

DID BULLIONISM MATTER? : SILVER-POINT MECHANISM AND CASTILIAN SMUGGLING IN THE EARLY 18TH CENTURY*

Pilar Nogues-Marco

Universitat Carlos III de Madrid

mnogues@clio.uc3m.es

This draft 9 March 2011

ABSTRACT

In the Early Modern period, there was a systematic flow of precious metals from American colonies to Spain and Portugal and, from there, throughout the world. This paper calculates the silver-point mechanism in the early 18th century to measure the Castilian silver outflows to Europe. The discovery of prices for silver sold on the Cadiz black market has been a milestone in reconstructing the silver-point mechanism. Silver-point mechanism shows persistent violations of the silver-point that made arbitrage systematically profitable until devaluation pegged the exchange rate to the arbitrated parity. Market structure explains the persistent violations. The Cadiz shadow price was lower than the international market price because bullionist regulations configured an oligopsonistic structure. The price gap was the reason for the Castilian silver outflows to Europe.

KEYWORDS: silver outflows, silver-point mechanism, Castilian smuggling, oligopsony, arbitrage.

* I am very grateful to Marc Flandreau for his constant support and valuable advice and to Vincent Bignon, Albert Carreras, Xavier Espluga, Alfonso Herranz, Carlos Marichal, Pablo Martín Aceña, Larry Neal, Stephen Quinn, Albrecht Ritschl, Javier San Julián, Carles Sudrià and Nathan Susman for their suggestions to earlier versions of this paper. I am also very grateful to participants in Cliometrics-La Crosse, Carlos III University-Madrid, ASSA-Atlanta, SAEe-Valencia, AEHE-Barcelona, WEHC-Utrecht, UAB-Barcelona, AEHE-Murcia, Euro-clio conference-Paris and UB-Barcelona for comments to previous drafts. I am responsible for any error or misinterpretation. Pilar Nogues-Marco is currently involved in the research projects ECO2009-08791 and HAR2010-17482. Funding for data collection was provided by the Chaire Finances Internationales, Sciences-Po Paris. The author is responsible for any errors or misinterpretations.

“Laws made against Exportation of Money or Bullion, will be all in vain. Restraint, or Liberty in that matter, makes no Country Rich or Poor: As we see in Holland; which had plenty of Money under the free liberty of its Exportation; and Spain, in great want of Money under the severest penalties against carrying of it out”.

Locke (1695): Further Considerations Concerning Raising the Value of Money

INTRODUCTION

The discovery of America was followed by a flow of precious metals to Spain and Portugal, and, from there, throughout the world. Gold and silver had a large and growing importance in international trade during the early Modern Period. And Spain was a main player of this international trade because the Spanish-American colonies produced three-quarters of the world’s silver and one-half of the world’s gold. Historiography has estimated the quantities of gold and silver transferred from the New World to the Old World, but we know little about the reasons for the bullion outflows. This paper analyzes the causes of precious metal outflows from Cadiz, Spain to the main northwestern European bullion centers in the early 18th century.

Castile enacted bullionist laws to prevent the outflow of precious metals during more than four centuries, from the Late Middle Ages to mid-19th century. Administrative prices prohibited the exchange of gold, silver or billon at a different price than the official parity, and bans on exports forbade the exportation of gold or silver without a license. The consequence of the bullionist legislation was the absence of a free bullion market. However, a majority of the silver that arrived from Spanish-America was smuggled from Cadiz to the rest of Europe because a black market had developed in Cadiz. The paper provides black market prices for silver in Cadiz. The international character of the arbitrage business forced merchant-bankers to continuously exchange information. Letters between correspondents of the merchant house *Roux* (Marseille) have provided data to calculate silver-point mechanism to measure the profitability of arbitrage as exactly 18th-century merchants practiced. The discovery of data on the silver black market in Cadiz has been a milestone in helping to understand the reasons behind the silver outflows.

The common understanding of the operation of the specie-point mechanism refers to an institutional setting of free bullion movements, such as that of the late 19th century. But

bullionist restrictions changed the performance of silver points. Smuggling was led by a cartel of foreign merchants who had the market power to drive down the price of silver in the Cadiz black market and provided them with the necessary international connections to illegally extract and distribute bullion from Cadiz. Silver-point mechanism shows that from 1729 to 1737, the gap between the implicit spot exchange rate and the lower silver point made arbitrage systematically profitable. And from mid-1737 to 1741, the gap was corrected because the Spanish crown reacted to the illegal silver outflows with a devaluation that equalized the implicit spot exchange rate and the arbitrated parity, so arbitrage stopped being profitable.

The paper is organized as follows. The first section explains Castilian bullionist regulations against silver export and how smuggling took place. The second section describes the oligopsonistic structure of the black silver market in Cadiz which drove down silver prices. The third section explains silver arbitrage according to *Roux* banker archive. And the fourth section calculates silver-point mechanism. The appendix focuses on the methodology and database.

1. WHY SILVER SMUGGLING?: THE RULES OF THE LAW VS. THE RULES OF THE GAME

The Castilian economic policy in the Early Modern period was dominated by the strategy of controlling the precious metal arrived from the colonies. Spanish-America produced the 85% of world silver and the 50% of world gold during the period 1493-1820.¹ Bullion mines in Spanish-America were operated by private agents, who must pay 20% of total extraction to the Monarch². Royal precious metal plus the precious metal obtained by private merchants in Spanish-America were repatriated to Castile in the Spanish vessels which traded with the colonies. Thus, Castile received a systematic inflow of gold and silver from the colonies. Being Castile the main producer of precious metals, bullionist laws were implemented to retain bullion into Castile according to the bullionist doctrine of precious metals possessions as the measure of wealth. The whole Castilian legislation about trade with colonies was

¹ Calculated from Merrill, C.W. (1930) and Ridgway, R.H. (1929)

² The extraction tax for precious metals was 20% (*quinto Real* - Royal fifth), and it was reduced to 10% (*diezmo Real* - Royal tenth) in 18th century (in 1716 for Mexico and in 1735 for Peru). Haring (1939), p. 198.

subordinated to the government's concern to accumulate precious metals in Spain³. Bullionist policy remained the essence of state economic policy during sixteenth, seventeenth and eighteenth centuries, reinforced through stagnated legislation and immobile institutions.⁴

Castile enacted bullionist laws which had their origin in the late Middle Ages and were in force until the colonial independence. Castile bullionist legislation was characterised by a chaotic form and anachronistic contents based on the successive ratification of previous laws. Two types of bullionist laws regulated bullion exchange with the objective of avoiding bullion outflows: administrative prices and bans on export.

On the one hand, the price of the exchange of the precious metal into Spain was regulated.⁵ Ingots must be sold to the mint at the mint price. And administrative prices prohibited the exchange of gold, silver or billon coins at a different price than the official parity, i.e., the legal value of coins in units of account⁶. The fixation of an administrative price for precious metal in Spain was regulated by the Mint Regulation of the year 1497 and was in force until the Reform of the Monetary System of the year 1848.⁷ Successive regulations modified the official parity between coins and the unit of account, but maintained the prohibition of selling coins at a higher price than the official parity. The consequence was the absence of a legal market to free exchange precious metal as a commodity. Castile only accepted precious metal as money, exchanged at the official parity. At the end of the 18th century, contemporaries claimed that *"Spain is absolutely the only country in Europe in which there is not trade of*

³ Girard (1967), p. 33

⁴ Bernal (1999), Stein and Stein (2000), p. 6.

⁵ *Recopilación ley IV tit 18 lib 5 year 1498, Recopilación ley VI tit 18 lib 6 year 1550, Recopilación cap 18 aut 16 tit 21 lib 5 1652, Recopilación aut 40 tit 21 lib 5 year 1704, Nueva Recopilación ley X lib IX tit XVII year 1743.*

⁶ The aim of these laws was to prevent the exportation of bullion: *"We have been informed that there is so much greed to take gold coins out of our kingdoms, that both foreigners and natives are involved in the business of collecting gold coins and paying for them more than their value, in order to take them out to other kingdoms, thus making profits, with no fear of the punishments that our laws provide; as the laws of our kingdom stipulate that no one can pay for coins more than their value"* [*"porque somos informados que es tanta la codicia, que hay en sacar la moneda de oro de nuestros reinos que así extranjeros como naturales tiene por trato de recoger la moneda de oro y dar por ella más de lo que vale, por la llevar a otros reinos y ganar por ella, sin temor de las penas de nuestras leyes contenidas, que por las leyes de nuestro reino está proveído que por las monedas no se pueda llevar más de lo que valen"*] (ley VI, tit 18, lib 6 R year 1550)

⁷ The Mint regulation was compiled in *Ordenanzas que regulan las Casas de Moneda de 13 de Junio de 1497*. This regulation prohibited the exchange of silver at a higher price than the Mint Price, but there is no reference to gold. Gold price was regulated next year (*Ley IV tit 18 lib 5 Recopilación year 1498*). The reform of the monetary system in 1848 was compiled in *RD de 15 de abril de 1848*.

gold and silver, and where there is no specialized merchant house dealing with this kind of business".⁸

On the other hand, bans on exports prohibited the export of gold and silver without a licence until the mid-19th century.⁹ The Treasury Department (*Consejo de Hacienda*) issued licences to export specific amounts of precious metals only to businessmen who justified the "provisions that they should make out of the Kingdom".¹⁰ Additionally, the import of the precious metal from the American colonies was controlled by the institution which administrated trade with the colonies: *Casa de Contratación*.¹¹ Merchants had to register gold and silver as soon as the vessel tied up in Cadiz –and paid the import tax for both ingots and coins.¹² Ingots had to be sold at the Mint price in the *Casa de Contratación* and sent to the Mints for minting. Coins received a certificate which proved the registration. The transport of precious metal into Spain was forbidden by sea or land, except to go to the mint or to be exchanged for goods, cases in which a licence was needed.

The consequence of bullionist legislation was the absence of a free bullion market. But a black market emerged in Cadiz and a great proportion of the silver arrived from Spanish-America was smuggled from Cadiz to the rest of Europe. The estimation of the silver illegally exported was around 50% in the mid-16th century, 70% during the first half of the 17th century and 50% in the mid-18th century.¹³

How did the illegal exchange take place? As Castile prohibited the existence of a market for silver, we could have expected the Spanish-American silver traded directly to the European bullion markets. But this did not happen and a black market was created in Cadiz. The Castilian crown concentrated the monopoly of trade with American colonies using one single port; first, Seville (1495/1503-1717), through the ports of Cadiz and Sanlúcar de Barrameda, and later, directly Cadiz (1717- 1765/1789).¹⁴ Cadiz was, therefore, the commercial geo-strategic centre which connected the maritime route Mediterranean Sea -

⁸ Larruga (1787-1800), vol. 3, p. 44.

⁹ The beginning of the prohibition is compiled in *Quadernos de Guadalaxara de D. Juan I y D. Enrique III*. And, according to Alcubilla (1868, vol. 9, p. 305), the free export of gold and silver in both ingots and coins was permitted from 1849 (RR.OO. 2 November 1849). The bans on export are compiled in *Nueva Recopilación tit. XIII, lib. IX: "de la saca prohibida de oro, plata y moneda del Reyno"*.

¹⁰ *Pragmática 13 Septiembre 1628. Madrid*.

¹¹ *Recopilación de Indias, lib. IX, tit. XIII*. Veitia (1672). Hamilton (1934).

¹² García Baquero (1988), vol. 1, pp. 197-210

¹³ Cipolla (1999), p. 35, Serrano Mangas (1989), p. 316, Morineau (1985), p. 375

¹⁴ Bernal (1992), García-Baquero González (1988, 2002)

Atlantic Ocean - North Sea - Baltic Sea though the Strait of Gibraltar. Bullion shipped from New World to Old World had to pass through Cadiz. As the Castilian crown concentrated the monopoly of trade with the American colonies in the port of Cadiz, the importers from the Spanish-America and exporters to Europe exchanged silver in the black market in Cadiz.

