

Appendix 0.1
Conversion of currencies into silver or gold

	Maravedís ¹	Portuguese réis	Grams of silver	Grams of gold
Spanish ducat	375		35.3	ca 3.5
Escudo	400			3.1
Spanish real	34		3.2	
Peso de ocho)				
Real de ocho)	272	400	25.5	
Real of eight)				
Reaal van achten)				
Peso de minas	450		42.2	
Cruzado 16th cent. ²		360		
17th cent.		400	30.5	
Xerafim		300	20.2	2.5
Pardao = Pagoda		360	22.9	2.9
Milréis 1500 ³			91.4	
Milréis 1588-1640			76.4	
Goanese milréis			48.6	
Tael			30.0	
Rixdollar			26.0	
Pound sterling			113	
Dutch guilder 1550			19.0	
" " 1600			11.0	
" " 1650			10.2	
Maravedí 1500-1600			0.096	
1650			0.065	
1700			0.050	

¹ Coin devaluation is a problem with conversion into other currencies or metals. This is best demonstrated by the decrease in the imaginary silver content of the Maravedí, which was a unit of account [Borrowed from F. Braudel, F. Spooner, 'Prices in Europe from 1450 to 1750' in *Cambridge Economic History of Europe IV* (Cambridge 1967) 374-486].

²The *cruzado* was originally a golden coin, which disappeared from circulation around the middle of the sixteenth century, but which continued to be used as a unit of account of 400 réis.

³ Réis is the Portuguese plural of real. In the beginning of the sixteenth century 2,340 réis were minted from 230 grams of silver with a purity of 93%. In the period 1588-1641 this had increased to 2800 réis and in Goa 4,398 réis were produced from the same quantity and quality of silver. The Portuguese real should not be confused with the Spanish real.

Appendix 1.1
Portuguese state revenues and some expenditures ¹
1580-1588 annual average and 1607 (tons of silver)

	1580 - 1588	1607
Inland revenues	24.7	24.9
Salt and fish	1.8	4.2
Maritime trade (incl. brazil wood)	10.6	20.3
Carreira da India (gross)	14.7	17.9
Atlantic empire	11.0	12.5
Total revenues	<u>62.8</u>	<u>79.8</u>
Some expenditures:		
Housing allowances ²	2.1	1.8
Pensions ³	15.4	12.8
Salaries ⁴	13.6	12.7
Amortization and interest of <i>juros</i> ⁵	6.8	15.8

¹Taken from Vit3rino Magalh3es Godinho 'Finan7as publicas e estrutura do Estado' in Joel Serr3o (ed.) *Dicion3rio de Hist3ria de Portugal* (Porto 1981) Vol. III 37-39. As from 1593, port movements carried an additional tax of three percent. Besides, a new tax had to be paid on salt. The revenues from the Carreira da India are gross, without accounting for any costs of the enterprise, which were substantial (see chapter 3).

²The so-called *morad3a* was a housing allowance for the lower nobility.

³These *ten7as* have very little to do with old age pensions, but were allowances paid in exchange for 'services'. They were also used to enforce the bond between the king and his vassals. In 1557 these payments amounted only to 8.5 tons of silver.

⁴So-called *ordenados*.

⁵In 1557 these payments amounted to 4.5 tons of silver.

Appendix 1.2 1
Portuguese royal rights in the 1580s and 1600s
(average tons of silver per annum)

Source of income	Tons of silver/ year		
Gold from S.J.da Mina	1580-1585	2.4	2
	1607	0.7	3
Brazil wood	1580	1.2	4
	1602	1.6	
	1606	1.8	
Slaves from Angola	1587-1593	0.8	5
	1593-1603	1.8	
	1603-1606	2.4	
Slaves from Cabo Verde and Guinea	1580-1588	1.3	3
	1607-1608	2.1	
Various places in Africa	1580-1588	0.1	3
	1607	0.3	
S.Tomé and Príncipe	1580-1588	0.8	3
	1607	0.4	
Sugar from Madeira	1580-1588	1.8	3
	1607	1.6	
Azores	1580-1588	2.3	3
	1607	3.1	
Sugar from Brazil	1580-1588	1.0	3
	1607	3.2	
Total Atlantic Basin	1580s	11.7	
	1600s	15.6	
Carreira da India (gross, including duties on private cargoes)	1580-1585	14.5	6
	1587-1592	12.2-18.7	7
	1593-1597	9.4	7
For comparison:			
Spanish American royal silver to Sevilla	1580s	65.8	
	1600s	63.6	

1. The data have been taken from Vitório Magalhães Godinho 'Finanças publicas e estrutura do Estado' in Joel Serrão (ed.), *Dicionário de História de Portugal* (Porto 1981) Vol.III 20-40; Frédéric Mauro, *Le Portugal, le Brésil et l'Atlantique au XVIIe siècle (1570-1670)* (Paris 1983); J. Bat'ora Ballong-Wen-Mewuda, *São Jorge da Mina 1482-1637* (Paris 1993), James C. Boyajian, *Portuguese trade in Asia under the Habsburgs 1580-1640* (Baltimore/London 1993) and Peter Thomas Rooney, 'Habsburg fiscal policies in Portugal 1580-1640' in *The journal of European economic history* 23 (1994) 545-562, who has used the same source as Magalhães Godinho, with some modifications here and there.

