Bullionism, Specie-Point Mechanism and Bullion Flows in the Early 18th-century Europe

Pilar Nogués Marco
BULLIONISM, SPECIE-POINT MECHANISM AND BULLION FLOWS IN THE EARLY 18TH CENTURY EUROPE

Pilar NOGUES-MARCO

Thesis supervised by:
Marc FLANDREAU, Professeur des Universités

Paris, 22 January 2010

Members of the jury:

Albert CARRERAS, Professor at the Pompeu Fabra University, Barcelona (president)
Marc FLANDREAU, Professor at the Graduate Institute, Geneva and detached Professor at the Institut d’Etudes Politiques, Paris (supervisor)
Larry NEAL, Professor at the University of Illinois and Visiting Professor at the London School of Economics (referee)
Carles SUDRIÀ, Professor at the University of Barcelona (co-supervisor)
Nathan SUSSMAN, Professor at the Hebrew University, Jerusalem (referee)

Referee for the European Mention at the University of Barcelona:

Vincent BIGNON, Associate Professor at the University of Paris 10 (referee)
I am very grateful to Marc Flandreau for supervising the dissertation, to the referees for their reports and to the members of the jury for accepting to be part of the jury.
BULLIONISM, SPECIE-POINT MECHANISM AND BULLION FLOWS IN THE EARLY 18TH CENTURY EUROPE

ABSTRACT
The market requires that exchanges are voluntary and the law may restrict the workings of a given market. This is the case with Castile bullionist regulations, which led to an illegal bullion market in Early Modern Cadiz. This paper focuses on the structure of this illegal bullion market in order to understand the logic of silver outflows. Arbitrage is explained by the presence of an oligopsony power that depressed the price of silver in Cadiz and created a systematic bias between domestic and international market prices. The lesson that emerges from this paper is that understanding the specie-flow mechanism in the Early Modern Period demands the comprehension of the bullion market structure for the place and time examined.

PREFACE AND ACKNOWLEDGEMENTS

I consider a dissertation as the result of a process of intellectual maturity and, in this sense, I have tried to present it as a finished product. To that purpose, I have tried to present a well defined question and answer it in a very straight way. I hope to have been able to transmit a simple and clear thesis. However, in fact, for me making this thesis has not been a straight, simple or clear process. On the contrary, as any intellectual venture, it has been a long and tortuous way. Many doubts and ideas have emerged during the process, which has taken five years of research work, over my previous economic history background.

My interest in monetary history awoke long time ago, while studying commodity-money during my Economic History PhD courses at the University of Barcelona. I was fascinated by that topic from a conceptual point of view, and commodity-money turned into an intellectual challenge for me. Despite my interest, my early research, during the pre-dissertation period, was focused on related subjects, but not directly on commodity-money. Concretely, I started researching on prices and finance. On the one hand, my Master’s dissertation, on consumer prices, gave me the opportunity to get involved in the construction of historical databases. Since my Bachelor’s degree was in Economics, that was a useful experience for the subsequent PhD dissertation, because it taught me to deal with primary sources. Additionally, on the other hand, I also had the opportunity to get involved in financial history, thanks to the Group of Financial History of the Departament d’Història i Institucions Econòmiques of the University of Barcelona. I am grateful to Yolanda Blasco, Lluís Castañeda, Pere Pascual, Marc Prat and Carles Sudrià, members of that group, for the
time that we shared and the exchange of ideas that we held during that period. I am especially grateful to Yolanda, with whom I had the pleasure to share a research project on the Bank of Barcelona. I hope that we will soon conclude our “trilogy”, with the paper on “insider lending”.

Papers and conferences on both prices and finance gave me enough experience as to decide to start the dissertation process. I was still seduced by the topic of commodity-money but I was not getting answers to my questions from my readings. For that reason, I decided to convert commodity-money into my research subject. Step by step, I tried to define my concrete topic of analysis, paying attention to the Spanish case. As my previous research had focused on the early 19\textsuperscript{th} century, I was at first interested in the Spanish monetary adjustment after the independence of the American colonies. However, I soon understood the difficulty to focus on this question, as the Spanish monetary system during the colonial period had not been well understood yet. Spain was an exceptional monetary case in the Early Modern period, since it was the main country of origin of the precious metal. While the historiography had long focused on bullion flows from the American colonies to Europe and Asia through Castile, the logic which governed those flows was not well known.

In order to analyse such a complex topic, I looked for the intellectual support of one of the main specialist on arbitrage, Marc Flandreau. I am grateful to Carles Sudrià for having encouraged me to move from Barcelona to Paris to work with him, and I am most grateful to Marc for having accepted to supervise my dissertation.
Marc Flandreau offered me the perfect intellectual framework for my research through the *Chaire Finances Internationales* in Sciences-Po. I am very grateful to the colleagues and professors who welcomed me to the *Chaire* in October 2004, and with whom I had the privilege to share three years of research work: Olivier Accominotti, Vincent Bignon, Béatrice Dedinger, Norbert Gaillard, Clemens Jobst, Riad Rezzik, Stefano Ugolini, Camila Vam Malle and Frédéric Zumer. I am especially grateful to my office-mate Riad for his moral support, and to Camila, with whom I had the pleasure to write the paper on “India bonds”, and who taught me how to write a good paper in an efficient and pragmatic way. I am also very grateful to Marie-Annick Payen and Linda Armani for their administrative support, which was so helpful for me to deal with the French bureaucratic system. And I am also grateful to Cristina, with whom I had the pleasure to share my flat in Paris.

My dissertation has been carried out (successfully, I hope!) thanks to Marc’s rigour and perseverance. From our first meeting and during three years he focused on the importance of keeping the topic into the specie-point mechanism framework and, therefore, on the need to connect the right variables: exchange rates and bullion market prices. However, this task was really hard to undertake, because market prices were not available for Castile in the Early Modern period. Being Castile a bullionist realm, bullion market was forbidden and no evidence on market prices was available in the Spanish sources. I unsuccessfully looked for traces of the market in many Spanish archives (starting in the 19th century and moving back to the 16th century): *Archivo Central del Ministerio de Hacienda* (Madrid), *Biblioteca de la Bolsa de Madrid* (Madrid), *Archivo Histórico del Banco de España* (Madrid), *Biblioteca Nacional de*
España (Madrid), Archivo General de la Administración (Alcalá de Henares), Archivo Histórico Nacional (Madrid), Hemeroteca Municipal (Madrid), Archivo de la Casa de la Moneda (Madrid), Archivo de la Corona de Aragón (Barcelona), Biblioteca de Catalunya (Barcelona), Arxiu Municipal de Barcelona (Barcelona) and Archivo General de Indias (Sevilla). I am very grateful to my friends and family who accommodated me in their homes during the missions: to my aunt Paula, who so many times made mine her home in Madrid, and to my friends Xavi, Elsa-Eli-Julia and Marc-Javi, who hosted me in Barcelona. They gave me the opportunity not only to explore the archives, but also to maintain close links with my friends from Barcelona during my stay in Paris. I am also very grateful to Chaire Finances Internationales that funded the trips for those missions, and to the wise archivist Antonia Heredia Herrera, who suggested me to stop looking for market prices in the institutional archives and to start looking for them in the merchant-bankers archives.

However, Spanish merchant-bankers archives are very scarce. Historians have made up for this shortage by using notary archives, but these were not useful either for my aim. I searched into the best Spanish merchant-banker archive for the Early Modern period, that of Simon Ruiz (16th century) in the Archivo Histórico Provincial (Valladolid), but I was not able to get market prices there. Finally, I could not obtain information on the markets in the periodical bulletins either, since bullion started to be quoted in Spanish bulletins only at the end of the 19th century (13 December 1885), which was a period too far away from my interest.
Therefore, due to the lack of market prices and after two years of exhaustive search, I decided to approach arbitrage through official prices, which are usually called mint prices in the historiography. On the basis of that information, I had the opportunity to present the first results of my research in some conferences during the third course of my PhD (2006-2007): Iberometrics, the Economic History Society Annual Conference and the Seminar of the University of Zaragoza. I thank the organisers of the three conferences for funding my attendance, as well as the participants for their comments. While the audience showed a high interest in the topic, I always had the same concern: could I derive conclusions about the law of one price for bullion (specie-point mechanism) by working with administrative prices? My results were not solid enough.

Fortunately, at that time I had joined Marc Flandreau’s research group: *Développement financier, regulation et mondialisation 1400-1800*, hosted by the *Chaire Finances Internationales* and formed by Christophe Galimard, Clemens Jobst, Marc Flandreau and myself. I had the pleasure to research with them in two projects, “Bell Jar” and “Networking Cities”. These projects gave me the opportunity to learn a lot about the European monetary system in the 18th century, which was an extremely useful background for my dissertation. I am very grateful to the members of the team, Christophe, Clemens and Marc, for our joint research. Indeed, the most important contribution of the project to my dissertation was that it gave me the opportunity to work in many European archives: *Nederlandsch Economisch-Historisch Archief* (Amsterdam), *Stadsarchief* (Amsterdam), *Koninklijke Bibliotheek* (The Hague), *Instituto di Storia Económica-Università Bocconi* (Milan), *Archivio di Stato* (Florence), The British Library (London), the *Bibliothèque Nationale de France* (Paris), the
Chambre de Commerce (Marseille) and the Archives Départementales de la Gironde (Bordeaux).

In June 2007, at the end of the third year of my PhD (2006-2007), I finally found the black market prices for silver in Cadiz for the early 18th century in the Fond Roux, Chambre de Commerce (Marseille). That was a great discovery!! Not only the Spanish institutional sources had excluded any traces of the bullion market. Also the historiography had focused on official prices when analysing the Castilian case, creating a lot of confusion about the topic. This is clearly illustrated by the following quotation from Rebuffat (1966), specialist in the Roux archive, where I found the black market data: “What are the requested conditions to get profit of arbitrage? For the pieces of eight, being constant its price in Cadix, it must be higher in Marseille”\(^1\). While both the institutional archives and the historiography were pointing at the apparent non existence of bullion market prices for Castile, I had been able to find them! Silver market prices in Cadiz were not constant, but fluctuated as the market prices of any other commodity.

The previous three year search for those data, without any certainty about their existence, had been a really risked venture, mainly in these days, when the universities impose extremely rigid deadlines and it is legally not possible to defend the dissertation after five years. I am very grateful to Amanda Diaz, who hosted me in her home in Marseille during my missions there and to Chaire Finances Internationales which founded the trips to the archives through the research project Développement financier, regulation et mondialisation 1400-1800. I am also very grateful to the Spanish and

---

\(^1\) Rebuffat and Courdurié (1966), p. 26 : « Quelles sont les conditions requises pour que s’exerce avec profit ce trafic? Pour la piastre, son prix à Cadix étant constant, il doit être, à Marseille, au plus haut ». The emphasis is mine.
French institutions which awarded me scholarships during that long searching period: 
*Banco de España, Fundación Instituto de Crédito Oficial, Chancellerie des Universités de Paris (Bourse Aguirre Basualdo en Sciences Economiques et de Gestion)* and *Ministère des Affaires étrangères (Bourse d’excellence Eiffel Doctorat)*. They gave me the possibility to undertake this venture. The probability of failure was very high but, fortunately, the attempt was finally successful. I want to thank Marc Flandreau’s great intuition and constant insistence on the need to find the market data which, together with my perseverance and experience with primary sources, permitted me to understand that I had found the black market data. While the source had often been exploited, nobody had ever noticed the presence of the quotations of the pieces of eight in Cadiz. Probably, the contemporaries’ use of nicknames and abbreviations for coins, and the lack of palaeographical research on commerce matters, had hidden the Cadiz market prices for silver into the *Fond Roux* for three centuries.

Once I had compiled the data, I started to process and interpret them. I carried out those tasks in Barcelona, where I spent the fourth year of research (2007-2008). In July 2007, just after the discovery of the shadow prices, I moved from Paris to Barcelona. I am very grateful to my flatmates during that year in Barcelona, Elsa Bolado and Elisenda Sáez, who supported me through the difficult task of learning how to work alone at home, without the intellectual incentive provided by a team. I am most grateful to Marc Flandreau, who offered me a contract of research assistant for two years, which permitted me to work without worrying about scholarship applications. I am also very grateful to him for the meetings we held to talk about my thesis, and specially because he always encouraged me to go one step further in the analysis of the topic. His teaching has been crucial for my process of intellectual growth. I am also
grateful to Camila Vam Malle and Stefano Ugolini, who hosted me in Paris and Geneva respectively when I went there for the meetings with my supervisor.

I devoted the fourth year of my research to process the data and interpret the results. Since those were black market data, that task was far from easy. Fortunately, I had access to the Goldsmiths’ Kress Library (The Making of the Modern Economy) for the research project Développement financier, regulation et mondialisation 1400-1800, and I could download many cambists’ books from this wonderful library, which were very useful to understand the quotations. The Castilian monetary system suffered many adulterations, mainly -although not only- during the period of the great debasement of the petty coin (17th century), and this made me doubt about the units in which the black market prices were quoted. Therefore, I had to be very careful when working with those data. As I had previously done many readings about the Castilian monetary system and I was aware of the legislation which regulated devaluations and debasement, I could finally solve my doubts. Besides, I could be completely sure that my data were correctly interpreted when I found in the Archives Départementales de la Gironde a mid 18th century banker’s notebook, which contained some exercises addressed at teaching how to arbitrate. These exercises showed me how to deal with units more clearly than any printed source.

I presented the first results of my analysis of the shadow market prices in some conferences during the fourth year of my PhD (2007-2008): the conference of the Associação Portuguesa de História Económica e Social, the seminar of the Xarxa de Referència d’R+D+I en Economia i Polítiques Públiques of the University of Barcelona, the First Euro-clio Conference and the conference of the Asociación
Española de Historia Económica. I am very grateful to the first three institutions, which funded my participation in their conferences, and to the Fonds de Mondialization-Sciences Po, which funded my participation in the conference of the Asociación Española de Historia Económica. I am really grateful to the participants in those conferences, who gave me so many good pieces of advice to improve my research. I particularly thank Pablo Martín Aceña, who did a careful reading of the paper I presented in the conference of the AEHE and helped me to go straight to the argument and eliminate all the incidental concepts and ideas which were not really important for my thesis. I am also especially grateful to Vincent Bignon (Euro-Clio Conference) and Carles Sudrià (University of Barcelona) whose comments helped me to understand that the essential point of my research was about market structure. Vincent Bignon, on the basis of his expertise in black markets, encouraged me to study how the illegal market was organized; and Carles Sudrià, on the basis of his vast knowledge of the Spanish historiography, suggested me to focus on foreign merchants, the leaders of smuggling. I also thank Paloma Fernández, a specialist in 18th-century Cadiz merchants, who provided me with very useful references.

Focusing on market structure was the solution to interpret my results. My quantitative evidence showed a systematic bias between the exchange rate and the relative silver prices—called arbitrated parity in the dissertation. Those results were robust from a historical point of view, as the historiography had long estimated the quantities of silver that was illegally exported. But they were difficult to interpret from an economic point of view. Why the law of one price did not equal exchange rates and relative silver prices? In other words, could we think in unexploited opportunities for arbitrage, knowing that smuggling connected markets? History and economy were
conciliated thanks to the consideration of market structure, since Cadiz black market for silver was an oligopsony.

The analysis of the market structure forced me to move my attention from readings on money to readings on trade. Actually, being the commodity-money both a commodity and money, my readings had been focused only on commodity-money as money, while the answer to my question required considering commodity-money as a commodity. The traditional trade literature gave me a great deal of information on the structure of the market. Both French and Spanish literature provided studies on networks, leaders of trade, foreign merchants, smuggling and other related topics for the Early Modern period. So, secondary sources, together with fiscal sources and contemporary reports, were finally extremely useful to interpret the behaviour of the arbitrage equation. I am very grateful to Alfonso Herranz, who provided me with access to the electronic journals and the university libraries in Barcelona, and to Marc Flandreau who ordered the specialized books which were not available in Catalonia and paid for the archive’s material.

The fifth and last year of my PhD (2008-2009) has been the most complicated. I was very happy with the market structure interpretation and I wanted to expand the argument geographically. To that purpose, I went to London to work with the East India Company bullion data. I am grateful to Marc Flandreau for funding this mission. As prices in Cadiz were lower than the competitive international price because Cadiz was an oligopsony, my intuition was that prices in Asia were higher than the international price because the East India Company had the monopoly of trade with Asia. I wanted to
test this intuition, but a car hit me while I was working in London in December 2008. It was a serious accident which has maintained me convalescent until now.

Under those circumstances, I abandoned the monopoly argument and just concentrated in writing the manuscript. I am really grateful to my family and friends for their moral support in those so difficult moments: my friends from Zaragoza who stayed with me during the first months of convalescence, and my friends from Barcelona who stayed with me afterwards. I am especially grateful to my parents, not only for their moral support, but also for having acted as the lender of last resort during the summer of 2009, when my funding was over. I am also grateful to the library of the University of Barcelona for bringing me the books I needed to the library closest to my place during the long period in which I had to walk with crutches.

I could complete the manuscript in the summer of 2009. I am very grateful to my friends from the Barcelona academy, Yolanda Blasco, Elsa Bolado, Xavier Esplugas, Alfonso Herranz, Marc Prat and Javier San Julian, for their moral support, which helped me to conclude the dissertation. Knowing difficulties of intellectual work, they have always given me wise pieces of advise. And I am especially grateful to Javier San Julian, who has voluntarily done the proofreading of the dissertation.

I have recently presented the results of my PhD research in the Departament d’Economia i d’Història Econòmica - Universitat Autònoma de Barcelona and in the World Economic History Congress. The very good reception of my research has encouraged me to present it for defence. I am very grateful to the participants for their comments and suggestions and to the Centre d’Estudis Antoni de Capmany –
Departament d’Història i Institucions Econòmiques - University of Barcelona for funding my attendance to the World Economic History Congress. I am also very grateful to the Departament d’Història i Institucions Econòmiques - University of Barcelona for lending me an office during the summer of 2009 to finish the manuscript.

Five years of dissertation. Five years which comprise four changes of residence and two countries, twenty two archives visited, one dissertation plus six published articles plus three working papers, twenty three presentations in conferences plus five attendances to courses, forty six applications to get funding, one traffic accident and nine months of convalescence, many renounces, sometimes happiness and other times sadness and, fortunately, many people who intellectually, financially and morally have supported me during this venture. Really thanks to all of them!!!

