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Piet Sercu: International Finance: Theory into Practice

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2

International Finance: Institutional Background

Before we can learn about topics such as currency futures and options, currency swaps, the behavior of exchange rates, the measurement of exchange risk, and valuation of real and financial assets in the presence of this risk, we need to understand a much more fundamental issue: namely, money. All of us are aware that money exists and that it is quite useful. Still, a review of why it exists and how it is created is crucial to understanding some of the finer points of international finance, such as how the ownership of money is transferred across countries, how a central bank's balance sheet is maintained, how money from one country can be exchanged for money from another, and so on. Government policy with respect to the exchange rate (the price at which this buying and selling of currencies occurs) is also an important institutional aspect.

This chapter is structured as follows. First, we explain how money gradually evolved from a commodity with an intrinsic value to fiduciary money whose value is based on trust, and how the role of banks has changed accordingly. In section 2.2 we consider international banking transactions. This then leads to our discussion, in section 2.3, about international banking (often still called eurobanking). The emergence of the international bond market is also explained in that section. We then turn to two more macro-oriented issues: the balance of payments and its relation to exchange transactions (section 2.4), and the relation of government policy to the exchange rate (section 2.5).

2.1 Money and Banking: A Brief Review

In this section, we first review the role of money. We then look back a few millennia and explain how money has evolved over time from a bulky, commodity-type physical object into its current form, a record in a bank's electronic memory.



Figure 2.1. Baroque open-market policies. (Fresco, probably by J. M. Rottmayr (1656–1730), in the cupola of the Karlskirche, Vienna. Author’s photo.)

2.1.1 The Roles of Money

Money has to do with buying and selling. The need for money arises in any economy in which economic units (for example, households, tribes, or fiefdoms) start to trade with each other. Pure, moneyless barter is inconvenient. To make a deal, a hungry blacksmith does not want to wander around until he meets a farmer whose horse has lost a shoe. The blacksmith would rather compensate the farmer for the food by giving him something called money. The advantage of paying in money rather than in horseshoes is that the farmer can then spend the money on other things if and when the need arises, and on any goods he chooses. Thus, trade and exchange with money are much easier, and the costs of searching for someone who needs exactly what you are selling at a particular point in time are greatly reduced if the buying and the selling bits can be separated.

Three conditions are needed for money to be a successful least-cost medium of exchange. First, it must be storable; the farmer would not like the unspent money to evaporate or rot. Second, it must have a stable purchasing power; the farmer would not like to discover that his hoard of money can buy a far smaller amount of goods than he had anticipated. This, in turn, requires that the stock of outstanding money must not rise substantially faster than the volume of transactions. Third, money must be easy to handle. Once these conditions are met, money can fulfill its role as the *least-cost medium of exchange*. When prices are expressed in units of money, money also acts as a *unit of account* or *numéraire*. Finally, money can also be lent and borrowed, which allows one to transfer purchasing power over time in a low-risk fashion.

2.1.2 How Money Is Created

In this section we trace the development of money from commodities and metal coins in early economies to privately issued money and, more recently, to official currency notes issued by the central bank of a country, or even electronic claims representing the right to withdraw currency notes.

2.1.2.1 Official Metal Coins

In relatively primitive economies, standard commodities played the role of money. In prehistoric Europe, domestic animals were used as unit of account. In fact, the Latin word for money, *pecunia*, simply derives from *pecus*, cattle. Also the ancient Greek silver *talanton* (“weight”) betrays its links to the old practice of using domestic animals as money: the original talent had the shape of a sheepskin, and it was about as heavy as a good-sized lamb—one slave could carry just one *talanton*.

Only cowboys, at best, would think of herds of cattle as being easy to handle. The ascent as a medium of exchange of one particular class of commodities, namely precious metals, occurred because for a given amount of purchasing power, precious metals are far less bulky and easier to transport than cattle. Second, precious metals do not rust. And third, production was and is sufficiently costly to ensure that the stock of rare metal does not grow much faster than the economy as a whole, thus ruling out sudden inflation due to a rapidly expanding money stock.

