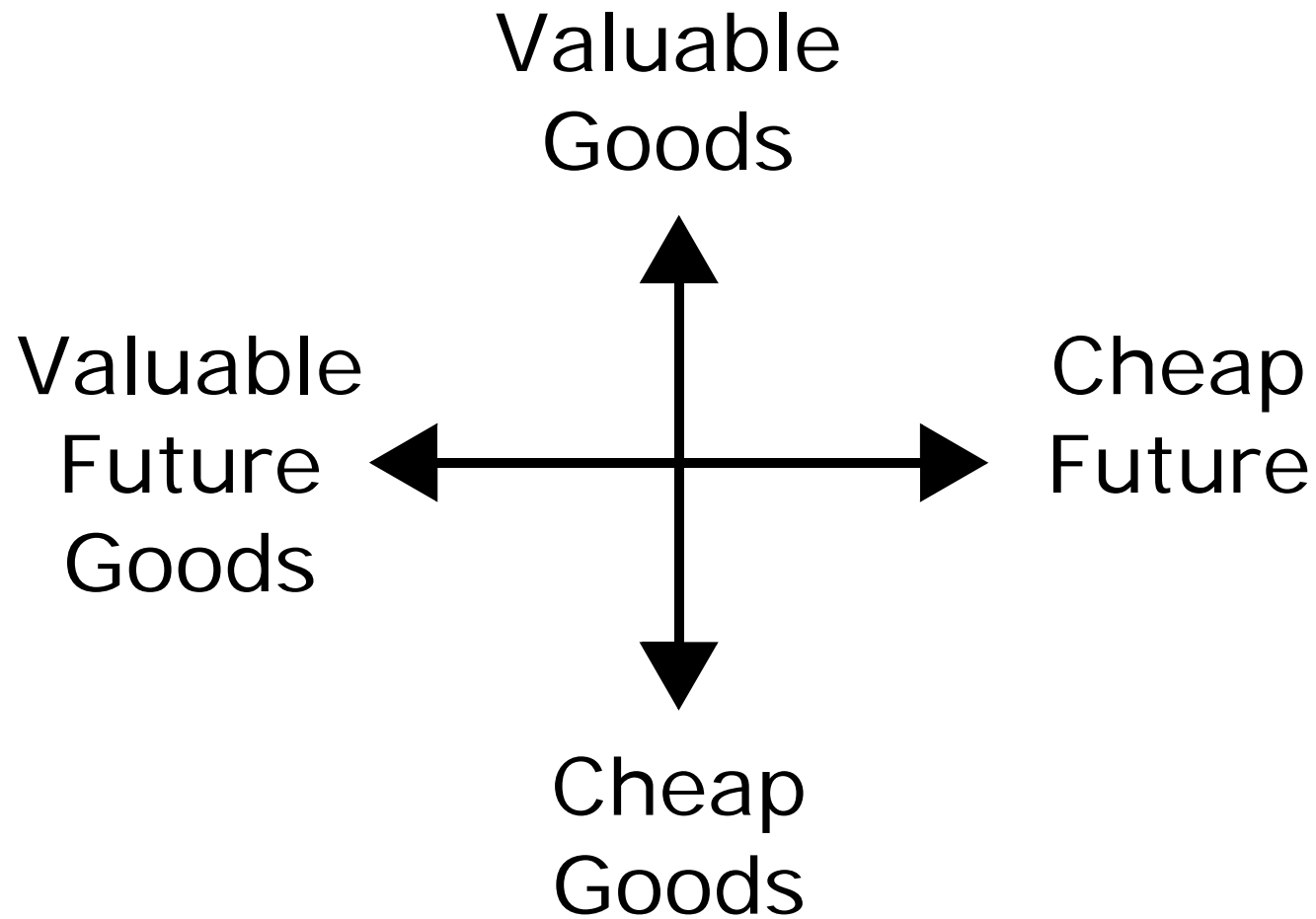
Valuable  
Goods



Cheap  
Goods

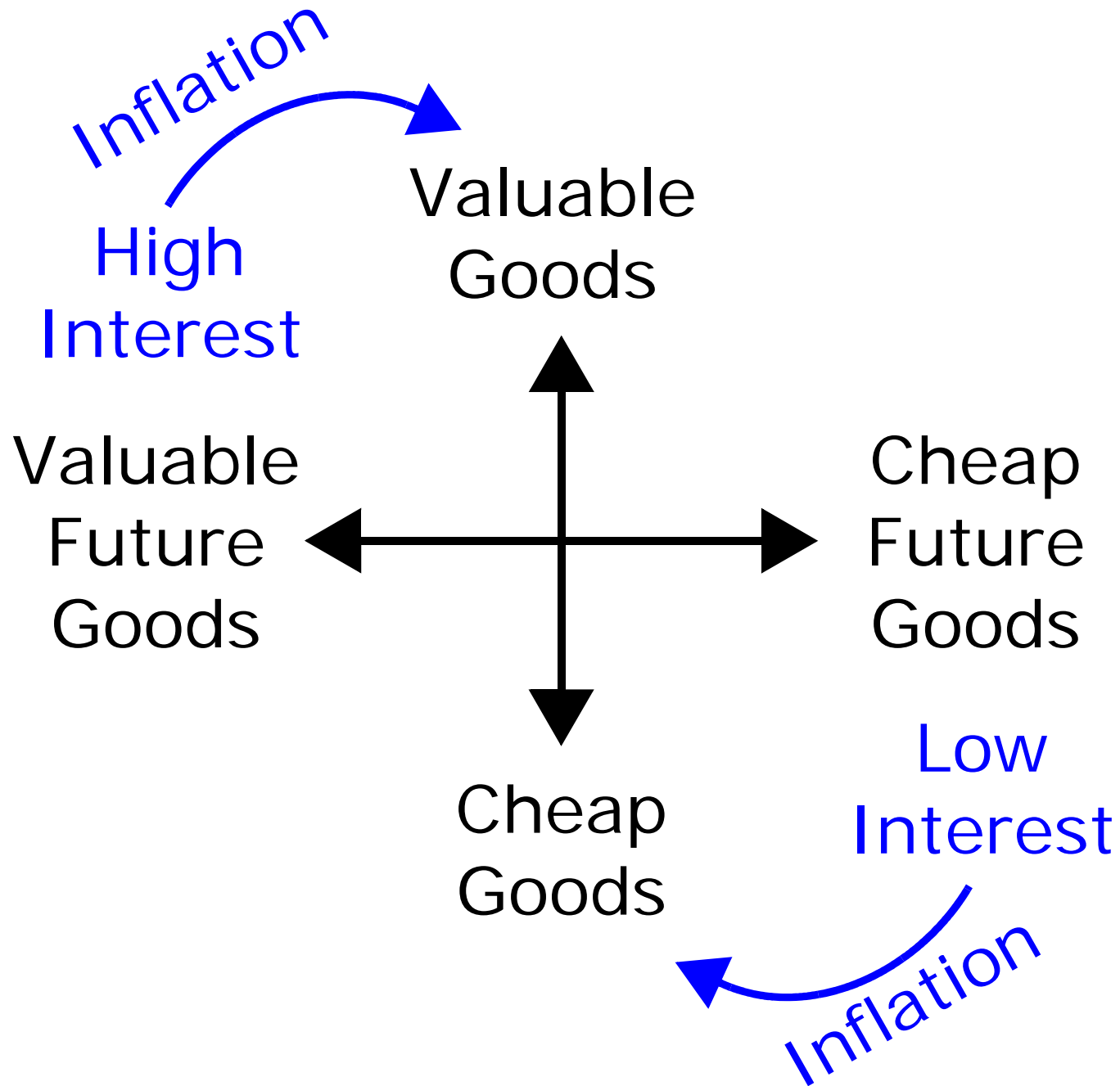
# Money and Credit

## Value pricing Now and in the Future

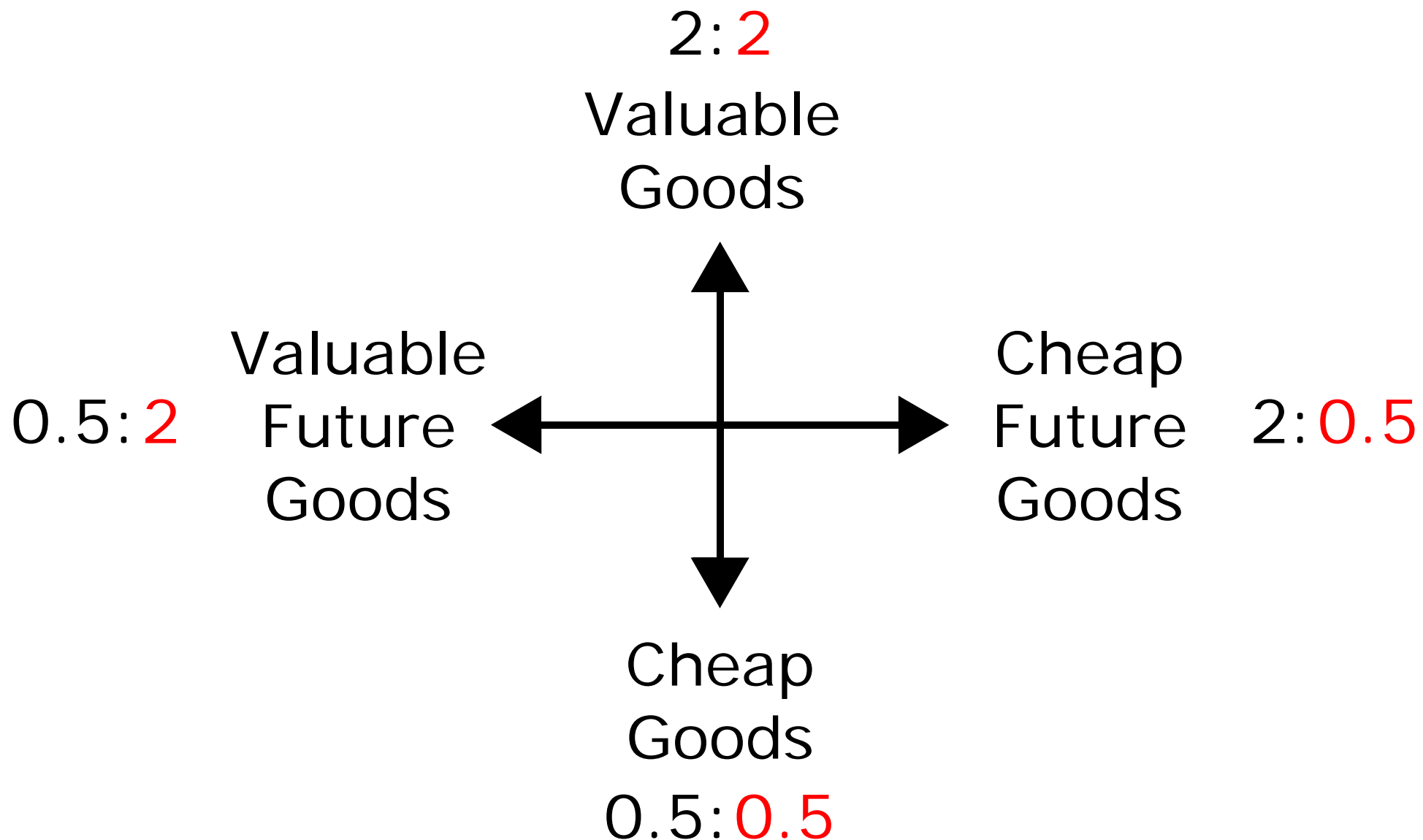


# Money and Credit

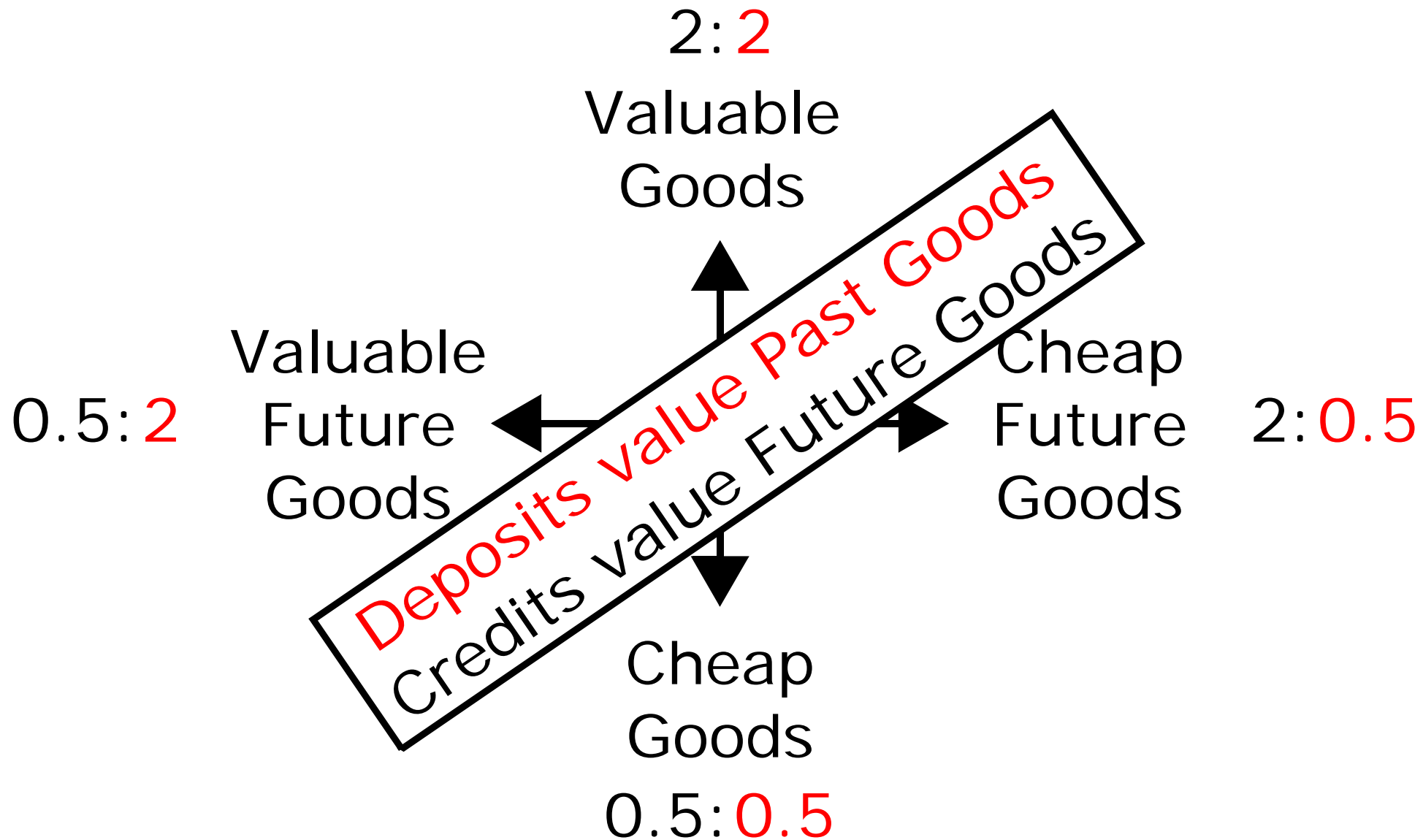
## Value pricing Now and in the Future



Reasons to Shift the Exchange Rate  
from Deposits: Credits = 1:1 to:



# Reasons to Shift the Exchange Rate from Deposits: Credits = 1:1 to:



# Conclusions

Banks define two currencies: Deposits and Credits with free floating exchange rate.

