

Lecture 3

Metallic money

Ec 365

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Before money

- Barter
- Problem of the double coincidence of wants
- Coins invented around 600 BC in Lydia (now in Turkey)
- But money was used before coins: unit of account

Egypt

- Near the tomb of Khafra (~2570 BC):

“I have purchased this house from the scribe Tjenti. I have given 10 châts for it; one piece of cloth with four threads, 3 châts; one bed, 4 châts; one piece of cloth with two threads, 3 châts.”

- Middle Kingdom (~ 2055-1650) in Karnak

“60 debens of gold were given to me, in various objects.”

- Unit of account
- Abundant literature (Daumas)

Remarks on metallic money

- Money is used for *transactions*.
 - We have paper money with no intrinsic value. The value of money is essentially the transaction value. We hold it because we can buy real goods with it. The seller of these goods accepts the paper because he can buy real goods. Etc.... Chain of transactions. If no one at the end, the chain unravels.
- Initially, metallic money because of lack of trust
 - Locally (within the same state, say)
 - Internationally (no overall authority, especially important)
- Two types of transactions
 - International
 - Local

Metallic money

- Reasons for metallic money
- Assume first pure metallic content
- Any metallic system is constrained by the physical properties of the metals, density and scarcity.

- **Price ratio:**

Roman time, 10-12

Now, about 75.

- **Metal Density**

Gold 19.3

Silver 10.5

Platinum 21.4

Palladium 12.0

Copper 9.0

- At equal value, during the Roman empire, a gold coin has a volume 1/20 of a silver coin, hence dimension almost 3 times smaller.

Gold and silver coins

- Small value coins cannot be in gold
- Large value coins cannot be in silver
- Hence, bi-metallic system
- In place, theoretically until the 20th century
- In Rome:
 - 1 Aureus (gold) = 25 denarius (silver) = 100 sesterces (bronze)
 - 1 Aureus struck at 40-45 to the Roman pound (327 gr), about 8gr (Shekel)
 - Today, 1 ounce (28gr) is about \$1000 (comment), aureus about \$300
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Denarius (19mm)



Sestertius (36mm)

tal– comments)
l economies.

Demand for money and price level

- Gold (and silver) coins can be used as store of value: equivalent to storage of the metal
 - No many safe investments at the time
- Coins are also (obviously) means of exchange
- The demand for “money as means of exchange” depends on the demand for the means of exchange, independent of the type of means of exchange
- Today: paper notes with no intrinsic value.
 - The value of the note depends on its acceptance in the next exchange.
- In an economy with metallic money, a public decree could replace all the coins with paper

$$\frac{M}{P} = L(Y, \text{inflation rate}, \dots).$$

Money issuance and inflation

$$\frac{M}{P} = L(Y, \text{inflation rate}, \dots).$$

- Increases of the quantity of money M generate increases of the price level P .
- Making new coins generates a profit only if the intrinsic value is smaller than the face value

Gresham's law

- Aristophanes
(*The Frogs*, 405 BC)

You know what I often think:
We treat our best men
The way we treat our mint
The silver and the golden
We were proud to invent
These unalloyed
Genuine coins, no less,
Ringing true and tested
Both abroad and [in] Greece
And now they're not employed
As if we were disgusted
And want to use instead
These shoddy coppers minted
Only yesterday
Or the day before
(as if that matters).

(*Aristophanes: The Complete Plays*,
trans. Paul Roche, New American Library, 2005, p. 573)

Seignorage and debasement

- They are not equivalent.
- Seignorage is the policy that raises revenues through issuing more money. The origin of the term should be clear. In the 20th century with paper money, seignorage is implemented with the printing press.
- Debasement is the reduction of the intrinsic value of the coins in the precious metal. Method used to generate seignorage in an economy with metallic money.
- At the time of Caracalla (200), the silver content of the denarius was reduced to less than 50 percent. The aureus was hardly modified. The official exchange rate between the two (25) was unchanged.

- Two types of transactions

– International

- large transactions: gold coins
- Professionals and no international enforcement (over the wide area for the chain of transaction): value *by weight*. (coin value is intrinsic)

– Local

- Smaller transaction: silver and bronze
 - local area for transaction: value *by tale*. (value is the face value of the coin)
- The distinction is found in *all* cases of metallic money

- Features of a coin

F : *degree of fineness* fraction of the coin in silver

silver is mixed with copper in an **alloy** (assume the value of copper is zero)

N : number of coins from one unit of alloy

Example (M. A): one unit = one marc = 244 grams

f : *face value (of the coin)*

- Profits from making coins out of a unit of metal:

- L : *par value* = value in coins (face) of one marc of silver $L = \frac{f \times N}{F}$.

- P market price of silver (for a unit weight of one marc)

- $L - P$ = gross profit (per marc of silver)

- Net profit is $L - P$ - brassage cost (i.e. production cost other than silver)

Coin of 10 Deniers Tournois in France (just before

time of Joan of Arc

specifications of
the coin

market
price

Date	F(%)	N	L	P	S(%)	c(%)	R(%)
30/3/1412	45.8	74.25	6.75	6.25	7.4	6.5	0.9
26/4-14/9/1412	41.7	80	8	6.75	15.6	6.0	9.6
14/9/12-23/6/15	41.7	80	8	7.0	12.5	6.0	6.5
28/6/12-12/6/17	41.7	80	8	7.1	11.3	6.0	5.3
22/6/17-17/2/18	33.3	80	10	8.0	20.0	6.0	14.0
26/2/18-1/6/18	22.2	80	15	9.0	40.0	6.0	34.0
12/11/18-1/2/19	22.2	80	15	9.5	36.7	6.0	30.7
1/2/19-14/4/19	22.2	80	15	11.0	26.7	6.0	20.7
19/19-24/6/19	18.8	81	18	13.0	27.8	5.9	21.9

$$S = (L - P) / S ;$$

c = brassage cost as a fraction of L; R = S - c net profit (nominal) as a fraction of L

L = (N / 24) / F (a 10 denier is 1/24 of a livre)

P*.(F / N)=1/24 : for P=P*, the intrinsic value = face value

When does a coin circulate

(used for transactions)

- When its intrinsic value is smaller than its face value
- Suppose the price of silver is Q livres
- Intrinsic value of the coin: $v = F.Q / N$
- The coin circulates only if $v < 1$
- Condition equivalent to $Q < N / F$