Early gold and silver money was defined by its weight. The *as*, early Rome’s basic currency unit, actually served as weight unit too: it was a cast piece of bronze weighing about $\frac{1}{3}$ kg. Likewise, almost all medieval European states had a pound or a *libra*, *livre*, or a *lira* unit of account, referring to 330–500 g of silver (see panel 2.1 and table 2.1). (Also *mark* was originally a weight—about $\frac{1}{4}$ kg—as was *peso*, from the Latin *pensum*, meaning weight.) What is striking is that the current value of the British or Irish or Maltese pound, not to mention the Turkish or late Italian lira, is not anywhere near the value of 370 g of silver. This *debasement* of the currency started quite early. One problem was that people reduced the true precious-metal content by melting down their coins, adding some cheap metal, and reminting the alloy.¹ To stop this practice—or, cynics might say, to monopolize it—the local lord, or seigneur, of the fiefdom installed an official mint to which people could bring precious metals for minting. The seigneur then imprinted his quality stamp on the coins in return for a commission or tax, the *seignorage*. This was one way that governments earned money. Later, governments made the issuing of coins their sole monopoly. This allowed them to become poachers themselves and reduce the gold or

¹ A related problem with precious metal coins was coin clipping: people scratched off part of the gold or silver around the edge, which reduced the intrinsic value of the coin but may have passed unnoticed. The ribs or other decorations that can still be seen on the rims of modern coins were originally meant to make coin clipping easier to detect.

In 1158, England's King Henry II fixed the financial pound on the basis of the weight standard of the French city of Troyes (Troy, in English) in the county of Champagne, then a leading European trading center. (In France, the leading currency was the *livre Tournois* (the Tournois pound)—20 *sols*, each consisting of 12 *deniers*—from Tours; its rival had been the *livre Parisis*—20 *sols*, each consisting of 15 *deniers*).

The *troy pound* (5760 gr.) consisted, Roman style, of 12 *troy ounces* (480 gr.), each worth 20 *pennyweights* (24 gr.). There was a 16 ounce *pound avoirdupois* too, fixed at 7000 gr. by Henry VIII, but that was for regular weighting. The *troy mark* was 8 troy ounces or 160d. and the *crown* was worth one-quarter pound or five shillings or 60d. The *troy ounce* is still being used nowadays for precious metals; it is 31.103 476 8 g.

Sterling is not an indication of weight but of quality for silver; it derives, like the old French *esterlin*, from Easterling, the name for a member of the German *Hansa*, a league of trading cities. Cynics might conclude that “pound sterling” means “a French coin of German quality,” but you did not hear *me* say this.

Like the mark, the pound was originally just a unit of account: while there were shilling coins (silver) and crown coins (silver and gold), there was no silver pound coin as that would have been inconveniently bulky and heavy. Henry VII first minted gold pounds in 1489. Its weight was 0.5 troy ounce, 23kt (96% pure), soon lowered to 22kt (92%) under Henry VIII. This coin was dubbed *sovereign* because it showed the king on the obverse.

The *guinea* originally referred to new pound coins (1663), made of gold from the Gulf of Guinea (Ghana, the Gold Coast). The new, unworn coins traded at a premium over the old. With gold appreciating relative to silver, the gold-based guineas and sovereigns further rose against the silver-based shilling (up to 30s. per guinea). By the twentieth century, the guinea had become just a unit of account meaning 21s., and since 1967 it has just been a hoity-toity synonym for pound; English barristers, for instance, say guinea when they mean pound. The English (and Irish and Scottish) pound went metric in 1967; at that time, Australia and New Zealand introduced their dollars (initially worth 0.5 pounds).

Panel 2.1. How British is the pound sterling?

silver value of their own coins. France's King Philippe Le Bel (Philip the Fair) was known in Flanders as, among other things, *Flup de munteschroder* (Flup the coinscratcher). The official minting monopoly meant that the rulers could produce a coin at a cost below its purchasing power and make a substantial profit—still called *seignorage* in a broader sense. Debasing another country's currency was not uncommon either: it was just part of economic warfare. For example, Philip the Bold, first duke of Burgundy, minted low-alloy replicas of the English *noble* and used them to pay for imports from England.²

This debasing—see parts (a) and (b) of table 2.1—threatened the stability of the money's purchasing power. Fluctuations in purchasing power also arose when the gold and silver mines were exhausted, when Germany opened new silver mines in Joachimsthal and started coining *joachimsthalers* or *thalers*, or when Spain imported huge amounts of gold and silver into Europe from its colonies.