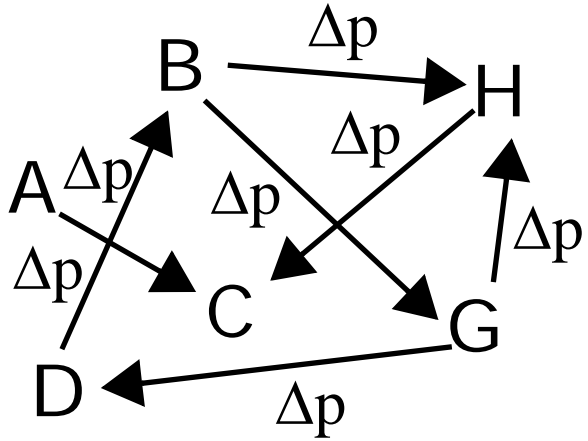
Interest is compensated by a rate change.  
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Credit without Creation or Interest.

Inflation  
by Randomness  
in Money Transfer

# Random Economy

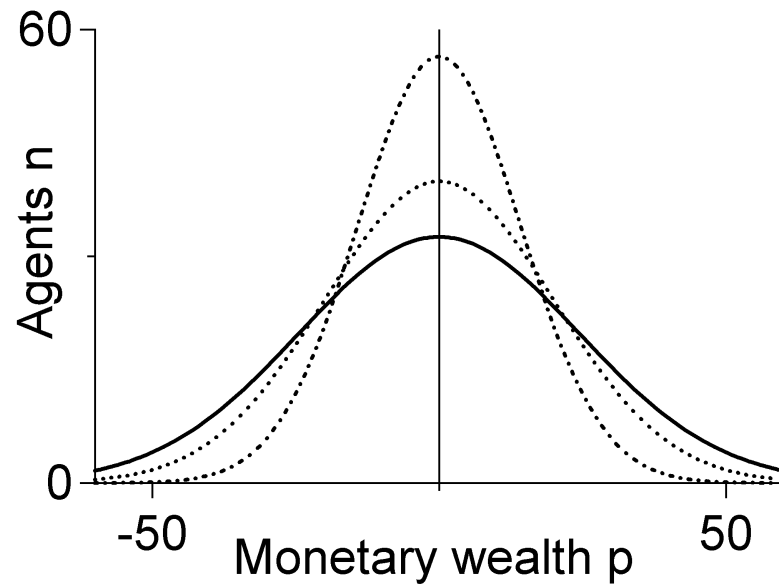
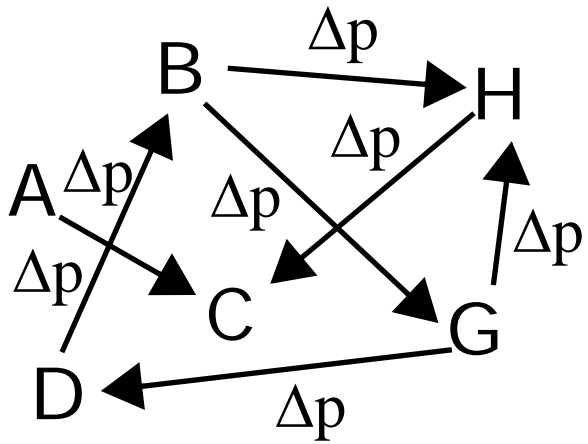
Random Transfers





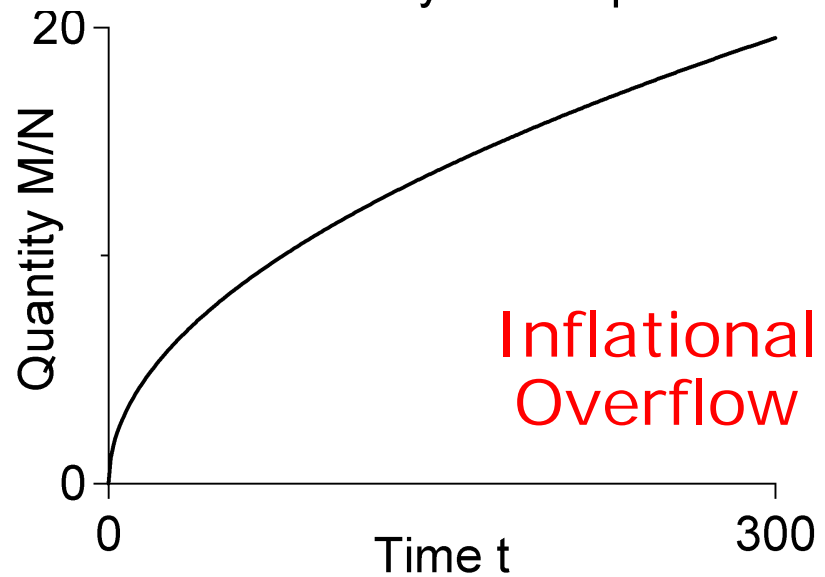
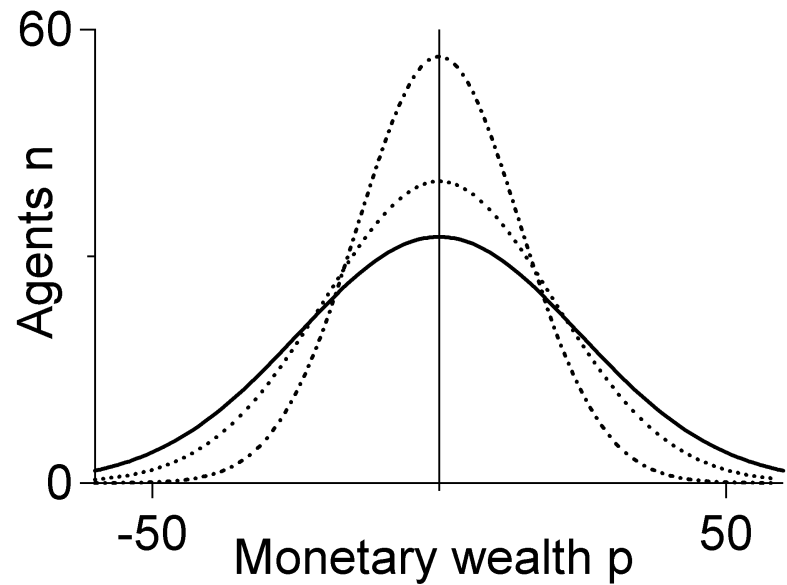
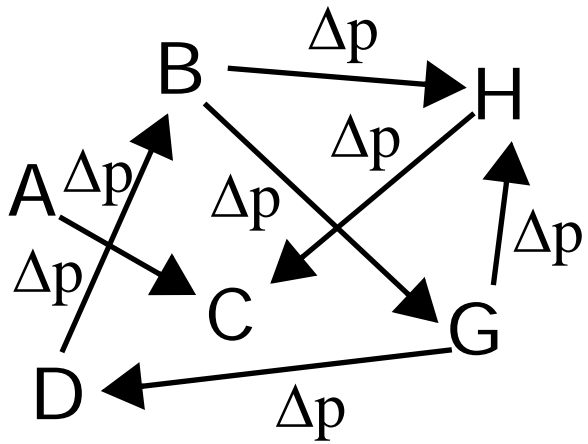
# Random Economy