Nationality criterion defined the sides of the silver black market in Cadiz. The supply side consisted of the Spanish businessmen who imported the silver from America to Cadiz. Trade with the colonies was restricted to the Spanish merchants¹⁵, who had to be registered as members of the guild *Consulado de Cargadores de Indias* (Consulate of delivery agents for Indies), and could trade for themselves or as commissioners for other Spanish businessmen¹⁶. The *Consulado de Cargadores de Indias* had judicial, fiscal, financial and administrative tasks. It was the merchants' court for the *Casa de Contratación*, the collector of commercial taxes for the monarch, the moneylender for the crown and the registry of the merchants with American colonies. Thanks to the guild's registry, we know the names of all *Cargadores de Indias*: in our period 1730-1742, there were 1,250 merchants registered.¹⁷

The demand side consisted of the foreign businessmen who illegally exported the silver from Cadiz to Europe. They could not legally trade with the American colonies, neither directly nor through the *Cargadores de Indias*. Silver travelling from the Spanish-American colonies to Spain was taken directly to the foreign ships anchored in the bay of Cadiz, property of foreign merchants living in the city. The smugglers were the foreign merchants settled in Cadiz because they were granted diplomatic immunity. Spain had granted commercial concessions to foreign merchants through Commercial Treaties signed after the Peace of Westphalia, due to the Spanish economic backwardness and loss of political power.¹⁸ Several clauses in the commercial treaties gave to foreign merchants indirect advantages for the smuggling of bullion because, although it had been explicitly prohibited, several loopholes gave protection to foreign merchants. Foreign merchants' books could not be searched by Spanish authorities and foreign merchants could not be prosecuted by a Castilian judge. They had special judges of their nationality –*juez consensuador*– who safeguarded their interests according to their national legislation.

¹⁵ *Real Cédula 27 July 1592, Real Cédula 24 May 1686*, García-Baquero (1991), pp. 69-101, *AGI Consulados leg 63A year 1747*, in Bustos (2005), p. 130.

¹⁶ García-Baquero (1991) pp.69-101.

¹⁷ Ruiz Rivera (1988), p. 113-130, reproduces the list with the names of *Cargadores de Indias*.

¹⁸ Report about the excess of smuggling, 1738-1744, *AGI, sección 5a, Gobierno, Legajo Indiferente General 2479 (microfilm C-1557 and C-1558)*. Girard (1967), McLachlan (1974), Stein and Stein (2000).

Therefore, Spanish merchants shipped the silver from the Spanish-American colonies to Cadiz. And foreign merchants settled in Cadiz bought the silver in the black market to the Spanish merchants, and sold it abroad. Both market sides won with the illegal exchange. The silver sellers saved to pay the very high import tax entering the silver illegally in Cadiz without registration¹⁹. And the silver buyers circumvented bans against silver exports. Voltaire (1756) described silver smuggling in Cadiz: *“The way in which, for a long time, foreigners appropriated the gold and silver that the galleons supplied from America was singular. The Spaniard, who is the factor of the foreigner in Cadiz, hands over the ingots he has received to some brave men called Metedores. These men, armed with small pistols and swords, carry the ingots numbered to the city walls, and hand them over to other Metedores, who carry them onto skiffs. These skiffs take the ingots onto vessels in the bay. These Metedores, these factors, the assistants, the guards who never disturbed them, all of them had their rights, and the foreign merchant was never deceived”*²⁰

2. OLIGOPSONISTIC STRUCTURE OF SILVER BLACK MARKET

Cadiz had a population around 60,000 people in mid-18th century²¹. Its economy was based on trade, and trade was dealt by businessmen who practised wholesale trade with America or with the main commercial and financial European centres²². We have seen in previous section that nationality defined market sides of trade: Spanish merchants traded with American colonies while foreign merchants settled in Cadiz traded with the European centres. The foreign merchants in Cadiz were the “merchants in the shadow”, i.e., those who could not trade with American colonies *de jure*, but who obtained the highest net income from the

¹⁹ During the period 1720-1765, the taxes for gold and silver introduced from America to Castile were more than 7% for gold and more than 10% for silver. García Baquero (1988), vol. 1, pp. 197-201

²⁰ “La manière dont on donna longtemps aux étrangers l’or et l’argent que les galions ont rapportés d’Amérique fut encore plus singulière. L’Espagnol, qui est à Cadix facteur de l’étranger, confiait les lingots reçus à des braves qu’on appelait Météores. Ceux-ci, armés de pistolets de ceinture et d’épées, allaient porter les lingots numérotés au rempart, et les jetaient à d’autres Météores, qui les portaient aux chaloupes auxquelles ils étaient destinés. Les chaloupes les remettaient aux vaisseaux en rade. Ces Météores, ces facteurs, les commis, les gardes, qui ne les troublaient jamais, tous avaient leur droit, et le négociant étranger n’était jamais trompé” Voltaire translated metedor –which literally means person who put something- as “météore” (meteor). The emphasis is his. Voltaire (1990) [1756], vol. II, p. 337

²¹ Cadiz was one of the main Spanish cities in 1750: Madrid had 160,000 inhabitants, Granada 70,000, Seville 66,000, Cadiz 60,000, Valencia 60,000 and Barcelona 50,000. Bairoch, Batou and Chèvre (1988), pp. 15-21.

²² Carrasco (1997) p. 17

mercantile activity *de facto*²³. Foreign wholesale merchants computed more than 80% of the total net income gained by trade in Cadiz by mid-18th century²⁴.

The fiscal statistic *Catastro de Ensenada* shows the distribution of the net income of wholesale merchants by nationality in the mid-18th century (Table 2.1)²⁵. First, the Spanish merchants who traded with Spanish-American colonies represented the 59% of total merchants, but they gained only the 17.5% of income. Foreign merchants represented the 41% of merchants and gained the 82.5% of total income. The nationalities of foreign merchants were French, Italian, German, Damascene (and Swedish and Prussian), Irish (and English) and Flemish. French merchants were the most important community of foreign merchants in Cadiz. They represented one quarter of the total merchants and obtained half of the total annual net income per wholesale trade.

The reason for the settlement of foreign merchants in Castile was the attractiveness of the American precious metals, although their exportation was forbidden²⁶. French merchants were the most significant foreign merchants in Cadiz in the 18th century because the Spanish Succession war had given privileges to the French merchants and expelled English Protestant merchants²⁷. French merchants were the main smugglers of silver. I have looked at the Cadiz's correspondents who arbitrated with silver together with the merchant-banker *Roux* to achieve a good approximation to the major figures of the silver smuggling business. According to the *Roux* archive, the smugglers in Cadiz were the following eleven merchant houses: *Pierre, Athanase, Jolif et Cie* (1729-1730)-*Athanase, Jean Jolif et Cie* (1731-1736)-*Alain Jolif et Cie* (1737-1741); *Guillaume Jogues* (1730-1735); *Jamets, Verduc, Vincent et Cie* (1733-1736)-*Verduc, Vincent et Cie* (1737-1740); *Duval-Baude* (1733)-*Duval-Baude et Cie* (1739); *Guillaume Macé* (1729-1738)-*Guillaume Macé, fils et Cie* (1739-1740);

²³ García Baquero (1976), p. 488; Solano (1991), p. 347

²⁴ Proportion calculated from Campos and Camarero (ed.) (1990), pp. 114-115 (see Table 4.1). And the 66% of the total net income gained by trade in Andalusia. García-Baquero (1991), p. 33

²⁵ The *Catastro de Ensenada* was a huge statistic made by the Castilian government between 1750 and 1756 in the 22 provinces of the Castilian Crown in order to replace several taxes (*rentas provinciales*) for one single tax proportional to wealth (*contribución única*). Therefore, the aim of this statistic was to know wealth. For this aim, it comprised 40 questions about wealth on different productive activities, and the number 31 asked for the annual net income of wholesale merchants. The answer for Cadiz broke down net income of wholesale merchants by nationality for the activity of "trade and transfer of bills of exchange" for the year 1753; and, additionally, a correction of the statistic done in 1762 added the number of merchants. The statistic made in 1762 also corrected the data regarding net income, but the statistic made in 1771 considered the data of the statistic made in 1753 as the good data. For this reason we take the data from 1753. See Ruiz Rivera (1988), p. 72.

²⁶ Girard (1967), p. 37.

²⁷ Carrasco González (1997), pp. 22-26.

Casaubon, Béhic et Cie (1731-1741); *Le Couteulx le jeune et Cie* (1729-1731)-*J. Le Couteulx, A. Le Normand et Cie* (1733-1741); *Magon et Lefer frères* (1730-1740); *Galibert, Cayla, Cabanes et Cie* (1730-1735); *Jean Solier et Cie* (1734-1739); *Antoine et Pierre Masson* (1729-1731)-*Pierre, Guillaume et Joseph Masson* (1733-1736).

Table 2.1: Wholesale merchants' net income according *Catastro de Ensenada*, 1753

Nationality	CADIZ			
	Wholesale merchants' annual net income (1753)		Number of merchants (1762)	
	Pieces of eight of old silver	%	number	%
French	710,450	46.04	60	16.17
Italian	149,800	9.71	35	9.43
German	31,000	2.01	3	0.81
Damascene (Swedish & Prussian)	75,500	4.89	11	2.96
Irish (and English)	231,100	14.97	30	8.09
Flemish	74,700	4.84	14	3.77
Spanish- <i>Cargadores de Indias</i> ²⁸	270,724	17.54	218	58.76
TOTAL	1,543,274	100.00	371	100.00

Source: net income data from the *Catastro de Ensenada* (1753), in Campos and Camarero (ed) (1990), pp. 114-115; number of merchants from the verification of the *Catastro de Ensenada* (1762) in García-Baquero (1988), vol 1, pp.491-492

The smugglers were the most important wholesale merchant among all French merchants in Cadiz according to a contemporary ranking elaborated by J.-B. Partyet a Maurepas in 1736.²⁹ Cadiz had in average 60 French merchant houses from 1724 to 1790 and the smugglers were the most important merchant houses among the French merchants who lived in Cadiz.³⁰ The first class French merchant houses were in average the first quartile of the total number of French merchants in Cadiz and 100% of the smugglers were into this top class. This means that silver smuggling was totally a business of the first class French merchant houses.

²⁸ The Spanish are the *Cargadores de Indias*, but not all *Cargadores* registered in the *Consulado* appeared in the *Catastro de Ensenada*. Those who did not appear, either did not practise or did not get enough income, although they were registered as *Cargadores*. Ruiz Rivera (1988), p. 73.

²⁹ J.-B. Partyet a Maurepas, 12 March 1736, in Ozanam (1968), p.348. "We prepared... a state of the entire nation, which was divided into 5 classes according to the more or less trade that we believed every individual makes... These classes will be reviewed every year in order to consider any change in the trade activity of their members, and to include the new merchant houses that could have been set up in Cadiz under the French flag". Quotation reproduced in Ozanam (1968), p. 269

³⁰ They all were first class –although Jolif and Jogues moved from 1st to 2nd class and Lecouteulx from 2nd to 1st class.

Therefore, the French merchants were the most important group among all foreign merchants (Table 2.1) and the smugglers were the most important merchants among the French merchants settled in Cadiz (ranking by J.-B. Partyet a Maurepas, 1736). Finally, I use a ranking of net income elaborated by *Consulado de Cargadores de Indias* in 1771 for the project of fiscal reform “*contribución única*” in order to identify the importance of the silver smugglers regarding the total number of merchants in Cadiz.³¹ The results are summarized in Table 2.2.

Table 2.2: Wholesale merchants’ net income per nationality, 1771

Net income (pieces of eight of old silver)	FRENCH	GERMAN, (Damascene, Swedish and Prussian)	IRISH (and English)	FLEMISH	ITALIAN	SPANISH
0,000- 7,999	80	14	38	18	43	283
8,000-15,999	15	4	4	1	4	1
16,000-23,000	6	1	0	0	0	0
24,000-31,999	2	0	2	0	0	0
32,000-39,999	3	0	0	0	0	0
40,000-plus	2	0	0	0	0	0
Total number	108	19	44	19	47	284
Net income per capita	6,606	5,605	5,418	3,932	3,198	954

Source: Self-elaboration using the list: “*Relaciones de comerciantes remitidas a la Escribanía de Cabildo, a 3 de junio de 1771*” (Archivo General de Indias, Consulados 892 bis), reproduced in Ruiz Rivera (1988), pp. 65-72.