Barcelona, 31 August 2009
# TABLE OF CONTENTS

**INTRODUCTION**

1. WHY SMUGGLING? THE CASTILIAN BULLIONIST LAWS AND THE WORKINGS OF THE LEGAL BULLION EXCHANGE IN CADIZ
   1.1. Bullionist theory
   1.2. The Castilian bullionist rules of the law
   1.3. The workings of the legal bullion exchange

2. THE PUZZLE: SILVER-POINT MECHANISM WITH BULLION CONTROLS (CADIZ-LONDON, 1729-1741)

3. THE COUNTERFACTUAL: SPECIE POINT MECHANISM WITH FREE BULLION MOVEMENTS (LONDON-AMSTERDAM, 1734-1758)

4. THE AGENTS INVOLVED IN THE ILLEGAL EXCHANGES OF SILVER IN CADIZ
   4.1. The Spanish merchants versus the foreign merchants
   4.2. Who was who? Measuring the importance of smugglers of silver

5. THE RULES OF THE GAME: HOW DID THE EXCHANGE TAKE PLACE?
   5.1. Why the agents preserved secrecy and how the smuggling was practised
   5.2. The Treaty System: smuggler's diplomatic immunity
6. THE SMUGGLERS’ NETWORK: THE OLIGOPSONISTIC STRUCTURE OF THE BULLION BLACK MARKET IN CADIZ

6.1. Wholesale merchants’ organization in the 18th century

6.1. The smugglers’ network in Cadiz

6.2. The geographical circuits of silver

7. THE MODEL AND DATA: THE BEHAVIOUR OF OLIGOPSONISTIC SILVER PRICES WITH DEVALUATION

7.1. The oligopsonistic silver-commodity market

7.2. The silver-money market and the oligopsonistic silver-commodity market

7.3. The effect of devaluation in the silver-commodity market

CONCLUSIONS

ARCHIVES

BIBLIOGRAPHY

APPENDIX 1: THE CONSTRUCTION OF THE SPOT EXCHANGE RATES, 1729-1741 (LONDON-AMSTERDAM, LONDON-CADIZ AND CADIZ-AMSTERDAM)
APPENDIX 2: THE CONSTRUCTION OF THE SILVER POINTS (CADIZ-LONDON, 1729-1741).................................................................................................................. 167
Silver market prices in London........................................................................ 167
Silver shadow market prices in Cadiz.............................................................. 169
The arbitrated par of exchange and the spot exchange rate......................... 172
Costs................................................................................................................... 175

APPENDIX 3: CASTILIAN MONETARY SYSTEM IN THE EARLY MODERN PERIOD............................................................................................................. 179

APPENDIX 4: THE COMPARISON OF THE BILATERAL SILVER POINTS (CADIZ-LONDON) AND THE MULTILATERAL SILVER POINTS (CADIZ-LONDON THROUGH AMSTERDAM)...................................................................................... 186

APPENDIX 5: THE CONSTRUCTION OF THE GOLD, SILVER AND BIMETALLIC POINTS (LONDON-AMSTERDAM, 1734-1758)................................. 188
Market prices for gold and silver in London.................................................... 189
Market prices for gold and silver in Amsterdam........................................... 191
Arbitrated par of exchange............................................................................. 193
Spot exchange rate......................................................................................... 195
Costs................................................................................................................... 197

APPENDIX 6: LIST OF FRENCH MERCHANT HOUSES IN CADIZ (1724-1746)............................................................................................................... 202
The discovery of America was followed by a flow of precious metals to Spain and Portugal, and from there throughout the world. Historiography has reconstructed the quantities of gold and silver transferred from the New World to the Old World in the Early Modern period, but what was the reason for the bullion outflows? This dissertation answers this question. In particular, it examines the logic of silver outflows from Cadiz to London in the first half of the 18th century.

Castile enacted bullionist laws during more than four centuries, from the Late Middle Ages to mid-19th century. The laws fixed prices and placed bans on export. But these measures did not prevent the export of silver and instead caused a great deal of smuggling. This dissertation aims at understanding the logic of silver outflows focusing on the smugglers’ point of view: arbitrage. In this regard, the archive of the merchant house Roux (Marseille), probably the best preserved 18th century commercial archive in Europe, has made possible the reconstruction of the specie-point mechanism for silver – the Old Mexican pieces of eight - between Cadiz and London as exactly practiced by contemporary merchants. The discovery of half-monthly data on silver black market in Cadiz for the period 1729-1741 has been a milestone in order to understand the logic of silver outflows.

“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
Empirical result from these data for arbitrage equation presents a puzzle for our understanding of the specie-point mechanism: from 1729 to 1737 there was a systematic bias between the implicit spot exchange rate and the arbitrated parity, which made arbitrage systematically profitable. On the contrary, from 1737 to 1741 the bias was corrected because the Spanish government reacted to illegal bullion outflows with a devaluation, which equalized the exchange rates and the arbitrated parity.

This research explores both theoretically and empirically the reasons for the apparent mispricing for the first period and the effect of the devaluation on silver prices for the second period. The outcome is that bullionist regulations configured an oligopsony structure in Cadiz that had the power to drive down silver prices below the international price (i.e., London price). Oligopsony agents were the most important foreign merchants in Cadiz, organized in family and partnership networks which were price-makers; their structure was maintained because the long-run international networks created entry barriers in the business of illegal export of bullion. Secrecy was preserved because both sides of the market cheated the Spanish government: importers from the Spanish American colonies saved the high import tax and exporters to the main European bullion markets ignored the ban against exports.

Nevertheless, oligopsony power had a floor, which was the Official Parity (i.e., the number of units of account per coin). Below the Official Parity, the pieces of eight were used as money and went out from the commodity market. The devaluation of 1737 should be understood as an increment of the Official Parity for eliminating oligopsony power.
Some main lessons emerge from this dissertation. First, understanding the reasons of the specie flows in the Early Modern period demands comprehension of the specie-point mechanism. Second, the construction of the silver-points requires the location, collection and manipulation of the right data: market prices, exchange rates and costs of arbitrage. And third, the interpretation of the arbitrage results needs to focus on the special microeconomic features of the bullion market structure. This is an original approach which will provide a lot of insight into the workings of commodity money.

The first chapter describes the Castilian stagnated legislation and immobile institutions established with the aim of avoiding bullion outflows: fixed prices and bans on export. The second chapter analyses the specie-point mechanism in the institutional setting of bullion controls: the case of silver Pieces of Eight between Cadiz and London during the period 1729-1741. Arbitrage equation shows a systematic bias between the spot exchange rate and the arbitrated parity corrected by the 1737 devaluation. The third chapter analyses the specie-point mechanism in the institutional setting of free bullion movement: the case of gold and silver bars between London and Amsterdam during the period 1734-1758. London-Amsterdam bullion market was integrated, and arbitrage equation shows only few and non persistent breaks. The fourth chapter tells the story of the agents involved in the illegal exchanges of silver in Cadiz, and demonstrates that the smugglers were the French merchants who obtained the highest income of all merchants.
in Cadiz. The fifth chapter examines the contemporary Castilian reports against smuggling in order to describe how the illegal exchange took place. Smuggling was reserved to foreign merchants because they had achieved privileges which prevented them to be prosecuted. The sixth chapter demonstrates that the smugglers were organized in long-run networks which conferred them the market power to drive down bullion prices below the international price, and the international connections to illegally extract and distribute the bullion from Cadiz. The seventh chapter develops a static model of partial equilibrium for commodity-money in order to understand the workings of the oligopsonistic silver-commodity market and the effect of devaluation on the bullionist goal of treasuring silver. We will end offering some conclusions. Appendices explain the construction of the specie-point mechanism.
1. WHY SMUGGLING? CASTILIAN BULLIONIST LAWS AND THE WORKINGS OF THE LEGAL BULLION EXCHANGE IN CADIZ.

Castilian economic policy in Early Modern Age was dominated by the strategy of controlling the gold and silver from the American colonies. After the America discovery, bullionism was consistent with the expansionist and imperialist interests of Castilian monarchy. Bullionism had created the mirage of precious metals mining wealth as the measure of economic success. And bullionism remained the essence of state economic policy during sixteenth, seventeenth and eighteenth centuries, reinforced through stagnated legislation and immobile institutions.

The system developed in the early 16th century remained until the end of the 18th century enshrined. Innovation was unacceptable because it would have meant to accept that somehow fundamental structures once admirable were failing. Inordinate reverence for past institutions was widely accepted and symptomatic of declining imperial projection. This chapter explains bullionism theory and describes the Castilian stagnated legislation and immobile institutions which preserved bullionism.

1.1. Bullionist theory

The most emphasized doctrine on wealth prior to Adam Smith stated that the key to increase wealth was the accumulation of bullion. The bullionist doctrine, which provided medieval roots to early-modern mercantilism, refers to government policies designed to maintain the stock of precious metal within the country. Late-medieval bullionist policies may be attributed to the strong, almost universal conviction that

---

wealth, prosperity, and power of a kingdom depended fundamentally upon its stock of precious metals\(^4\).

The way to accumulate bullion for a country with no gold or silver mines was to get an excess of exports over imports. This is why the contemporary economic thought stressed the importance of the mercantile system and, therefore, authors have been labelled as “mercantilists”. According to the orthodox classification of the different trends in economic thought, two main periods separated early bullionist doctrines from late balance-of-trade doctrines. The English authors called “the four Ms”\(^5\), Malynes and Milles vs. Misselden and Mun, are usually considered the main representatives of mercantilism. During the bullionist period previous to 1620 -represented by Malynes and Milles-, trade policies focused on restrictions on the export of bullion (ingots and coins) with the aim of maintaining the country’s stock of bullion (see Table 1.1.).

\textit{Table 1.1.: Bullionism policies}

<table>
<thead>
<tr>
<th>BULLIONIST POLICY</th>
<th>AUTHOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bans and/or licences on specie exports</td>
<td>Gresham (1558)</td>
</tr>
<tr>
<td></td>
<td>Milles (1550-1627)</td>
</tr>
<tr>
<td>Administrative bullion prices at legal Mint Price</td>
<td>Clement (1695)</td>
</tr>
<tr>
<td></td>
<td>Malynes (1601)</td>
</tr>
</tbody>
</table>

\(^4\) Munro (1992)

\(^5\) Gil Harris (2004), p. 2
During the balance-of-trade period after 1620 (represented by Misselden and Mun), the objective of trade policies was to increase stock of bullion indirectly by means of regulation of trade (commodities imports and exports) rather than direct restrictions on the export of bullion°

In the 18th century the balance-of-trade doctrine had long displaced the bullionist doctrine, and the prohibition of exporting gold and silver was in France and England confined only to the domestic coin, while the exportation of foreign coins and ingots was free. In Holland, and in some other places, this liberty was extended even to the coin of the country7. However, in the countries with gold and silver mines, like Spain and Portugal, the bullionist goal survived. These countries did not need to focus on the influx of bullion resulting from an excess of exports over imports, as they believed that they could achieve the bullionist goal directly producing gold and silver and prohibiting their export. But, according to Smith [1776], “all the sanguinary laws of Spain and Portugal are not able to keep their gold and silver at home”.

In Spain, probably because it was a mining country, non conceptual transformation was reflected in legislation and institutions. From 16th to 19th century, Spain identified wealth with bullion, and the same bullionist laws which regulated the country at the end of the Middle Age perpetuated during the Early Modern Period, and bullion could not be freely exported until the mid 19th century. Then, when we refer to bullionism in Spain in this text, we mean the crudest sense of bullionism, this is, bullion accumulation; we are not standing for the most sophisticated meaning of bullionism as

---

7 Smith (2003) [1776], pp. 545-546
money circulation to increase trade\textsuperscript{8}. Laws and institutions had been created in Spain to accumulate bullion, not to circulate it. Following sections will explain these laws and institutions oriented to the bullionist goal which created anachronistic rules of the law for the early 18\textsuperscript{th} century Spain.

1.2. The Castilian bullionist rules of the law

Economic thought considers bullionism as the economic theory that defines wealth by the amount of precious metals possessed. Castile enacted bullionist laws until mid-19th century. These regulations had their origin in Late Middle Ages and, due to the America discovery, endured until the independence of the colonies. Contemporary Castilian economists clung to the principle of bullion accumulation into Castile\textsuperscript{9}; legislation reflecting contemporary political economic thought. Castile bullionist legislation was characterised by a chaotic form and anachronistic contents based on the successive ratification of previous laws. Concretely, two types of bullionist rules regulated bullion exchange with the aim to avoid bullion outflows: fixed prices and bans on export.

Fixed prices prohibited the exchange of gold, silver or billon coins at a different price than the official parity, i.e., the number of units of account per coin: “\textit{On behalf of this law, we declare that any conventional alteration in the fixed price that we assign now to gold, silver and billon coins will be regarded as an actual and material adulteration of those coins, and therefore an evident and public robbery […] Therefore we want and command that any individual whatever his class or condition who,}

\textsuperscript{8} Viner (1955), p. 36-40
\textsuperscript{9} Larraz (1943)
infringing this law, makes any trade, exchange, contract, or have knowledge or takes part in them, be it as a dealer or in any other form, conferring the aforementioned gold, silver or billon coins higher or lower value than their legal value, or accepting any difference or premium for them, be it a low or a high quantity, will be regarded as a forger and public robber” (Cap 18 aut 16 tit 21 lib 5 R)\textsuperscript{10}

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”\textsuperscript{11}. Fixed price was regulated by the Mint Regulation of the year 1497 that was in force until the reform of the monetary system in 1848\textsuperscript{12}. Successive regulations modified the official parity of gold and/or silver regarding the unit of account, but maintained the prohibition of using a higher price for specie than the official parity through the recurrent expression: “we order the value [equivalence with the unit of account] and no more”.

\textsuperscript{10}“declaramos por esta nuestra ley que cualquier alteración convencional en el precio fijo, que ahora damos a las monedas de oro, plata y vellón sea lo mismo que la adulteración real y material de las mismas monedas y sea tenido esto por hurto manifiesto y robo público [...] por tanto queremos y mandamos que cualquier persona de cualquier calidad o condición que sea que en contravención de esta ley hiciere alguna permuta, trueque, contrato, o fuere sabedor, u interviniere en él, como corredor, o en cualquier otra manera, dando a dichas monedas de oro, plata o vellón mayor o menor estimación de la legal que tienen, o admitiendo entre ellas alguna diferencia o premio, aunque sea poca, o mucha cantidad, sea habido y tenido por aleve y por falseador de moneda y por ladrón y robador público” Cap 18 aut 16 tit 21 lib 5 R year 1652, ratified in aut 40 tit 21 lib 5 R year 1704 and ley X lib IX tit XVII NR year 1743. Fixed prices also affected to ingots that should be exchanged in the Mint at the fixed price. Larruga (1787-1800), vol. 3, pp. 44

\textsuperscript{11}“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 proveido que por las monedas no se pueda llevar más de lo que valen” (ley VI, tit 18, lib 6 R year 1550)

\textsuperscript{12}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 not any reference to gold. Gold was regulated next year (Ley IV, tit 18, lib 5 R year 1498). The reform of the monetary system in 1848 was compiled in RD de 15 de abril de 1848.
Fixed prices endured almost four centuries and step-by-step government toughened the penalties for those who did not comply with the regulations. In mid-18th century the penalty was the loss of the occupation and the confiscation of all goods, from which one third was the reward for the informer. Additionally, these laws included the penalty of the loss of naturalization papers because government considered foreign people as responsible of bullion export: “considering that these contracts are made in secret, foreigners attempting to make enquiries impossible”13. The consequence of this regulation was the absence of a legal bullion market with free prices. As contemporaries claimed at the end of 18th century: “Spain is absolutely the only country in Europe in which there is not trade of gold and silver, and where there is not any specialized merchant house dealing with this kind of business”14 (Larruga, 1787-1800, vol. 3, pp. 49-57).

The absence of a legal bullion market with free prices was complemented with bans on the export of bullion15: “It is forbidden to any native or foreign individual to take out of the Kingdom any amount of gold or silver, be it in bars or coins, without our permission, and if he had permission, no more quantity than what it is stated in the licence”16 (Pragmática 14 October 1624).

13 “atendiendo a que estos contratos se hacen secreta y paliadamente, procurando los extranjeros imposibilitar la averiguación”. In 1498 the penalty was a pecuniary fine, from which one quarter was the reward for the informer (Ley IV, tit 18, lib 5 R). In the law of the year 1550 the government increased the pecuniary fines and added a flog penalty for a second time infraction and the permanent exile for a third time infraction (Ley VI, tit 18, lib 6 R). In the law of the year 1609 the government increased again the pecuniary fine and added 3 years of exile for the first time infraction (Ley XVI, tit 18, lib 5 R). In the laws of the years 1652, 1704 and 1743 the penalty was the loss of the occupation, the confiscation of all goods and the loss of naturalization papers (Aut 16 tit 21 lib 5 R year 1652, ratified in Aut 40 tit 21 lib 5 R year 1704 and ley X lib IX tit XVII NR year 1743).
14 “España es absolutamente el solo país de Europa donde no se hace el comercio de materias de oro y plata, y donde se carece de casas particulares autorizadas para este trato” (Larruga, 1787-1800, vol. 3, pp. 49-57).
15 The bans on export are compiled in tit. XIII, lib IX, NR: “de la saca prohibida del oro, plata y moneda del Reyno”
16 “Se prohíbe que ninguna persona natural ni extranjera saque fuera del Reino oro ni plata en pasta ni
The prohibition to export bullion started in the time of King Juan I (1358-1390) and remained until mid-19th century\textsuperscript{17}. The penalty from Juan I reign to 1761 was the sentence of death and the confiscation of all goods for the offender and collaborators. The denunciator received one quarter of the goods confiscated\textsuperscript{18}. The regulation of 1761 changed the penalties. A penalty of eight years of prison and a pecuniary fine was stipulated for the first illegal export. Ten years of prison and the double of the pecuniary fine for the second infraction and life imprisonment in Africa and confiscation of all goods for the third infraction, for offender and collaborators (and if the convicted offender was a public servant, the penalty was the loss of occupation and 10 years of prison in Africa). The denunciator received one-third of gold or silver seized\textsuperscript{19}.

The exporter needed a licence to export bullion legally. Licences were issued to businessmen \textquotedblleft for the provisions that they should make out of the Kingdom\textquotedblright{} by the Treasury Department (\textit{Consejo de Hacienda})\textsuperscript{20}. Licences did not pay fees. The legislation recognized that bullion exporters tried to export the precious metal without the registration or paying duty-guards a bribe. To avoid businessmen cheating, the licence should contain the following information: the name of the exporter, the quantity of bullion, the reason of export, the time needed to the transport and the port of destination. The exporter should show the bullion to the Mayor, who checked it against

\textit{en moneda, en ninguna cantidad, sin nuestra licencia, ni con ella en más cantidad de lo que la licencia contuviera} (Pragmática 14 October 1624). In the 16th century, Spanish government required foreign merchants to settle their merchandises with Spanish products. Girard (1967), p. 52. Pragmática 14 October 1624. Madrid. The law specified that imports should be paid with Spanish exports and not with specie. Although the regulations recognized the use of bills of exchange to pay for imports, the legislator ordered the payment of imports with exports and imposed a Duty register.

\textsuperscript{17} Beginning: Quadernos de Guadalaxara de D. Juan I y D. Enrique III. End: 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).

\textsuperscript{18} Pragmática 14 Octubre 1624. Madrid.

\textsuperscript{19} Capítulo 28 de instrucción 22 Julio 1761 and Cédula del Consejo de Hacienda de 23 Julio de 1768.

\textsuperscript{20} \textit{para las provisiones que hubieren de hacer fuera del Reino}. Pragmática 13 Septiembre 1628. Madrid.
the licence and wrote in the duty-passport the word “fulfilled” \(^{21}\). Licences had an expiration date to avoid a black market for them. Selling or transferring a licence was forbidden, and the infraction had the same penalty (for the buyer or assignee) as the export without a licence. To transport gold or silver among Spanish ports was forbidden. Transport of ingots into Spain by land only was permitted thought places that had a Mint. In this case, the exporter needed a return-passport (tornaguía) which demonstrated that bullion came back from the Mint. Transport of coins into Spain by land only was permitted if they were exchanged for goods and required a passport and a return-passport detailing what had been bought and where. The falsification of the return-passport had a penalty of 6 years of prison in Africa.