Random Transfers



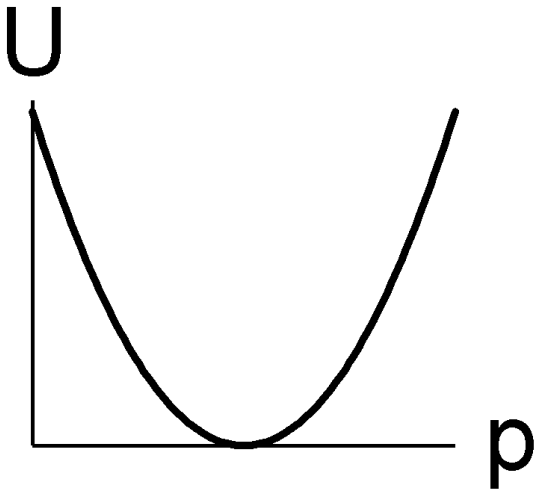
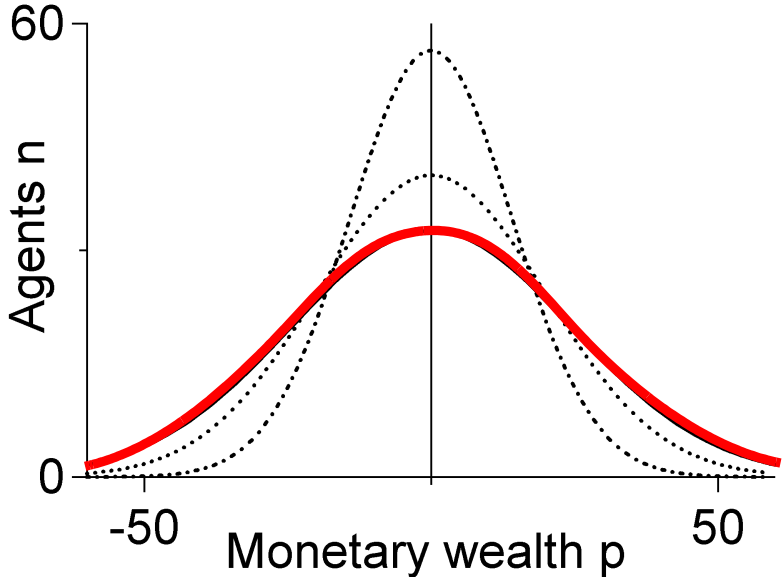
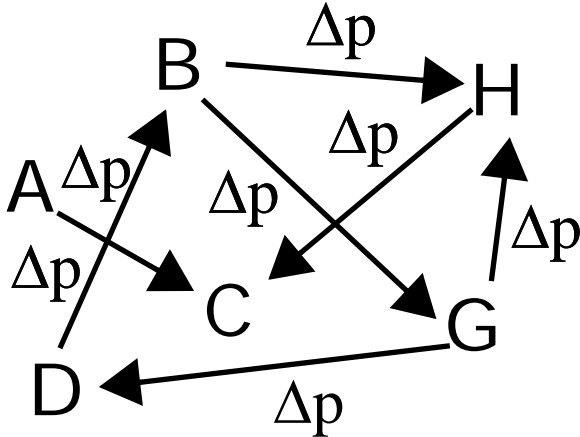
# Stochastic Inflation

Random Transfers



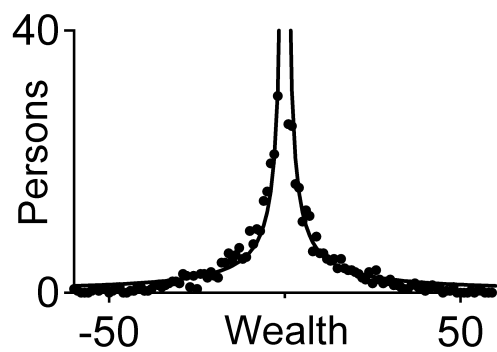
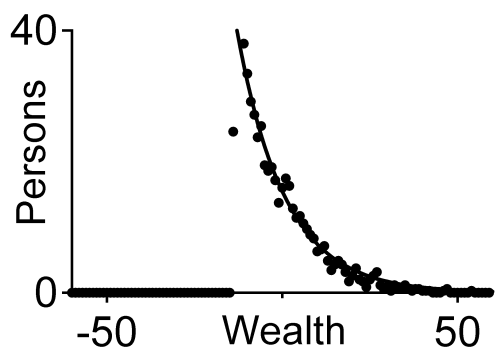
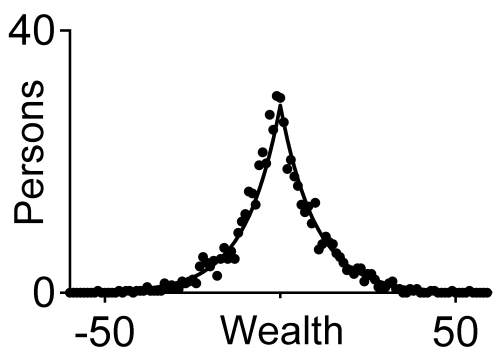
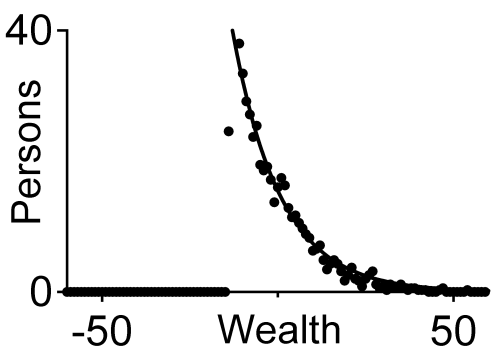
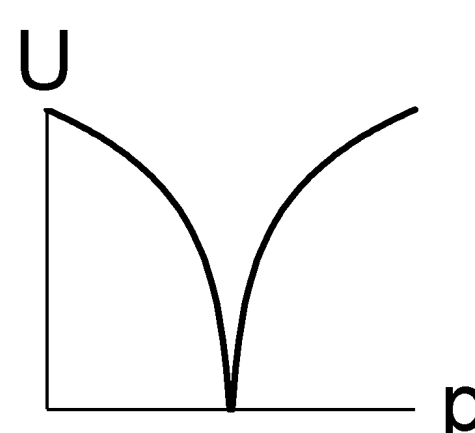
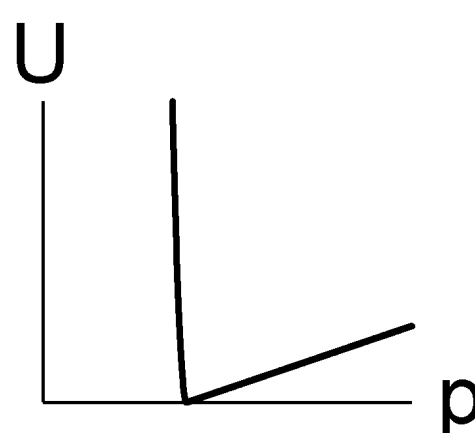
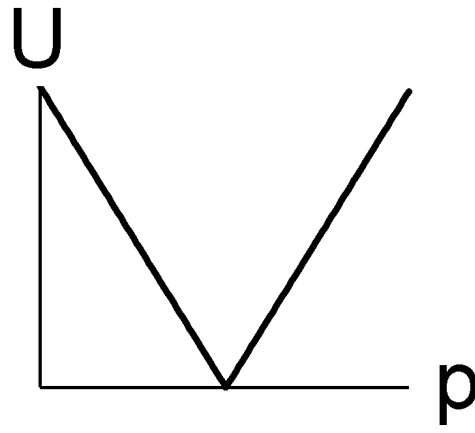
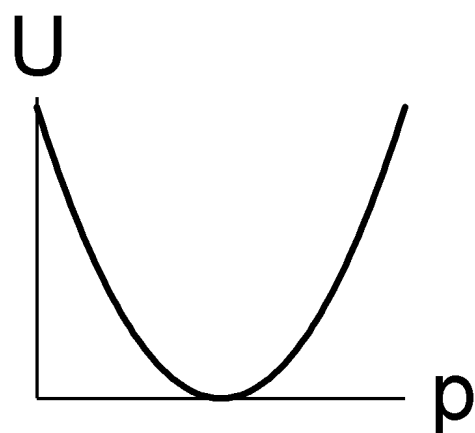
# Stochastic Inflation stops with Taxation

Random Transfers



Parabolic Potential = Negative Interest

# Taxation determines Wealth Distribution



“Economic Boltzmann”

$$n(p) \propto \exp\left(-\frac{U(p)}{D}\right)$$

# Conclusions

Banks define two currencies: Deposits and Credits with free floating exchange rate.