2. J. Bat'ora Ballong-Wen-Mewuda 1993: 389.

3. Magalhães Godinho 1981: 37-38.

4. Mauro 1983: 154.

5. Mauro 1983: 178.

6. Boyajian 1993: 21-22.

7. Rooney 1994: 548-549. See also appendix 3.2.

**Appendix 2.1 - Public revenues, total and retained,
In Mexico and Peru(tons of silver and percentage of total)¹**

	Mexico			Peru		
	total	retained	perc.	total	retained	perc.
1591-1600	569	319	56	861	351	41
1601-1610	607	303	50	972	531	55
1611-1620	401	180	45	886	587	66
1621-1630	484	223	46	851	556	65
1631-1640	660	343	52	963	516	54
1641-1650	369	236	64	1129	747	66
1651-1660	414	265	64	820	600	73

¹Calculated from John J. Tepaske, 'New world silver, Castile and the Philippines 1590-1800' in J.F. Richards (ed.) *Precious metals in the late medieval and early modern worlds* (Durham N.C. 1983) 425-445, table 3 and 4. It should be noted that the total revenues as calculated are not always complete, so that in fact they may have been higher, just as the quantities of silver retained.

**Appendix 2.2- Public revenues remitted from Mexico and Peru 1561-1660, as registered in Vera Cruz, Lima and Sevilla;
private remittances as recorded in Sevilla and silver imports into Europe
with correction for transshipments in Cádiz (tons of silver)a)**

	Public revenues remitted b)			Recordings in Sevilla c)		Transshipments Cádiz d)	Corrected silverflows into Europe		
	Mexico	Peru	Total	Public	Private	Total	Total	Public	Private
1561-1570				236	833		1069	236	833
1571-1580				420	810		1230	420	810
1581-1590				658	1587		2245	658	1587
1591-1600	239	510	749	886	2051		2937	886	2051
1601-1610	274	441	715	636	1719		2355	636	1719
1611-1620	156	299	455	488	1817		2305	488	1817
1621-1630	169	295	464	401	1791	87	2279	464	1815
1631-1640	223	447	670	398	1013	858	2269	670	1599
1641-1650	76	382	458	266	811	1064	2141	458	1683
1651-1660	110	220	330	120	329	?	?		

a) This table has been calculated from the data compiled by Earl J. Hamilton, *American treasure and the price revolution in Spain, 1501-1650* (New York 1965) 34. (Original edition 1934), John J. Tepaske, 'New World silver, Castile and the Philippines 1590-1800' in J.F. Richards (ed.) *Precious metals in the later medieval and early modern worlds* (Durham N.C. 1983) 425-445 and James C. Boyajian, *Portuguese bankers at the court of Spain 1626-1650* (1983 New Brunswick, NY) 92-94, 212 Appendix F.

b) Tepaske 1983: 443, table 2.

c) Hamilton 1965: 34, table 1.

d) Boyajian 1983: 212, Appendix F.

Appendix 2.3
Distribution of compensations for the asentistas' remittances,
1631-1650 (tons of silver)¹

Year	Total	London exchange	Northwest European exchanges	Lisbon exchange
1626-1630	659	-	-	87
1631-1640	1799	376	451	31
1641-1650	1391	743	321	-

¹Summarized from *Boyajian* 1983: 212, appendix F.

Appendix 3.1 a - Carreira da Índia - Outward voyage, Departures Lisbon

	Number of Ships ³	Tons ¹ Ship	Tons/ Ship	Heads ² Ship	Heads/Heads/ Ton ⁴	Arrib. Lost	Invern. Lost	Ships Lost	Perc
1571-1580	50	42900	858	22575	452 0.53	0	7	2	4
1581-1590	59	55420	939	23285	395 0.42	6	1	5	8
1591-1600	43	49200	1144	26550	617 0.54	6	5	3	7
1601-1610	71	77190	1087	33195	468 0.43	6	6	13	18
1611-1620	66	60990	924	27100	411 0.44	7	3	8	12
1621-1630	60	48000	800	18725	312 0.39	13	4	11	18
1631-1640	33	20020	607	7885	239 0.39	0	1	0	0
1641-1650	42	22840	544	11928	284 0.52			10	24
1651-1660	35	14320	409	9470	271 0.66			4	11
1661-1670	21	8635	411	4865	232 0.56			2	10

¹The tonnage of the Portuguese ships includes the cargo-carrying capacity in the form of Portuguese wine casks of approximately 1,000 liters and the weight of the ship when empty (Duncan 1986: 9, 19 note 8).

²Number of heads that left, not including arribadas

³Number of ships, including arribadas, except probably for 1591-1600 [Lopes 1992: 227 gives for this decade 48 departures with 7 arribadas and 4 losses on the outgoing voyage, resulting in 37 arrivals in Índia and 35 departures from Índia, with 13 losses and 22 arrivals in Lisbon].

⁴Number of arribadas and invernadas taken from Magalhães Godinho 1991: III,49. Series run to 1635.