The French group was the group with higher net income per capita, followed by the German, Irish, Flemish, Italian and Spanish groups. Only 1% of all merchants gained a net income higher than 32,000 pieces of eight of old silver, and all of them were French. The composition of the French colony was fairly stable -lists available from the 16th century show almost always the same names³²- which makes easier to compare the names of smugglers who appear in *Fond Roux* (1729-1741) with the names listed the project of fiscal reform “*contribución única*” (1771). The 5 merchants with highest net income among all merchants in Cadiz were the silver smugglers: *Casaubon Domingo, por sí y Casaubon Behic y Cia, Solier, Marcos, por sí y por Cayla, Solier, Hermanos Cabanes y Compañía, Verduc, Pedro y*

³¹ It is a list which contained the names and net income for all wholesale merchants in Cadiz, in order to implement the project of fiscal reform “*contribución única*” which started in the 1750s.

³² Mauro (1990), p. 280

*Compañía, Masson, Josèph y Cia, and Lefer, Francisco por sí y Magon y Lefer Hermanos.*³³ These top merchants who appear as the smugglers in *Fond Roux* are the same names denounced by the Spanish authorities as the bullion smugglers (1738-1744): *Casaubon, Behic et Compagnie* and *Cayla, Solier, Cabanes et Compagnie.*³⁴

Thus smuggling was practised only by few and very powerful foreign merchants who were able to smuggle the silver because they had an international network to distribute the silver and granted diplomatic immunity to smuggle without risk of being captured. The French smugglers were organized in a cartel of a few powerful merchants linked in networks. Historical 18th-century trade networks combined formal limited-partnership ties with informal alliances based on family ties. Marriage, partnership and trade were closely related. Merchant and family networks linked individuals from similar geographic origins and professions, and were a common strategy used by Irish, Italian and French merchant houses, and also by merchants coming from the North of Spain and Catalonia. Alliances helped merchant houses to achieve stability and an adequate operation, and also contributed to the expansion of merchants' networks towards the main centres of the European and Atlantic trade.³⁵

Stable networks were based on the principles of obedience and submissiveness to the decisions taken by the family hierarchy. The power of the corporate family to interfere in the life of its members was strong. Not only women, but also young men depended on family decisions. The agents sent to Cadiz by French merchants were generally their sons or other members of their families. They were often young bachelors, who were learning commercial skills to create a branch in Cadiz or to eventually take charge of their parents' firms in France.³⁶ They were in care of the members of the initial network of foreign businessmen who had previously settled in Cadiz.³⁷

³³ The fifth most important merchant was not one of our smugglers: *Gilly, Simón, por sí y su Compañía*. But this merchant house did not exist in our arbitrage period (1729-1741). It appears in the ranking of French merchant houses in Cadiz of 1746. The other smugglers had a lower net income, but higher than the average: *Jolif, Juan y sus hermanos compañeros*: 8,000 and *Maccè, Nicolás, por Guillermo Maccè, Hijo y Cia*: 8,000. *Le Couteulx* did not appear in *Contribución Unica*. Only his partner appeared *Lenormand, Antonio por sí y su compañía*: 18,000; but according to *Almanach Général des marchands* (1772; p. 73), the company was: *Le Couteux, Le Normand & Compagnie*. *Guillaume Jogues* and *Duval-Baude* had disappeared from the ranking of French merchant houses in Cadiz of 1746. Ozanam (1968), p. 348.

³⁴ Archivo general de Indias, sección 5ª, Gobierno, legajo 2479, Indiferente general (microfilm C-1557 and C-1558)

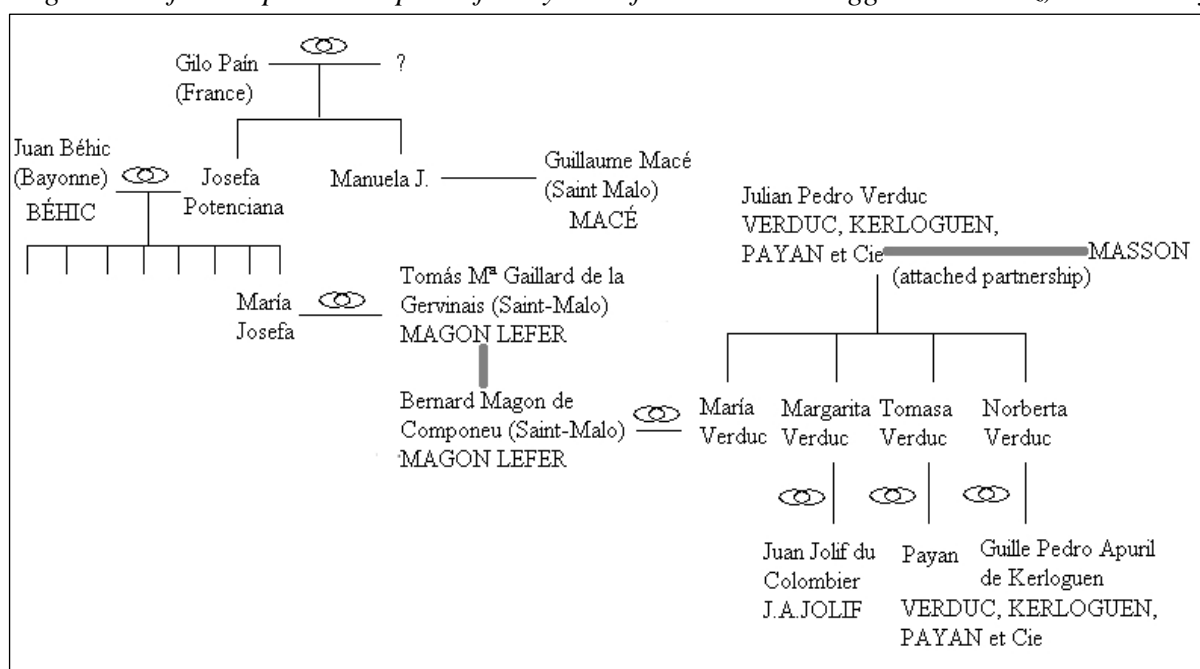
³⁵ Fernández (1997), pp. 173-174, Stein and Stein (2000), p. 72, Bustos (2005), pp. 465-469

³⁶ Girard (1967), Mauro (1990), p. 280, Fernández (1997).

³⁷ Carrasco (1997), p. 52

The merchants' biographies obtained from notaries and ecclesiastical sources illustrates the strategies that were followed by bullion smugglers to develop their networks in Cadiz: the long-run stability of their merchant houses was guaranteed by the transfer of partnership to younger relatives, and the houses' power was increased by the strategic marriages which linked the most important merchant houses. On the basis of the biographies, I have been able to find ties among six of the eight merchant houses studied.³⁸ These merchant houses were mutually connected by the family and partner-ship ties which configured the cartel of smugglers. (Figure 2.1).

Figure 2.1: formal partnership and family ties of the bullion smugglers in Cadiz, 18th century



Source: self-elaboration. Bustos Rodríguez (1995), Bustos Rodríguez (2005), Garcia-Mauriño Mundi (1999), L'espagnol (1997), Rebuffat (1965).

The most important implication of the existence of a cartel of smugglers mutually connected in networks was the capability to drive down silver prices in the Cadiz black market. Smugglers were the price-makers as contemporaries recognized:

“In spite of this division of the body of merchants into 4 classes, by which the first one is formed by 12 houses, and it can be said that these 12 houses are practically of the same range, I believe it is my duty to inform you that the houses of Mr. Masson, Verduc, Vincent et

³⁸ I have only been unable to find ties with other houses in the case of *Cayla, Cabanes, Solier et Cie* and *LeCouteulx, Le Normand et Cie*, either because they were really not connected to other houses, or because I could not trace the connections.

*Cie., Magon et Lefer, and above all, those of Mr. Casaubon, Béhic et Cie, and Cayla, Solier frères, Vendun et Cie., receive more merchandises, be they from France or from foreign countries, than the rest of the nation altogether; that Mr. Casaubon and Béhic, Masson, Wailsh, Handricx, Sobia et Vande, and Cayla, Solier frères, Vendun et Cie are believed to be the wealthiest Frenchmen in Cadiz: **these merchant houses are the ones which rule the price of exchange largely**, together with that of Mr. Le Couteulx, who is significant in this kind of trade”³⁹*

The nationality criterion of trade with the Spanish-America prevented silver from going directly to the European bullion markets: Spanish imported and foreign merchants exported the silver, and, therefore, a black bullion market appeared in Cadiz. Bans on export created a barrier of entry to the business of illegal silver export. Only foreign merchant who had diplomatic immunity could smuggle silver. And only those foreign merchants powerful enough to have the international connections to extract the silver were able to smuggle. The most important French merchants were the leader of smuggling. They were organized in cartel which drove down silver prices in Cadiz below the international price. Therefore, arbitrage with silver from Cadiz to the main European financial centres guaranteed systematic profitability. Next section explains how arbitrage took place according to Roux banker ledgers of silver arbitrage.

3. SILVER ARBITRAGE ACCORDING TO ROUX BANKER ARCHIVE

I show an accurate reconstruction of arbitrage with silver practised by contemporaries according to *Roux* banker’s archive.⁴⁰ The Merchant House *Roux* operated from the beginning of the 18th century until the mid-19th century (1728-1843). *Roux* practised a polyvalent business that embraced many commercial activities developed in a vast geographical domain

³⁹ The emphasis is mine. Partyet à Maurepas, 4 April 1746, in Ozanam (1968), p. 272-273

⁴⁰ The archive of the merchant house *Roux* is a remarkable 18th century commercial archive kept in *La Chambre de Commerce et d’Industrie de Marseille*. Its 1,320 bundles contain 78,274 documents of correspondence, 14,516 of accounting and 23,216 of commercial matters (sea and land transport, weaponry, food, raw material and manufactured goods). Rebuffat (1965), section L.IX. The correspondents in Cadiz reported to *Roux* merchant house the black market prices of the pieces of eight from 1729 to 1741. *Roux* started to arbitrate with silver through the *Compagnie Royale d’Afrique* from its foundation in 1741. The correspondence from the *Compagnie Royale d’Afrique* has not been preserved and, therefore, the series of black market silver prices in Cadiz is uninterrupted just from the foundation of the merchant house *Roux*, in 1729, to the foundation of the *Compagnie Royale d’Afrique*, in 1741

of 360 cities in Europe, Levant, Barbary Coast and Antilles connected for near 2,000 correspondents. Arbitrage was a joint venture which set up operations for merchant-bankers in different cities on a joint account (“*compte à demi*” or “*compte à tiers*”)⁴¹, and its success lay in the application of double-entry bookkeeping and the knowledge of local units of mass and account for the world geography⁴². Arbitrage with bullion was denominated “bullion trade” (“*commerce des matières*”)⁴³ and its logic can be understood thanks to the documents kept in the accounting section of the archive “arbitrage accounts” (“*comptes d’arbitrage*”).⁴⁴ The following examples explain arbitrage with silver (see Figure 3.1 and Figure 3.2). Arbitrage was done between two or three partners from different cities, who bought pieces of eight in Cadiz and usually sold them in other European centres, such as London, Paris, Marseille, etc. The first partner was the *Roux* merchant house in Marseille, the second partner was its correspondent in Cadiz, and the third partner was a banker from a European centre (Lyon, Paris, Amsterdam, etc). The profit, as the difference between buying prices in Cadiz and selling prices abroad, was shared among the partners.