1.3. The workings of the legal bullion exchange

The Castilian legislation forbade free exchange of gold and silver. Legal exchange of the precious metal from American colonies was regulated through the institution which administrated trade with colonies: the Casa de Contratación (House of Trade\(^ {22}\)). Merchants should register the bullion as soon as the vessel tied up in Cadiz – and paid the import tax for both ingots and coins. The precious metal was registered in the Casa de Contratación and kept in the Treasure Chamber, which had thick walls, strong doors, double bars of iron in windows and night guards. The treasure chest had three locks which had to be opened simultaneously with three different keys watched over by the three judge-officials of the Casa de Contratación -the factor, the treasurer and the comptroller\(^ {23}\) (see Illustration 1.1.). The coins were returned to their owners

\(^{21}\) Ley de 13 diciembre de 1760.

\(^{22}\) The literal translation of Casa de Contratación is “House of Contracting”. Hamilton (1934) translated it as “House of Trade”.

\(^{23}\) Hamilton (1934), p. 25
after the registration. The ingots were sold at auction in the Casa de Contratación: suppliers were the owners of bullion arrived from America and demanders were the “compradores de oro y plata” (gold and silver buyers), who bought both King’s bullion and individuals’ bullion. The owner of the bullion received a receipt for the gold and silver deposited (see Illustration 1.2.).

*Illustration 1.1.: The Lock of the Treasure Chest*

Source: Archivo General de Indias. The chest now rests at the head of the stairway in Archivo General de Indias (building of the Casa Lonja in Seville). Image reproduced in Hamilton (1934)
The compradores de oro y plata were individuals in the 16th century, but from the beginning of the 17th century a new legislation obligated to create limited partnership companies which should be approved by the Casa de Contratación and should deposit there a certain amount of money as insurance for depositors²⁴. The compradores de oro y plata bought the bullion in order to refine at the monetary fineness, because Castilian Mints only minted the ingots received at the monetary fineness, and then sent the ingots to the Mint for minting²⁵.

²⁵ Recopilación de Indias, lib. IX, tit. XIII (see Illustration 1.2.)
brassage and seigniorage, the compradores de oro y plata charged the refining commission and the rest of the ingot minted was given to its owners in coins through the Treasurer of the Casa de Contratación.

The refining commission was a fixed amount which covered the refining cost in the case of the King’s bullion, and a variable charge which depended on the price of auction in the case of individuals’ bullion. In the 16th century the biddings were spirited and the profit for compradores de oro y plata should have been small because the price paid to them by the Mint minus the refining cost represented the maximum auction price. Additionally, the compradores de oro y plata had to bid for bars without previous assay, a system which had a great risk in case that the American bullion had a lower fineness than what was marked. This happened repeatedly and provoked the bankruptcy of many Compradores de Oro y Plata. In 1563 there were fifteen compradores de oro y plata, but in 1615 bankruptcies had reduced them to eight, and in 1620 there were only 3 companies.

In the 17th century, the compradores de oro y plata demanded to the Casa de Contratación to make the assay for gold previously to auction to avoid cheating in fineness (although silver continued being sold without assay, just with the mark from America). The reduction of the number of the Compradores de oro y plata stabilized the price in the 17th century. Gold was sold at 608 maravedis/peso (Castellano) of 22 ½ carat to the Compradores de Oro y Plata and at 611 maravedis/peso (Castellano) of 22 carat.

26 Brassage was the fee charged by the Mint to cover the coinage costs. Seigniorage was the revenue to the King for coinage.
27 Hernández Esteve (1986) and Donoso Anes (1996) explain the accounting process of legal bullion exchange through the Casa de Contratación.
28 Hamilton (1974), p. 27
29 Ingots came marked from American colonies because the bullion extracted had to be assayed to pay the extraction tax. 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.
30 Hamilton (1934), p. 31.
½ carat to the Mint, which means a margin of 0.5%\textsuperscript{32}. Net profit (deducted refining cost) was 0.18% for silver and 0.2% for gold\textsuperscript{33}. Illustration 1.3. shows an example of accounting books of bullion exchange. We can see that gold was sold to the Compradores de oro y plata at the fixed price of 608 maravedis/peso (Castellano) of 22 ½ carat.

In the 18\textsuperscript{th} century, we lose track of the Compradores de Oro y Plata. They survived in Seville until the end of the 17th century\textsuperscript{34}. According to the documentation preserved in the Archivo General de Indias, there were accounting books of the Compradores de Oro y Plata at least until 1714. After that year, the Casa de Contratación was moved from Seville to Cadiz, and some accounting collections interrupted. Therefore, we do not know if the Compradores de Oro y Plata stopped being the intermediaries between the bullion owners and the Mint in the 18\textsuperscript{th} century or if we do not have any further evidence just because the accounting books have not been preserved. Additionally, their activity was regulated in Leyes de Indias, and the last compilation of Leyes de Indias dates from 1682. Therefore, we do not know if Compradores de Oro y Plata’s activity existed and was regulated afterwards\textsuperscript{35}. As Bernal (2000) pointed out, the monetary historiography of Cadiz in the 18\textsuperscript{th} century is still awaiting for further development\textsuperscript{36}.

\begin{flushright}
\textsuperscript{32} Veitia (1672), p. 257. \\
\textsuperscript{33} Veitia (1672), p. 251. \\
\textsuperscript{34} Mangas (1989), p. 330, footnote 62. According to Bernal (2000), pp. 657-658, the last comprador de oro y plata stopped refining the precious metal in 1710. \\
\textsuperscript{35} Recopilación de Leyes de los Reynos de las Indias (1681), Libro IX, Título XIII \\
\textsuperscript{36} Bernal (2000), p. 658
\end{flushright}
Illustration 1.3.: Accounting book, compradores de oro y plata

Source: Archivo General de Indias, Contratación S32, legajo 4959
Perhaps the explanation lies in the fact that Bourbon Kings reformed the functioning of the Mints, and permitted individuals to take ingots directly to the Mint, without using the Compradores de Oro y Plata as intermediaries. The Mint provided to individuals the refining service if needed: “I allow that any individual, no matter his state or condition, may buy gold and silver freely and take them to the Mints of my Kingdoms here and in the Indies, but not take them out to foreign kingdoms.(...) If any individual required place to refine, or gold and silver taken to carve, it will be promptly provided to him”\(^{37}\). Then, the price for ingot continued being the Mint price, although it then comprised a fixed refining commission (without the auction margin). To sum up, during the Early Modern period, bullion should be exchanged at the fixed Mint price in Castile, which was the total ingot minus the brassage minus the seigniorage and minus the refining commission.

This particular way to deal with bullion created a systematic registry of bullion inflows from the American colonies to the Casa de Contratación, registries of quantities valued at fixed prices (see Illustration 1.3.). These registries have been exploited by scholars who have developed the Spanish monetary historiography. Therefore, the Spanish monetary historiography for Early Modern period is a story of quantities: Quantities of gold and silver imported by Europe from America through Spain; quantities counted by Hamilton in his seminal book “American treasure and the price revolution in Spain” (1934). These quantities counted by Hamilton were brought down by Morineau (1985). The divergence in results originates from the different sources

\(^{37}\) “permito que cualesquier personas, de qualquier estado, i condicion que sean, puedan libremente comprar oro, i plata para llevarlos à labrar à las Casas de Moneda de estos mis Reinos i de los de Indias, i no para extraerlos à Dominios extraños. (...) Si algun particular necessitare de Oficina para afinar, ó beneficiar el oro, ó plata, que traxere à labrar, se le franquearán prontamente” Nueva Recopilación, Libro V, titulo XXI, Auto LIX, 16, Madrid 9 Juny 1728.
consulted. Hamilton used the official registers in the Casa de Contratación, whereas Morineau focused his research on Dutch mercantile gazettes, consular reports and merchants’ correspondence. And Morineau’s quantities were re-counted by García-Baquero (1996) for the 18th century, using the data obtained from the registers of the different vessels. Counting accurate quantities is difficult due to the very high level of smuggling.

Castile legislation had, therefore, a deep bullionist spirit oriented to avoid bullion outflows. However, laws and institutions did not prevent silver exportation and caused a great smuggling. A great proportion of the American bullion was not registered in Spain, but it was illegally exported from Spain to the rest of Europe. The estimation of the silver illegally exported was around 50% in the mid-16th century\textsuperscript{38}, 70% during the first half of the 17th century\textsuperscript{39} and 50% in the mid-18th century\textsuperscript{40}. And so, throughout the whole 18th century, as it already happened in previous periods, the fraud appeared as an inevitable consequence of the bullionist regulations. All the copious legislation decreed on this matter lost its effectiveness for the reason of smuggling\textsuperscript{41}.

What logic explains silver outflows? To answer this question we should introduce the research into the logic of the black bullion market. The Spanish sources are a wrong approach because they are legal sources which just contain the logic of the legal bullion exchange and the reports against smuggling (Archivo General de Indias and Archivo General de Simancas). Understanding the logic of the silver outflows

\textsuperscript{38} Cipolla (1999), p. 35
\textsuperscript{39} Serrano Mangas, F. (1989), p. 316
\textsuperscript{40} Morineau (1985), p.375
\textsuperscript{41} García Baquero (1988), p. 223-224
requires focusing on the point of view of the merchants who practiced the smuggling. Merchant House *Roux* archive is one of the best 18th century commercial archive, which contain more than 5,000 letters of Cadiz correspondents for our period of study (1729-1741), plus invoices, notes of cargo, ledgers, etc. This extremely rich archive has made it possible to reconstruct the specie-point mechanism for silver between Cadiz and London as exactly as contemporary merchants practiced it. It has shed much light about the logic of silver arbitrage in 18th century. The next section shows the empirical results of arbitrage equation and Appendix 2 the description of the construction of the silver points.
This chapter shows the accurate reconstruction of the silver arbitrage practised by contemporaries according to Roux banker’s archive. The merchant house Roux operated from 1 October 1728 to 3 February 1843. Roux practised a polyvalent business that embraced many commercial activities: trade, insurance, banking, etc. He worked either for his own account, for joint-accounts with partners from other cities, or still as a commissioner. His network was compounded by more than 1,900 correspondents, and his activity was developed in a vast geographical domain (360 places): Europe, Levant, Barbary Coast, Antilles and South America -through his Cadiz correspondents. The merchant house Roux had correspondents in 360 places around the world: 213 places in France (Agde, Agen, Aix-en-Provence, Amberg, Amiens, Angoulême, Annonay, Antibes, Apt, Arles, Aubagne, Aurillac, Auriol, Avignon, Bagnols, Bandol, Barbentane, Barbezieux, Barrême, Bastia, Bayonne, Beaucaroise, Beune, Beauregard, Beauvais, Bédarieux, Berre, Bertonne, Besançon, Béziers, Binic and Port-dic, Bize, Bordeaux, Boulogne, Bourges, Brest, Brignoles, Brioude, Brive, Caen, Cannes, Carcassonne, Carpentrats, Cassis, Castelnaudary, Castres, Caudiès, Chalabre, Charleville, Chalon-sur-Saône, Chartres, Châteauroux, Château-Thierry, Châtellerault, Clermont-de-Lodève, Cognac, Collioure, Conques, cotignac, Cuxac-Cabardès, Dieppe, Dijon, Dinan, Draguignan, Dunkerque, Elbeuf, Entrecasteaux, Eyguières, Eyguieres, Fabrezan, falaise, Foix, Fourques, Fréjus, Gardanne, Gars, Gémenos, Givors, Grans, Gray, Granville, Grasse, Grenoble, Hyères, Jonzac, La Ciotat, La Grasse, La Fare-les-Oliviers, Laon, Landerneau, Largentière, La Rochelle, La Seyne, La Tourrette, Laval, Lavardac, Le Bauissat, Le Canet, Le Havre, Le Mans, Le Puy, Le Puy-Sainte-Réparade, L’Étivo, Le Vigan, Libourne, Lille, Limoges, Limoux, Lodève, Lorient, Lunel, Lyon, Malajia, Manosque, Marignac, Marseille, Marsillargues, Martigues, Marvèjols, Mas-Cabardès, Montargis, Montauban, Mont-Dauphin, Montélimar, Montmorency, Montolieu, Montpellier, Montréal, Morlaix, Moulins, Nantes, Narbonne, Nîmes, Niort, Nogent-le Rotrou, Oloron, Ollioules, Orange, Orléans, Paris, Pêlissanne, Pannautier, Perpignan, Peyrin, Peynas, Poitiers, Pontacq, Pontoise, Port-de-Bouc, Port-Vendres, Pouliguen, Pourrières, Prades, Quillan, Reims, Rennes, Rians, Roanne, La Roche-Bernard, Rochefort, Romans, Roquemaure, Roquevaire, Rouen, Saint-Brieuc, Saint-Chamond, Saint-Chamond, Saint-Denis, Saint-Enogat, Saint-Étienne, Saint-Malo, Saint-Maries, Saint-Maximin, Saint-Omer, Saint-Pierre-de-Val, Saint-Pons, Saint-Quay-Protrieux, Saint-Quentin, Saint-Servan, Saint-Tropez, Saissac, Salon-de-Provence, Sapets, Sedan, Sens, Septèmes, Sète, Sourdeval, Strasbourg, Tain, Tarascon, Tarbes, Tonneins, Toulon, Toulouse, Tournon, Tours, Tourves, Tulles, Tréguier, Valence, Vannes, Versilles, Vienne, Villefranche-d’Aveyron, Villeneuve, Villeneuve-lès-Avignon, Vire, Vitré, Voiron), 11 places in Germany (Augsburg, Hamburg, Berlin, Dantzig, Dortmund, Embden, Eupen, Frankfort, Gunzburg, Koenigsberg, Magdeburg), London in England, Vienna and Lochau in Austria, 31 places in Spain (Alicante, Almeria, Barcarana, Barcelona, Bilbao, Cadiz, Cartagena, Cordoba, Denia, Gandia, Gibralta, Granada, Guadalajara, A Coruña, Lleida, Madrid, Mahon, Málaga, Mataro, Murcia, Murviedro, Palamos, Palma, Pamplona, Puerto de Santa Maria, Reus, San Felipe, Salamanca, Zaragoza, Sevilla, Valencia), 36 places in Italy (Ancône, Bergame, Bordighera, Bolongo, Cagliari, Civitavecchia, Corneto, Crema, Florence, Genes, Leghorn, Lucques, Mazara, Menton, Messine, Milan, Monaco, Musumelii, Naples, Nice, Oneglia, Padoue, palerme, Parme, Pesaro, Pistola, Port-Maurice, Rome, San-Remo, Sassari, Sospel, Trieste, Turin, Venice, Villefranche), Malt, 11 places in Netherlands (Amsterdam, Rotterdam, Anvers,
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). The arbitrage with bullion was denominated “bullion trade” (“commerce des matières”), and its success lay in the application of double-entry bookkeeping and the knowledge of local units of mass and account for the world geography. The documents in the accounting section of the archive “arbitrage accounts” (“comptes d’arbitrage”) illustrate the arbitrage of silver as a co-operative business: 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). This co-operation was a distinctive feature of the 18th-century French partner-ship, a consequence of the lack of fixed

Gand, Hoorn, The Hague, Leyde, Liège, Ostende, Schiedam, Ypres), Lisbon in Portugal, Göteborg in Sweden, 4 places in Switzerland (Basel, Geneva, Lausanne, Saint-Gall), 26 places in Levant (Constantinople, Angora, Brousse, Smyrna, Andrinople, Rhodes, Modon, Coron, Naples-de-Romaie, Larta, Janina, Missolonghi, Athens, Livadia, Négrepon, Alexandria, Cairo, Seyde, Acre, Alep, Beyrouth, Tripoly-de-Syrie, Cyprus, La Canée, Salonique, Cavalle), 8 places in Barbary (Alger, La calle, Tunis, Mazagan, Mogador, Safi, Sainte-Croix de Barbarie, Salé), Guadeloupe, Martinique (Saint-Pierre, Macouba, Port-Sainte-Marie, Robert), Saint-Domingue (Cap Français, Cul-de-Sac-de-Léogane, Jacmel, Port-au-Prince), Guyane (Cayenne) and foreign colonies (Curaçao, Saint-Eustache, Tenerife and Trinidad).

43 Rebuffat (1965), section L.IX
44 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
45 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 Peschaire from Naples (1784): “I have already written my accounts ½ 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 succinette et la plus claire ») Carriere (1973), pp. 767-779.
assets and investments. The ordinary co-operative relationship was the joint venture which set up operations for merchant-houses in different cities on a joint account ("compte en partage") or half/third shares ("compte à demi" or "compte a tiers") \(^{46}\). The profit, as the difference between buying prices in Cadiz and selling prices abroad, was shared among the partners\(^{47}\).

We have reconstructed silver arbitrage practised by contemporaries. How can we measure arbitrage with specie? The single arbitrage equation measures silver flows between two centres \(A\) and \(B\) (Flandreau, 1996, p. 422 and 2004, p. 59):

\[
(1 - c_{BA}) \frac{P_A}{P_B} \leq x \leq (1 + c_{AB}) \frac{P_A}{P_B} \tag{2.1}
\]

where \(P_A\) denotes the silver market price in centre \(A\); \(P_B\) is the silver market price in centre \(B\); \(x\) is the spot exchange rate between \(A\) and \(B\); \(c_{BA}\) is the cost of trading silver from centre \(B\) to centre \(A\); and \(c_{AB}\) is the cost of trading silver from centre \(A\) to centre \(B\).

When is arbitrage profitable? If the exchange rate goes down the lower band \(\left(1 - c_{BA}\right) \frac{P_A}{P_B} > x\), exporting silver from centre \(B\) to centre \(A\) is profitable (see Figure 2.1.); and if the exchange rate goes up the upper band \(\left(1 + c_{AB}\right) \frac{P_A}{P_B} < x\), exporting silver from centre \(A\) to centre \(B\) is profitable.

\(^{46}\) Taylor (1964), pp. 483-484

\(^{47}\) Fond Roux, L. IX section II- compte arbitrage: liasse 53.

\(^{49}\) 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.
Arbitrage equation means the Law of One Price for silver specie, which states that different prices of silver will tend to equalize. If the silver point were violated, we would expect that arbitrageurs would buy silver in the centre with the lowest market price and sell it in the centre with the highest market price, which would adjust prices to eliminate arbitrage profitability.