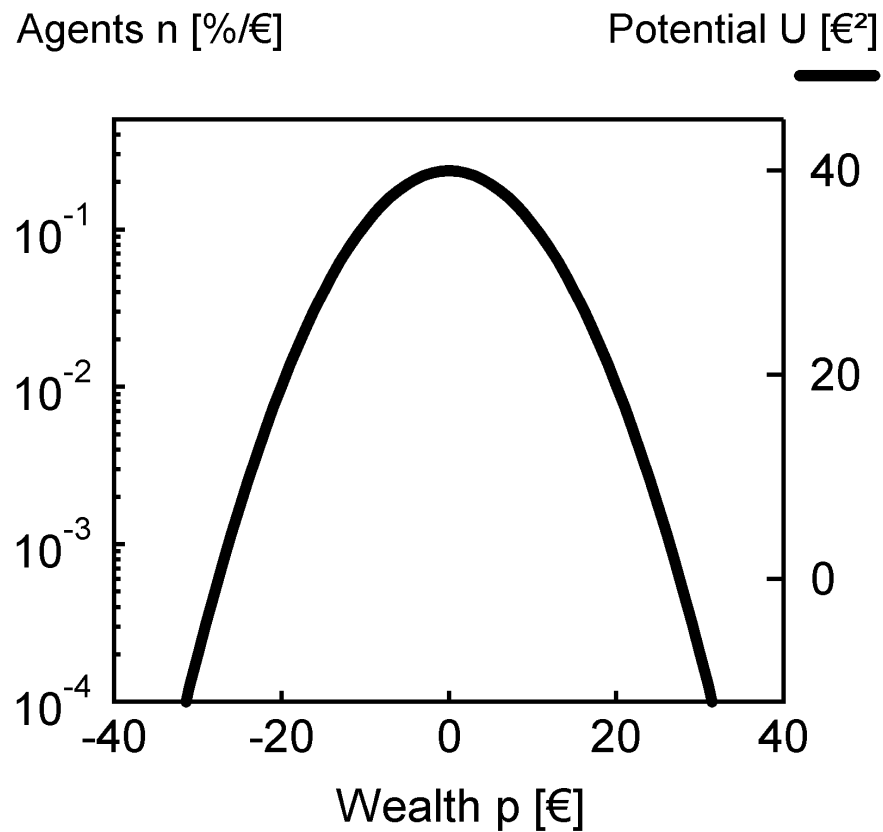
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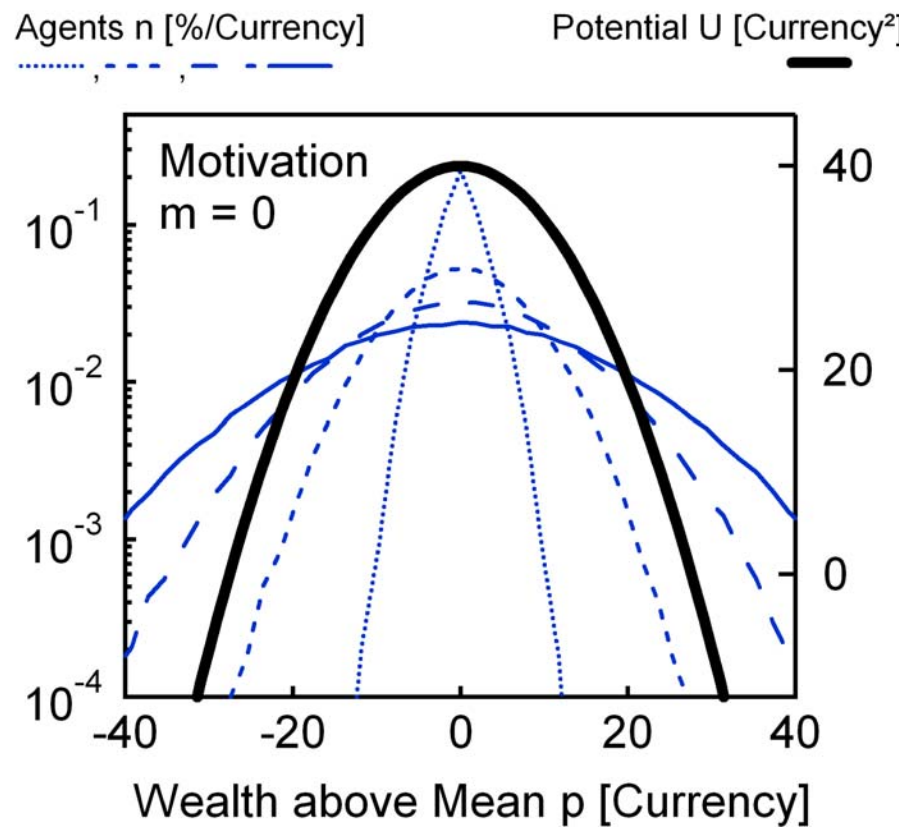
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# Wealth Accumulation by Motivation and Interest

# Random Economy + Interest

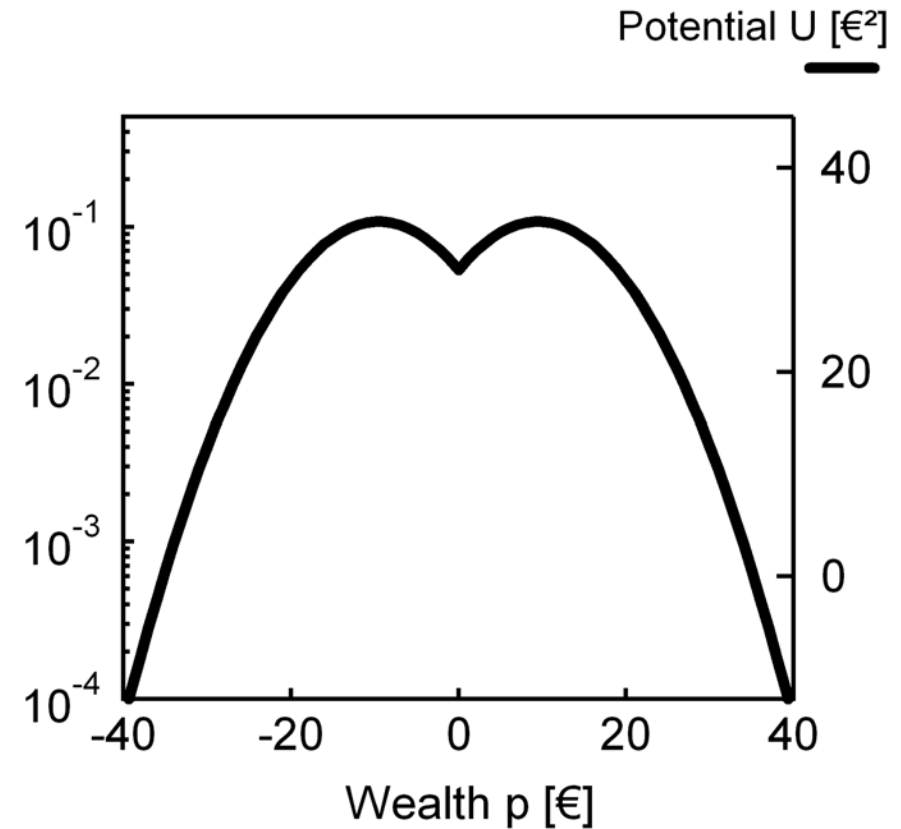
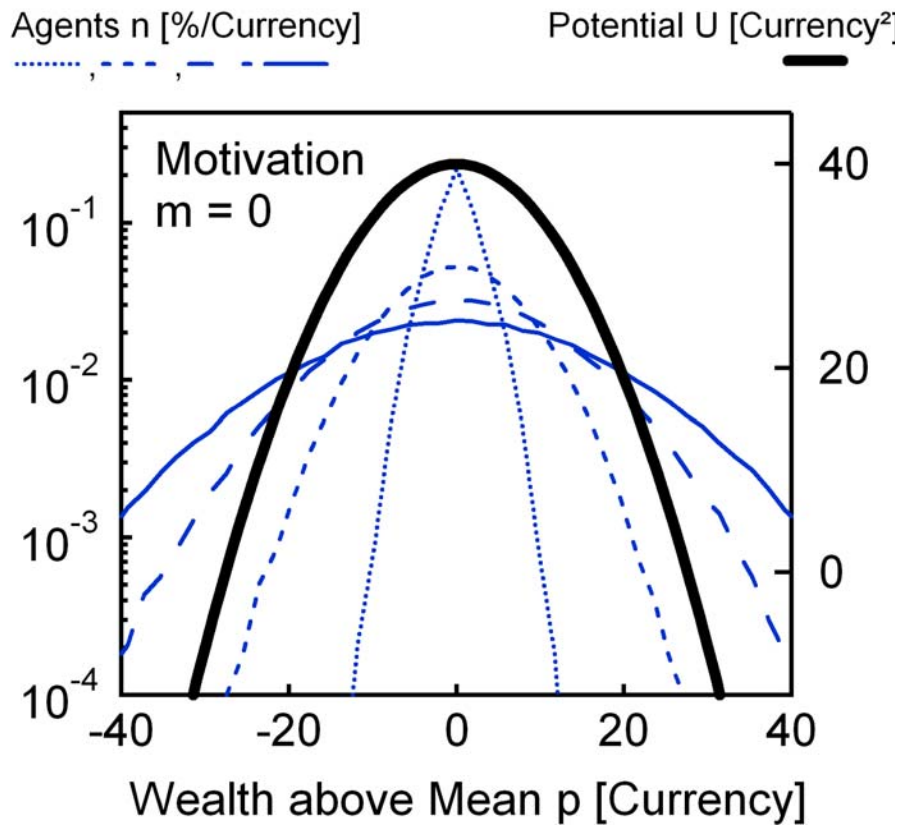
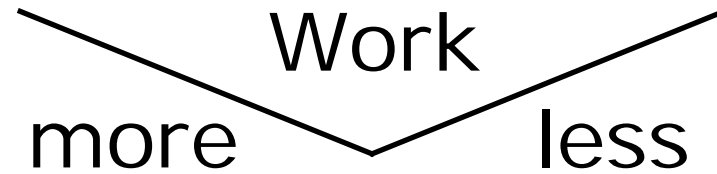