Appendix 3.1 b - Carreira da Índia - Outward voyage, Arrivals Asia and Gains in Asia

	Arrivals Asia Number of Ships	Tons	Tons/ Ship	Heads	Heads/ Ship	Gains in Asia Losses in Asia	Ships	Tons	Heads
1571-1580	48	40800	850	19691	410	0	6	2550	4391
1581-1590	45	42870	953	20850	463	0	-6	-5580	2770
1591-1600	39	42540	1091	25863	663	0	-1	-2810	9273
1601-1610	45	49540	1101	27559	612	5	4	646	10203
1611-1620	47	44060	937	23106	492	2	13	1835	6966
1621-1630	39	31410	805	17448	447	2	9	5649	7778
1631-1640	28	15770	563	7225	258	0	7	2060	1741
1641-1650	28	14280	510	7642	273	0	-4	-1750	1230
1651-1660	35	18990	543	9274	265	2	17	9935	6086
1661-1670	14	5635	403	2633	188	0	0	-435	205

Appendix 3.1 c - Carreira da Índia - Return Voyage, Departures Asia and Arrivals Lisbon

	Departures Asia					Arrivals Lisbon						
	Number of Ships	Tons	Tons/ Ship	Heads	Heads/ Ship	Arri- badas	Ships Lost	Perc. Loss	Ships	Tons	Tons/ Ship	Heads
1571-1580	42	38250	911	15300	364		3	7	39	35150	901	14038
1581-1590	51	48450	950	18080	355	1	8	16	42	39290	935	15945
1591-1600	40	45350	1134	16590	415		18	45	22	25000	1136	11190
1601-1610	36	43390	1205	17356	482	2	7	19	28	32290	1153	14876
1611-1620	32	40350	1261	16140	504	2	3	9	28	35550	1270	13645
1621-1630	28	24150	863	9670	345		8	29	19	15050	792	6087
1631-1640	21	13710	653	5484	261		5	24	15	9910	661	4606
1641-1650	32	16030	501	6412	200		4	13	24	12030	501	4823
1651-1660	16	7970	498	3188	199		1	6	16	8120	508	3385
1661-1670	14	6070	434	2428	173		1	7	13	4820	371	1708

Appendix 3.2 - The Carreira pepper contracts

The Rott-Rovelasca contract (1580-1585)

For the period 1580-1585 the information produced by Boyajian is the most consistent. Over these five years the contractors in India spent 918,000 *cruzados* on pepper and the quantities brought back amounted in total to 102,000, or 20,400 light *quintals*¹ per annum, half of which were for the *Casa da India* at no cost. They were sold back again to the same contractors, who also took care of the distribution in northern Europe, for the fixed price of 32 *cruzados* per *quintal* (19 grams of silver per kilogram). For the *Casa da India* this produced a gross income of 326,400 *cruzados* per annum, to which one may add the farming contract price of the import duties on private merchandise, which at that time would have been 150,000 *cruzados*, to a total of 476,400 *cruzados* per annum (14.5 tons of silver).²

In India the going rate for the pepper was 8 *cruzados* per *quintal*, whereas the market price in Europe at that time varied between 45 and 55 *cruzados*. With the buy-back arrangement against 32 for half the total volume, the gross income of the contractors, not taking into account any costs or losses, must therefore have been at least 428,000 *cruzados* (13 tons of silver) per annum.

The Rovelasca-Fugger-Welser-Ximenes contract (1587-1592)

This six years' contract was more complex than the previous one because the *Casa da India* now paid a fixed price of 16 *cruzados*³ to the Asia contractors for the total volume, which was then sold to the Europe contractor for 'the going rate'. From the annual revenue data of the *Casa da India* produced by Rooney one can calculate that with an average amount of pepper arriving in Lisbon of 15,000 *quintals*, its total gross revenue over the six years period amounted on average to 400,000 *cruzados* (12.2 tons of silver) per annum,⁴ of which about 150,000 *cruzados* may have come from the fees that were received from the collectors of the import duties.⁵ In particular the years 1588-1590 were very good years for the *Casa da India*, and with five ships arriving,⁶ 1588 must have been a top year. However, in 1591 no ships returned at all, and also 1592 was a very low- income year.⁷

Magalhães Godinho⁸ reports for the period 1580-1588 an average

¹A light *quintal* (the so-called *peso velho*) was 51.4 kilograms.

²Boyajian 1993: 21. His quantities of money and pepper suggest a price in India of 9 *cruzados* per *quintal*, but that would not take in account the shipping losses on the way back.

³Which included a four *cruzado* allowance for the equipment and maintenance of the ships [Kellenbenz 1959: 20].

⁴Peter Thomas Rooney, 'Habsburg fiscal policies in Portugal 1580-1640' in *The Journal of European Economic History* 23 (1994): 548. He expresses his revenue data in *milréis*; the total over six years amounted to 958,237 *milréis*.

⁵According to Boyajian 1993: 131 during the 1580s custom revenues were farmed out against 57,000 *cruzados*; according to Kellenbenz 1959: 3 in the period 1587-1592 sixteen carracks made it to Lisbon.

⁶Kellenbenz 1956: 3, Boyajian 1993: 248.

⁷Rooney 1994: 548, table 3.

⁸Magalhães Godinho 1981: 37.

sale of 16,000 *quintals* of pepper, generating a revenue of 385,000 *cruzados* in addition to 229,000 *cruzados* from the customs collectors, resulting in a total gross revenue of 614,000 *cruzados* (18.7 tons of silver).

The price that the Asia contractors paid in India for the pepper that finally arrived in Lisbon must still have been in the order of 8 *cruzados* per *quintal*⁹ and after deducting these costs the volume that arrived in Lisbon would therefore have given them a profit of 120,000 *cruzados*. Keeping in mind that with the ships that were lost also the silver or pepper they were carrying had to be written off, this was a rather sickening result.