²During World War II, the German “Operation Bernhard” similarly attempted to counterfeit various denominations between £5 and £50 producing 500,000 notes each month in 1943. The original military plan was to parachute the money on Britain in an attempt to destabilize the British economy, but economists pointed out that it was more profitable to use the notes to make payments throughout Europe. Why give the *seignorage* away, indeed?

Table 2.1. A family tree of floundering currencies.**(a) Ancient**

Name	Original parity	Wikis
<i>as</i> , pl. <i>aeres</i>	<i>aes</i> = bronze	Republican Rome; related words: öre, øre (= metal, ore)
<i>sesterce</i>	2.5 <i>as</i>	Republican Rome
<i>denarius</i>	4 <i>sesterce</i>	Republican Rome, silver; see <i>denier</i>
<i>solidus</i>	gold (4.5 g)	Rome, 309 C.E.; called <i>numisma</i> in Byzantium

Until 270 B.C.E., the Roman *as*, a cast bronze piece, also doubled as a 1 lb. weight (ca. 325 g—Roman ounces were copied by medieval Europe, but Rome used a 12 oz. not a 16 oz. pound). Then, weight and coin became disjointed, with the coin falling by $\frac{11}{12}$ to 1 *uncia* of weight in a mere 60 years. By 23 B.C.E. it had become a small copper coin. In 270 C.E. its purchasing power was zip, and the coin was abandoned. Rome's *denarius* (10 *as*, later 16 *as*), which still survives as *dinar* in many countries in the Mediterranean or the Middle East, started off as a 4.75 g silver coin. It was still 93% pure (4.5 g) under Emperor Nero. Two hundred years later, in 215 C.E., it was down to 50% silver, and by 260 C.E. to 2.5%.

(b) Charlemagne (ca. 800 C.E.) and medieval

Name	Original parity	Wikis
<i>denier</i> (d.)	silver (1.55 g)	<i>dinaro</i> , <i>dinero</i> , <i>dinheiro</i> , <i>dinar</i>
<i>solidus</i> (s.)	12 <i>deniers</i>	<i>solde</i> , <i>solt</i> , <i>sol</i> , <i>sou</i> , <i>suelva</i> , <i>shilling</i> ; <i>gros</i> , <i>grosschen</i> , <i>grote</i>
<i>libra</i> (£)	20s., 240d.	<i>livre</i> , <i>lira</i> , pound

The *denarius* was revived by Charlemagne (ca. 800 C.E.) and contained about 1.55 g of silver, a pennyweight or *denier*; 12 *deniers* made one (European, not ancient Roman) *solidus*. *Solidus*, of course meaning “strong,” is at the origin of the French *sou* and, after translation, the French *gros* or the German *Groschen* or the Flemish *grote*. Tellingly, both *sou* and *Grosschen* are now bywords for worthless coins. The French *livre Tournois* was often called *franc* after its inscription “FRANCORUM REX,” king of the Franks.

2.1.2.2 Privately Issued Paper Money

Another drawback of precious-metal money was that carrying huge amounts of gold from Italy to Scotland, for example, was rather cumbersome and risky. Traders therefore deposited money with international bankers (who often started off as goldsmiths), and used the receipts, or later also bills of exchange and promissory notes, to pay each other.³ The receipts and bills were convertible into the underlying coins *at sight* (that is, whenever presented to the bank),

³A bill of exchange is a summary of the invoice; it is written (drawn) by the seller (drawer) and presented to the customer (drawee), who is asked to accept the bill (that is, acknowledge the existence of the debt by countersigning it) and to return it to the drawer. A promissory note, in contrast, is an “I owe you” note rather than a “you owe me” note; that is, it is written by the customer rather than by the seller. Bills and promissory notes can be sold to investors or can be used to pay off other debts.