# Random Economy + Interest

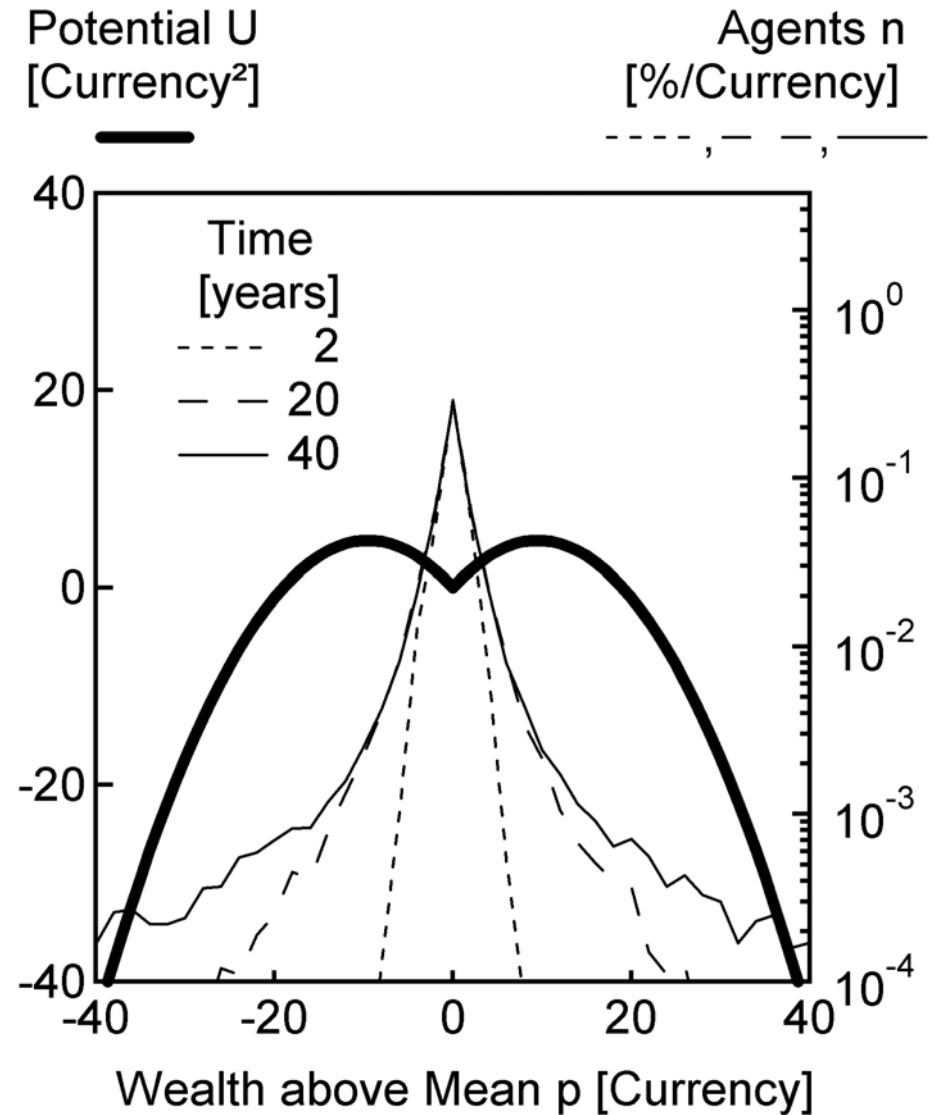
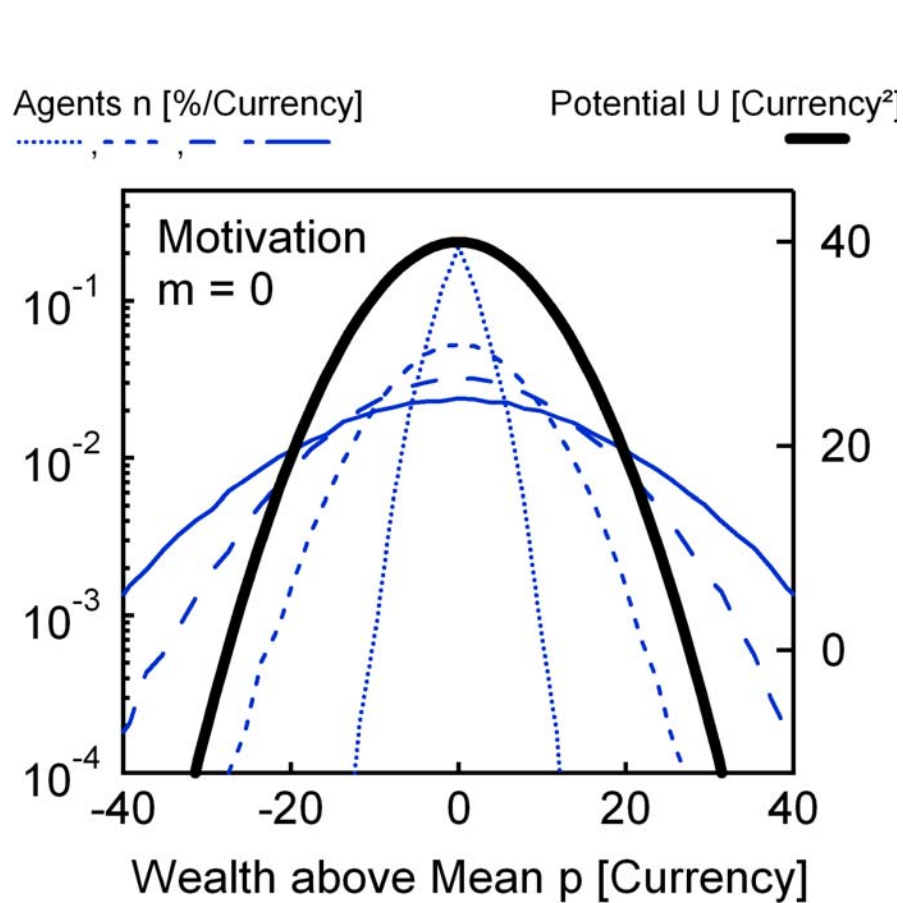