The Portuguese contract (1593-1597)

Finally, during the Portuguese contract of the years 1593-1597 on average 9,311 *quintals* of pepper per annum were brought ashore and the total gross revenue for the *Casa da Índia* came down to an annual average of 308,000 *cruzados* (9.4 tons of silver).¹⁰ With 165,000 *cruzados* from the collectors of the customs¹¹ its annual pepper revenues therefore amounted to 143,000 *cruzados*. Making for once the common error of dividing an average revenue by an average volume, and assuming the same 16 *cruzados* per *quintal* for the Asia contractors, the *Casa da Índia* would have sold its pepper for distribution in Europe at an average price of 31 *cruzados*. This is close enough to the 30 *cruzados* that prevailed on the Lisbon market during the 1590s (see appendix 3.4). During the contract, the gross income of the Asia contractors was reduced to 74,000 *cruzados* per annum.

A confirmation of the trends in the revenues of the *Carreira da Índia* can be found in an estimate (or forecast?) for 1607.¹² The *Casa da Índia* expected to sell 10,000 *quintals* in that year, yielding 120,000 *milréis* (300,000 *cruzados* or 9.2 tons of silver), whereas from freight, customs and special duties on indigo and jewelry they estimated to receive 114,000 *milréis* (286,000 *cruzados*). Notwithstanding the stagnating pepper trade they were therefore still contemplating a total gross revenue of 586,000 *cruzados* (17.9 tons of silver).

⁹Boyajian 1993: 21-22, see also appendix 3.4.

¹⁰Calculated from Rooney 1994: 548 who quotes 615,000 *milréis* in total.

¹¹According to Boyajian 1993: 131 during the contract 1593-1598 the price for the right to collect the customs was raised to 75,000 *cruzados* per carrack. During those five years 11 carracks came 'home' [Idem 259].

¹²Magalhães Godinho 1981: 38.

**Appendix 3.3 - Estimates of money and silver
shipped to Asia on behalf of the
Portuguese crown (tons of silver)¹**

Years	Arrived in Asia (Godinho)	Shipped from Lisbon (Disney)	Shipped from Lisbon (Reid)
1581-1590	26		86
1591-1600	?		?
1601-1610	15		59
1611-1620	32	31	47
1621-1630	20	28	44
1631-1633		5	

¹*Magalhães Godinho* 1991:Vol. I 251-252 quotes Italian observers who stated that in 1578 five ships left Lisbon, carrying 1.3 million *cruzados* and in 1583 five ships with more than 1.5 million *cruzados* in money and merchandise. But one of them also stated upon arrival in Goa, that every year 800,000 to 1 million *cruzados* arrived in Goa. Again according to Magalhães Godinho, Van Linschoten would have written that in the latter quarter of the 16th century the value of the cargo of each ship that anchored in the river Tejo, coming from India, reached 1 million *cruzados*. In fact, what Van Linschoten wrote was: 'the least ship, sailing from Cochin to Portugal, carries a value of over a million in gold' [*Van Linschoten* 1910: Vol. II, 105]. Furthermore, Godinho quotes for various years, between 1581 and 1626, the *cruzados* of ten Spanish *reales*, which arrived in the Orient to buy pepper. *Disney* 1978: 161, appendix 2, uses almost the same data for the years 1611-1633, calling them *cruzados*, which would have left Lisbon. Anthony Reid, "An 'Age of Commerce' in Southeast Asian history" in *Modern Asian Studies* 24 (1990) 20-21 also uses Godinho's data, expressing them in kilograms of silver average per year that were sent from Lisbon to buy pepper in Asia, whereafter he puts his data in a table for imports into Asia; the outcome of his calculation appears to bear little relationship with Godinho's data. In chapter 4 I have, for the purpose of discussion, accepted Reid's figures at face value, because they fit best around my own calculations for the 1590s.

**Appendix 3.4 - Purchase and selling prices of pepper in South India
and in Lisbon¹ (grams of silver per kilogram of pepper)**

Year	Purchases Kanara	Sales Lisbon
1580s		26.7-32.6 ²
1590s		17.8
1600		18.5 ³
1607	5.2-4.8	17.8-18.4 ⁴
1611	5.3	
1612	5.3	
1613	5.8	
1614	6.2	
1615	6.4	20.2-18.7
1616	6.7	
1617	6.7	26.7-25.2
1618	6.4	
1619	6.2	
1620	6.5	11.9-14.8 ²
1621	7.2-5.5	16.6
1622	6.7-5.7	
1624	5.8-5.2	
1625	5.5	
1626	7.9-5.2	
1627		11.6-10.1
1628		13.3-11.3
1629	7.6-5.3	13.0
1630		14.8
1631		14.2
1632	7.6	14.2

¹Except where annotated otherwise, calculated from A.R. Disney, *Twilight of the pepper empire. Portuguese trade in Southwest India in the early seventeenth century* (Cambridge Mass./London 1978) 112, 162. Originally Disney's prices in India were expressed in xerafins per heavy quintal (58.752 kg) and those in Lisbon in cruzados per light quintal (51.4 kilograms).

²Calculated from James C. Boyajian, *Portuguese bankers at the court of Spain 1626-1650* (New Brunswick NY 1983) 7.

³Boyajian 1993: 87-88.

⁴Calculated from GAA Not. arch. 107, fo 226v-228 Not. J.Fr.Bruyningh, dated 22/10/1607.