Arbitrage has been empirically analysed for the 19th century. What do we know about the arbitrage process according to literature? Suppose exporting silver from centre $B$ to centre $A$ is profitable $\left(1 - c_{BA}\right) \frac{p_A}{p_B} \times \frac{1}{x}$. In a first step, the arbitrageur will buy silver in centre $B$ in exchange for domestic banknotes. In the second step, he will sell the silver in centre $A$ in exchange for a bill of exchange (in centre $A$ on centre $B$). In the last step, he will cash the bill of exchange in centre $B$ in exchange for domestic banknotes, and he will have more banknotes than at the beginning. The difference between the original and final amount of banknotes is the profit.
We know the logic of arbitrage in the 19th century, when banknotes existed but, how was the process of arbitrage in the 18th century, when banknotes did not exist? Let us reconstruct arbitrage in the 18th century through two examples obtained from the “account of arbitrage” (“comptes d’arbitrage”) in the Roux archive:

EXAMPLE 1 (Illustration 2.1. reproduces the account of arbitrage and figure 2.2. schematizes the logic of arbitrage): In 1728, three partners, Raymon Bruny et Cie from Marseille, Brethous Clock et Cie from Cadiz and Guillaume Louis de Surmont from Amsterdam had a joint-arbitrage-account (“compte a tiers”) in Amsterdam. As a first step, 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 Amsterdam, while Bruny, Clock & Louis de Surmont had one entry on the debit side of the joint-arbitrage-account ledger. In a second step, Bruny’s correspondents 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 after deducting costs.

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.
Figure 2.2.: Scheme of arbitrage according to the arbitrage account (Illustration 2.1.)

**AMSTERDAM**
*Bruny (Marseille), Clock (Cadiz) & Louis Surmont (Amsterdam)*

<table>
<thead>
<tr>
<th>Debit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>debit</td>
<td>credit</td>
</tr>
</tbody>
</table>

\[ \text{profit} = (p_L \cdot x_{LA} + p_P \cdot x_{PA}) - p_C \cdot x_{CA} \]

**PARIS**

silver seller → silver buyer
*(Bruny corresp)*

*Bruny sold Pieces of Eight in exchange for a bill of exchange in Paris on Amsterdam*

**LONDON**

silver seller → silver buyer
*(Bruny corresp)*

*Bruny sold Pieces of Eight in exchange for a bill of exchange in London on Amsterdam*

**CADIZ**

silver seller → silver buyer
*(Clock)*

*Clock bought Pieces of Eight in exchange for a bill of exchange in Cadiz on Amsterdam*
EXAMPLE 2 (Illustration 2.2. reproduces the account of arbitrage and Figure 2.3. schematizes the logic of arbitrage): This example also describes the workings of a joint-arbitrage-account among three partners. In 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. 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. Then, 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 2.3.: Scheme of arbitrage according to the arbitrage account (Illustration 2.2.)*
Illustration 2.1.: Arbitrage account, 1728

Source: Fond Roux, L. IX, section II- compte arbitrage, liasse 53
Illustration 2.2.: Arbitrage account, 1730

Source: Fond Roux, L. IX, section II- compte arbitrage, liasse 53
Arbitrage with specie was, therefore, a multilateral business in the 18th century. International trade was based upon multilateral payments\(^{51}\). Silver, as any other commodity, followed the logic of multilateral international payments.

The great negotiability of foreign bills of exchange drawn on the main centres allowed multilateral settlement. Flandreau et al. (2009a) have recently measured the degree of multilateralism in mid-18th century: 18% of links between cities were direct, 75% had to pass through an intermediary centre, and 7% needed two intermediaries\(^{53}\). The main centres were the connecting hubs: Amsterdam, Paris and London (see Illustration 2.3.). Therefore, it is not surprising that silver arbitrage was settled through the main centres (Amsterdam and Paris in our examples 1 and 2, respectively).

Illustration 2.3.: Monetary agglomeration in the mid-18th century\(^{54}\)

\(^{51}\) Heckscher (1950), Sperling (1962).
\(^{53}\) Flandreau et al. (2009a), p. 162
\(^{54}\) Monetary agglomeration is measured as the number of centres quoting on a centre. The total number of centres in the sample is 64
How is the equation of the multilateral arbitrage with specie? Suppose that the silver was traded between Cadiz and London and settled through the main centre (e.g., Amsterdam), then, the multilateral arbitrage equation is:

\[
(1 - c_{CL}) \frac{p_L}{p_C} \leq x_{CA} \cdot x_{LA} \leq (1 + c_{LC}) \frac{p_L}{p_C}
\]  

(2.2.)

where \( p_L \) denotes the market price of silver in London; \( p_C \) denotes the shadow price of silver in Cadiz; \( x_{CA} \) is the spot exchange rate between Cadiz and Amsterdam; \( x_{LA} \) is the spot exchange rate between London and Amsterdam; \( c_{CL} \) 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 multilateral arbitrage equation for specie equals the bilateral arbitrage equation defined in equation 2.1. assuming the arbitrage condition for the triangular arbitrage of bills of exchange, that is:

\[
x_{CA} \cdot x_{LA} = x_{LC}
\]  

(2.3.)

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.

Graph 2.1. shows 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 another between London-Amsterdam.
Graph 2.1.: scatter diagram spot exchange rate in London on Cadiz – spot exchange rate in Cadiz on Amsterdam multiplied by spot exchange rate in London on Amsterdam, (half-monthly observations) 1729-1741 (pence sterling/peso de plata antigua)

Source: see Appendix 1.

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 we accept the integration of the bills market.

Therefore, as the bill market is integrated, results do not differ considering bilateral or multilateral arbitrage. Contemporaries practised multilateral arbitrage because 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. We prefer to show here the bilateral arbitrage in order to compare results with our knowledge of specie arbitrage for the 19th century. Appendices 2 and 3 describe all the details regarding the construction of the bilateral silver points (London-Cadiz). Appendix 4 compares results of the bilateral arbitrage equation (London-Cadiz) and the multilateral arbitrage equation (London-Cadiz though Amsterdam) to show that results do not change using the bilateral or the multilateral equation.

Why was it profitable to buy silver in Cadiz and sell it in other places, e.g., London? Does not the Law of One Price hold in silver between Cadiz and London for the period 1729-1741? Let us observe the reconstruction of the lower band of the bilateral arbitrage equation according to equation 2.1. (see Graph 2.2.):

\[(1 - c_{cl}) \frac{p_L}{p_C} \leq x \quad (2.4.)\]

where \(p_L\) denotes the market price of silver in London, concretely the American-Spanish coin named the Old Mexican piece of eight; \(p_C\) denotes the shadow price of the Old Mexican pieces of eight in Cadiz; \(\frac{p_L}{p_C}\) is denominated the arbitrated par of exchange; \(x\) denotes the spot exchange rate between London and Cadiz and \(c_{cl}\) is the cost of trading the silver from Cadiz to London.
What results can we expect? (see Figure 2.4.). We expect 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 does not fall lower than the point when sending silver from Cadiz to London becomes profitable.
What results do we obtain? (see Figure 2.4.) According to results in Graph 2.2, we can distinguish two different periods:

- From 1729 to 1737, there was a systematic bias between the implicit spot exchange rate and the arbitrated parity. The bias was greater than costs. The gap between the implicit spot exchange rate and the lower silver point made arbitrage systematically profitable then. International markets were connected through smuggling, so how should we interpret this systematic bias? According to the Law of One Price, arbitrageurs should buy silver at the lowest market price (Cadiz) and sell it at the highest market prices (London), which would adjust prices thus removing arbitrage profitability. Why was it possible to maintain a long-run profitability during nine years without prices adjusting?

- From mid-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. So, what was the role of devaluation in the specie-point mechanism?

Figure 2.4.: Expected vs. obtained silver points
The empirical results present a puzzle for our knowledge of the specie-point mechanism. How could the exchange rate break the lower band systematically during nine years? And what was the role of devaluation in correcting the systematic gap between the exchange rate and arbitrated parity? The key point is that historiography has calculated the arbitrage equation in the 19th century institutional setting of free bullion movements\textsuperscript{55}. But, what happens when bullion movements are controlled? What was the effect of bullionist restrictions on the workings of silver points?

If the price of silver in Cadiz is lower than in London, arbitrageur should buy the pieces of eight in Cadiz and sell them in London, which equalizes prices. But we do not observe adjustment. The Law of One Price holds only if markets are competitive. Despite smuggling, persistent differences in the price levels indicate that markets were not competitive. But before exploring the reasons for this outcome, let us analyse what would have happened without bullionist bans. Are our results really due to bullionist controls or, on the contrary, could we obtain similar results for the same period without these controls? The next chapter calculates arbitrage with free bullion movements, i.e., arbitrage between two non-bullionist centres: Amsterdam and London. We will see that in the case of free bullion movements, gold arbitrage, silver arbitrage and bimetallic arbitrage worked as expected, and only occasionally did a specie-point violation occur.

\textsuperscript{55} Flandreau (2004)
3. THE COUNTERFACTUAL: SPECIE-POINT MECHANISM WITH FREE BULLION MOVEMENTS (LONDON-AMSTERDAM, 1734-1758)

This is the first research work in which silver points have been calculated for an emblematic case in the early 18th century: Cadiz-London. The results obtained in the previous chapter have contradicted our knowledge about the workings of the specie-point mechanism. However, this knowledge is based on the evidence for the case of free bullion movements in the second half of the 19th century. Therefore, can we accept that the obtained results respond to bans on bullion export? i.e., would we have obtained the same results without bans on export? We are not able to quantify a hypothesis, but we can approach the calculation of the specie-point mechanism without bans on export in the 18th century through another case of free bullion movements: the case of London-Amsterdam during the period 1734-1758.

This is a new and interesting calculation, because so far, no scholar has calculated the specie point mechanism for periods prior to the second half of the 19th century using market prices. Focusing on the case of arbitrage between London and Amsterdam during the Nine Years’ War, Quinn (1996) emphasized the idea of arbitrage between bullion and bills of exchange, more than the traditional idea of arbitrage between gold and silver due to divergences in the legal bimetallic ratio, i.e., export one metal in order to import the other. According to Quinn’s approach, “the adjustment mechanism of arbitrage between bills, gold and silver persisted into the eighteenth century”. However, the lack of series of the bullion market prices for Amsterdam impeded to calculate arbitrage between bullion and bills using market prices.

56 Flandreau (2004)
57 Quinn (1996), p. 474
58 Quinn (1996), p. 477
Until now, London was the only center which had series of the bullion market prices from the end of the 17th century, collected in the financial bulletin *The Course of the Exchange*. According Van Dillen (1926), Amsterdam was the main bullion market in the world during the 17th and 18th centuries. Despite its importance, no scholar has exploited Amsterdam bullion prices. But the price data for Amsterdam do exist—at least for some periods—, as the data for Cadiz also existed, as we have seen before. The usual problem is to locate them. We were not able to locate them for periods previous to the beginning of the 18th century. But we have found Amsterdam data in the commercial bulletin *Kours van Koopmanschappen tot Amsterdam* for the period 1734-1758, a period similar to the period we used between London and Cadiz, which allows us to compare both results59. We have prices for both gold and silver bars and, therefore, we can calculate gold points, silver points and bimetallic points between London and Amsterdam.

We use the arbitrage equation set out by Flandreau (1996, 2004)60, as we showed in the equation 2.1., because it explains the way in which contemporaries practised bullion arbitrage61:

59 McCusker and Gravesteijn (1991)
61 Arbitrage between bullion and bills of exchange was explained into the contemporary cambist’s books. Hayes (1739), pp. 285-288. The appendix 5 reproduces Hayes’ explanation of arbitrage between bullion and bills.
The single arbitrage equation measures gold or silver flows between two centres:

**Gold points:** \( (1 - c_{BA}^g) \frac{p_A^g}{p_B^g} \leq x \leq (1 + c_{AB}^g) \frac{p_A^g}{p_B^g} \) \hspace{1cm} (3.1)

**Silver points:** \( (1 - c_{BA}^s) \frac{p_A^s}{p_B^s} \leq x \leq (1 + c_{AB}^s) \frac{p_A^s}{p_B^s} \) \hspace{1cm} (3.2)

where \( p_A \) denotes the market price of gold (silver) in centre \( A \); \( p_B \) is the market price of gold (silver) in centre \( B \); \( x \) is the spot exchange rate between \( A \) and \( B \); \( c_{BA} \) is the cost of trading gold (silver) from centre \( B \) to centre \( A \); and \( c_{AB} \) is the cost of trading gold (silver) from centre \( A \) to centre \( B \).

The bimetallic arbitrage equation puts together gold and silver arbitrage equations. It is the narrow band between gold and silver bands, i.e., the range of overlap between gold and silver points:

**Bimetallic points:**

\[
\max \left[ (1 - c_{BA}^g) \frac{p_A^g}{p_B^g}; (1 - c_{BA}^s) \frac{p_A^s}{p_B^s} \right] \leq x \leq \min \left[ (1 + c_{AB}^g) \frac{p_A^g}{p_B^g}; (1 + c_{AB}^s) \frac{p_A^s}{p_B^s} \right] \hspace{1cm} (3.3)
\]

Graph 3.1. shows the gold band, graph 3.2. the silver band and graph 3.3. the bimetallic band. Appendix 5 explains the construction of the gold, silver and bimetallic points between London and Amsterdam for the period 1734-1758.
Graph 3.1.: Gold band of arbitrage equation between London and Amsterdam, 1734 - 1758 (monthly observations), shellinge bank/sterling pound

(normalized at intrinsic par, 36.59=1)

Source: see Appendix 5. Intrinsic par calculated by Newton (1717) - reproduced in Appendix 5

(Illustration A5.3.)
Graph 3.2.: Silver band of arbitrage equation between London and Amsterdam, 1734 - 1758 (monthly observations), shellinge bank/sterling pound
(normalized at intrinsic par, 36.59=1)

Source: see Appendix 5. Intrinsic par calculated by Newton (1717) - reproduced in Appendix 5
(Illustration A5.3.)
Graph 3.3.: Bimetallic band of arbitrage equation between London and Amsterdam, 1734 - 1758 (monthly observations), shellinge bank/sterling pound
(normalized at intrinsic par, 36.59=1)

Source: see Appendix 5. Intrinsic par calculated by Newton (1717) - reproduced in Appendix 5
(Illustration A5.3.)
Graphs 3.1., 3.2. and 3.3. show that the specie point mechanism between London and Amsterdam worked as expected, and only few and no persistent breaks occurred. Breaks mean that the exchange rate falls below or rises above the bullion point in which sending bullion from one to the other centre become profitable. Concretely, results show that all breaks are located in the lower band, which means profitability in arbitrage from London to Amsterdam. We only find one break for the lower band of gold on 18 September 1741 (Graph 3.1.), for the lower band of silver there were breaks in 1736 (23/04/1736, 13/08/1736 and 17/09/1736) and 1750 (13/04/1750, 18/05/1750 and 15/06/1750) (Graph 3.2.); and the breaks for the bimetallic lower band are the reunion of both gold and silver breaks (Graph 3.3.). There are no breaks for the upper band and, therefore, it was never profitable to export bullion from Amsterdam to London.

Although there are some blanks in the arbitrage calculation between London and Amsterdam, it is clear that the relationship between the spot exchange rates and the arbitrated parities had different behaviour in the case of Amsterdam-London than in the case of London-Cadiz (see Figure 3.1.). In the case of Amsterdam-London, with free bullion movement, there were only few and no persistent breaks. Whereas in the case of London-Cadiz, with bans on export, there was a systematic bias between the spot exchange rate and the arbitrated parity despite smuggling, until the devaluation corrected this bias.
Figure 3.1.: Scheme of silver points between Amsterdam-London vs. London-Cadiz

The scatter diagrams show the relationship between the spot exchange rate and the arbitrated parity (Graph 3.4. for London-Cadiz and graph 3.5. for Amsterdam-London). The black diagonal represents perfect equality in a hypothetical world without costs (and the solid grey diagonal includes costs), and dots on the right and left sides of the grey diagonals mean profitability in exporting bullion between the two centres.

We observe in Graph 3.4. that the arbitrage from London to Cadiz was systematically profitable during the first period (1729-1737) as a consequence of the bias between the arbitrated parity and the spot exchange rate. During the second period (1737-1741), arbitrage stops being profitable because the devaluation pegged the arbitrated parity to the spot exchange rate.
Graph 3.4.: Scatter diagram arbitrated parity - spot exchange rates, London-Cadiz

*pence sterling/peso de plata antigua (normalized at 54*8/10=1)*

Source: see Appendix 2

62 To draw the scatter diagram, we suppose that the costs of arbitrage from London to Cadiz were the same as the costs from Cadiz to London.
The scatter diagram for the case of London - Amsterdam (Graph 3.5.) shows that the arbitrated parity was pegged to the spot exchange rate. Only a few dots are on the right side of the grey diagonal, which means profitability in exporting bullion from London to Amsterdam just in a few and non persistent times.

*Graph 3.5.: scatter diagram arbitrated parity -spot exchange rates, Amsterdam-London
shellinge bank/sterling pound (normalized at 36.59=1), 1734 - 1758*<sup>63</sup>

Source: see Appendix 5

<sup>63</sup> The cost for the arbitrage Amsterdam-London was not fixed during the whole period, because the insurance increased during instable periods. See Appendix 5 for details. To draw the scatter diagram we suppose the average cost, 2.6%
It is interesting to compare how small the cost between London-Cadiz (1.425%) was in comparison to Amsterdam-London (2.65%), because French freight and insurance for specie carried out from Spain paid only 1%, as explained in Appendix 2. But our story is not a story of costs. Even if costs between London-Cadiz had been identical to costs between Amsterdam-London, the results would not have changed (see dotted grey diagonal in Graph 3.5.) The great gap between the arbitrated parity and the spot exchange rate for London-Cadiz in the period 1729-1737 indicates that something was happening in the black market in Cadiz, which was driving down the price of silver.

What do we know about the bullion black market in Cadiz? The following chapters focus on the market structure in order to demonstrate that the silver market structure in Cadiz was an oligopsony. We will describe the agents involved in silver transactions in Cadiz in order to measure the importance of smugglers regarding the total merchants in Cadiz. Then, we will describe how the exchange took place in the silver black market through the contemporary reports against smuggling. Finally, we will describe the smuggler’s network to demonstrate the oligopsonistic structure of the silver black market in Cadiz.
4. THE AGENTS INVOLVED IN THE ILLEGAL EXCHANGES OF SILVER 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). The whole legislation about trade with America colonies (Carrera de Indias) was subordinated to the government’s concern to accumulate precious metals in Spain. Cadiz was, therefore, the commercial geo-strategic centre which connected the maritime route Mediterranean Sea - Atlantic Ocean - North Sea - Baltic Sea though the Strait of Gibraltar. Bullion shipped from New World to Old World had to pass through Cadiz. This chapter describes the agents involved in the illegal exchanges of silver in Cadiz and measures the importance of the smugglers regarding the total number of merchants in Cadiz.

4.1. The Spanish merchants versus the foreign merchants

Cadiz had a population around 60,000 people in mid-18th century. Its economy was based on trade, and trade was dealt by businessmen who practised wholesale trade and invested capital in speculative trading activities with America or in the main commercial and financial European centres.

---

65 Girard (1967), p. 33
66 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.
67 Carrasco (1997) p. 17
These businessmen can be classified in two types of agents, depending on their nationality: those who legally could trade with American colonies –Spanish businessmen-, and those who were not allowed –foreign businessmen. Trade with the American colonies was restricted to Spanish citizens because it was “a right of all the Spanish without exception”\(^{68}\). These Spanish businessmen who traded with colonies were called “Cargadores de Indias” (delivery agents for Indies), they had to be registered as members of the guild Consulado de Cargadores de Indias (Consulate of delivery agents for Indies)\(^{69}\), and they could trade for themselves or as commissioners for other Spanish businessmen\(^{70}\). 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\(^{71}\). 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.\(^{72}\).