Table 2.1. Continued.
(c) Late medieval and modern

Name	Original parity	Wikis
<i>real</i>	1.25s.	Spanish (= Royal). Survives in Saudi Arabia, Yemen, Oman, Iran, Qatar (Ri(y)al); resurrected in Brazil
half crown	2.5s.	U.K. coin until 1967; became quarter dollar in New Zealand and Australia
crown	5s.	survives in Scandinavia or pre-1967 U.K.
florin	4 flemish s.	Dutch Republic, gold; copied after Firenze (Florence)
<i>thaler</i>	2.5 florins	German, silver; aliases: daler, daalder, tolar, or dollar; England (e.g., Macbeth, act 1, scene 1): 1 dollar = 10s.
<i>peso</i>	1 <i>thaler</i>	Spain, Latin America
<i>piaster</i>	1 <i>thaler</i>	France; Louisiana; now $\frac{1}{100}$ Middle East £, dinar, or lira
<i>écu</i>	3 <i>£Tournois</i>	French, gold or silver; <i>escudo</i> (PT), <i>scudo</i> (IT)
euro	1 ECU	ECU itself originally worth 1 EUA, code for 1 USD

The *thaler* was the first world currency, especially in its Austrian, French, and Spanish versions (Maria Theresa (M-T) dollar, *piaster*, *peso*). The silver M-T dollar still circulates in the Arabian peninsula. Because of its parity, 2.5 florins, the *thaler* was denoted in the same way as the old *sesterce* (2.5 *as*): IIS in Roman numerals (“II” for “2” and “S” for “semi”), compressed into “\$” (and thence “\$”) The value of the 1958 USD was copied into the European Unit of Account (EUA)—the old European Community bookkeeping unit—and thence into the ECU and the EUR.

and were as good as gold as long as the issuer was creditworthy.⁴ Note that a merchant who pays with a promissory note that remains in circulation for years before being cashed in, obtains an interest-free loan. By rolling over the notes, the merchant earns quite an advantage. This is *seignorage* (income from creating money) under a new guise.

Banks themselves then started issuing bills on a regular basis. Early bank notes were rather similar to the modern traveler’s check—they were printed and issued by a private bank, in standard denominations, and were convertible at sight into the underlying, official coins. But bankers knew that, on average, only a small fraction of the circulating notes was actually cashed in; most of them remained in circulation for quite some time. This meant that, on the basis of one coin, a bank could issue notes for a much larger total value. Let us see how such an issuing bank’s balance sheet is built up and how it creates money.

⁴This practice started about 1,000 years ago in Italy and went on until the nineteenth century. You can still find references to this practice in Thomas Mann’s novel, *Buddenbrooks*, which is set in nineteenth-century northern Germany.

Table 2.2. Balance sheet of an issuing bank: day 1.

Assets		Liabilities	
Silver coins (owner's input)	120	Equity	120
Gold (A's deposit)	100	Notes issued to A	100
Domestic credit (loan to B)	200	to B	200
Credit to the government (loan to G)	150	to G	150
Foreign credit (loan to F)	70	to F	70
(dollar T-bills)	100	to X	100
Total assets	740	Total notes issued	740

Once you understand the following example, it becomes easier to understand how modern central banks work.

Example 2.1. Consider a bank that issues its own notes. On the bank's opening day, the following five transactions take place:

- A merchant, A, deposits 100 golden crowns in exchange for bank notes. The notes become the bank's liabilities, since they are essentially promissory notes that can be cashed in for true money (gold coins). The merchant's coins go into the bank's vault and are part of its assets.
- Another merchant, B, asks for a loan of 200 crowns. The bank issues bank notes (a liability, since the borrower can cash in the notes for coins), and accepts a promissory note (or any similar claim) signed by B as the offsetting asset.
- The government, G, asks for a loan of 150 crowns. The bank hands over bank notes (that are, again, part of the bank's liabilities), and accepts a Treasury bill (T-bill) or a government bond as the corresponding asset.
- A foreign merchant, F, wants to borrow 70 crowns. The bank issues notes, and it accepts a claim on the foreign trader as the corresponding asset.
- A local exporter, X, wants to convert dollar bank notes into crown bank notes worth 100 crowns. The bank issues crown bank notes (a liability), and it uses the dollar notes to buy foreign T-bills.