Appendix 3.5
Carreira da India - Profitability estimates
during the 1590s (tons of silver)

	Casa da India	Asia	Privatized contractor	Privatized Carreira
Investment				
Outfitting	65.6			65.6
Pepper money			49.0	49.0
Private money			138.0	138.0
Total investment	65.6		187.0	252.6
Returns				
Pepper	45.8		48.8	94.6
Private goods		240.0	240.0	
Customs received	48.0			
Gross returns	93.8		288.8	334.6
Customs paid 20%			48.0	66.9
Nett returns	93.8		240.8	267.7
Profit	28.2		53.8	15.1
Percentage on investment (in 1.4 yr.)	43		29	6

Assumptions:

During 1590s 43 departures from Lisbon of which 22 returned
 Outfitting costs 50,000 cruzados per departure
 Pepper money leaving Lisbon 49 tons of silver
 Private money leaving Lisbon 138 tons of silver
 Value of private merchandise landed in Lisbon 240 tons of silver
 Customs on private merchandise 20% of landed value
 Amount of pepper landed in Lisbon 100,000 quintals
 Sales price pepper to Casa da India 16 cruzados per quintal
 Sales price pepper in Lisbon 31 cruzados per quintal

Appendix 4.1

Revenues and expenditures according to the budgets of the *Estado da India* (tons of silver)

Year		Tot.Estado		Goa		Hormuz		Diu		Bassein		Chaul		Damãn		Malacca6)		Ceylon7)		Moluccas8)	
		Rev.	Exp.	Rev.	Exp.	Rev.	Exp.	Rev.	Exp.	Rev.	Exp.	Rev.	Exp.	Rev.	Exp.	Rev.	Exp.	Rev.	Exp.	Rev.	Exp.
1574	1)	21.2	18.0	6.70	9.87	3.90	1.19	3.70	0.86	2.60	0.50	0.61	0.27	1.38	1.00	1.30	1.00	0.20	0.57	0.02	0.35
1581	2)	20.1	18.5	4.81	11.0	3.90	0.89	2.75	1.02	3.28	0.96	0.70	0.34	1.18	0.86	1.22	0.72		0.05	0.02	0.26
1588	2)	23.1	19.9	6.61	9.84	4.13	1.33	3.15	1.20	3.28	1.37	1.18	0.34	1.18	1.07	1.93	1.36	0.07	0.71		0.26
1600	4)	23.9	15.9	8.21																	
1607	3)	27.2	18.0	9.07		4.40	4.80	2.76	0.69	1.33		1.96									
1609	2)	29.3	17.7	10.1	5.72	5.26	1.32	5.60	4.97	2.75	0.92	0.94	0.32	1.27	0.70	2.06	1.23	0.24	0.89		
1610	5)	26.3	17.3	8,88	5.04																
1617	4)			11.1																	
1620	2)	24.9	24.3	8.60	10.0	4.60	2.99	4.67	1.83	2.95	1.83	0.71	0.52	0.92	0.79	1.38	1.18	0.01	0.98		
1630	5)	16.2	19.4	6.50	8.27			2.04	1.91	2.32	2.17	0.48	0.39	1.00	0.95	0.77	1.10				
1634	5)	23.9	22.5	6.15	6.85			0.91	1.65	2.47	1.19	1.08	0.35	1.08	0.72	0.76	1.40	0.80	1.50		
1635	2)	27.2	25.6	15.3	11.9	nil		1.03	1.87	2.81	1.35	1.23	0.40	1.23	0.81	0.86	1.61	1.55	2.46		
	4)	23.9	22.5	13.5																	
1680	4)	14.8	9.2	7.26																	

1) Vitorino Magalhães Godinho, *Les finances de l'état Portugais des Indes Orientales (1517-1635) (Matériaux pour une étude structurale et conjoncturelle)* (Paris 1982).

2) Artur Teodoro de Matos, 'A situação financeira do Estado da India no período Filipino (1581-1635) in *idem, Na Rota da India. Estudos de História da expansão Portuguesa* (Macao 1994) 61-81.

3) Artur Teodoro de Matos, 'The financial situation of the State of India during the Philippine period (1581-1635)' in Teotonio R. de Souza, *Indo-Portuguese history. Old issues, new questions* (New Delhi 1985) 90-101. For the year 1607 these data are more consistent with the other years.

4) M.N. Pearson, 'Indigenous dominance in a colonial economy. The Goa rendas, 1600-1670' in *Mare Luso-Indicum 2* (Genève/Paris 1973) 61-73.

5) A.R. Disney, *Twilight of the pepper empire. Portuguese trade in Southwest India in the early seventeenth century* (Cambridge Mass./London 1978) 54-55.

6) Sanjay Subrahmanyam, Luís Filipe F.R. Thomaz, 'Evolution of empire: The Portuguese in the Indian Ocean during the sixteenth century' in James D. Tracey, *The political economy of merchant empires* (Cambridge 1991) table 8.3, 313, quote for Malacca following customs collections: 1574: 3.2, 1581: 3.0, 1586: 4.1, 1590: 3.6 tons of silver.

7) Ceylon revenues in the form of 300 bahar (52.9 kg) of cinnamon, at a total value of 2,592 milréis.

8) Moluccas revenue was the king's part of the cloves brought from there.