Foreign businessmen, however, could not trade with American colonies, neither directly nor through Cargadores de Indias, because it was considered by the government a way to extract precious metals from the Castile kingdom\(^{73}\). During some periods, trade with American colonies was also permitted to naturalized foreign merchants\(^{74}\) and foreign merchant’s sons (named *jenízaros* - foreign father and Castilian

\(^{68}\) “un derecho de todos los españoles sin excepción” AGI, Consulados, leg 63A, year 1747, in Bustos, (2005), p. 130

\(^{69}\) Real Cédula 24 may 1686


\(^{72}\) Ruiz Rivera (1988), p. 113-130, reproduces the list with the names of Cargadores de Indias.

\(^{73}\) Real Cédula 27 July 1592.

\(^{74}\) Foreign merchants could obtain the naturalization documents if they were Catholic, had patrimony, more than 20 years of residence in Castile and 10 years married with a Castilian woman. Diaz Blanco and Maillard Alvarez (2008)
mother). But during our period of analysis, the application of the nationality criterion was very strict, and in the period 1730-1742 both naturalized merchants and jenízaros were excluded from the guild Cargadores de Indias. In 1742 the King allowed naturalized foreign merchants and jenízaros to trade with America de jure, but de facto the conflict between the Spanish merchants and the naturalized and jenízaros merchants persisted until the end of the century. Indeed, naturalized merchants and jenízaros represented a very small percentage of the total Cargadores de Indias: zero during the period 1730-1742 and less than 5% for the period 1743-1823.

What was the effect of nationality on the bullion business? Nationality defined both sides of the market: Spanish merchants introduced the American bullion in Cadiz, while foreign merchants extracted it from Cadiz. Although trade with American colonies had to be done by Spanish merchants, foreign merchants had the key role through the illegal trade (as much the illegal importations of goods from Europe to Spain and from Spain to American colonies as the illegal exportations of bullion from Spain). The foreign merchants have been considered by the Spanish historiography as 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 mercantile activity de facto: by mid-18th century foreign wholesale merchants computed more than 80% of the total net income gained by trade in Cadiz.

---

75 Castilian law considered a man as a national if he had been born in Castile (or Aragon) and his father was Castilian. A woman was a national if she had been born in Castile (or Aragon) although her father was a foreigner. Diaz Blanco and Maillard Alvarez (2008)
77 Garcia- Mauriño (1991) p. 268
78 The Cargadores de Indias’ registry registered to 50 naturalised merchants, 89 jenízaros, 3057 Spanish merchants and 56 indíanos (55 from the American colonies and 1 from Manila). Ruiz Rivera (1988)
80 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. Garcia-Baquero (1991), p. 33
The Spanish historiography has focused on the Spanish trade with Colonies because the guild structure of trade made sources easy to gather together (Consulado de Cargadores de Indias- archive compiled in Archivo General de Indias). But we lack a systematic research about trade with Europe, due to the dispersion of sources, as foreign wholesale merchants were not organized in a guild\textsuperscript{81}. Fortunately, fiscal sources help us to approach to the foreign wholesale merchants group. 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\textsuperscript{82}. Results are in Table 4.1:

\textsuperscript{81} García-Baquero points out that the colonial trade has been really much more studied than the trade with Europe due to the comparative availability of sources. García-Baquero (1991), p. 34

\textsuperscript{82} 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.
Table 4.1.: Wholesale merchants’ net income according Catastro de Ensenada, 1753

<table>
<thead>
<tr>
<th>Nationality</th>
<th>Wholesale merchants’ net income per year for trade and transfer of bills of exchange (1753)</th>
<th>NUMBER OF MERCHANTS (1762)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pieces of eight of old silver</td>
<td>%</td>
</tr>
<tr>
<td>French</td>
<td>710,450</td>
<td>46.04</td>
</tr>
<tr>
<td>Italian</td>
<td>149,800</td>
<td>9.71</td>
</tr>
<tr>
<td>German</td>
<td>31,000</td>
<td>2.01</td>
</tr>
<tr>
<td>Damascene (Swedish &amp; Prussian)</td>
<td>75,500</td>
<td>4.89</td>
</tr>
<tr>
<td>Irish (and English)</td>
<td>231,100</td>
<td>14.97</td>
</tr>
<tr>
<td>Flemish</td>
<td>74,700</td>
<td>4.84</td>
</tr>
<tr>
<td>Spanish- Cargadores de Indias(^{83})</td>
<td>270,724</td>
<td>17.54</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1,543,274</td>
<td>100.00</td>
</tr>
</tbody>
</table>

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

We observe in Table 4.1. the predominance of French merchants. They were the most important group of foreign merchants, followed by Irish and Italian. Other nationalities also had representation in the wholesale trade in mid-eighteenth century Cadiz: Damascene (and Swedish and Prussian), Flemish and German. The French merchants represented one quarter of the total merchants and obtained half of the total annual net income per wholesale trade in mid 18\(^{th}\) century. Why were French the richest group of wholesale merchants? The situation of foreign merchants in Castile depended on the bilateral diplomatic relations. Tariffs, licenses and bans on import and export discriminated against nationalities. When political relations broke, Castilian authorities ordered the embargo of goods and the expulsion of the foreign merchants who lived in

\(^{83}\) 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.
the Castilian kingdom. Different nationalities had different privileges depending on the period.

The reason for the settlement of foreign merchants in Castile was the attractiveness of the American precious metals, although their exportation was forbidden\(^\text{84}\). The French had an early settlement in Spain, and trade relations intensified with the America discovery. At the end of the 16\(^{\text{th}}\) century, the French population in Castile was so important that French consulates were established in several Spanish cities -Cadiz (1575), Seville (1578), Barcelona (1578) and Valencia (1593)\(^\text{85}\). The Spanish Succession war gave privileges to the French merchants and expelled English Protestant merchants\(^\text{86}\).

Foreign merchants had a key role in Spanish trade -as we have seen in Table 4.1. The unchanged rules of law that had been defined by the Castilian government to organize trade with America were subverted through complex systems of patronage, corruption and collusion strategies\(^\text{87}\). The elites exploited the American empire through a socio-political patronage system facilitated by the rules of the law. And the Crown’s dependence upon American precious metal to maintain the American empire perpetuated these rules. The complex systems facilitated both clandestine European imports and exports, including bullion exports. The next section shows the names of the French smugglers of silver in our period and measures their importance, regarding the total French merchants in Cadiz and also regarding the total merchants in Cadiz (both foreign and Spanish).

\(^{\text{85}}\) Girard (1967), pp. 37-42.
\(^{\text{87}}\) Ringrose D. R. (1996), p. 84.
4.2. Who was who? Measuring the importance of smugglers of silver

We have seen in the previous section that the French merchants were the most important merchants in Cadiz in the mid-18th century. What were their regional origins? According to a contemporary document written near our period: “Liste des négocians Français établis à Cádiz” (List of French merchants settled in Cadiz) (2 January 1714), two regions stand out: Bretagne (Saint-Malo) and Provence (Marseille). See Map 4.1.

Map 4.1.: Regional origin of French merchants settled in Cadiz (1714)\(^{88}\)

\(^{88}\) There were 80 merchants registered, jointed in 68 Merchant Houses. Twenty four merchants were from Provence (20 from Marseille, 2 from Toulon, 1 from Aix and 1 from Ollioules), twenty merchants were from Bretagne (8 from Saint-Malo, 6 from Nantes, 4 from Morlaix, 1 from Dinard and 1 from Landerneau), 12 merchants were from Lyon, and the other 24 merchants were from various French places: 5 from Orléans, 4 from Rouen, 3 from Paris, 2 from Bordeaux, 2 from Lille, 1 from Rochelle, 1 from Laval, 2 from Languedoc, 2 from the region Basco-Béarnaise (Bayonne and Lestelle). There were also 2 foreign merchants registered: 1 from Switzerland and 1 from Ypres.
On the one hand, the route Saint Malo - Cadiz was the maritime link for trade between West France and the Spanish America from the second half of the 17th century. According to L’Espagnol (1997), the route Cadiz – Saint Malo constituted one of the major European routes of redistribution of the American silver from the end of the 17th century. On the other hand, Marseille was the French Mediterranean port in the Old Levant route, a traditional channel for gold and silver to the East. Flandreau et al (2009a) pointed out the important role played by the Franco-Spanish connection for channelling the American treasure out of Spain; concretely the Franco-Spanish monetary block formed by Madrid-Cadiz-Lyon-Marseille. Merchant families from Bretagne and Provence had sent some of their members to Cadiz to expand geographically the network for distributing the silver.

The role of Marseille as a bullion trade centre grew during the 18th century. It is not surprising, therefore, that we have located the Cadiz black market of silver in the Cadiz correspondence of the Marseille Merchant House Roux. Indeed, the banker Roux was the specialist of arbitraging with bullion in Marseille. Therefore, looking at the Cadiz correspondents who arbitrated with bullion together with Roux, we will try to achieve a good approximation to the major figures of the silver smuggling business. Who were the smugglers according to the Roux banker archive? Table 4.2. shows the names of the Merchant Houses which reported the shadow silver quotations to Roux.

---

89 See L’Espagnol (1997), p. 403-493. Malouin prominent commercial, shipping, and financial roles in the War of the Spanish Succession stemmed from previous decades of expansion at Cadiz. During the 1650s Malouins had obtained from Spanish government licences to freight silver in wartime to Saint-Malo. The regular shipper was La Lande Magon of Saint-Malo at Cadiz, the great-grand father of one of our main silver smugglers. Stein and Stein (2000), p. 113 and L’Espagnol (1997), p. 125.
92 Flandreau et al (2009), pp. 163-164
93 L’Espagnol (1997), p. 454
94 Rambert (1966), p. 545
95 Rambert (1954), vol. 4, p. 480
They were the Merchant Houses that reported quotations, and not necessarily those that arbitrated with silver, although it seems logical that someone who knew and reported black market prices should be involved in the business. The information about the arbitrage carried out is available in the invoices, but not all of them have been preserved. Then, we can not know the total quantities arbitrated, but we do know the names of the small number of merchants who led the silver smuggling.

They were eleven Merchant Houses:

- **Pierre, Athanase, Jolif et Cie** (1729-1730) - **Athanase, Jean Jolif et Cie** (1731-1736) - **Alain Jolif et Cie** (1737-1741) - Lyon (Athanase)
- **Guillaume Jogues** (1730-1735) - Orléans
- **Jamets, Verduc, Vincent et Cie** (1733-1736) - **Verduc, Vincent et Cie** (1737-1740) – Saint Malo (Vincent)
- **Duval-Baude** (1733) - **Duval-Baude et Cie** (1739)
- **Guillaume Macé** (1729-1738) - **Guillaume Macé, fils et Cie** (1739-1740) – Saint Malo
- **Casaubon, Béhic et Cie** (1731-1741) - Bayonne
- **Le Couteulx le jeune et Cie** (1729-1731) – **J. Le Couteulx, A. Le Normand et Cie** (1733-1741) - Rouen (Le Couteaux)
- **Magon et Lefer frères** (1730-1740) - Saint-Malo
- **Galibert, Cayla, Cabanes et Cie** (1730-1735) - Geneva (Cayla)
- **Jean Solier et Cie** (1734-1739)
- **Antoine et Pierre Masson** (1729-1731) - **Pierre, Guillaume et Joseph Masson** (1733-1736) - Orléans
Table 4.2.: The Merchants Houses in Cadiz which reported the silver shadow prices to Roux banker, 1729-1741

<table>
<thead>
<tr>
<th>Year</th>
<th>1729</th>
<th>1730</th>
<th>1731</th>
<th>1732</th>
<th>1733</th>
<th>1734</th>
<th>1735</th>
<th>1736</th>
<th>1737</th>
<th>1738</th>
<th>1739</th>
<th>1740</th>
<th>1741</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pierre, Athanase Jolif et Cie</td>
<td>Athanase, Jean Jolif et Cie</td>
<td>Alain Jolif et Cie</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guillaume Jogues</td>
<td>Jamets, Verduc, Vincent et Cie</td>
<td>Verduc, Vincent et Cie</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duval-Baude et Cie</td>
<td>Guillaume Macé</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J. Le Couteux le jeune et Cie</td>
<td>Casaubon, Béhic et Cie</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magon et Lefer frères</td>
<td>Le Couteux, Le Normand et Cie</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Galibert, Cayla, Cabanes et Cie</td>
<td>Jean Solier et Cie</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antoine et Pierre Masson</td>
<td>Pierre, Guillaume et Joseph Masson</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Black colour means that there is no correspondence for that merchant house in that year; white colour means that there is correspondence but no silver quotation for that correspondent in that year, and grey colour means that there is quotation for that merchant house in that year. Names have been organized according to the number of times that they reported the silver black market prices for the whole period (first name, maximum quotations).

Source: Fond Roux L.IX. Section IV: Correspondance passive Cadiz, liasses 810-856.

---

96 We did not include the merchant houses which only reported prices during one single year: Cleaudé hervé et Cie (1729), Brethous, Clock et Cie (1729), Pelicot (1730), Jacques Gough et Cie (1734) and Boby, LeGobien et Cie (1740).
Arbitrage with silver was practised as we explained in Chapter 2: two or three partners from different cities bought the pieces of eight in Cadiz and sold them in another European centre ("compte à demi" or "compte a tiers"). The first partner was Roux in Marseille, the second partner was one of his correspondents in Cadiz, and the third partner was a merchant from a European centre, usually from Amsterdam. This system made it possible to share profits and risks. Let us see some examples of the arbitrage partnership:

- 1730-1731: Tourton Baur et Cie (Paris)- Magon et Lefer frères (Cadiz)- Roux (Marseille)
- 1728: Guillaume-Louis de Surmont (Amsterdam)- Brethous Clock et Cie (Cadiz)- Roux (Marseille)

Therefore, the smugglers in Cadiz used to collaborate with other European merchants to distribute the silver outside Spain. According to Rambert (1954), Verduc, Vincent et Cie could have been the Merchant House which had a higher silver trade with Roux during our period. According to the invoices, the most repeated names are: Jean Jolif et Cie, Verduc, Vincent et Cie, Magon et Lefer frères, Joseph Masson, Galibert, Le Couteulx, and Guillaume Jogues.

---

97 The accounts of arbitrage showed in the Chapter 2 (Illustrations 2.1. and Illustration 2.2.).
98 Rambert (1954), vol IV, p. 481.
How important were the smugglers? We measure importance regarding the total number of French merchants in Cadiz (1) and regarding the total number of merchants in Cadiz (2).

(1) We use a contemporary ranking to measure the importance of the smugglers regarding the total number of French merchants in Cadiz: “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” (J.-B. Partyet a Maurepas, 12 March 1736) 99.

Cadiz had in average 60 merchant houses from 1724 to 1790 (see Graph 4.1.). We take 3 breaks near our period: years 1724, 1736 and 1746 (Graph 4.2. shows the number of merchant houses of any class for the selected years) 100. The top French merchant houses in Cadiz (1st class) represented the 32% of the total in 1724, 16% in 1736 and 24% in 1746.

99 “Nous dressâmes... un état de toute la nation, qui fut divisée en 5 classes selon le plus ou le moins de commerce que nous estimâmes qu’un chacun fait... Ces classes seront refaites tous les ans pour y insérer les changements auxquels la nouveauté qu’il pourrait y avoir dans le commerce de ceux qui les composent pourroient donner lieu, et les augmenter des nouvelles maisons qui pourroient s’établir dans la suite à Cadiz sous pavillon français”. Quotation reproduced in Ozanam (1968), p. 269

100 Appendix 6 reproduces the ranking of the French merchant houses in Cadiz for the 3 selected years.
Graph 4.1.: number of French merchant houses in Cadiz (1724-1791)

Source: Ozanam (1968), p. 270

Graph 4.2: number of merchant houses per class for the years 1724, 1736 and 1746

Source: Ozanam (1968), p. 270
What was the smugglers’ position in the ranking? (see Table 4.3.) The smugglers were the most important merchant houses among the French merchants who lived in Cadiz. They all were first class –although Jolif and Jogues moved from 1st to 2nd class and Lecouteulx from 2nd to 1st class. We have seen in Table 4.3. that the top French merchant houses in Cadiz represented the 32% in 1724, 16% in 1736 and 24% in 1746 of the total number of French merchants in Cadiz, and that 100% of the smugglers were in this top class. This means that silver smuggling was totally a business of the top French merchant houses.

\[ Table \text{ 4.3: smugglers’ position in the French ranking, 1724, 1736, 1746} \]

<table>
<thead>
<tr>
<th>1724</th>
<th>1736</th>
<th>1746</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jolif frères (1 class)</td>
<td>Athanas, Jean Jolif et Cie (2 class)</td>
<td>A. Jean, L. Jolif et Cie (2 class)</td>
</tr>
<tr>
<td>Guillaume Jogues (1 class)</td>
<td>Guillaume Jogues (2 class)</td>
<td></td>
</tr>
<tr>
<td>Jamet et Ollivier (?) (1 class)</td>
<td>Jamet, Verduc, Vincent et Cie (1 class)</td>
<td>Verduc, Vincent et Cie (1 class)</td>
</tr>
<tr>
<td>Macé (1 class) (101)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fortic et Casaubon (?) (1 class)</td>
<td>Casaubon, Béhic et Cie (1 class)</td>
<td>Casaubon, Béhic et Cie (1 class)</td>
</tr>
<tr>
<td>Lecouteulx (2 class)</td>
<td>Lecouteulx et Lenormand (1 class)</td>
<td>Lecouteulx, Lenormand et Cie (1 class)</td>
</tr>
<tr>
<td>Magon frères (1 class)</td>
<td>Magon et Lefer frères (1 class)</td>
<td>Magon et Lefer frères (1 class)</td>
</tr>
<tr>
<td>Masson (1 class)</td>
<td>Masson frères (1 class)</td>
<td>Joseph Masson et Cie (1 class)</td>
</tr>
</tbody>
</table>

Source: Ozanam (1968), p.348

\(101\) Guillaume Macé appears as naturalized in 1745 with the Spanish name Guillermo Macé (Ruiz Rivera, p. 56)
important group regarding the total number of merchants –as French obtained half of the total annual net income per wholesale trade in mid 18th century. Let us see now the importance of the silver smugglers regarding the total number of merchants in Cadiz.

In order to do this, we will use a ranking elaborated by Consulado de Cargadores de Indias in 1771. It is a list that 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. Results are summarized in Table 4.4.

Table 4.4: wholesale merchants’ net income per nationality

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

We see in Table 4.4 that the French group was the most important group in net income per capita, followed by the German, Irish, Flemish, Italian and Spanish groups. Only 1% of the total merchants gained a net income higher than 32,000 pieces of eight of old silver, and all them were French. The composition of the French colony was fairly stable -lists available from 16th century show almost always the same names\textsuperscript{102}. Then, we can compare the names of smugglers that appear in Fond Roux (1729-1741) with the names listed the project of fiscal reform “contribución única” (1771).