Figure 3.1 shows arbitrage with silver between three partners operating with a joint-arbitrage-account during the year 1728. The partners were *Raymon Bruny et Cie*⁴⁵ from Marseille, *Brethous Clock et Cie* from Cadiz and *Guillaume Louis de Surmont* from Amsterdam, who had a joint-arbitrage-account (“*compte à tiers*”) in Amsterdam. When the silver arrived in Cadiz from the Spanish-America, the partner of the joint-account in Cadiz, *Brethous Clock*, bought the silver in Cadiz in exchange for a bill of exchange in Cadiz on Amsterdam. The seller of silver in Cadiz cashed the bill to have a credit balance in

⁴¹ Taylor (1964), pp. 483-484

⁴² Double-entry bookkeeping system (ou à l’italienne) in Ricard, 1732, p. 521-600. *Roux* “exported” the system of double-entry bookkeeping for arbitrage with specie to his correspondents abroad. For example, J. A. Henry, correspondent in Constantinople explained (1778): “*We are going to follow your method of maintaining the accounts of arbitrage in two columns, which will be easier (...). By this current method, everything in a single account*” («*Nous allons suivre votre méthode de tenir le compte d’arbitrage en deux colonnes ce qui sera beaucoup plus facile (...) Par cette méthode actuelle, le tout se trouve remis dans un seul compte*») and Peschire from Naples (1784): “*I have already written my accounts 1/2 in my books exactly as you have suggested, which is, effectively, the most succinct and clear method*” («*J’ai déjà fait le compte à demi sur mes livres exactement comme vous me l’indiquez, ce qui est, en effet, la manière la plus succincte et la plus claire*») Carrière (1973), pp. 767-779.

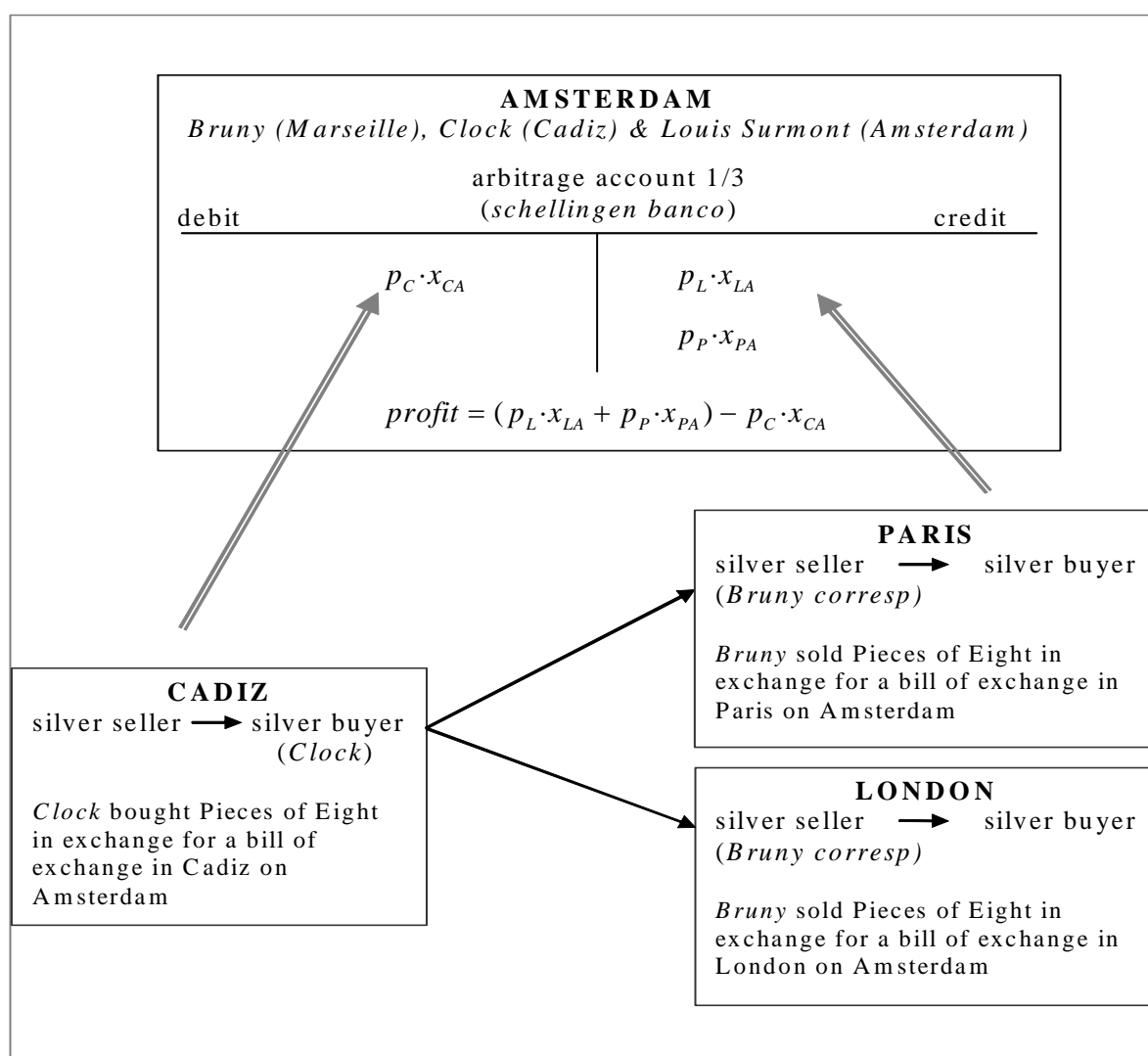
⁴³ *Matières* was the French word for bullion in 18th century according to *Roux* archive. This same word is still used in the Rothschild archives in mid-19th century. See Flandreau (1995), pp. 193-225

⁴⁴ Fond Roux, L. IX section II- compte arbitrage: liasse 53. These two examples are the only accounts of specie arbitrage preserved for our period of study as the accounting registers were destroyed in a fire in 1941. Rebuffat (1965), p. 89.

⁴⁵ Raymon Bruny was Roux’s uncle. The 1 October 1728 he transferred the merchant house *Raymon Bruny et Cie* to his two nephews, Jean-Baptiste-Ignace and Pierre-Honoré Roux. The new merchant house was named *Jean-Baptiste, Honoré Roux et Cie*. Rebuffat (1965), p. 89.

Amsterdam, while *Bruny, Clock & Louis de Surmont* had one entry on the debit side of the joint-arbitrage-account ledger. Then, *Brethous Clock* shipped the silver from Cadiz to Paris and London, and *Bruny's* correspondents in Paris (and London) sold the silver in Paris (and in London) in exchange for bills of exchange in Paris (or London) on Amsterdam. The buyer of silver reduced his credit balance in Amsterdam, while *Bruny, Clock & Louis de Surmont* cashed the bills in Amsterdam thus having one entry on the credit side of the joint-arbitrage-account ledger. Finally, the profit was calculated as the difference between the entries on the credit side and the entries on the debit side. This profit was shared among the three partners at the end of the year after deducting costs.

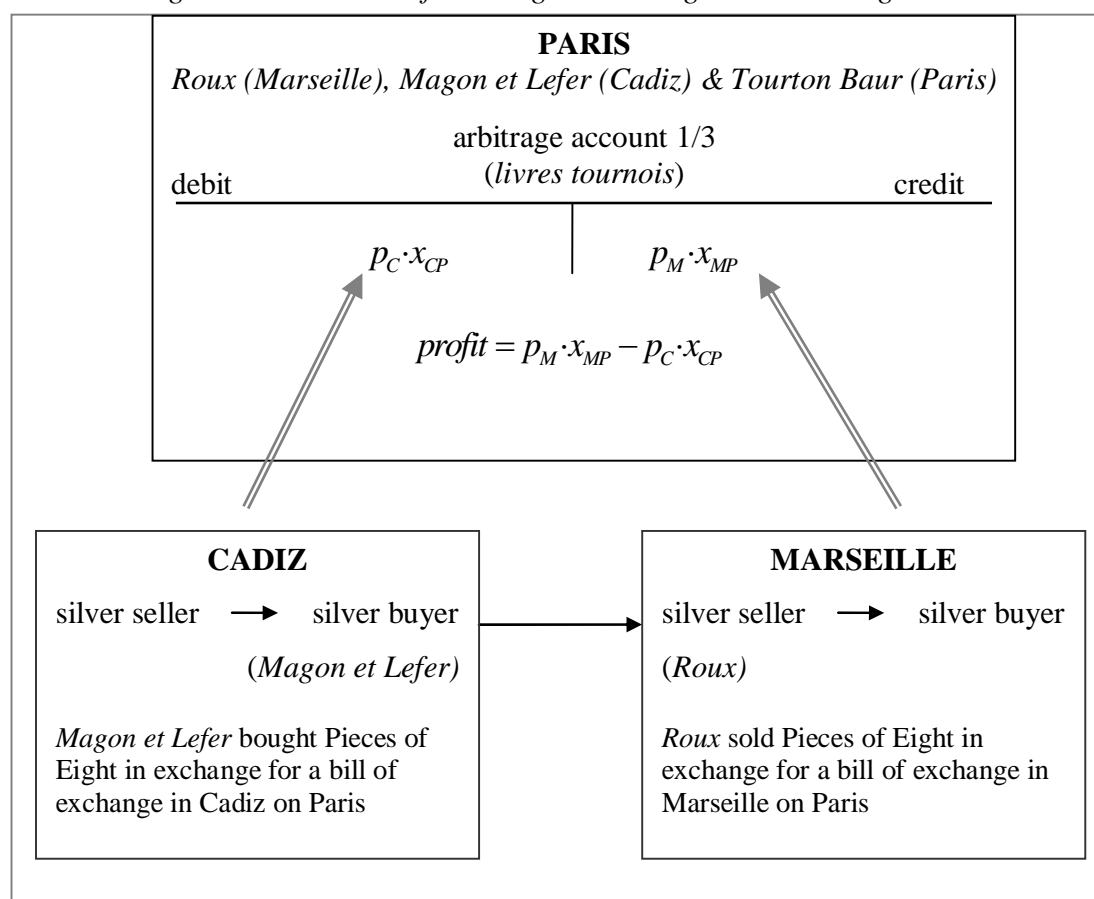
Figure 3.1.: Scheme of arbitrage according to the arbitrage accounts



Source: author's elaboration from *Fond Roux, L. IX section II- compte arbitrage: liasse 53*.

Figure 3.2 shows arbitrage with silver between three partners operating with a joint arbitrage account during the year 1730. *Jean-Baptiste et Honoré Roux* from Marseille, *Magon et Lefer frères* from Cadiz and *Tourton Baur et Cie* from Paris had the arbitrage account in Paris. First, *Magon et Lefer frères* bought the Pieces of Eight in Cadiz in exchange for a bill of exchange in Cadiz on Paris, which was cashed in one entry on the debit side of the joint-arbitrage-account. Second, *Magon et Lefer frères* shipped the silver from Cadiz to Marseille, and *Roux* sold the silver in Marseille in exchange for a bill of exchange in Marseille on Paris, which represented one entry on the credit side of the joint-arbitrage-account. At the end, the profit, calculated as credits minus debits, was shared among the partners.

Figure 3.2.: Scheme of arbitrage according to the arbitrage accounts



Source: author's elaboration from *Fond Roux, L. IX section II- compte arbitrage: liasse 53*.

The examples have shown that arbitrage was done between silver and bills of exchange, instead of the traditional belief of arbitrage between gold and silver.⁴⁶ Arbitrage with silver

⁴⁶ For arbitrage between bullion and bills in the Early Modern period, see Quinn (1996) and Nogues-Marco (2011a).

was cashed with a multilateral bill-of-exchange payment.⁴⁷ According to the first example, silver arbitrage from Cadiz to Paris and London was settled through a third centre, Amsterdam. And according to the second example, silver arbitrage from Cadiz to Marseille was settled through a third centre, Paris. The great negotiability of bills of exchange drawn on the main financial centres allowed the multilateral settlement in the 18th century. Flandreau *et al.* (2009a) have recently measured the degree of multilateralism of bills of exchange in mid-18th-century Europe: only 18% of bills were directly traded between two cities, 75% had to pass through an intermediary centre and 7% needed two intermediaries⁴⁸. The main financial centres were the intermediary connecting centres: Amsterdam, Paris and London. It is not surprising thus that silver arbitrage was settled through the main financial centres (Amsterdam and Paris in the examples 1 and 2, respectively). Sellers of silver in Cadiz preferred to have a credit balance in the main financial centres than in Cadiz.