**Appendix 4.2 - Silver flows into the Philippines Treasury¹
(Tons of silver)**

	Total Imp./Export Duties	Import Duties ex China ⁴	Import Duties ex N.Spain	Aid ² Rec.d from N.Spain	Transf. ³ Caja de Mexico to Acapulco	Public Revenue from Mexico toPhil. ⁵
1581-1590						32
1591-1600	10	6	4	>6	14	12
1601-1610	13	10	3	27	34	30
1611-1620	15	13	2	64	64	65
1621-1630 ⁶	>3	>3	>1	>32	85	92
1631-1640	9	8	1	70	100	94
1641-1650	5	4	1	45	61	56
1651-1660	2	1	<1	20	53 ⁷	39
1661-1670	1	<1	<1	25	39 ⁸	35

¹Except where annotated otherwise, borrowed or calculated from P. Chaunu, *Les Philippines et le Pacifique des Ibériques (XVIe, XVIIe, XVIIIe siècles) Introduction méthodologique et indices d'activité* (Paris 1960) Vol. II 34, 78, 80, 92-93, 106, 116-117.

²Public remittances received in Manila, as recorded in Manila. A more precise figure for 1621-1630 is probably 64, or maybe even closer to 70. The differences between the transfers from Mexico to Acapulco and the aid arriving in Manila maybe caused by bad administration, losses at sea or otherwise.

³Transfers of money and silver from Mexico 'city' to Acapulco, destined for Manila, according to Chaunu.

⁴As from 1610 increased from 3 to 6%. The collapse of the Chinese trade occurred after 1645, with the invasion of the Manchus in China.

⁵According to John J. TePaske, 'New World silver, Castile and the Philippines 1590-1800' in J.F. Richards (ed.) *Precious metals in the late medieval and early modern worlds* (Durham N.C. 1983) 444, table 4.

⁶Chaunu's data from the Philippines' records do not include the years 1621-1625. George Bryan Souza, *The survival of empire. Portuguese trade and society in China and the South China Sea 1630-1754* (Cambridge 1986) 82-83 suggests for 1621-1630 import duties on Asian goods to the amount of 6 tons of silver.

⁷In the same period the cost of the Philippines to the *Caja de Acapulco* was recorded as the equivalent of 50 tons of silver.

⁸In the same period the cost of the Philippines to Acapulco was recorded as the equivalent of 35 tons of silver.

**Appendix 4.3 - Officially recorded private silverflows
into the Philippines
(tons of silver)**

	From Acapulco to Manila ¹	Estimates of TePaske and Klein ²
1591-1600	26	15
1601-1610	114	90
1611-1620	107	129
1621-1630	126	139
1631-1640	88	90
1641-1650	61	45
1651-1660	87	52
1661-1670	46	

¹Calculated from *Chaunu* 1960, who reports the duties on silver paid in Acapulco at a rate of 5/6 of 2% on silver leaving Mexico.

²*TePaske* 1983: 445, table 5.

Appendix 4.4
Number and origin of ships arriving at Manila
(approximate annual average in brackets)¹

	Portuguese from Macao	Estado da India	Mainland China	Taiwan	Japan	Macassar
1627-1630	16(4)	19(5)	48(12)	9(2)	4(1)	-
1631-1640	27(3)	16(2)	278(28)	20(2)	6(1)	-
1641-1644	4(1)	0(0)	80(20)	3(1)	0(0)	6(1.5)

¹Taken from George Bryan Souza, *The survival of empire. Portuguese trade and society in China and the South China Sea 1630-1754* (Cambridge 1986) 84, table 4.8.

**Appendix 4.5 - Exports of money and precious metals to Asia
including Japanese exports (Tons of silver)**

	Casa ¹ daIndia	VOC ²	EIC ³	Manila TePaske ⁵	Galleon Chaunu ⁶	Japan Reid ⁷	Japan Glahn ⁸	VOC ⁴ Japan
1581-1590	86			40		300	240	
1591-1600	49			27	40	400	270	
1601-1610	59	57	14	120	148	800	275	
1611-1620	47	106	56	194	171	1,300	568	
1621-1630	44	137	40	231	211	1,500	537	
1631-1640		98	39	184	188	800	924	264
1641-1650		90	?	101	122	500	513	152
1651-1660		86	?	91	140	500	523	131
1661-1670		121	101	80	85	300	448	145

¹Taken from Anthony Reid, "An 'Age of Commerce' in Southeast Asian history" in *Modern Asian Studies* 24 (1990) 20-21. For a discussion see chapter 3 and appendix 3.3 with note. The figure for 1591-1600 is the result of the estimate made in chapter 3, page 98-99.

²Calculated from F.S. Gaastra, *De geschiedenis van de VOC* (Haarlem 1982) 125, table 13. The VOC year of account differed from the calendar year.

³Calculated from K.N. Chaudhuri, *The English East India Company. The study of an early joint-stock company 1600-1640* (London 1965) 115 and K.N. Chaudhuri, *The trading world of Asia and the English East India Company 1660-1760* (Cambridge 1978) 512.

⁴The figure for 1631-1640 has been taken from Eiichi Kato, 'Unification and adaptation, the early Shogunate and Dutch trade policies' in Leonard Blussé, Femme Gaastra (eds.) *Companies and Trade* (Leiden 1981) table 2, 224. Kristof Glamann, *Dutch-Asiatic trade 1620-1740* (The Hague 1981) 58 has been used for the next three decades.

⁵Calculated from *Tepaske* 1983: 444-5, adding public revenues and private remittances (our appendix 4.2 column 7 and table 4.3 column 3). For 1581-90 and 1661-70 private remittances have been estimated by Reid 1990: 20-21.

⁶Chaunu's data have been calculated as the sum of the transfer of royal silver from Caja de Mexico to Acapulco (table 4.2 column 6) and the private flow of silver from Acapulco to Manila (table 4.3 column 2).