Who were the 5 merchants with highest net income regarding the total number of merchants in Cadiz?\textsuperscript{103} They were the following silver smugglers:

- Casaubon Domingo, por sí y Casaubon Behic y Cia: 40,000 pieces of eight of old silver
- Solier, Marcos, por sí y por Cayla, Solier, Hermanos Cabanes y Compañía: 40,000 pieces of eight of old silver
- Verduc, Pedro y Compañía: 36,000 pieces of eight of old silver
- Masson, Josèph y Cia: 35,000 pieces of eight of old silver
- Lefer, Francisco por sí y Magon y Lefer Hermanos: 30,000 pieces of eight of old silver

\textsuperscript{102} Mauro (1990), p. 280
\textsuperscript{103} 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 Couteux 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.
Bullion smuggling was a business for the “top” merchant houses because exporting bullion illegally required an international network to extract and distribute the bullion outside Cadiz and resist by force the Spanish duty control if needed. Only the top merchant houses could do it, because they were international societies, with their headquarters in Cadiz and partnership companies abroad\textsuperscript{104}. Not surprisingly, the most important merchant houses (net income 40,000 pieces of eight of old silver) were the same names denounced by Spanish authorities as bullion smugglers (1738-1744): \textit{Casaubon, Behic et Compagnie} and \textit{Cayla, Solier, Cabanes et Compagnie}\textsuperscript{105}. The following section exploits the contemporary Spanish reports against smuggling in order to explain how it was carried out.

\textsuperscript{104} Bustos (2005), p. 459
\textsuperscript{105} Archivo general de Indias, sección 5\textdegree, Gobierno, legajo 2479, Indiferente general (microfilm C-1557 and C-1558)
5. THE RULES OF THE GAME: HOW DID THE EXCHANGE TAKE PLACE?

We have seen in the previous chapter that the smugglers were the most important businessmen in Cadiz. In this chapter we will study the reasons for their activity. The smuggling system survived during such a long time because both sides of the bullion market cheated Spanish government: importers saved the import tax and exporters ignored bans on export. And the illegal bullion export was reserved to foreign merchants because they had achieved privileges which prevented them to be captured. After the War of the Spanish Succession, the French community reinforced its privileges which made smuggling easier for them than for other foreign communities.

5.1. Why the agents preserved secrecy and how the smuggling was practised

The agents preserved secrecy because both sides of the bullion market cheated the Spanish government: the exporters ignored the ban against export and the importers saved the import tax.

The Cargadores de Indias were obligated to register the commodities that were sent to America and came from there. The registration had been implemented to collect the taxes. The Spanish taxation system has been defined by McLachlan (1974) as a fiscal nightmare\textsuperscript{106}. It was complex, outdated and suffered from an excess of taxes. The introduction of bullion from Spanish America into Cadiz was also charged with a very high tax. Those who registered bullion had to pay more costs than those who smuggled, and thus they had incentives to smuggle too\textsuperscript{107}. During the period 1720-1765 the taxes

\textsuperscript{106} McLachlan (1974), p. 21
\textsuperscript{107} Barret (1990), p. 235
for the gold and silver introduced from America to Castile were more than 7% of its value for gold and more than 10% for silver. These taxes are broken down as follow:\textsuperscript{108}:

- \textit{Derecho de palmeo}: 2% on the official parity for gold and 5% on the official parity for silver (import tax from year 1720)\textsuperscript{109}
- \textit{Almirantazgo}: 10 reales/1000 pesos for gold and silver (tax created in 1737 to support the admiral and Court and Ministry of his jurisdiction)
- \textit{Guardacostas}: 4% on official parity for gold and silver (tax created in 1737 and used to support the Royal Navy which guarded the coasts)
- \textit{Avisos}: tax of 1% on the gold and silver (tax used to pay to \textit{Consulado de Cargadores de Indias} the expenses of Navios de Avisos)\textsuperscript{110}

The nominal level of duties remained well above the effective rates, and merchants constantly tried to avoid even these. The Castilian crown often arbitrarily imposed a general “pardon”-levy (\textit{indulto}) instead the import tax, which guaranteed the collection and avoided searches or seizures\textsuperscript{111}. The king imposed the \textit{indulto} to the community of merchants from the \textit{Consulado de Cargadores de Indias}, and the \textit{Consulado} had to allocate the payment among the merchants. The \textit{indulto} was a carefully structured legitimization of fraud at Cadiz which maintained the level of duties

\textsuperscript{108} García Baquero (1988), vol 1, pp.197-210. The reform of 5 April 1720 replaced the system of import tax \textit{ad valorem} (\textit{almojarifazgo}) by an import tax on quantities (\textit{derecho de palmeo}) to simplify the process of tax collection, but it maintained the traditional high taxation. The reform of 16 October 1765 replaced again the import tax on quantities for an import tax \textit{ad valorem} and started the gradual process of tax reduction. For the case of gold and silver, however, the system of tax \textit{ad valorem} or on quantities did not matter because precious metals were charged in both cases as a percentage of the official parity as the government did not accept a market value.

\textsuperscript{109} In 1711 this tax was 1 ½ % gold and 4% silver; in 1717 it was increased to 2% gold and 5% silver (Walker, 1979, p. 302)

\textsuperscript{110} \textit{Navios de avisos} were light and fast ships which travelled between Spain and American colonies several times per year to transport correspondence.

\textsuperscript{111} \textit{Indulto} literally means “pardon”, but actually it was a levy.
desired by the government. Non formal even defined the moment that the *indulto* became the rule and stopped being the exception, but Girard (1967) has estimated that the *indulto* generalized during the Franco-Spanish war (1635-1659), when smuggling had expanded.

The *Indulto* was lower than taxes for some merchandises. But, in the case of silver, the *indulto* represented the same payment as taxes did, so merchants introduced silver without registration, as much as they could (see Illustration 5.1.)

*Illustration 5.1.: Charges for the legal import of silver from American colonies, 1760s*

Source: Lettres by Edouard and Jacques Gough (1760s), Fond Roux, L.IX, liasse 816

---

113 Girard (1967), pp. 25-26
Therefore, smuggling happened and secrecy was preserved because both sides of
the silver market had incentives to cheat the Spanish government. The importers
(*Cargadores de Indias*) introduced the silver in Cadiz without registration not to pay the
import tax or *indulto*, and the exporters (foreign merchants) illegally exported the silver
taking no notice of the bans against export (see Figure 5.1.)

*Figure 5.1: Scheme of silver smuggling*

![Diagram of silver smuggling]

Once the metal had been introduced without registration in Cadiz, what could
the merchants do with it? The registration entailed the obtaining of a passport conferred
the right of property of the bullion. Therefore, without registration, owning bullion into
Spain was risky and then, illegal export was the easiest destination for bullion. How was
the export done?
Silver traveling from Spanish American colonies to Spain was taken directly to the foreign ships anchored in the bay or gulf of Cadiz, property of foreign merchants living in the city, or was landed and temporarily stored in warehouses near Cadiz. Silver went out at night in skiffs across the bridge Suazo, which joins the island with the peninsula. Controlling the coast was difficult for the Spanish authorities due to its geography. The bay of Cadiz is a broad enclosed harbor some thirty miles in circuit opening on the North into a larger and open gulf with anchorage for many ocean-going vessels. On the West a five-mile tongue of land separates it from the Atlantic Ocean, and on the North it was separated from the gulf by a headland jutting out from the mainland whose irregular coastline curved South and West to form the bay’s eastern and southern shores (see Map 5.1.). Horror stories emptied the beach at night, which facilitated the smuggling activity: the Report of 1726 explains the story of a great snake which appeared at night in the beach where smuggling usually occurred. Laxness on the part of the authorities entrusted to fulfill the law, and agreement of silence of the merchant community made smuggling easier.

---

116 Bustos (2005), p. 403
The shadow market for silver in Cadiz seems to have been developed in the 17th century. The silver from America was illegally sold by the Spanish merchants to the foreign merchants in Cadiz, instead to the official Compradores de Oro y Plata in Seville; and sometimes the Compradores de Oro y Plata sold the ingots to the foreign merchants instead of sending them to the Mint for minting. The reason was the price, as

---

117 Serrano Mangas (1989)
it was recognized in the legislation. “As we have learnt the large damages caused by the fact that the Compradores de plata y oro of the city of Seville buy many bars from individuals who bring them from the Indies, not transforming them into coins because they are better paid by foreigners who receive them in bars, what is causing large damages; we have decided that those Compradores will be obliged to turn all the bars of gold and silver that they buy into coins, imposing them as harsh punishments as it should be considered convenient, and warning that they should give enough guarantees to the ministers of the Casa de Contratación that they will do this with the bars they buy, and they should provide testimony of the Mints where this work is done, in order to check that the amount of coins corresponds to the amount of bars, thus avoiding the diversion of silver and gold”118. (Recopilación de Leyes de los Reynos de las Indias, Libro IX, Título XIII, 31 December 1678).

As we have seen in Chapter 1, the official Compradores de Oro y Plata paid sellers the Mint Price (minus the refining commission). The foreign merchants, however, paid a higher shadow price than the Mint Price, although it was lower than the international price. Therefore, sellers of silver in Cadiz earned money in the black market, because they sold the silver at a higher price than the Mint Price, and buyers of silver in Cadiz also earned money in the black market, because they bought the silver at a lower price than the international price: “Silver has become a commodity, because

118 “Por Quanto haviendose reconocido los graves daños, que resultan de que los Compradores de plata, y oro de la Ciudad de Sevilla, compran muchas barras de personas particulares, que las traen de Indias, dexandolas de reducir á moneda, por la graniéria de que se las pagan mejor los estrangeros, reciviendolas en pasta, y siguiendose de este desorden graves daños, resolvemos se diese forma sobre que dichos Compradores tengan obligación de labrar, y reducir á moneda todas las barras de oro, y plata, que compraren, imponiéndoles las rigurosas penas, que pareciesse, previniendo, que dexen seguridad bastante á los Ministros de la Casa de Contrataron de Sevilla, de que lo ejecutarán assi con las barras, que reciervien, y de que llevarán testimonio de los de la Casa de moneda, en que se haya hecho la labor, para que se pueda ajustar si la moneda corresponde á las barras, y se evite el extravio de la plata, y oro” The emphasis is ours. Recopilación de Leyes de los Reynos de las Indias, Libro IX, Título XIII, 31 December 1678
whereas the price of the mark of silver at the buyer’s home is 66 reales, it is sold in 
Cadiz by 72 reales, it being of a unique fineness, and there are foreigners in Cadiz 
devoted only to this occupation, having it as their profession”¹¹⁹. (Consulado de Sevilla 
al Secretario del Consejo de Indias. Seville, 22 march 1646)

Smugglers used sea routes for the illegal silver export. The sacks of silver were 
re-embarked onto foreign ships for West European harbours from the Cadiz bay shore 
by specialised carriers called “metedores”, who were noblemen, paying them a 
commission.¹²⁰ Madam D’Aulnoy defined the metedor’s work (end 1670- beginning 
1680)¹²¹: “There is an actual fact: when the fleet casts anchor in Cadiz, there are some 
people there whose public occupation is to help to commit fraud against the rights of 
the King (...) They are called metedores, and in spite of they being crooks to the King, it 
is notorious that they do not behave in this way with the individuals with whom they 
make a deal, by which, through a certain payment, they guarantee all their money in the 
city they wish to have it. This is such a safe business that none of them has never broken 
his word. It would be possible to punish this people on behalf of the frauds they make 
against the King, but it would bring inconveniences to commerce, and such punishment 
would cause more harm than benefits. Therefore, both the governor and the judges just 
ignore what is happening”

¹¹⁹ “la plata se ha hecho merceduría, porque valiendo el marco de plata en casa del comprador a 66 
reales, se vende en Cadiz a 72 reales, siendo toda de una ley, y hay extranjeros en Cadiz que sólo tratan 
de este ministerio y lo tienen por oficio y encomienda” El Consulado de Sevilla al Secretario del Consejo 
¹²¹ “hay una cosa particular, y es que cuando la Flota llega a echar el ancla en Cádiz, se encuentran allí 
gentes que tienen como público oficio el ayudar a defraudar los derechos del rey (...). Los llaman 
metedores, y por muy tunantes que sean con respecto al rey, es preciso convenir en que no lo son con los 
particulares que hacen un trato con ellos, por el cual, mediante una cierta entrega, les garantizan todo su 
dinero en la ciudad donde deseen. Es un comercio tan seguro que nunca se ha visto que falten a su 
palabra. Podiera castigarse a esas gentes por las defraudaciones que hacen al rey, pero de ello nacerían 
inconvenientes para el comercio, que causarían mayores perjuicios que el beneficio que procurase ese 
castigo; de manera que el gobernador y los jueces no se dan por enterados de lo que ocurre” Reproduced 
in Bustos (2005), p. 400
The way to practise smuggling in Cadiz was *vox populi*. Voltaire described it in the *Essai sur les moeurs et l'esprit des nations* (1756):

“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 Météores. These men, armed with small pistols and swords, carry the ingots numbered to the city walls, and hand them over to other Météores, who carry them onto skiffs. These skiffs take the ingots onto vessels in the bay. These Météores, these factors, the assistants, the guards who never disturbed them, all of them had their rights, and the foreign merchant was never deceived”\(^\text{122}\) Voltaire (1990) [1756], vol. II, p. 337

Secrecy was preserved because smugglers acted as a mafia and, therefore, the cost of denounce was higher than the pecuniary fine offered by government. In a raid at the end of 1691, one *metedor* denounced an illegal silver exportation to the City Governor through the Mayor Duty guard. But the smugglers looked for the *metedor* having the intention to kill him and the *metedor* had to escape to America to save his life (and the Duty guard kept the reward as he could not find the *metedor*). The City Governor ordered death to the archdeacon who kept the silver for extraction at his house.\(^\text{123}\)

\(^{122}\) “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 lesjetaient 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.

\(^{123}\) Bustos (2005), p. 402
A contemporary inquiry on smuggling (1738-1744) describes how smugglers resorted to force when they practised the illegal export of silver\textsuperscript{124}. The silver was transported to foreign ships by skiffs and, once it had been loaded onto the ship, smugglers resisted with weapons when duty guards insisted on inspecting the ship. The report offers the names of some smugglers in our period: Casaubon, Behic et Cie, Juan Bautista Magon and Diego Cabanes. The report corroborates that the smugglers were the main French merchants in Cadiz, as we have seen in the previous chapter. So the Spanish contemporary report against smuggling denounced the same smugglers who appeared in Roux archive. They were the leaderships of arbitrage. We are going to study the reasons in the next section: foreign merchants had diplomatic immunity due to Commercial Treaties. Then, the risk of smuggling for the leaderships of the system (foreign merchants) was zero as they could not be prosecuted.

5.2. The Treaty System: smuggler’s diplomatic immunity

The report against smuggling elaborated during the period 1738-1744 and related to the previous year 1736 provides a lot of details about smuggling. Towards the end of 1738 there was in Cadiz a warning that the clandestine export of bullion might be investigated in connection with the exceptionally flagrant smuggling. The judge in charge of the report was sent to Cadiz to enquire into this smuggling, and it was announced that he intended to examine not only Spaniards, but also foreign merchants. The British consul, seriously alarmed, wrote: “\textit{If the Court of Spain once insist upon entering into disquisition of this kind, and molest the commerce in the point of exportation of the species of the kingdom... they may as well prohibit all further trade}"

\textsuperscript{124} Expediente sobre la comisión de don Tomás Pinto Miguel para averiguación y castigo de los excesos de contrabando cometido por varios sujetos de Cádiz, 1738-1744, Archivo General de Indias, sección 5º. Gobierno, Legajo Indiferente General 2479 (microfilm C-1557 and C-1558)
form abroad, and order every foreign merchant out of their country, since without that exportation either permitted or connived at, no trade can be carried on with them” 125

Let us study the report. First of all, we should emphasize the title: “Dossier by Tomás Pinto Miguel for the enquiry and punish of the excess of smuggling of several individuals in Cadiz” 126. The “excess of smuggling” recognized that the government tolerated smuggling although not its excesses. The reason was a fiscal one: Smuggling was tolerated because its control was expensive, but the excess of smuggling reduced largely fiscal revenues because the bullion illegally exported was the same bullion introduced in Cadiz without paying the indulto. The report showed the fiscal reasons of the bullionist goal and proposed a reduction in the indulto to 2% or 3% as the way to reduce smuggling: “so that royal finances would increase and would eliminate frauds without any harm, because prohibition just serve to foster this confusion which hampers trade and make delinquents wealthier, without restraining the extraction, which has always occurred” 127 (fol. 189).

The fiscal reason of the bullionist goal is an argument consistent with a “recent” reinterpretation of the meaning of the mercantilist doctrine. According to Ekelund and Robert (1981), the mercantilist policies were enforced by rent-seeking merchants and governments. Spanish merchants benefited from the monopoly and bans on foreign competition of trade with colonies, as we have seen in the previous chapter; and

126 Expediente sobre la comisión de don Tomás Pinto Miguel para averiguación y castigo de los excesos de contrabando cometido por varios sujetos de Cádiz. Archivo general de Indias, sección 5ª, Gobierno, legajo 2479, Indiferente general (microfilm C-1557 and C-1558)
127 “por lo que aumentaría el real herario, y quitaría los fraudes sin perjuicio, pues la prohibición solo sirve para fomentar este desorden que menoscaba el comercio y enriquece a los transgresores sin contener la saca que siempre ha sucedido”. 
government benefited from the high taxes/payments from the merchants, i.e., the *indulto*. But merchants also wanted to gain the government rent, and imported the bullion from colonies without paying the *indulto*. The report stressed that the extraction of silver was the most serious fraud in Cadiz.

The silver was introduced in Cadiz from Vera Cruz without registry and, therefore, it was not bound to pay the freight and the *indulto*. Navy officers were the intermediaries between America and Cadiz. They were the persons in charge to legally register the merchandises and, therefore, the only people able to transport products without the register. Although silver was transported without the legal register, other “non-legal” documents registered the shipment. They were called “*cartas de creencia*” (letters of belief) and sometimes they also appear in the source as “*cartas de confidencia*” (letters of confidence/secret). These letters contained the detail of the silver transported and should be signed by the receiver in Cadiz. The Captain of the ship was the person in charge to give the *metedores* these letters together with the silver. The transfer was usually done at 12 or 20 leagues from the bay: “*the introduction of silver and gold that come from the Indies without registration is made before the vessels arrive to the bay, as foreigners go out to meet them, or on vessels carrying letters of confidence, as some of them have been seized*”

---

128 Leyes de Indias (1681), libro L.IX, título XXIV, and Ordenanzas de Bilbao (1737), capítulo XXIV, número VIII.
129 “*que la introducción de plata y oro que viene de indias sin registro se hace antes que avisten los navios a aquella bahía saliendo los extranjeros de acuerdo a buscarla, o en embarcaciones que van con cartas de creencia de que se han recogido algunas*”
The *cartas de creencia* were the only proof to accuse smugglers because, according to the report, the merchant community never accused smugglers in order to preserve its honor. Merchant relations were based on confidence and merchants declared “*Bona Fides Inter Mercatores est Servanda*”\(^{130}\) But the *cartas de creencia* were seized from the *metedores* during a raid, which permitted the redaction of the dossier that we are studying (fol. 358-360). Also the *metedores*’ notebooks\(^{131}\) were seized together with the *cartas de creencia*. Both give us the major figures of silver smuggling:

- Mr. Ignacio Dautevil, ship’s captain, shipped silver without registration from *Nueva España* in 1736 and gave it to Jines Hivernon, *metedor* of Manuel de Axye (*Cargador de Indias*) for the French merchant house *Casaubon Behic* (fol. 383).