Next section measures the profitability of silver arbitrage explained in this section according to *Roux* merchant-banker ledger accounts.

4. SILVER-POINT MECHANISM, CADIZ-LONDON THROUGH AMSTERDAM

The profitability of arbitrage is measured with the silver-point mechanism formula, which represent arbitrage operations as explained with previous examples. Although the dynamic of silver arbitrage permitted to use different destination centres for different arbitrage operations, the scarcity of bullion market prices for the 18th century limits the calculations to one single arbitrage operation: silver shipped from Cadiz to London through Amsterdam.

The silver-point mechanism represents the law of one price for silver specie, i.e., in the absence of transportation and other transaction costs, competitive markets will equalize the price of the silver coin *Old Mexican piece of eight* in the two centers, London and Cadiz, when both prices are expressed in the same currency:

$$P_L = P_C \cdot X_{CA} \cdot X_{LA} \tag{4.1}$$

⁴⁷ International trade was based upon multilateral payments in the 18th century. Heckscher (1950), Sperling (1962).

⁴⁸ Flandreau *et al.* (2009a), p. 162

where p_L denotes the market price of silver in London (pence sterling), p_C denotes the black market price of silver in Cadiz (*peso de plata antigua*), x_{CA} is the spot exchange rate in Cadiz on Amsterdam, x_{LA} is the spot exchange rate in London on Amsterdam, so $x_{CA} \cdot x_{LA}$ denotes the multilateral spot exchange rate between London and Cadiz through Amsterdam (pence sterling/*pesos de plata antigua*).

But actually arbitrage involved costs. Silver-Point mechanism between Cadiz and London through Amsterdam considering costs is the equation 4.1 plus costs, as represented by equation 3.2⁴⁹:

$$(1 - c_{CL}) \frac{p_L}{p_C} \leq x_{CA} \cdot x_{LA} \leq (1 + c_{LC}) \frac{p_L}{p_C} \quad (4.2)$$

where $\frac{p_L}{p_C}$ is called arbitrated parity⁵⁰; c_{CL} is the cost of trading the silver from Cadiz to London; and c_{LC} is the cost of trading the silver from London to Cadiz.

The specie-point mechanism recognizes that gold and silver, along with bills of exchange, may be used to settle international payments. Exchange rate will not be exactly the arbitrated parity, but it will fluctuate within the silver-points because shipping silver involved transaction costs. To prevent arbitrage, for a given spot exchange rate between Cadiz and London and the market price of silver in London, the market price for silver in Cadiz could

⁴⁹ The multilateral silver-point mechanism equals the bilateral specie-point mechanism defined by Flandreau (1996, p. 422 and 2004, p. 59) assuming the arbitrage condition for the triangular arbitrage of bills of exchange, i.e.,: $x_{CA} \cdot x_{LA} = x_{LC}$, where x_{CA} is the spot exchange rate between Cadiz and Amsterdam, x_{LA} is the spot exchange rate between London and Amsterdam, and x_{LC} is the spot exchange rate between London and Cadiz. I tested the stochastic integration for the bills of exchange market, i.e., drawing a hypothetical spot bill between London-Cadiz is equivalent to drawing a hypothetical spot bill between Cadiz-Amsterdam, plus other bill between London-Amsterdam. The spot exchange rate in London on Cadiz and the spot exchange rate in Cadiz on Amsterdam multiplied by the spot exchange rate in London on Amsterdam are largely correlated (Pearson correlation coefficient is 0.96), so I accept the integration of the bills market. Therefore, results do not differ considering bilateral or multilateral arbitrage. Contemporaries practised multilateral arbitrage because the sellers of silver preferred to have credit balances in the main centres (e.g., Amsterdam) than in Cadiz, not because they obtained an extraordinary profitability through the triangular arbitrage with bills.

⁵⁰ The arbitrated parity (or arbitrated par of exchange) between London and Cadiz is defined by the relative market prices: p_L / p_C . Arbitrated par of exchange is a 19th century wording. Flandreau (1996, p.422 and 2004, p. 59). See also Tate (1834, pp. 169-170). Merchants in 18th century used the name “par or equality of exchange” Giraudeau [1756] (1796, p. 15), or the name “accidental par”. Newton (1734).

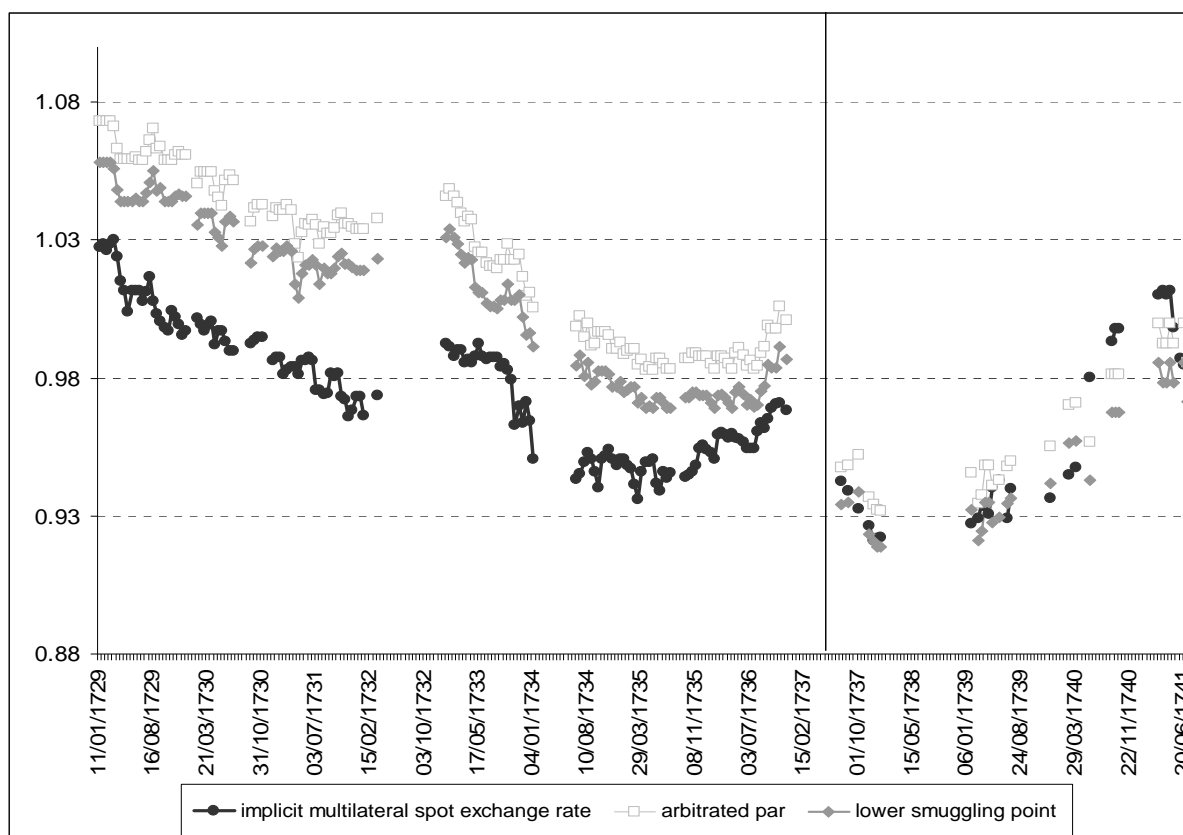
not rise higher than the point where it became profitable to send silver from London to Cadiz; or fall lower than the point where it became profitable to send gold from Cadiz to London.

When is arbitrage profitable? If the exchange rate goes up the upper band $\left((1 + c_{LC}) \frac{P_L}{P_C} < x \right)$, exporting silver from London to Cadiz is profitable, and if the exchange rate goes down the lower band $\left((1 - c_{CL}) \frac{P_L}{P_C} > x \right)$, exporting silver from Cadiz to London is

profitable. Thus, silver-point breaks mean that the exchange rate falls below or rises above the bullion point in which sending silver from one to the other centre become profitable. We should expect that breaks are short lived because arbitrageurs will buy silver in the center with the lowest market price and sell it in the center with the highest market price, which will adjust prices to eliminate arbitrage profitability. So, the process of arbitrage should maintain the exchange rate within silver-points, and it is expected to find only few and no persistent breaks. This reasoning works well when silver movements are free. Nogues-Marco (2011a) has calculated specie-point mechanism for London and Amsterdam in mid-18th century, and demonstrates that bullion markets were integrated when bullion movements were free, so only few and non persistent breaks occurred. International arbitrages ensured uniformity in the market price of gold and silver in the case of London and Amsterdam in the 18th-century.

But international arbitrages do not ensure uniformity in the market price of silver when bullion movements are controlled. The arbitrage mechanism of adjustment demands free bullion movements and perfect competition where both buyers and sellers are price-takers. However, we have seen in previous sections that Castile forbade bullion exports and free bullion exchanges, and the oligopsonistic structure of the black market of silver in Cadiz enabled buyers to purchase silver at a lower price that would have prevailed in a competitive market. Buyers were price-makers, so forced no prices adjustment to create systematic arbitrage profitability. I construct the lower silver point according to equation 4.2 to measure profitability in exporting silver from Cadiz to London. Appendix explains data and calculations, and Figure 4.1 shows the lower silver-point band between Cadiz and London through Amsterdam.

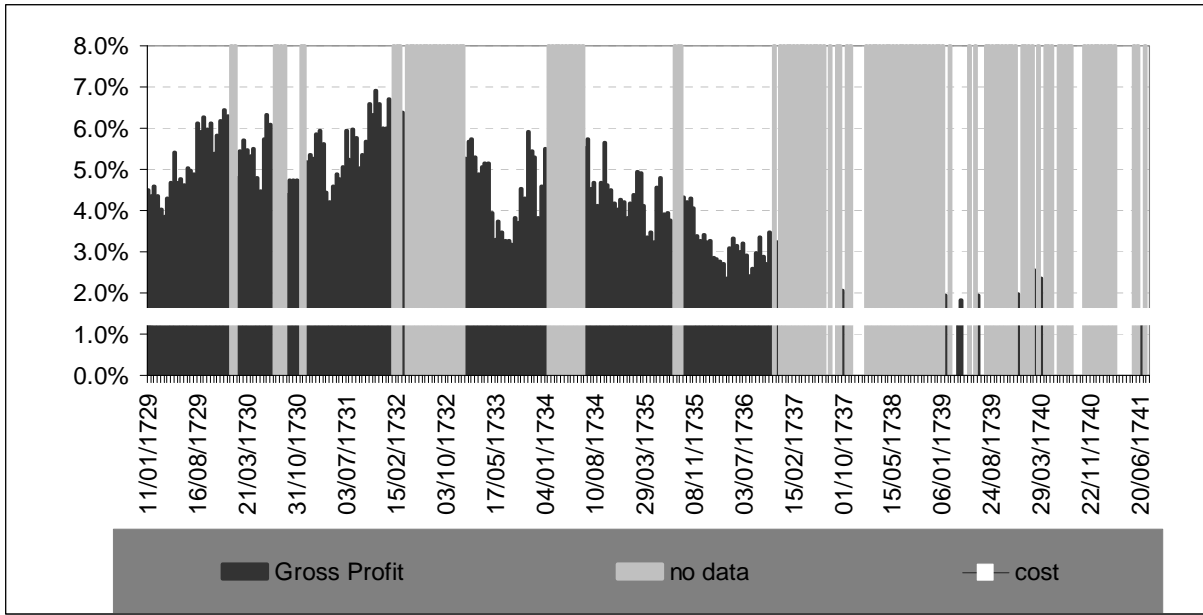
Figure 4.1: lower band of arbitrage equation between London and Cadiz, 1729-1741
(half-monthly observations), pence sterling/peso de plata antigua
(normalized at intrinsic par, 1729-1737, $54 \cdot 8/10=1$)



Source: see Appendix

According to results shown in Figure 4.1, we can distinguish two different periods. In the first period, from 1729 to 1737, there was a systematic gap between the implicit spot exchange rate and the lower silver point which made arbitrage systematically profitable. International markets were connected through smuggling, but smuggling did not ensure uniformity of the silver prices in Cadiz and London. In a perfectly competitive market, arbitrageurs should have bought silver at the lowest market price (Cadiz) and sold it at the highest market prices (London), which would have adjusted prices thus removing arbitrage profitability. But in an imperfect competitive market, long-run profitability was maintained during nine years without price adjustment because oligopsony drove down prices in Cadiz. Figure 4.2 measures profitability as the gap between the exchange rate and the arbitrated parity (gross profitability) and the gap between the exchange rate and the lower silver-point (net profitability, i.e., gross profitability minus costs)

Figure 4.2: Profitability of the silver arbitrage from Cadiz to London, 1729-1741



Source: see Appendix.