⁷Estimates by Reid 1990: 20-21. Ward Barrett, 'World bullion flows, 1450-1800' in James D. Tracy, *The rise of merchant empires. Long-distance trade in the early modern world, 1350-1750* (Cambridge 1991) table 7.4, 246, quotes slightly higher figures over the periods 1560-99 and 1600-40, but a lower figure for 1601-94.

⁸Calculated from Richard von Glahn, 'Myth and reality of China's seventeenth century monetary crisis' in *Journal of Economic History* 56 (1996) 429-54. For 1581-1590 and 1591-1600 the lowest and highest average were extrapolated from his table 3. His annual average of Japanese exports for the period 1604-1639 amounts to 57 tons and that for Japanese imports into China during the years 1601-1640 to 52 tons. Consequently, for the decades in the latter period his import figures from table 5 were used and 10 % added. For the decade 1641-1650 his data from his tables 2 and 4 were extrapolated. The next two decades were taken from his table 4. His data include Japanese, Chinese, Portuguese and Dutch exports.

**Appendix 4.6 - Estimated volumes of trade in Asia
Tons of silver per year¹**

Export via <i>Carreira da India</i> (1590s)	17
Total volume maritime trade Goa, excl. <i>Carreira da India</i>	57
Total inland trade Goa	30
Total volume Hormuz	48
<i>Casados'</i> share in Hormuz trade	17
Total volume Diu	48
Total volume Chaul	22
Japan, <i>The Great Voyage</i> per cargo	18
Japan, silver exports	50-150
Philippines, average total volume	
China trade 1601-1620 (Chaunu)	35
China trade 1621-1630 (Souza)	20
of which Chinese	7
Portuguese Macao	6
Others	7
Silver from Acapulco to Manila	
1621-1630	22
1631-1640	19
1641-1650	11
Total Portuguese trade Macassar	18

¹Total trade means imports plus exports.

Appendix 7.1

Amsterdam share of costs of Dutch shipping to Asia during the early voyages around 1600

	De Houtman	van Neck	V.d. Haghen	Wilckens/ Van Neck	Harmensz	Heemskerck	Van Warwijck
Number of ships departed 1	4	8	3	10	5	8	6
Date of departure 1	2/4/1595	1/5/1598	6/4/1599	21/12/1599 28/6/1600	23/4/1601	23/4/1601	17/6/1602
Cost of outfitting Dfls. 2	170,000	372,312	158,408	638,121	224,601	609,741	622,382
Merchandise and money Dfls. 2	120,000	396,738	-	294,500	?	704,900	1,115,944
Total capital provided Dfls 2	290,000	768,466	-	914,205	?	1,334,473	1,738,325
Total tonnage (m.tons) 1	1230	2610	1480	4160	1150	?	3060
Average tonnage (m.tons) 1	308	326	493	416	230	?	510
Cost of outfitting Dfl/m.ton	138	143	107	153	195		203
or in kgs silver/m.ton	1,5	1,6	1,2	1,7	2,1		2,2
Merchandise and money Dfl/m.ton	98	152		71			365
Total number of men on board 1	249	560	?	912	?	?	?
Men per ton freight	0.20	0.21	?	0.22	?	?	?
Number of ships returned 1	3	8	3	8	3	6	4
Years of return 1	8/1597	1599-1601	10/1601	1600-1607	1603	1603-1604	1604-1607
Portuguese equivalent (<i>toneladas</i>) ³	1845	3900	2220	6240	1725		4,600
in carracks	2 x 900	3 x 1300	2 x 1100	4 x 1560	1 x 1700		4 x 1,150
Estimated costs (<i>cruzados</i>) ⁴	2 x 47,000	3 x 63,000	2 x 55,000	4 x 73,000	79,000		4 x 58,000
Portuguese costs/Dutch m.ton (kgs silver/m.ton)	2.3	2.2	2.3	2.1	2.1		2,3

Notes:

1. J.R. Bruijn, F.S. Gaastra, I. Schöffer, *Dutch-Asiatic shipping in the 17th and 18th centuries* (The Hague 1979), Vol. II and III.

2. F.S. Gaastra, *De geschiedenis van de VOC* (Haarlem/Antwerpen 1982) 22 tabel 2.

3. Calculation according to Frederic C. Lane, 'Tonnages, Medieval and Modern' in *Venice and history. The collected papers of Frederic C. Lane* (Baltimore 1966) 348, 364.

4. Costs interpolated on basis of data given in Chapter 3.

Appendix 7.2

Amsterdam share of the costs of the first four VOC fleets 1603-1607

	V.d. Haghen	Matelieff	Van Caerden	Verhoeff
Number of ships departed 1	6	7	4	7
Date of departure 1	18/12/1603	12/5/1605	20/4/1606	4-12/1607
Cost of outfitting Dfls. 2	580,000	813,058	462,559	763,605
Merchandise and money Dfls. 2	413,052	624,624	367,587	532,300
Total cost Dfls.	993,058	1,416,682	830,146	1,295,905
Total capital provided Dfls 2	922,379	1,220,719	1,217,368	308,550
Total tonnage (m.tons) 1	2,620	4,000	2,100	3580
Average tonnage (m.tons) 1	437	571	525	511
Cost of outfitting Dfl/m.ton	221	203	228	213
kgs silver/m.ton	2.4	2.2	2.4	2.3
Merchandise and money Dfls/m.ton	158	156	175	149
Total number of men on board 1	530	888	?	840
Men per ton freight	0.20	0.22	?	0.23
Number of ships returned 1	4	3	4	4
Years of return 1	1605-1606	1608	1608-1610	1610-1612
Portuguese equivalent (<i>toneladas</i>) ³	3,931	6,000	3,150	5,371
in carracks	3 x 1300	4 x 1500	2 x 1550	4 x 1350
Estimated costs (<i>cruzados</i>) ⁴	3 x 63,000	4 x 71,000	2 x 73,000	4 x 65,000
Portuguese costs/ Dutch m.ton				
(kgs silver/m.ton) 4	2.2	2.2	2.1	2.2