- The *cartas de confidencia* (8 and 22 February 1736) seized from the *metedores* Jines Hivernon and Antonio Corrales indicated that the silver without registration had to be delivered to Mr. Juan Baptista Magon and Mr. Diego Cabanes (fol. 384).

The *metedores* denied knowing who the receivers of the illicit silver were (fol. 384). The silver was smuggled on foreign ships. In this case, the silver was introduced on a French vessel of war tied up in the beach (fol. 395). When the silver was illegally introduced into the city, the guards charged 1% of bribery (fol. 396). The *metedor*

---

\(^{130}\) Carrasco (1997), p. 54  
\(^{131}\) Notebooks “para la negociación de introducir en aquella ciudad y transbordar a Navios extranjeros la plata que sin registro se trae de los reinos de las Indias, y de extraer de estos para los extranjeros” (fol. 601)
charged 3%-4%\textsuperscript{132} (fol 602). The payment for metedor and guards’ briberies were charged to the silver importer (Cargador de Indias) and not to the silver exporter (foreign merchant). The gold was illegally introduced in Cadiz in a different way: gold from Nueva España was introduced on the foreign ships sewed into vests (fol. 608).

The metedores, navy officers and collaborators were sentenced. The metedores Jines Hibernon and Antonio Corrales were sentenced to six years of prison in Africa and the perpetual exile from Cadiz and surroundings (fol. 569). The navy officers who illegally shipped the metal from America were also sentenced, and additionally some French collaborators were penalized: Mr. Diego de la Bastida, main caretaker of Mr. Casaubon’s house, Mr. Luis de la Borda, a relative of the French consul, and Mr. Pedro Membiella, a French man grown up in Granada. The King passed judgment not to sentence to Diego de la Bastida, and to send into exile the others “as a lesson and punishment” (fol. 541)\textsuperscript{133}.

However, the leaders of smuggling were not sentenced. In order to be able to sentence the leaders, the judge in charge of the enquiry requested to the Cadiz governor the search and seizure of the foreign merchants’ books and documents (fol. 290). But the French consul rejected it invoking the Commercial Treaty signed by the Castilian Crown and the French consul on 14 September 1711: treaty for the friends and neutral nations\textsuperscript{134}: ch. 18: “French merchants that come and go or stop in this Kingdom cannot be judged by Castilian judges, but by the special consensuador judge of the French

\textsuperscript{132} At the end of the 18\textsuperscript{th} century (1780s), the smuggling maintained the same logic, and metedores continued charging the same commission (3%). Tedde (1988), pp. 121-122
\textsuperscript{133} “como ejemplo y escarmiento à otros”
\textsuperscript{134} Treaty into the framework of Peace of Utrecht (1713)
nation”135; ch. 19: “only the special consensuador judge can search merchant houses and French stores, not a Spanish judge”136 (fol. 310). The French consul in Andalusia allied with the British consul and the Republic of the United Provinces consul to recall to Cadiz Governor “the peace and privileges treaties”. They also recalled that there were other two commissions against smuggling in 1711 and 1725, and both respected the Commercial Treaties and foreign merchants’ books were not searched because it was expressly forbidden in the Treaties (fol. 339-342). And the Cadiz Governor ordered the judge in charge of the smuggling enquiry not to search the foreign merchants’ books because “this measure is considered as prejudicial to commerce and it causes complaints, with no need to prove anything”137 (fol. 334). Therefore, the leaderships were never sentenced and their relation with smuggling could not be proved.

Smuggling leaders did not have the risk to be captured because they were granted diplomatic immunity, i.e, they could not be judged by a Castilian judge. The existence of special judges for foreign merchants – juez consensuador138 - were a safeguard of the export of bullion139. When and why this privilege appeared?

Trade with American colonies was reserved to Spanish merchants, as we have seen in the previous chapter; although Spanish government had long tolerated resident foreign merchants. During the 17th century, due to the Spanish economic backwardness and loss of political power, Spain granted commercial concessions to foreign merchants

---

135 “comerciantes franceses que van y viene o se detienen en este reino no pueden ser juzgaos por jueces castellanos, sino por el juez especial consensuador de la nación francesa”
136 “solo el juez especial consensuador puede registrar casas de comercio y tiendas francesas, no juez español”
137 “se considera esta diligencia como turbatiba del comercio y excitante de muchas quejas sin haverse de probar nada”
138 The translation of “juez consensuador” is “judge who state consensus”, although it has been translated to English as “judge conservator” (see Stein and Stein, 2000) and literally re-translated to Spanish as “juez conservador” (see McLachlan, 1974)
139 McLachlan (1974), p. 57
through Commercial Treaties. The foreign businessmen had long desired legal recognition in Lower Andalusia of their presence and their rights and protection for their persons and properties. And this recognition came after the Peace of Westphalia by means of privileged treatises which broke Spanish control over foreign residents and opened the way to systematic fraud.

The precedent was the favoured treaty with Hanseatic towns which recognized Hanseatic merchant houses at Spanish ports, the presence of consuls representing the community and their own internal system of adjudication - the forerunner of the juez consensuador. This agreement embodied the guarantees desired by foreign merchants from any nationality in Lower Andalusia\textsuperscript{140}.

The Peace of Westphalia commercial treaty (Münster, 1648) conferred on the Dutch the same status that Hanseatic towns had: “the same rights, franchises, immunities and privileges” in establishing consuls to protect the status of merchants, factors, ships captains, and sailors. The treaty signed by Spain bestowed “merchants…with the right to establish commercial houses in Spanish ports, to reside under their consuls’ protection, in a kind of independence of sovereign authority, to create an ethnic unit, to enjoy a special court for commercial litigation…”\textsuperscript{141}. The Treaty facilitated smuggling because it allowed Dutch citizens to sail and unload on Spanish coasts without the obligation to give details of the cargo to Spanish authorities, except in case of suspicion of weaponry cargo\textsuperscript{142}.

\textsuperscript{140} Stein and Stein (2000), p. 58-59
\textsuperscript{141} Stein and Stein (2000), p. 59
The French were granted the same privileges at the end of the Treaty of 1659. The Treaty of Pyrenees provided French merchants with internal jurisdiction over the community, choice of community representatives, protection against arbitrary searches by customs officials or inspection of private business documents, confiscation of illegal merchandises but not of the entire shipment, the right to travel, conduct business and write the business documents in French. In 1662 Madrid authorized the *juez consensuador* for the French, who gave the same privileges, franchises, liberty and security as French merchants according to French legislation. French community gained the "*liberté de commerce*" strengthening its security while the control in illegal operations became more difficult for Spanish authorities.\(^{143}\)

The English got the privileges with the Treaty of peace and commerce of 1667 (Madrid). English merchants had become the major carrier of Spanish silver coin and bullion to Flanders in the decade of 1635-1645, when both Holland and France warred against Spain.\(^{144}\) Several clauses in the commercial treaty gave indirect advantages for the export of bullion because, although the export of bullion had been explicitly prohibited, several loopholes gave indirect protection to smuggling. Ships being laden and customs paid, the goods were not to be detained in port under any pretext whatever, nor were factors, who had bought and loaded goods, to be questioned after the ships had set sail. The Treaty limited the number of Customs officials that might visit an English ship, so that the master might not be ruined by having to pay the customs duties. Merchants’ houses were not to be searched; their books might not be demanded in courts of law. The protection of individual merchants was achieved with the *juez*


\(^{144}\) Stein and Stein (2000), p. 62
consensuador and the English consul who safeguarded the interests of English merchants.  

The privileges granted to foreign merchant communities covered their rights of residence, consuls and juez conservador, the handling of their shipping, incoming cargoes, and smuggling infractions became riskless. Castilian government had lost the legal monopoly to enforce the law. Treaties, therefore, were imposed to legitimize illegal commercial activity because gave legal superiority to foreign merchants over Spanish merchants.

In the second half of the 17th century, the diplomatic relations were stable with Genoa, Spanish Netherlands and Hanse, but the English and the French were penalized. The Spanish Succession war gave privileges to the French merchants and expelled English protestant merchants. The French community was the most important community of foreign merchants, as we have seen in Chapter 4, and they were the main smugglers of silver because they had diplomatic immunity, as we have seen in this chapter. In Chapter 6 we will demonstrate that the smugglers were organized in long-run networks which gave them the market power to fix bullion prices below the international price and the international connections to illegally extract and distribute the bullion from Cadiz.

---

146 Girard (1967), p. 89
147 Carrasco González (1997), pp. 22-26
6. THE SMUGGLERS’ NETWORK: THE OLIGOPSONISTIC STRUCTURE
OF THE BULLION BLACK MARKET IN CADIZ

What do we know about the structure of the bullion market in Cadiz? We have
explained in the first section of this dissertation that the Castilian legislation forbade
exchanging bullion at a different price than the official parity, and imposed bans against
bullion exports. The structure of the bullion black market was affected by the
enforcement of those regulations. We also have demonstrated in chapters 4 and 5 that
smugglers were the most important foreign merchants in Cadiz, who were granted
commercial privileges, such as rights of residence, consuls and special judges, and
cargoes secrecy. Those privileges protected them against the risk of being seized for
smuggling. We will demonstrate in this chapter that those foreign merchants were
organized in long-run networks, which gave them enough market power as to influence
bullion prices and provided them with the necessary international connections to
illegally extract and distribute bullion from Cadiz.

6.1. Wholesale merchants’ organization in the 18th century

A social network is a set of agents connected to each other by relationships
related to some specific activities or goals.148 In our case, the networks were formed by
foreign merchants connected by partnership and familiar ties, and were addressed to
undertake illegal trade operations between the Spanish American colonies and Europe
through Spain. Concretely, we focus here on the case of illegal bullion exports from
Cadiz to Europe.

148 Jackson (2008)
Bullion trade was led by French wholesale merchants’ networks in Cadiz. Foreign communities in Cadiz had a great cohesion among their members. These merchants’ enclaves were structured in partnership and family enterprises and were institutionalized through the Consulates; they formed culturally and economically hermetic undertakings, and were kept safe by relying upon speaking and keeping business records in their native tongue, recruiting new members and personnel among their own nationalities, and buying primarily from producers at home\textsuperscript{149}.

Firms usually form networks with numerous multilateral links on the basis of different kinds of ties. These can be formal ties, like business groups, business cooperatives, business consortia, joint ventures, franchising, sub-contracting, voting agreements or collective trademarks; or informal ties, like interlocking directorships, cross-ownership, industrial districts or family and ethnic ties\textsuperscript{150}. Historical 18\textsuperscript{th} century trade networks combined formal limited-partnership ties with informal alliances based on family ties. Marriage, partnership and trade were closely related. Those two strategies, family and partnership, were combined in the process of formation of merchant houses: during the first half of the 18th century the priority strategy to introduce individuals in wholesale trade firms and networks was marriage, whereas during the second half of the century the partnership strategy was given priority over marriages\textsuperscript{151}. These were the instruments for network integration in Cadiz, both for foreign merchants and for Spanish agents coming from regions other than Lower Andalusia\textsuperscript{152}. Merchant and family networks linked individuals from similar geographic origins and professions, and were a common strategy used by Irish, Italian and French

\begin{footnotesize}
\begin{enumerate}
\item[149] Stein and Stein (2000), p. 72
\item[150] Scalera and Zazzaro (2009).
\item[151] Fernández (1997), p. 133
\item[152] Fernández (1997), p. 127
\end{enumerate}
\end{footnotesize}
merchant houses, and also by merchants coming from the north of Spain and Catalonia. Like religious endogamy, the strategy of developing merchant alliances between families of similar profession and nationality on the basis of marriage 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.

Cadiz was a vertex of international commercial networks, where European trade was connected with Spanish-America, and international networks established branches in Cadiz in order to get access to the transatlantic trade. Merchants from different nationalities had different languages, customs, and laws; they lived in different areas of the city, and they usually practiced endogamous alliances. For these groups, obedience to the kin was more important than individual wishes. The strategic marriages and family decisions were firmly determined by a broad web of gender roles and family pressures and controls.

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. 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. They were in care of the members of the initial network of foreign businessmen who had previously settled in

---

154 Fernández (1994)
155 Girard (1967), Mauro (1990), p. 280
Cadiz. The young and single members lived together and shared their private and professional life. This was typical in the French merchant network. The commercial relationships were based in trust and secrecy provided by long run familiar ties. People outside the family circle were accepted with great caution. They had to spend some years working as assistants and, sometimes, they could be promoted to partners afterwards.

We have seen in chapter 4 that French merchants were the most important community in mid-18th century Cadiz. It was the largest foreign merchant group in the city and had the highest income, both globally and individually. We have seen that the most important merchant houses in Cadiz were the bullion smugglers: *Jolif et Cie, Verduc, Vincent et Cie, Macé et Cie, Casaubon, Béhic et Cie, Le Couteulx, Le Normand et Cie, Magon et Lefer frères, Cayla, Cabanes, Solier et Cie* and *Masson et Cie*. The next section studies the partnership and marriage ties which defined the oligopsonistic bullion market in Cadiz.

6.2. The smugglers’ network in Cadiz

To start with the analysis of the oligopsonistic bullion market, this section offers some merchant’s biographies, in order to discover the partnership and familiar ties which constituted the bullion smuggler’s networks in Cadiz.

PIERRE, ATHANASE, JOLIF et Cie – ATHANASE, JEAN JOLIF et Cie – ALAIN JOLIF et Cie. The merchant house Jolif, coming from Saint Malo, was

---

156 Carrasco (1997), p. 52
established in Cadiz from 1724, although they had participated in freight to Indies from the beginning of the century. The merchant house changed its name several times according to the association and retirement of its members: *Pierre, Athanase Jolif et Cie* in 1729, *Athanase, Jean Jolif et Cie* in 1730, *Alain Jolif et Cie* in 1730, *Jean, Alain, Louis Jolif et Cie* in 1745, *Jean, Alain Jolif et Cie* in 1774 and only *Jean Jolif et Cie* in 1781.

**JAMETS, VERDUC, VINCENT et Cie – VERDUC, VINCENT et Cie**

This house’s name was *Jamets, Verduc, Vincent et Cie* from 1733 to 1737 and *Verduc, Vincent et Cie* from 1737 to 1766. Vincent was a merchant family from Saint-Malo. Jacques Vincent, *Marquis de Gournay*, moved to Cadiz in 1729, when he was 17 years old, to start working as an apprentice in *Verduc-Jamets*, a merchant house that was owned by his uncle, René Vincent de la Brimaniere. His three younger brothers, Joseph, Pierre and Bernard, would also join the merchant house later. He was promoted to partnership and, after fifteen years, he became manager of the merchant house. In 1748 he married one partner’s granddaughter – Verduc- and moved to Paris, in order to work in the high public administration (director of the *Grand Conseil* and *Intendant du Commerce*).

In the 1760s the merchant house *Verduc, Kerloguen et Cie* (1766 to 1769) was formed by four partners (Julian Pedro Verduc, Gille Kerloguen, Francisco Querard and Luis Seré), five assistants (Diego Lemain, Pedro Marré, Gabriel de Louvre, Bernardo Portacq and Bertrand Lasson), one apprentice (Pedro Julian de San Marc) and nine servants. The merchant house included Payan at the beginning of the 1770s, becoming *Verduc, Kerloguen, Payan et Cie* (1771-1777), and was formed by Gilles

---

Apuril de Kerloguen, from Denmark, Lucas-Hipólito Seré, from Saint Malo, Juan Payan, from La Ciotat, and Pedro Saint-Marc, from Bordeaux. Verduc and Querard retired from the merchant house in the 1770. Pedro de Saint Marc was then promoted from apprentice to partner and lived together with Kerloguen, their employees and their servants.

Verduc is an excellent example of marriage strategies. One of Julian Pedro Verduc’s daughters, María Verduc, got married with Bernard Magon de Componeu, member of the merchant house *Magon Le Fer*. Another Verduc daughter, Margarita Verduc, married her cousin Juan Jolif du Colombier, member of the merchant house *J.A. Jolif*, against her mother wishes. Still, another Verduc daughter, Norberta Verduc, married Gille Pedro Apuril de Kerloguen, a member of his merchant house, and finally, his last daughter, Tomasina Verduc, married Payan, also a member of his merchant house.

**GUILLAUME MACÉ – GUILLAUME MACÉ, FILS et Cie**159. Guillaume Macé, from Saint Malo, settled in Cadiz at the end of the 17th century. He started to work as a partner of the Gilo Pain Company, and married Pain’s daughter in 1713. She contributed to the marriage a dowry of 2,000 *pesos* and he provided a deposit of 8,000 *pesos*. When his father-in-law passed away, he increased their capital with the inheritance of 6,000 *pesos*. He created the merchant house *Guillaume Macé, fils et Cie* with his sons, Claudio and Nicolas, and with a French partner, Simon Lassala. He was naturalized in 1718 and was the only silver smuggler who was accepted as *Cargador de Indias*, in 1728, although he was expelled in 1730 and accepted again only in 1745. Actually, the *Casa de Contratación* tried to prevent him from trading

---

with America, and he turned to the king to recall their long-run friendship, expressed in the loans he had granted him and the times he had hosted him in his home in *Isla de León*. This is a clear example of the importance of political connections, since the king finally forced the *Casa de Contratación* to accept him in the *Cargadores de Indias*’ registry. Nicolas Macé, his son, was one of the agents who acted as consultants to the king regarding the trade with the American colonies.

*Casaubon, Béhic et Cie*\(^{160}\). Juan Béhic, from Bayonne, settled in Cadiz in 1720, after the monopoly of the Indies trade had been translated to Cadiz and the peace of Utrecht had granted privileges to French merchants. Béhic formed the merchant house *Casaubon, Béhic et Cie* with other French merchants (Juan Casaubon, Pedro Davout, Diego Delane, Dionisio Lebrun, Diego Labastide and Francisco Monfunt). In 1735 he married a *jenizara*, Josefa Potenciana, Gilo Pain’s daughter. Gilo Pain was a rich French merchant who had a company with his son-in-law, the aforementioned Guillermo Macé. Juan Béhic and Josefa had four sons and four daughters. The sons bought shares of the company *Casaubon, Béhic et Cie* when Juan Béhic assigned 12,500 *pesos* to each of them for their emancipation. The merchant house operated with America by consigning merchandise to *Cargadores de Indias*, sending merchandise on credit and giving maritime loans. In the 1770s the main partners of the company were Juan Béhic and Gabriel Tanevot. They had eight servants and eight assistants. Juan José Béhic and Manuel Béhic tried to be nationalised in 1772 in order to be accepted as *Cargadores de Indias*. They apparently fulfilled all the requirements, since they were catholic, had kept a fixed address in Spain from 10 years, were married to Spanish wives, and declared their

intention to live and die in Spain. But the Spanish government rejected their request because they lacked one additional requirement: to be separated from their original nation. The Spanish government argued that in 1757 Juan Béhic had signed his intention to continue attending the French consular committees.