By the end of the day, the bank's balance sheet looks like table 2.2. For completeness, I have added 120 crowns of silver initially brought in by the owner/shareholder: there always needs to be some equity.

Table 2.2 shows how bank notes are created, and how an issuing bank's balance sheet is being built up. The issuing bank's own bank notes are the liability side of its balance sheet.⁵ On the asset side we find (i) international reserves or "reserves of foreign exchange" (gold and silver, plus claims on foreigners or governments of foreign countries), (ii) claims on the domestic

⁵A "note" often means an "I owe you" document; in the United States, 1- to 10-year bonds are called notes, for instance; and we all know about promissory notes (PNs). So "bank note" literally means bank debt.



Figure 2.2. Bank notes: echoes from the past. Two new notes and an old one. (a) The Barbados dollar note still reassures the holder that this note is “legal tender for the payment of any amount,” that is, cannot be refused as a means of payment. (b) This particular Hong Kong dollar note is issued by HSBC, a private bank, and still bears the message that the general manager (of HSBC) “promises to pay the bearer on demand at its Office here” the amount of ten dollars (in coins). (c) I will translate the 1910 German note bit by bit: *Ein Tausend Mark* (one thousand marks) *zahlt die Reichsbankhauptkasse in Berlin ohne Legitimationsprüfung dem Einlieferer dieser Banknote.* (the central teller of the Reichsbank pays) *in Berlin (in Berlin) ohne Legitimationsprüfung* (without proof of legitimation) *dem Einlieferer dieser Banknote* (to the deliverer of this bank note).

private sector, and (iii) claims on the domestic government. Note also that most of the money it created is *lent* to the economy, not given away. So by refusing to roll over the loans, the bank can shrink the money supply back to the original size. Even the money brought into circulation as a payment for assets bought from the private sector or the government, as in the above foreign exchange example, can be retired: just sell back the asset into the open market and take payment in notes. This mechanism, as we shall see, is still the basis of monetary policy.

Since the production cost of bank notes was quite low, private banks earned a large seignorage. The risk, of course, was that holders of the notes would lose confidence in the issuer, in which case there would be a run on the bank, with many people simultaneously trying to convert their notes into coins. In the United States, for instance, there were widespread runs on banks as late as 1907. John Pierpont Morgan, a New York banker, helped solve the crisis by shipping in a then gigantic USD 100 million (100m) worth of gold from Europe. As recently as 2007, there was a run on an English bank, inaptly named Northern Rock—the first such run since 1866.

To avert such crises in confidence (and probably also to regain the seignorage), most governments then assigned the production of bank notes to a government institution, or at least a semiofficial institution, the central bank.⁶

⁶There are exceptions: in Hong Kong, for instance, notes are still issued by three private banks (Standard Chartered, HSBC, and Bank of China). But even there, these banks are closely supervised by the currency board. In Belgium, the central bank is a listed company, part-owned by the government, by the commercial banks, and by the public.

2.1.2.3 *Official Paper Money and the Central Bank*

Initially, the official bank notes were still convertible at sight into true money—that is, into the coins issued by the mint or the treasury. For instance, until the mid 1900s, most bank notes still said that the note was “payable on sight” (although the 1910 reichsmark note ominously added that you had to see the Berlin head office for that purpose). Indian rupee bank notes still show a payable-at-sight phrase: “I [the governor of the central bank] promise to pay to the bearer the sum of x rupees.” So do British pounds. Still, for all practical purposes, the central bank’s notes have become as good as (or even better than) the treasury’s coins, and have become the true underlying money in the eyes of the population. In many countries, coins are no longer legal tender above certain amounts. For instance, the seller of a house cannot be forced to accept payment of the full amount in coins. Thus, money has become a fiduciary instrument. Unlike cattle or gold, modern money has basically no intrinsic worth of its own, nor is the value of modern money based on a right to convert bank notes into gold. Rather, the value of money is based on the trust of the people, who believe that money will have a reasonably stable purchasing power.⁷