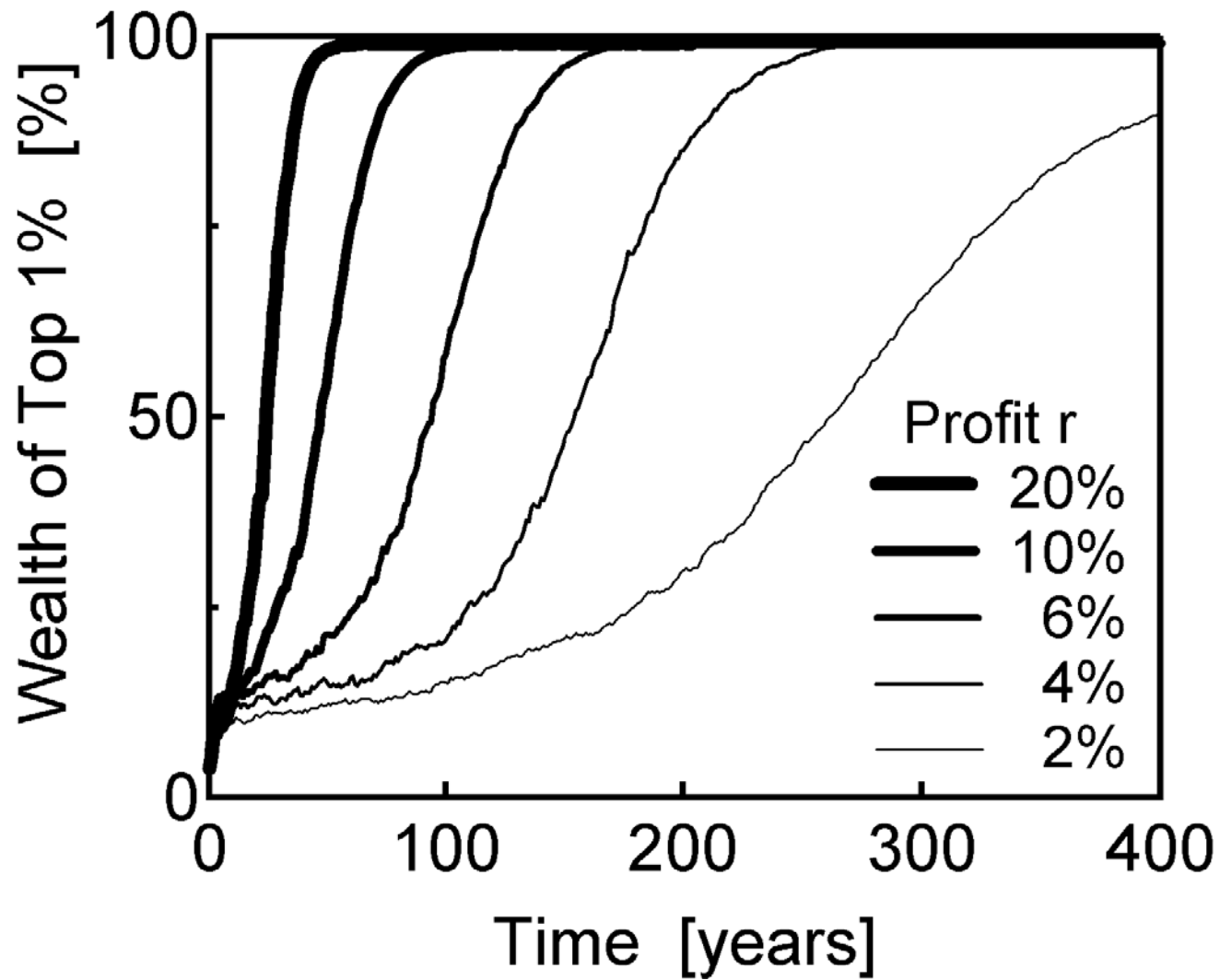
# Random Economy + Interest



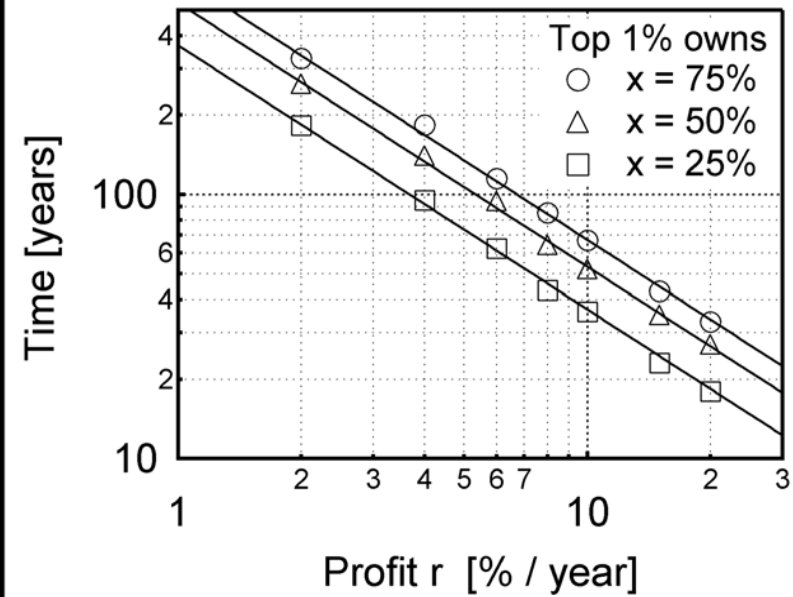
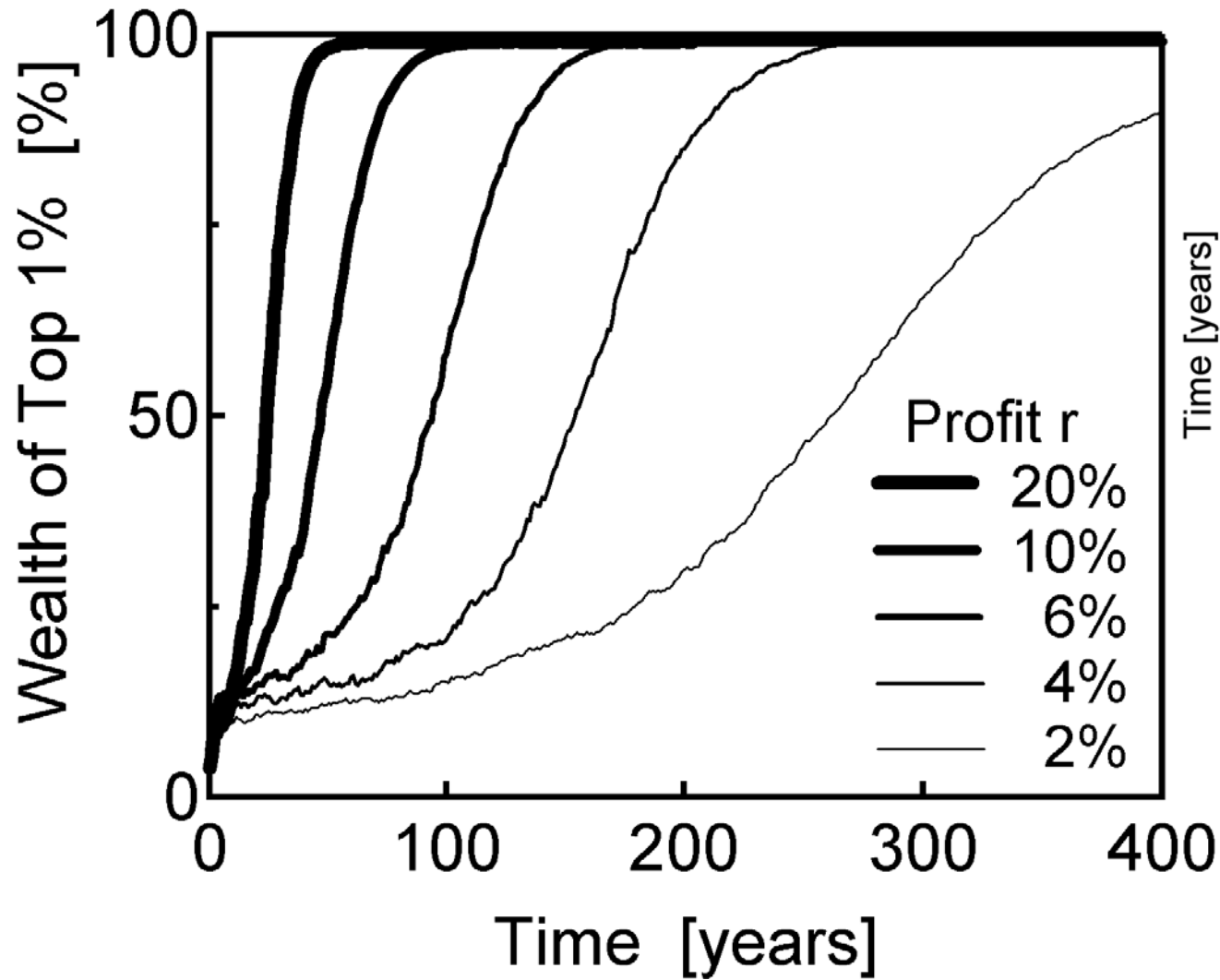
# Random Economy + Interest