Figure 4.2 shows the profitability of the silver arbitrage from Cadiz to London. From 1729 to 1737, arbitrage was systematically profitable because there was a gap between the oligopsonistic price in Cadiz ($p^{oligop} = p_C$) and the international price in London ($p^* = p_L \cdot x$)⁵¹. We have seen that if the exchange rate goes down the lower band $\left((1 - c_{CL}) \frac{p_L}{p_C} > x \right)$, exporting silver from Cadiz to London is profitable. According to Figures 4.1 and 4.2, exchange rate was systematically below the lower silver band because the oligopsonistic price in Cadiz was below the international price:

$$p_L \cdot x \equiv p^* \geq p^{oligop} \equiv p_C \quad (4.3)$$

The difference between the international price and the oligopsonistic price in Cadiz measures the oligopsonistic market power. The larger the gap between the oligopsonistic and the international price, the higher the oligopsonistic power. However, the oligopsonistic price has a floor, which is the official parity (\bar{p}). The oligopsonistic price can not be lower than the official parity, i.e., the legal value of the *Old Mexican pieces of eight* coin. If the oligopsonistic black market price were lower than official parity, the sellers of silver in Cadiz

⁵¹ Assumes that the London market is a competitive market and its price represents the international price. British law has permitted the exportation of bars and foreign coins in gold and silver since 1663 (Munro, 1992, p. 212). Our representative coin, the Old Mexican Piece of Eight, had a free quotation in the London Stock Exchange in the 18th century.

would move the silver from the commodity market to the money market because coins circulated at official parity in the money market:

$$p_C \equiv p^{oligop} \geq \bar{p} \quad (4.4)$$

The existence of a floor for the oligopsonistic market price gave the government the possibility to apply an exchange rate policy oriented to the bullionist aim of avoiding silver outflows. The 16 May 1737 the Spanish government moved the official parity from 1 Piece of Eight coin=10/8 *peso de plata antigua* to 1 Piece of Eight coin=(10 5/8)/8 *peso de plata Antigua*.⁵² It means that the government fixed the official parity at the same level than the international price in order to remove the arbitrage profitability (see Figure 4.2). The devaluation equalized the implicit spot exchange rates and the arbitrated parity from mid-1737 to 1741, so arbitrage stops being systematically profitable (see Figure 4.1)

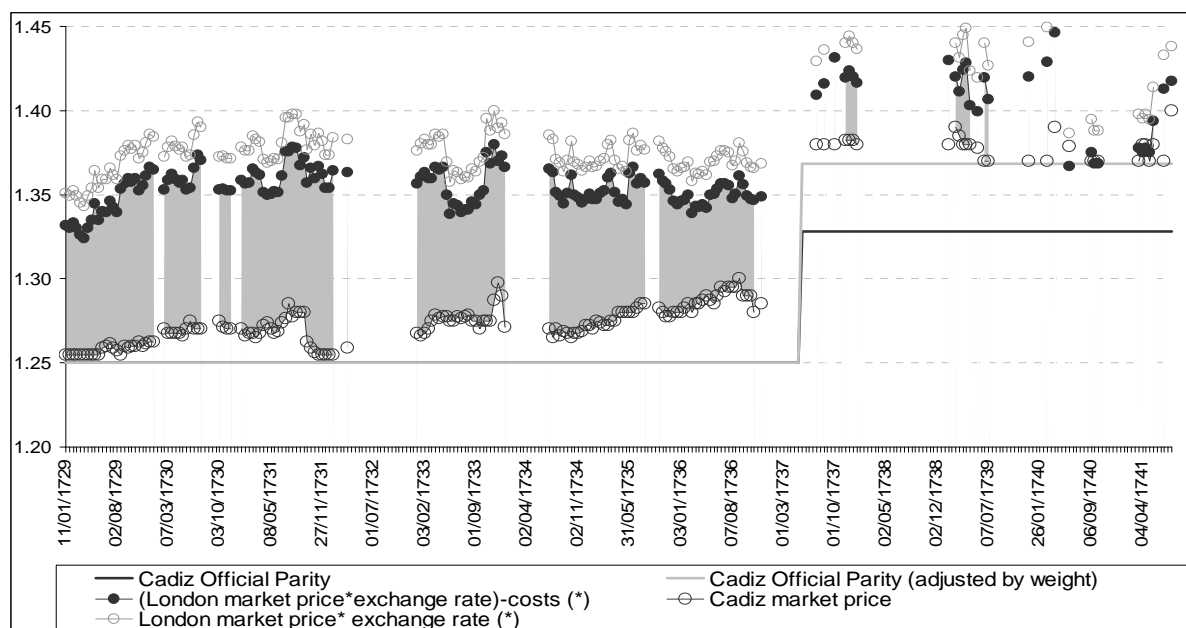
Therefore, the oligopsonistic price was enclosed between the international competitive price and the official parity. The international price was the maximum price because the oligopsonistic markdown is equal to zero at the international price (equation 4.3). And the official parity was the minimum price because below the official parity, sellers would use the coins as money at the official parity and would not sell them as commodity (equation 4.4). Merging equations 4.3 and 4.4 we have the oligopolistic price enclosed between the international market price and the Cadiz official parity:

$$p^* \geq p^{oligop} \geq \bar{p} \quad (4.5)$$

Figure 4.3 shows the effect of devaluation in arbitrage profitability. The grey zone shows net profitability of arbitrage. Before the devaluation, the buyers of silver in Cadiz gained the difference between Cadiz shadow market prices and London prices (grey zone). Oligopsonistic price fluctuated between official parity and international price (equation 4.5). But the devaluation increased official parity at the international price level. The gap between international market prices and official parity was reduced, so eliminating the possibility of driving down the shadow prices in Cadiz below the international price.

⁵² Autos Acordados (1772), libro 5, título XXI, auto 61. Novísima Recopilación (1805), libro 9, título XVII, ley 8, and Innocencio Aparici (1741), pp. 24-26

Figure 4.3: Official parity in Cadiz and market prices in London and Cadiz, 1729-1741 (half-monthly observations), pesos de plata Antigua/Mexican old piece of eight



Source: see Appendix.

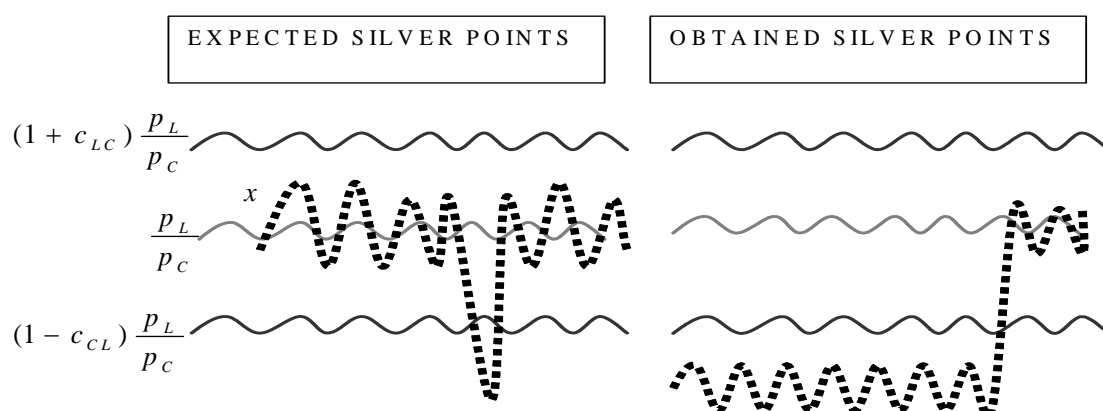
(*) Cadiz prices are given per coin, while London prices are given per standard ounce. Abrasion has been added to London prices to compare with Cadiz prices.

To sum up, Figure 4.4 summarises the behaviour of silver-point mechanism with free bullion movements compared with bullionist controls. For a case of free bullion movements we should have expected occasional silver point violations adjusted by arbitrage. That is, for a given London-Cadiz exchange rate and the silver price in London, the silver price in Cadiz should not fall lower than the point when sending silver from Cadiz to London became profitable. If the silver point were violated, we would expect that arbitrageurs bought silver in the centre with the lowest market price and sold it in the centre with the highest market price, which would adjust prices to eliminate arbitrage profitability. However, obtained silver points for a case of bullionist controls show a very different picture. From 1729 to 1737, there was a systematic bias between the implicit spot exchange rate and the lower silver point that made arbitrage systematically profitable. Despite smuggling which connected international markets, arbitrage did not adjust prices because the oligopsonistic structure of the black market in Cadiz maintained shadow prices below the international price to get profitability of arbitrage. But from 1737 to 1741, the bias was corrected because the Spanish government reacted to the illegal bullion outflows with a devaluation, which equalized the implicit spot exchange rates and the arbitrated parity. The long-run effectiveness of devaluation will depend on the

evolution of international price levels. The problem of the exchange rate policy is that the international price is a variable and, therefore, in order to maintain the bullionist political goal, the government must change the official parity from time to time according to the fluctuation of international price.

Castile applied several devaluations which are compiled in Castilian legislation. The legislation states specifically that avoiding the extraction of specie was the reason for the devaluations⁵³. Devaluation restricted bullion outflows, but it was an unpopular monetary policy because changed the legal relation between the unit of account and the medium of exchange, so altered the measure of value and provoked “*darkness, confusion and abuses*” in the Castilian monetary system⁵⁴

Figure 3.4.: Expected vs. obtained silver points



The most interesting implication is the effect of oligopsony on quantities. Oligopsony limited smuggling *per se* because silver outflows were lower under oligopsony than under perfect arbitrage competition. To some extent, oligopsony was helpful to the government. If it had not existed, pressures from international prices would have been much bigger. Indeed, this may explain why the government implicitly accepted the existence of the cartel. Of course, smuggling was not good from a bullionist point of view but cartelized smuggling was better than competitive smuggling.

⁵³ Autos acordados, Libro V, título XXI, auto L and auto LI, 14 January 1726

⁵⁴ *Dictamen sobre moneda*, 4 Dec 1834, in Prieto and De Haro, 2004, pp. 210.

CONCLUSIONS

This paper has reconstructed the silver-point mechanism from Cadiz to London in order to understand the basis for the Castilian bullion outflows by combining new data from primary sources collected in *Roux* banker archive (Marseille). Silver-point mechanism measures the gap between the exchange rate and the relative bullion prices in two centres. If the gap is bigger than the arbitrage costs, arbitrage is profitable and bullion will be shipped from the cheapest to the most expensive center.

When studying the specie-point mechanism in Spain, a basic problem arises. Market prices for bullion are not available because a legal bullion market did not exist. Being the main producer of precious metals, Spanish monetary policy focused on hindering the drain of gold and silver from the American colonies to other countries. From the late Middle Ages until the mid-19th century, administrative prices prohibited the exchange of gold, silver or billon at a different price than the official parity, and bans on exports forbade the exportation of gold or silver without a license. The consequence of the bullionist legislation was the absence of a free bullion market and the formation of a black market for bullion in Cadiz.