One difference between a modern central bank and the private issuing banks of old is that the modern bank notes are no longer convertible into gold. If many central banks still hold gold, the reason is that they think of it as a good investment. Other differences between a modern central bank and a private issuing bank include the following:

- A central bank no longer deals directly with the public. Its customers are commercial banks, foreign central banks, and the government. Commercial banks, in fact, act as liaisons between the public and the central bank. For instance, commercial banks can borrow from the central bank by rediscounting commercial paper (i.e., by passing on to the central bank loans they extended to private companies), or by selling to the central bank the foreign currency they bought from the private sector.
- When a central bank buys a domestic or foreign asset from a commercial bank, it no longer pays entirely in the form of bank notes. Commercial banks demand notes only to the extent that their own customers demand actual currency; most of the payment for the asset the commercial bank sold is credited to its account with the central bank, where it is still payable at sight. One result is that the central bank’s liabilities consist not only of bank notes, but also of commercial banks’ deposits into their account with the central bank. This liability side (bank notes circulating plus central bank deposits) is called the country’s *monetary*

⁷ Israel’s experience in the 1970s illustrates this point: when inflation came close to 1,000% per year, people started expressing prices in USD rather than in Israeli pounds. The pound was no longer a trustworthy currency, nor was it a convenient numéraire because prices expressed in pounds had to be changed every day. Similar breakdowns occurred in Germany after World War II, when Lucky Strike cigarettes and chocolate bars became the effective currency.

SDRs are internationally created funds. They were invented toward the end of the fixed-rate era (1944–74), in an attempt to create an alternative international currency next to the beleaguered USD, with the seignorage going to the IMF member states rather than to the United States. The original SDR was at par with the USD. One difference with the USD is that the original SDR was issued by the IMF rather than by the Federal Reserve. Another difference is that the SDR is a purely electronic currency; an SDR deposit cannot be cashed in for SDR bank notes or coins. Central banks can make payments to each other in SDRs, or convert SDRs into other currencies and vice versa at the going market value of the SDR. When in

the 1970s the USD plunged relative to the DEM and JPY, the SDR was redefined as a basket of sixteen currencies. This definition was rather cumbersome, so after some time the basket was again redefined, this time in terms of just five currencies: USD 0.54, DEM 0.46, JPY 34, FRF 0.74, and GBP 0.071. Since the introduction of the EUR, the marks and francs have not been replaced by euros, so the SDR now consists of just USD, GBP, and JPY.

The changes in the SDR composition did not help to make the SDR popular. And in many countries, politicians hated surrendering seignorage to the UN in the first place, disingenuously arguing that the IMF's money was inflationary.

Panel 2.2. The special drawing right (SDR).

base or M_0 . The monetary base is still the basis for money creation by commercial banks, in the sense that it provides the backing for the electronic money the commercial banks are issuing—as we shall see in the next section.

A minor change is that the bank's reserves also include special drawing rights (SDRs) held with the IMF⁸ (see panel 2.2). But the amounts are tiny, at best.

2.1.2.4 Privately Issued Electronic Money

The official monopoly on the printing of bank notes did not mean that private banks lost all seignorage. Any private bank knows from experience that its borrowers rarely take up the full amount of a loan as notes or coins. Rather, customers tend to leave most of their borrowed funds in a *checking account* (also called a *sight account* or *current account*, in Europe), and make payments by check (United States) or bank transfer (Europe). In short, *loans make deposits*.

Example 2.2. Shengmei gets a car loan from her bank. She almost surely will not withdraw the money in cash, but will pay for the car by check or bank transfer. The car dealer will likewise keep most of the money in a bank account; and if and when

⁸The International Monetary Fund (IMF) was created as part of the 1944 Bretton Woods Agreement with the mission of providing short-term financing to deserving central banks that wanted to intervene in exchange markets. (Bretton Woods is a ski resort in New England, where the Allies met to hammer out a postwar financial infrastructure.) It is funded by the participating countries. Since the demise of the fixed-rate exchange-rate system and the near-disappearance of intervention, the IMF has become a general lender to governments, often making loans conditional on changes in economic policy and even general policies about institutions. Lately, the Fund (and the World Bank) has been losing business because most countries can nowadays borrow directly themselves.