# Random Economy + Interest



# Random Economy + Interest



$$\tau_{50\%} = \frac{530\%}{r}$$

# Conclusions

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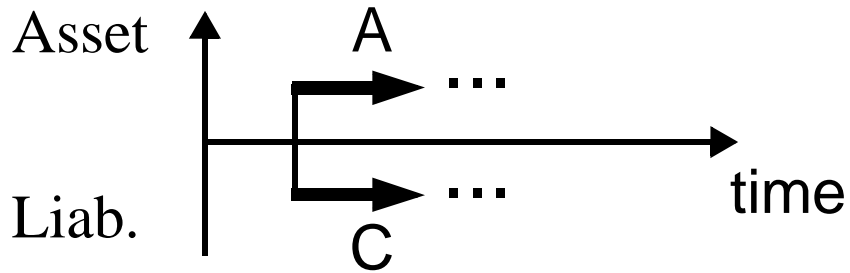
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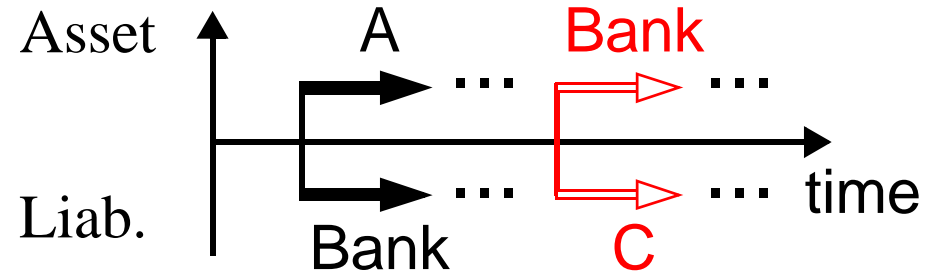
Randomized Economies under positive Interest  
trigger catastrophic wealth accumulation.

# Feynman Graphs of Bookkeeping

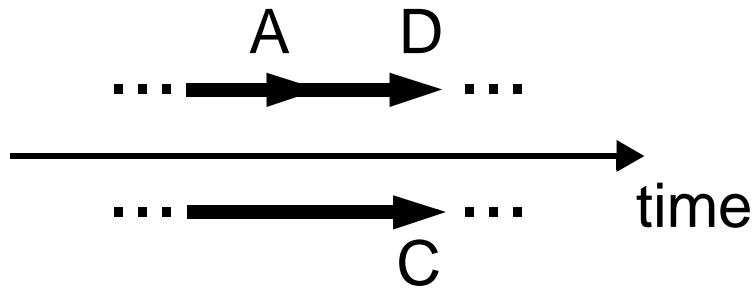
Creation Transfer...



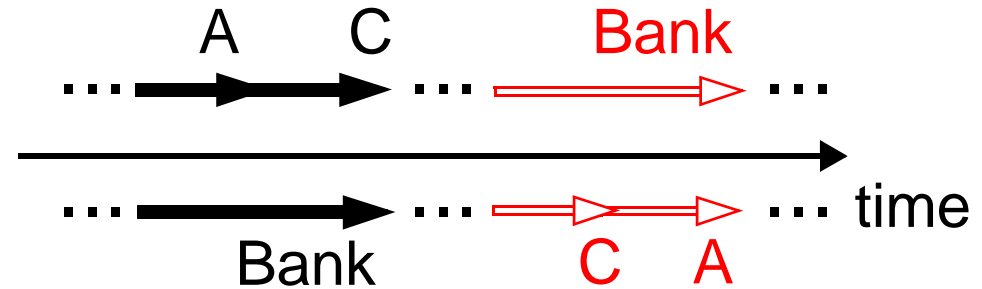
Creation Transfers...



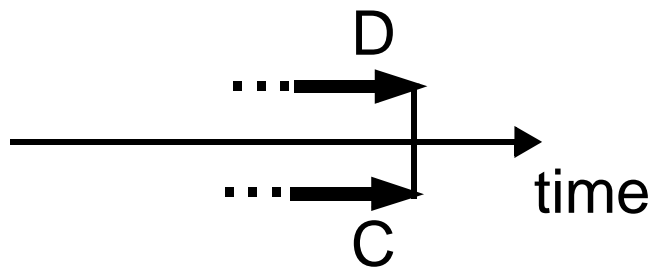
...Asset Transfer...



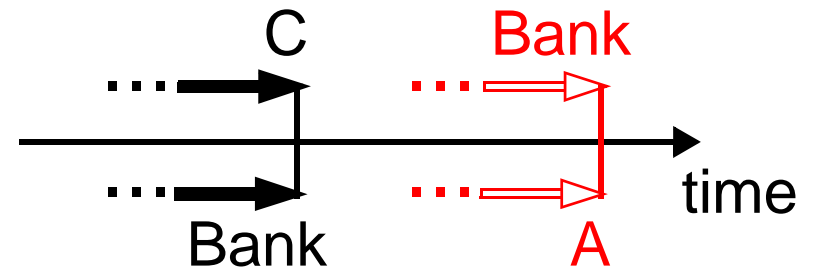
...Transfers...



...Termination Transfer



...Termination Transfers



# Noether Theorem of Monetary Systems

<p>Momentum Conservation Symmetry of Space</p>		<p>Asset - Liability Conservation Symmetry of Persons</p>
<p>Current Conservation Charge Symmetry</p>		<p>Asset/Liability Pairing Conservation Symmetry of Currency</p>
<p>Energy Conservation Symmetry of Time</p>		<p>Asset + Liability Conservation Symmetry of Time</p>

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Thanks to:

Robert Fischer, Benjamin Franksen

Ernst Dorfner and Stephen Zarlenga

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[www.bookkeepingmechanics.com](http://www.bookkeepingmechanics.com)