The sides of the black market of bullion in Cadiz were defined by nationality criterion. The suppliers of silver in Cadiz were the Spanish merchants who legally could trade with the colonies. The demanders of silver were the foreign merchants who had settled in Cadiz, and who were not allowed to import silver from the Spanish colonies. They had diplomatic immunity and could, therefore, illegally extract the silver from Cadiz and smuggle it to main centers in Europe. The French merchants who had settled in Cadiz were the main smugglers. They were the most important merchants in Cadiz according to Spanish fiscal sources and French contemporary reports on French merchants who settled abroad.

The smugglers' network reveals the oligopsonistic structure of the silver black market in Cadiz. The most important foreign merchants in Cadiz were members of international societies with partnership companies abroad. They were organized in long-run networks and were specifically directed to undertake illegal trade operations between the Spanish-American colonies and Europe through Spain. Networks gave smugglers enough market power to drive down the price of silver and provided them with the necessary international connections to

illegally extract and distribute bullion from Cadiz. Silver smugglers were the price-markers, according to contemporary reports.

The capability of smugglers to drive down prices created a systematic profitability of arbitrage. The archival research in the account books of *Fond Roux*, a leading 18th century French merchant from Marseille, provides an explanation of the exact working of the arbitrage with silver. The arbitrage was conducted between silver and bills by three partners from different cities. The first partner was the *Roux* merchant house in Marseille, the second partner was its correspondent in Cadiz, and the third partner was a banker from another European center (Paris, Amsterdam, etc). They had a joint arbitrage account in a main financial center, for example Amsterdam, to settle the arbitrage operations. The partner in Cadiz bought the silver in the Cadiz black market in exchange for a bill of exchange drawn in Cadiz on the main center, Amsterdam. The seller of the silver in Cadiz cashed the bill to have a credit balance in Amsterdam while the arbitrageurs had one entry on the debit side of the joint-account ledger. The partner in Cadiz sent the silver from Cadiz to a main European bullion market, for example, London. The correspondent in London sold the silver in exchange for a bill of exchange drawn in London on Amsterdam. The buyer of silver reduced his credit balance in Amsterdam while the arbitrageurs cashed the bill in Amsterdam, thus having one entry on the credit side of the joint-account ledger. Finally, the profit was calculated as the difference between the entries on the credit side and the entries on the debit side in the joint-account ledger. This profit was shared among the three partners after deducting costs.

Profitability of arbitrage has been measured using the silver-point mechanism. The paper reconstructs the silver-point mechanism between London and Cadiz through Amsterdam for the period 1729-1741, when half-monthly quotations of silver in the Cadiz black market are available. I consider data of arbitrated parity between the two centers, arbitrage costs, and spot exchange rates calculated from the exchange rate paid in bills of exchange at maturity. Then, I compare the implicit spot exchange rate with the arbitrated parity adjusted by costs. Results show that from 1729 to 1737, the gap between the implicit spot exchange rate and the lower silver point made arbitrage systematically profitable. From mid-1737 to 1741, the gap was corrected because the Spanish crown reacted to the illegal silver outflows with a devaluation that equalized the implicit spot exchange rate and the arbitrated parity, so arbitrage stopped being profitable.

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APPENDIX: SILVER-POINT MECHANISM DATABASE

This appendix explains the variables used to calculate the lower silver point: the silver market prices in London (p_L), the silver black market prices in Cadiz (p_C), the arbitrated par of exchange (p_L/p_C), the multilateral spot exchange rate between Cadiz and London ($x_{CA} \cdot x_{LA}$) and the cost of trading the silver from Cadiz to London (c_{CL}).

Silver market prices in London (p_L)

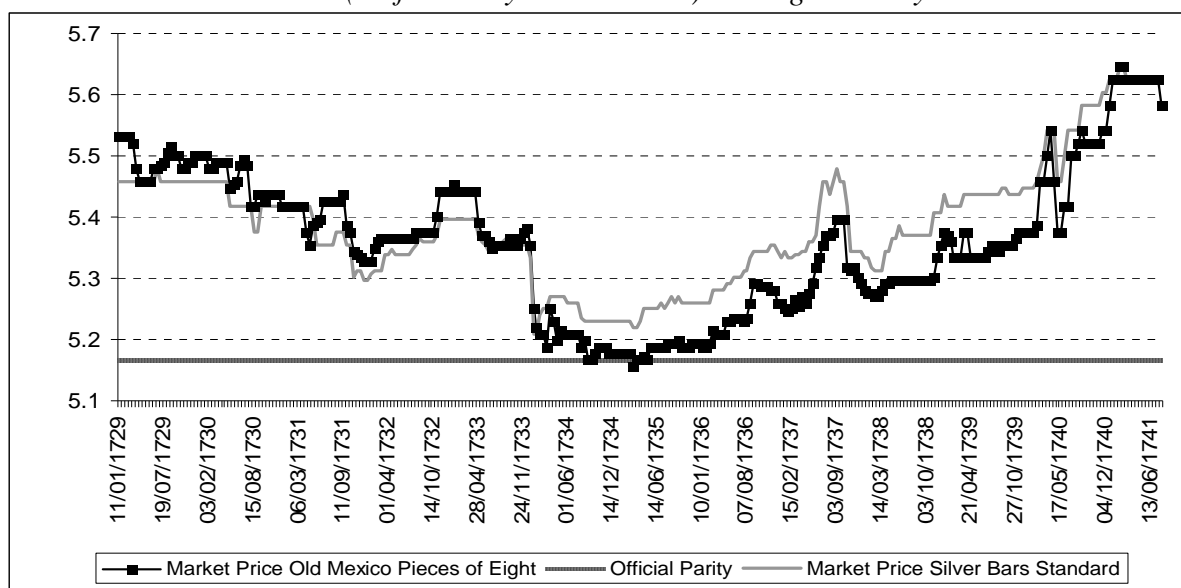
Data are taken from *The Course of the Exchange*, a twice-weekly financial bulletin that started being published in the 1690s⁵⁵. The silver price was measured in shillings (s) and pence (d) units of account per Standard Troy ounce.⁵⁶ *The Course of the Exchange* collected data on silver bars and foreign silver coins, specifically Pieces of Eight⁵⁷. I collected half-monthly prices of the Mexican Pieces of Eight at the beginning and the middle of every month - the precise date corresponds to the same date as the Cadiz data (see Figure A1). When quotations are in a range, I converted ranges to the midpoint. England used the Julian calendar but, since Cadiz used the Gregorian calendar, I converted the dates of the Julian calendar (Old Style) into the Gregorian calendar (New Style) in order to maintain homogeneity of the data.

⁵⁵ McCusker and Gravestijn (1991).

⁵⁶ Equivalent units of account were as follow: 1 pound sterling (£-*librae*)=20 shilling, 1 shilling (s-*solidi*)=12 pennies (d-*denarii*). The fineness of the Standard Troy ounce was the Sterling Standard (Old Standard), which had 92.5% fineness. Fallon (1988, p. 9). The equivalences among the units of mass were: 1 English Pound Troy=12 Ounces, 1 Ounce=20 Pennyweights, 1 Pennywt=24 Grains, 1 Grain=20 Mites. (Newton, 1731). One standard Troy ounce was equivalent to 31.103496 grams in the International System of Units. Lemale (1875, p. 189)

⁵⁷ The Course of the Exchange compiled quotation on Pillar Piece of Eight and Mexican Piece of Eighth from 1721 onwards, and also Small Pillar Pieces of Eight and Small Mexican Pieces of Eight from 1732 onwards. Pieces of Eight were the only coins quoted in financial bulletins in London during the 18th century (until March 1795, when the French New Louis began to be quoted together with the Pieces of Eight).

Figure A1: Price of Mexican Pieces of Eight on the London Stock Exchange, 1729-1741 (half-monthly observations) shilling/std. Troy ounce



Source: Course of the Exchange for market prices and Feavearyear (1931, p. 346) for Official Parity.

Silver black market prices in Cadiz (p_c)

Data are taken from the correspondent's letters kept in the Merchant House *Roux*.⁵⁸ Cadiz correspondents reported the black market silver prices and sometimes added a description of the relationship between exchange rates and silver prices, or directly, a recommendation on arbitrage (whether to buy Pieces of Eight or not). Silver prices appeared inside the text or at the end of the letter together with the exchange rates (Figure A2 shows an example of Pieces of Eight quotations inside the text of the letter).

Figure A2: Pieces of eight quotation in Cadiz correspondents' letters

Source: Fond Roux, L. IX liasse 819 : letter Guillaume Jogues, 30 October 1730

⁵⁸ Cadiz correspondence is compiled in Fond Roux L.IX. Section IV: *Correspondance passive Cadix*, liasses 810-856.

Cadiz correspondents' letters in the *Roux* archive reported almost half-monthly black market prices of old and new Pillar and old and new Mexican Pieces of Eight. Letters were reported every week or two weeks.⁵⁹ I collected half-monthly prices of Old Mexican Piece of Eight (see Figure A3).⁶⁰ When quotations are in a range, I converted such ranges to the midpoint. Prices were reported as the percentage of premium over the unit of account *peso de cambio* (also called *peso de plata antigua* or *peso de plata vieja*) per Old Mexican Piece of Eight coin. The *peso de plata vieja* is an imaginary coin whose legal equivalence with the Spanish-American Piece of Eight coins was defined in Castilian Legislation as follows:

→ from 08/09/1728 to 16/05/1737:⁶¹ 1 Piece of Eight coin=10/8 *peso de plata antigua*

→ from 16/05/1737 to 29/05/1772:⁶² 1 Piece of Eight coin=(10 5/8)/8 *peso de plata antigua*

The Old Mexican Piece of Eight was struck in 67/8 pieces of 93.056% fineness per Standard Cologne Mark (25.60722 grams of fine silver/coin)⁶³. The Mint retained 3/8 pieces in concept of seigniorage and brassage and gave 64/8 pieces to the ingot's owner.⁶⁴ The New Mexican Piece of Eight was struck in 68/8 pieces of 91.667% fineness per Standard Cologne Mark (24.85407 grams of fine silver/coin). The Mint retained 4/8 pieces for seigniorage and brassage and gave 64/8 pieces to the ingot's owner.⁶⁵ The Old Mexican Piece of Eight remained as legal tender with the same legal value as the New Mexican Piece of Eight, although both coins differed in net silver weight⁶⁶. Figure A3 shows market value of the Old Mexican Piece of Eight in comparison with Official Parity (tale value) and Official Parity adjusted by weight. Observe that the market value of Old and New Pieces of Eight was adjusted by weigh because the utility of silver in the commodity market depends upon the physical quantity (see Nogues-Marco, 2011a)

⁵⁹ I collected half-monthly prices available in 50 bundles of Cadiz correspondence from 1729 to 1741, which comprise around 5,000 letters. Fond Roux. L.IX, *liasses* 810-856.

⁶⁰ The Mexico Mint started to strike the silver coin *real* in May 1535, in three-*reales*, one-*real* and half-*real* pieces -and four-*reales* from 1537 (Leyes de Indias (1681), book 4, title XXIII, law VII-VIII. Pradeau, 2001, p. 35). Old pieces of eight were struck from 1572 to 1734 (cob coins-Equilateral Jerusalem Cross type). These Old pieces of eight stopped being struck in 1734, but they remained as legal tender; and New pieces of eight were struck from 1732 to 1772 (milled coins-Pillars of Hercules type) (Autos Acordados (1772), book 5, title XXI, auto 59-60-61-65-70. Pradeau (2001)).

⁶¹ Autos Acordados (1772), libro 5, título XXI, auto 61.