Notes:

1. J.R. Bruijn, F.S. Gaastra, I. Schöffer, *Dutch-Asiatic shipping in the 17th and 18th centuries*, Vol.II and III.
2. J.P. de Korte, *De jaarlijkse financiële verantwoording in de Verenigde Oostindische Compagnie* (Leiden 1984) 10 table 2. According to De Korte the Amsterdam share of Verhoeff's fleet would have been nine ships, which is incompatible with the low costs of outfitting and with the number of men on board. According to *Bruijn* 1979: Vol.II in 1607 only seven ships would have departed on account of the Amsterdam Chamber, which includes the *Gelderland* which left 8 months earlier than the main fleet. Of the Amsterdam ships two were captured near Manila and one stayed in the Indies.
3. Calculation according to Frederic C. Lane, 'Tonnages, Medieval and Modern' in *Venice and history. The collected papers of Frederic C. Lane* (Baltimore 1966) 348, 364.
4. Costs of carracks interpolated on basis of the data given in Chapter 3 and expressed in kgs silver per equivalent Dutch metric ton.

Appendix 8.1 - VOC shipping 1)

Outward voyage

Arrivals Asia

Period	Number of Ships	Tons	Tons per Ship	Heads	Heads per Ship	Heads per ton	Number of Ships	% Loss	Number of Heads
1595-1602	66			5300	80		62	6	
1602-1610	76	34970	460	8500	112	0.24	69	13	
1610-1620	117	56280	481	19300	165	0.34	114	3	
1620-1630	141	54720	388	23700	168	0.43	130	8	20200
1630-1640	157	63970	407	28900	184	0.45	154	2	26200
1640-1650	165	100950	651	33100	201	0.33	165	0	30100
1650-1660	206	123990	674	40200	196	0.32	196	5	36400
1660-1670	238	129349	565	40900	172	0.32	228	4	35900

Return voyage

Withheld or lost in Asia

Period	Number of Ships	Heads	Ship arrivals	% Loss Ships	Number of Ships	Heads	% Ships
1595-1602	49				13		21
1602-1610	40		35	13	29		42
1610-1620	50	14500	46	8	64		56
1620-1630	71		68	4	59		45
1630-1640	75	10000	74	1	79	16200	51
1640-1650	93	11800	92	1	72	18300	44
1650-1660	103	13000	102	1	93	23400	47
1660-1670	127	14400	115	9	101	21500	44

1.) Borrowed from J.R. Bruijn, F.S. Gaastra, I. Schöffer, *Dutch-Asiatic shipping in the 17th and 18th centuries* (The Hague 1987) Vol. I, 163-164, 174, 177.

Appendix 10.1 - Bullion flows in and from Mexico and Peru, 1591-1650
Order of magnitude estimates in tons of silver 1)

	1591-1600	1601-1610	1611-1620	1621-1630	1631-1640	1641-1650
Production						
Royal quinto 2)	1140	1260	1030	1070	1300	1200
Private silver 3)	4580	5040	4120	4280	5200	4800
Total	5720	6300	5150	5350	6500	6000
Export to Europe 4)						
Royal silver	890	640	490	460	670	460
Private silver	2050	1720	1820	1820	1600	1680
Total	2940	2360	2310	2280	2270	2140
Export to Philippines 5)						
Royal silver	10	30	60	90	100	60
Private silver	20	90	130	140	90	50
Total	30	120	190	230	190	110
Retained in Americas or illegal						
From royal quinto 6)	240	590	480	520	530	680
Private silver 7)	2510	3230	2170	2320	3510	3070
Total	2750	3820	2650	2830	4040	3740
Other royal revenues 8)	290	320	260	270	320	300
Total royal retained (theoretical)	530	910	740	790	850	980
Total royal retained (TePaske) 9)	670	830	770	780	860	980

Notes

1. The figures have been taken or calculated from previous appendices and rounded off to nearest 10 tons.
2. Assuming the royal quinto on the silver production to be 80% of the total royal revenues in Mexico and Peru (see appendix 2.1). The remaining 20% would then be other royal revenues, from taxation and other income.
3. Theoretically, the total production would be five times the royal quinto, the private silver 4/5 of that total production.
4. Corrected silver flows into Europe, taken from appendix 2.2, columns 9 and 10.
5. Taken from appendix 4.2 and 4.3.
6. Purely theoretical. Difference between total royal quinto and total royal exports.
7. Difference between total private silver and total private exports.
8. Purely theoretical. See note 2. These revenues already formed part of the Mexican and South American economy.
9. Theoretical royal revenues retained are sum of 6) and 8). 'Actual' figures are those of TePaske, presented in appendix 2.1. The difference between the two for the years 1591-1610 tells something about the validity of the data and assumptions. The 'accuracy' for the years 1621-1650 is the result of 'circular' reasoning.