⁶² *Novísima Recopilación (1805)*, libro 9, título XVII, ley 8, and Innocencio Aparici (1741), pp. 24-26

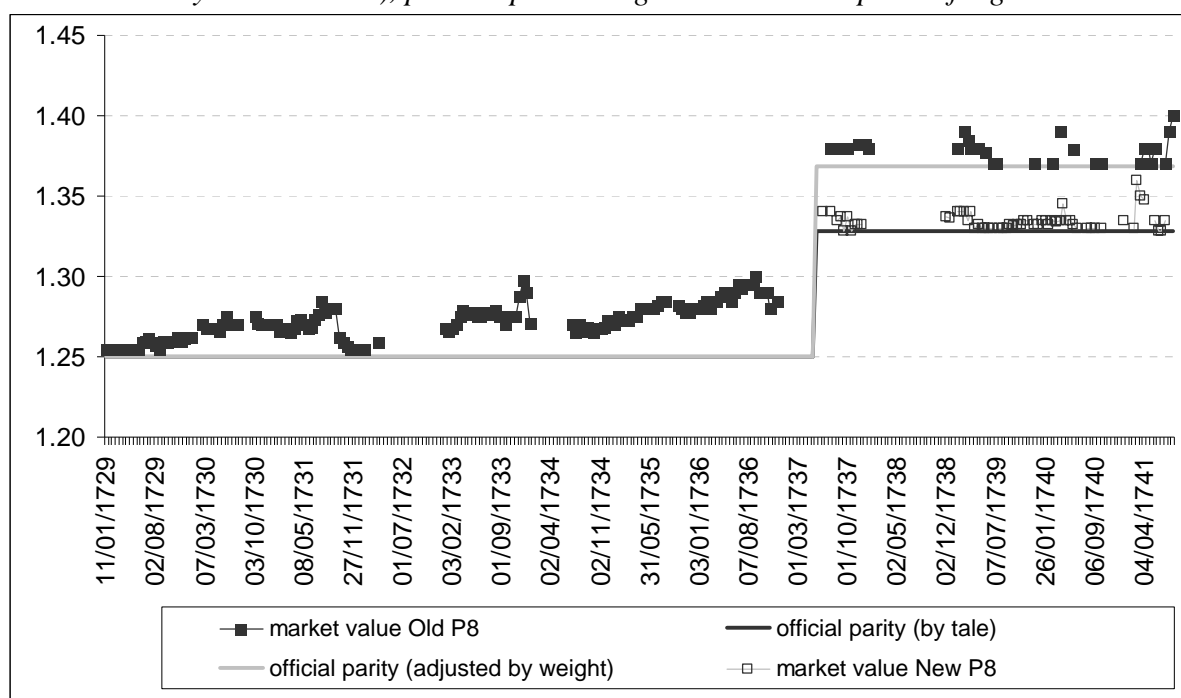
⁶³ One Cologne Mark ingot is equal to 230.465 grams. García-Patón (1903), p. 23 (tablas anejas a la ley de pesos y medidas de 19 de junio de 1849) and pure silver (100% fineness) is equivalent to 12 *dineros* (1 *dinero* = 24 *granos*). Dasi (1950), vol. 1, p. 21.

⁶⁴ Law 11/05/1535 in Leyes de Indias (1681), book 4, title XXIII, law VII-VIII and Law 04/11/1886 in Autos Acordados (1772), book 5, title XXI, auto 36. See also Céspedes del Castillo (1996), pp. 214-215

⁶⁵ Law 09/06/1728 in Autos Acordados (1772), book 5, title XXI, auto 59

⁶⁶ Innocencio Aparici (1741)

Figure A3: Black market price of old Mexican pieces of eight in Cadiz, 1729-1741 (half-monthly observations), peso de plata antigua/old Mexican piece of eight



Source: Fond Roux, L. IX *liasses* 810-856 for black market price. Appendix 3 for Official Parity

The arbitrated par of exchange (p_L / p_C)

The arbitrated par of exchange between London and Cadiz is defined by the relative market prices: p_L / p_C .⁶⁷ London silver prices are given per unit of mass (standard ounce) while Cadiz silver prices are given per coin. I converted Cadiz prices per coin to prices per unit of mass to calculate the arbitrated par of exchange. Old Mexican Pieces of Eight had the following legal features: 930.56 ± 3.472 thousandths of fineness and 27.518 grams of gross weight.⁶⁸ We also should take in account abrasion, i.e., weight deficiency with respect to standard weight for wear and tear.⁶⁹ I know abrasion because coins were always weighted according to Roux's invoices.⁷⁰ Abrasion was 1.5% and, therefore, I considered a net weight equal to the legal weight minus abrasion.

⁶⁷ Arbitrated par of exchange is a 19th century wording. Flandreau (1996, p.422 and 2004, p. 59). See also Tate (1834, pp. 169-170). Merchants in 18th century used the name "par or equality of exchange" Giraudeau [1756] (1796, p. 15), or the name "accidental par". Newton (1734).

⁶⁸ Céspedes del Castillo (1996), pp. 214-215

⁶⁹ Officer (1986) and Flandreau (2004)

⁷⁰ Invoices measured weight in Castilian units: 1 Marco=8 Onzas and 1 Onza=8 Ochavas. 1 Marco is equivalent to 230.465 grams. García-Patón (1903, p.23). One Old Mexican Piece of Eight had a gross weight of 27.518 grams according to Castilian legislation while it had around 27.079 grams according to Fond Roux invoices.

The multilateral spot exchange rate between London and Cadiz ($x_{CA} \cdot x_{LA}$)

The implicit spot exchange rate in Cadiz on Amsterdam has been calculated according to the equation:

$$x_{CA} = a_{CA} \cdot \left(1 + \frac{n}{365} \cdot r_A\right) \quad (\text{ducat of exchange/ } \textit{groot}) \quad (\text{A1})$$

where x_{CA} denotes the implicit spot exchange rate in Cadiz on Amsterdam, a_{CA} is the exchange rate in Cadiz on Amsterdam at 60 days, and r_A is the commercial interest rate in Amsterdam.⁷¹

The implicit spot exchange in London on Amsterdam has been calculated according to Flandreau, Galimard, Jobst and Nogues-Marco (2009b). The exchange rate in London on Amsterdam quoted systematically in the financial bulletin *The Course of the Exchange* at two different maturities: two-months and sight. In an earlier joint work (Flandreau *et al.*, 2009b) we took advantage of the two maturity quotations to produce series of commercial interest rates for Amsterdam, London and Paris in the 18th century. I reproduce here the same methodology to calculate the spot exchange rate in London on Amsterdam. The long maturity exchange rate ($a_{LA}[n_l \text{ days}]$) and the short maturity exchange rate ($a_{LA}[n_s \text{ days}]$) can be written in terms of the implicit spot exchange rate x_{LA} :

$$a_{LA}[n_l] = x_{LA} / \left(1 + r_A^L \cdot \frac{n_l}{365}\right) \quad (\text{sterling pound/} \textit{schelling} \text{ bank}) \quad (\text{A2})$$

$$a_{LA}[n_s] = x_{LA} / \left(1 + r_A^L \cdot \frac{n_s}{365}\right) \quad (\text{sterling pound/} \textit{schelling} \text{ bank}) \quad (\text{A3})$$

Thus, solving system of equations (A2) and (A3) derives the implicit commercial interest rate (r_A^L) and the implicit spot exchange rate (x_{LA}).⁷²

⁷¹ I have collected half-monthly exchange rates in Cadiz on Amsterdam from correspondence in *Roux* archive. When quotations are in a range, I convert such ranges to the midpoint. The exchange rate in Cadiz on Amsterdam quoted in *groot/ducat of exchange*. One *ducat of exchange* was equal to 375 *maravedis* and one *peso de plata antigua* was equal to 272 *maravedis*. Giraudeau, 1796, p. 239. The maturity for bills in Cadiz on Amsterdam is 2 months (1 Usances; 1 Usance = 2 months), plus 6 days of grace at payment in Amsterdam (Hayes 1724, pp. 261-265). The Amsterdam interest rate is the implicit market interest rate in Flandreau, Galimard, Jobst and Nogues-Marco (2009). Actually, it is the interest rate in Amsterdam from London, and I take it as a proxy of the interest rate in Amsterdam from Cadiz. See Flandreau and Nogues-Marco (2011) and Nogues-Marco (2011b) for a more detailed explanation on the methodology.

⁷² The exchange rate in London on Amsterdam was expressed in *schelling* and *groot* bank per sterling pound at 2 usances (occasionally 2 and half usances) and sight Hayes (1739, p. 278). Two months maturity, plus 6 days of grace (one usance in London on Amsterdam is 1 month). Sight is 3 days. Flandreau *et. al* (2009b), p. 186. England used the Julian calendar but, since Amsterdam used the Gregorian calendar, I converted the dates of the

Costs of arbitrage (c_{CL})

Costs are taken from Roux's invoices (see an example in Figure A4).⁷³ The total cost is 1.425%, which breaks down in financial costs and freight and insurance:

- Financial costs: they were brokerage (2‰) plus the intermediation cost, which was a brokerage fee (2‰) when the intermediary was a partner; or a commission (1%) when the intermediary was a commission agent. For calculations I consider the intermediary as a partner, as it was the usual case according to invoices.

- Freight and Insurance:⁷⁴ When organizing a maritime voyage, French ship-owners involved as many as sixty participants in the venture, some being merchant houses and bankers, others being professionals, nobles, or stockholders.⁷⁵ The freight was defined as a global price for trip and calculated according to the volume (and/or weight) of merchandises. Freight rates fluctuated during the 18th century, increasing in times of war and decreasing in times of peace. The insurance rate depended on the distance and also fluctuated according to peace or war times, although it decreased in the long run.⁷⁶ However, French freight and insurance for precious metal had a different logic. It was constant in the 18th century. The gold and silver from Spain paid a fixed rate of 1% for freight and insurance -and in times of war it was transported for free in the Royal vessels.⁷⁷ Freight and insurance for specie was denominated "port on board" ("*port à bord*"), and it was collected directly by the vessels' captains from the sacks which transported the specie: "*The pieces of eight, when they arrive to Marseille, Genoa, London, Amsterdam, etc. pay some percentage; this is, an effective piece of eight out of every 100 effectives pieces of eight, which the captains of the vessels get themselves from the sacks*".⁷⁸ Additionally, according to invoices, I should add the cost of transporting the sacks to the port (1/4‰)

Julian calendar (Old Style) into the Gregorian calendar (New Style) in order to maintain homogeneity of data. I collected half-monthly data –the precise date corresponds to the same date as the Cadiz quotations. When quotations are in a range, I convert such ranges to the midpoint.

⁷³ *Fond Roux L.IX. Section VI : affaires maritimes et commerciales. D. Marchandises. c) Produits manufacturés. Liasses 1,261-1,264 : Monnaies d'or et d'argent : factures.* The invoices, named cost and fee account (« *compte du cout et frais* ») broke down the following information : shipment identification (ship and captain's name, cargo's correspondent sign and the sack's number) and cargo description (type of pieces of eight, quantity and weight per sack, unitary market price, total price, expenses and final price)

⁷⁴ Rambert (1954), pp. 556-596.

⁷⁵ Taylor (1964), pp. 483-484.

⁷⁶ The result of the decline in piracy was a lowering of insurance costs during the 18th century. North (1968), p.960

⁷⁷ Rambert (1954), pp. 571, 582.

⁷⁸ Giraudeau, [1756] (1796), p. 460

Figure A4: Cost and fee account- partner ("compte du cout et frais")

Marseille R. J. B. honnoze Roux & Co. } Nous paye tiers
 Courton Baur & Comp.

Compte du Cout & frais des 4 Sais des Indes Entieres
 mexiques Et menues des Indes Chargez à la drene des S.
 Roux & Comp. de Marseille sur le Cap. de la Buette
 Cap. de Blanc. Scauoir

N^o 33a36 { 2 sacs d. 2002 1/2 mex. att. 234. 4. à 26/8 p. font... R^{te} 20180.-
 2^e menues des Indes 234. 4. à 86 d. l'att. 20167. R^{te} 40,347.-

frais.

frais de port à la Maison ... R^{te} 10.-
 Courtages à 2 p. sur R^{te} 36167. 72.-
 Port au Bord à 1 p. 320.-
 Courtage de traitte Mont. R^{te} 40830.17 ... 81.17 483.17

Sorteau debit ou R^{te} à 1/3 avec les d. f. R^{te} 40,830.17

Sauf Erreur & omission, à Paris le 20^e g. 1729
 en 3 par Duplicata

[Signature]

CHAMBRE DE COMMERCE
 ARCHIVES
 DE MARSEILLE

Source: Fond Roux, L. IX liasse 1,261 : Monnaies d'or et d'argent : factures