**LE COUTEULX le jeune et Cie – J. LE COUTEULX, A. LE NORMAND et Cie**\(^{161}\)

This house appears in the Roux archive as *Lecouteulx, Lenormand, Terry* (1713), as *J. Le couteulx le jeune et Cie* (1729), as *J. Le Couteulx, A. Le Normand et Cie* (1733) and as *Jacques et Barhélemy Le Couteulx et Cie* (1771). In 1765 the company had one apprentice, Bartolomé Lecouteulx (probably Diego Lecouteulx’s son), four assistants and five servants. In 1773 the merchant house *Jacques et Barhélemy Le Couteulx et Cie* was formed also with two other partners: Luis Lecouteulx de Lanoraye, from Paris, and Pedro Desportes, from Rouen, who had been an assistant in the house in 1765. As was explained in Chapter 4, *Le Couteulx* did not appear in the 1770s in the fiscal list *Contribución Única*, but only his partner was quoted, as *Lenormand, Antonio por sí y su compañía*. But, according to the *Almanach Général des marchands* (1772; p. 73), the name of the company in the 1770s was *Le Couteulx, Le Normand & Compagnie*.

**MAGON AND LEFER frère**\(^{162}\). Magon was descendant of a very important merchant dynasty from Saint Malo, coming from the mid 16\(^{th}\) century. They were very reputable, were promoted to the French aristocracy and accumulated a great fortune during the 17\(^{th}\) century. Magon settled in Cadiz at the end of the 17\(^{th}\) century (1660-


1668), and provided armament to the Spanish government during the Spanish Succession War.

Lefer, also from Saint Malo, was descendant of a merchant family specialized in shipping and maritime trade. Pierre Lefer was director of the *Compagnie des Indes Orientales* (Saint-Malo, 1715-1719). He married Marie Gibert, who was Nicolas Magon’s widow, and accumulated a substantial fortune. Their sons were sent to Cadiz to work together with their half-brothers Jean-Baptiste and Guillaume Magon. Magon and Lefer jointly established the company *Magon and Lefer frères* in 1724 (1729?). In 1765 they had three partners (Pedro Boisrion, Tomás Gervinais and Francisco Lefer), four assistants (Lorenzo Lopes, Reymundo Laserre, Julián Cosse and José Nogue), and six servants. In 1773 Gervinais and Lefer’s son shared their home together with one of the apprentices, José Nogue, and with nine servants. In 1777 the company was formed by five partners: Thomas-Marie Gaillard de La Gervinais, from Saint Malo, José Nogué, from Oléron, and three other merchants coming from Saint-Malo: Bernard Magon de Campaneu, Luc Eon de la Baronie and Luis Becard. All of them lived together. José Nogué had been promoted from assistant to partner and was the link between the old and new generation. Jose Lefer appeared as an assistant, related to Francisco Lefer, who was a partner in 1765. Thomas-Marie Gaillard de La Gervinais married María Josefa Béhic, the daughter of Juan Béhic, who was a member of the aforementioned merchant house *Casaubon, Béhic et Cie*.

**GALIBERT, CAYLA, CABANES et Cie and JEAN SOLIER et Cie**\(^{163}\). These firms operated as two different merchant houses at the beginning of the 18\(^{th}\) century: *Galibert, Cayla, Cabanes et Cie* (1729) and *Jean Solier et Cie* (1734). They merged

in 1735 as *Cayla, Cabanes, Solier et Cie*. In 1766 the house was called *Cayla, Solier, Cabanes, Jugla* (for Juan Cabanes, Juan and Diago Jugla and Juan Lassale). They had four family assistants (Luis Cabanes, Felipe Lassalle, Felipe Fucier and Antonio Roque) and four other assistants (Bartolomé Soly, Juan Lasalemenor, Esteban Mondet and Antonio Mauleon), seven servants and one associate merchant, Juan Diego Gerard. In 1777, the merchant house was called *Cayla, Solier Hnos Cabanes*, and the partners had changed, but they were related to the previous partners (Jacqués Juglá, Jean Solier and Antoine Roque -who was a family assistant in 1766- and Barthélemy Joly). The assistants had also changed: only Esteban Mondet (from Lyon) remained, whereas two of the new assistants were relatives of the former ones: Juan-Abraham Roque and Pierre Lasalle (from the South of France). Finally, there was another new assistant, Jean Boiselle (from Abbeville), and the number of servants had been reduced to three.

**ANTOINE et PIERRE MASSON – PIERRE, GUILLAUME et JOSEPH MASSON**\(^{164}\). These merchants came from Orléans. Joseph Masson appeared in Cadiz with the Spanish name *Juan Mazón y Compañía* from 1713 onwards. In the consular list of 1765 Antoine Masson appeared as an attached merchant of the Merchant House *Verduc, Vincent*.

---

These merchants’ biographies have illustrated 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 among them. On the basis of the previous biographies, we have been able to find ties among six of the eight merchant houses studied. We 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 we could not trace the connections in the sources. The other six merchant houses were mutually connected as the following family tree shows (Illustration 6.1.).
Illustration 6.1.: family tree of the bullion smugglers in Cadiz in the 18th century
To sum up, Manuela J., the daughter of Gilo Pain, a French wholesale merchant in Cadiz, got married to Guillaume Macé, which was partner of the French merchant house Macé et Cie. His other daughter was married with Juan Béhic, another French merchant, which was partner of the house Casaubon, Béhic et Cie. Juan Béhic’s daughter, María Josefa, got married with Tomás Mª Gaillard, member of the merchant house Magon Lefer. Other member of Magon Lefer, Bernard Magon, got married with María Verduc, who was the daughter of Julian Pedro Verduc, partner of the merchant house Verduc, Kerloguen, Payan et Cie. Julian Pedro Verduc’s other three daughters got also married with French wholesale merchants: Margarita Verduc with Juan Jolif, partner of the house Jolif; and Tomasa Verduc and Norberta Verduc with two members of his own company, Payan and Kerloguen, respectively. Finally, the merchant house Verduc, Kerloguen, Payan et Cie had an attached partner, Masson, which was another of the French bullion smugglers in Cadiz.

Bans on exports meant that Cadiz was a bullion market with few buyers: only those that were able to illegally extract the bullion. Bans on export were, therefore, a barrier of entry to the bullion smuggling business, which was restricted to a small number of very important foreign merchants. And, additionally, these few buyers did not compete among themselves. On the contrary, they were mutually related in family networks that had the capability to affect prices. This was recognized by the contemporaries: “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 Cie., Magon el 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, Handrix, 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”

(Parlyet à Maurepas, 4 April 1746)

6.3. The geographical circuits of silver

The spatial circuits of the Pieces of Eight comprised the world geography: from Spanish America to the Far East through Europe. Smuggling had an essential role in the circulation of silver around the world: the main foreign merchant houses that were settled in Cadiz spread silver throughout Europe. They were members of international societies with partnership companies abroad. The diversity of routes that they used was significant. Although silver was usually shipped to Cadiz, we also can find examples of other routes: from Mexico to the Far East via the Philippines, or from Potosí into Portuguese vessels to Lisbon via Rio de Janeiro.

Bretagne and Provence had a key role in the silver business. We have seen in Chapter 4 that Bretagne (Saint-Malo) and Provence (Marseille) were the main regional origins of the French merchants that were settled in Cadiz at the beginning of the 18th century.

165 “Malgré cette division du corps des négocians en gros en 4 classes, par laquelle la première étant composée de 12 maisons, on a lieu de juger que ces 12 maisons sont à peu près de la même portée, je crois cependant devoir, Mgs., vous observer que les maisons des Srs Masson, Verduc, Vincent et Cie, Magon et Lefer, surtout celles des Srs Casaubon, Béhic et Cie, et Cayla, Solier frères, Vendun et Cie, reçoivent plus de marchandises, soit de France, soit du pays étranger, que tout le reste de la nation ensemble; que les Srs Casaubon et Béhic, Masson, Wailsh, Handrix, Sobia et Vande, et Cayla, Solier frères, Vendun et Cie passent pour les plus riches François de Cadiz: que ces sont ces maisons qui règlent principalement le prix du change, ainsi que celle des Srs Le Couteulx, qui est considérable pour cette partie du commerce”. The emphasis is ours. Parlyet à Maurepas, 4 April 1746, in Ozanam (1968), p. 272-273
century. In Bretagne, the merchant house Magon was the leader of the business. Magon bought the silver in Spain and sold it mainly in Paris (via Bordeaux and Limoges). His correspondents’ network was extended to Bordeaux, London and Amsterdam. He shipped silver from Cadiz, but also moved silver from the north of Spain through Bayonne: by sea, from San Sebastian, Bilbao and Santander; and by land from the Pyrenees (from Guipúzcoa to Saint Jean de Luz, from Navarra to Ainhoa and Saint Jean Pied de Port, and from Aragón through Jaca and Canfranc). Silver was exported in exchange for bills drawn by French bankers on Cadiz, Madrid or Barcelona.

In Marseille arbitrage was led by Roux. The pieces of eight were sent from Cadiz to London, Paris or Geneva through Marseille and Lyon. Lyon was connected with Geneva, centre of intersection of two other routes of the pieces of eight: one coming from Nice via Turin and the pass of Mont Cenis (route: Nice-Turin-Geneva), and the other from Genoa through Milan and the Simplon (route: Genoa-Milan-Geneva). Genoa had been transformed in the late sixteenth and early seventeenth centuries into the distribution centre for Spanish American silver. American silver coming from Spain was distributed into Europe through northern Italy and, via the Rhine, into the Netherlands. Annual silver fleets entering Amsterdam from Spain after 1648 made that city the centre of the European international payment system.

---

166 Dermigny (1954), p. 245
167 Dermigny (1954), pp.245-247
169 Stein and Stein (2000), p. 52. The Genoese had maintained a predominant trade position in Castile from the 13th century, and in the 16th century they dealt with silver thanks to the licenses granted by Charles V. They were the main bankers of the Crown during the 16th and 17th centuries (together with the Germans in the 16th century and the Portuguese in the 17th century). Carande (1949-1968), Álvarez Nogal (1997). Girard (1967), p. 37-42.
The spatial circuits depended on the international networks and the wars, which forced agents to change the routes and to reorganize the networks. For example, during the war of Jenkins’ Ear (1739-1742), Santa Cruz de Tenerife acted as an intermediary harbour for silver coming from La Habana and Veracruz for French and Dutch merchant houses. In times of war, the shipping routes were changed by land routes (German and Swiss routes through Frankfort, Basel, Geneva and Lyon).

Silver was moved from Europe to the Far East by the East India Companies, and to Levant and Barbary through the Mediterranean Sea: from Leghorn and Salonika to Smyrna and Constantinople, and also by the Compagnie Royale d’Afrique to Tunis. Map 6.1. shows the main silver routes for the period 1785-1790.

Map 6.1.: The movement of pieces of eight around Marseille (1785-1790)

7. THE MODEL AND DATA: THE BEHAVIOUR OF OLIGOPSONISTIC SILVER PRICES WITH DEVALUATION

In this chapter we will develop a static model of partial equilibrium for commodity-money in order to understand the workings of the oligopsonistic silver-commodity market and the effect of devaluation. First, we will describe the oligopsonistic silver-commodity market. Second, we will add the silver-money market. And, finally, we will analyze the effect of devaluation on the bullionist goal of hoarding silver.

7.1. The oligopsonistic silver-commodity market

We have seen in chapter 2 that the arbitrage equation 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 two countries, when both prices are expressed in the same currency:

\[
p^* = p_c = p_L \cdot x
\]  
(7.1.)

where \( p^* \) represents the international competitive price expressed in one single currency (the Castilian unit of account: *peso de plata antigua*); \( p_c \) denotes the shadow market price of silver in Cadiz (*peso de plata antigua*); \( p_L \) denotes the market price of silver in London (shilling), and \( x \) denotes the spot exchange rate between London and Cadiz (*pesos de plata antigua*/shilling).

The Law of One Price works due to arbitrage opportunities. If the price of silver is different in two markets, then sellers will sell in the market with the highest price and buyers will buy in the market with the lowest price. This will adjust prices and
equilibrate the Law of One Price. This mechanism of adjustment implies a model of perfect competition in which both buyers and sellers are price-takers.

What happens to the Law of One Price in a case of imperfect competition? We have demonstrated in chapters 6-8 that the structure of the silver black market in Cadiz was an oligopsony and buyers were price-makers. Oligopsonistic power enables buyers to purchase silver at a lower price than would prevail in a competitive market. In addition, the quantity purchased is lower under oligopsony than under perfect competition.

Let us draw the silver-commodity market. Suppose you are the merchant-banker who is trying to decide how much silver to purchase. You could apply the basic marginal principle – keep purchasing units of silver until the last unit purchased gives additional value, or utility, just equal to the cost of that last unit.

The individual’s demand curve measures the marginal value as a function of the quantity purchased. Therefore, the marginal value schedule is the demand curve for the silver. But the marginal cost of buying additional units of silver depends on whether you are a competitive buyer (case 1) or an oligopsonistic buyer (case 2).

CASE 1: Suppose you are a competitive buyer, i.e., a price-taker (Figure 7.1.). Then, you take the market price \( p^* \) as given. Your marginal expenditure is equal to your average expenditure, which in turn is equal to the market price of silver. The quantity purchased is found by equating price to marginal value, i.e., your demand curve.
CASE 2: Now suppose you are an oligopsonistic buyer, i.e., a price-maker (Figure 7.2.). In order to determine how much silver to buy, set the marginal value from the last unit purchased equal to the marginal expenditure on that unit. The market supply curve shows how much you must pay per unit, as a function of the total number of units you buy. The supply curve is the oligopsonistic average expenditure curve. The average expenditure curve is upward sloping, so the marginal expenditure curve must lie above it because the decision to buy an extra unit raises the price that must be paid for all units, not just the extra one\(^{174}\). The oligopsonistic quantity purchased in Cadiz \((q_{\text{oligop}})\) is localized at the intersection of the demand and the marginal expenditure curve. And the price paid by the oligopsonistic buyer \((p_{\text{oligop}})\) is localized by equating

\[ ME = \frac{\partial E}{\partial q} = p(q) + q \frac{\partial p}{\partial q} \]

\(^{174}\) Total expenditure: \(E=p(q)q\); and marginal expenditure: \(ME = \frac{\partial E}{\partial q} = p(q) + q \frac{\partial p}{\partial q} \). The supply curve is upward sloping, then \(\frac{\partial p}{\partial q} > 0\), and marginal expenditure is greater than average expenditure.
quantity \( q^{\text{oligop}} \) to the average expenditure (supply) curve. Note that the oligopsonistic price \( p^{\text{oligop}} \) is lower, and the quantity \( q^{\text{oligop}} \) is less than the price and quantity that would prevail in a competitive market \((p^* \text{ and } q^*)\)

Figure 7.2.: Commodity-silver market (oligopsonistic buyer)

Smuggling connected Cadiz to the international markets (i.e., London). The oligopsonistic price in Cadiz \((p^{\text{oligop}})\) was lower than the competitive price \((p^*)\). Smugglers in Cadiz bought \( q^{\text{oligop}} \) quantity of silver at the oligopsonistic price \((p^{\text{oligop}})\) and sold it in London at the competitive price \( p^* = p_L \cdot x \). The difference between the quantity exchanged in a competitive market \((q^*)\) and the quantity exchanged in an oligopsonistic market \((q^{\text{oligop}})\) is the hoarded quantity of silver.

\(^{175}\text{Assumes that the London market is a competitive market and its price represents the international price. British law permitted the exportation of bars and foreign coins in gold and silver since 1663 (Munro, 1992, p. 212). Our representative coin, the Old Mexican Piece of Eight, had a free quotation in the London Stock Exchange in the 18th century.}\)
The oligopsonistic power is the capability of the buyer to modify the price of the silver and pay for it less than the price that would exist in a competitive market. The larger the divergence between the competitive price and the oligopsonistic price, the higher the market power of oligopsony and the lower the quantity smuggled. The Graph 7.1. and Graph 7.2. test the oligopsonistic power measured though the mark-down over competitive prices.

**Graph 7.1.: Market price of Mexican old pieces of eight in Cadiz and London, 1729-1741 (half-monthly observations), pesos de plata antigua/Mexican old piece of eight**

(*) London price is given in units of mass (standard Troy ounce). We converted price per unit of mass to price per coin at legal weight per coin minus abrasion (see Appendix 2)

Source: see Appendix 2
Graph 7.2.: Mark-down of the silver arbitrage from Cadiz to London

Graph 7.1. shows a different behaviour of prices before and after the 1737 devaluation. Before the devaluation (1729-1737), the systematic gap between the oligopsonistic price \( p_{\text{oligop}} \) and the international price \( p^* \) measures the oligopsonistic power (the grey area in the graph shows the mark-down). Graph 7.2. shows the mark-down including cost. The larger the gap between the oligopsonistic and the international price, the higher the oligopsonistic power.

But after the devaluation (1737-1741), the systematic gap between the oligopsonistic price \( p_{\text{oligop}} \) and the international price \( p^* \) disappears because the devaluation pegs oligopsonistic and international price.
7.2. The silver-money market and the oligopsonistic silver-commodity market

In order to understand the meaning of the devaluation, we should specifically include the money market in the picture. The silver market is decomposed in the commodity-silver market and the money-silver market. The commodity-silver market has previously been explained as an oligopsony. The money market will be explained now.

The money demand is defined according to the Cambridge equation:

$$M^d = k \cdot P \cdot Y$$  \hspace{1cm} (7.2)

where $M^d$ is the nominal money demand, $k$ denotes the Cambridge coefficient, $Y$ is the real income and $P$ is the general price level.

The nominal money demand is equal to the number of coins ($q_{\text{money}}$) multiplied by the price of coins ($p$):

$$M^d = p \cdot q_{\text{money}}$$  \hspace{1cm} (7.3)

The money-silver demand is a decreasing function of the silver price (equ. 7.2. plus equ. 7.3.):

$$q^d_{\text{money}} = k \cdot \frac{P}{P^*} \cdot Y$$  \hspace{1cm} (7.4)

Figure 7.3. draws money-silver market. For the sake of simplification we will suppose that money supply is exogenous ($M^*$) and money market is in equilibrium at the official parity $\overline{P}$.
Let us join the commodity-silver market (Figure 7.2.) and the money-silver market (Figure 7.3.) to observe the effect of the official parity on the commodity-silver supply curve (Figure 7.4.)
The commodity-silver supply curve is a kinked supply curve because for any market price lower than the official parity \((\forall p \leq \bar{p})\), suppliers would use the coins in the money market at the official parity \((p = \bar{p})\) and they would not offer them in the commodity market. The official parity modifies the form of the supply curve, which becomes:

\[
S : \begin{cases} 
    p = \hat{p}(q) & \forall \hat{p} \leq \hat{p}(q) \\
    p = \bar{p} & \forall \bar{p} \geq \hat{p}(q) 
\end{cases}
\]

Then, the oligopsonistic price is enclosed between the international competitive price and the official parity. The international price is the maximum price because the oligopsonistic markdown is equal to zero at the international price. And the official parity is the minimum price (maximum markdown) because below the official parity \((\bar{p})\), sellers would use the coins as money at the official parity and would not sell them as commodity:

\[
p^* \geq p^{\text{olig}} \geq \bar{p} \tag{7.3.}
\]

The floor of the commodity-silver market price gives the government the possibility to apply an exchange rate policy oriented to the bullionist aim of avoiding silver outflows. Results will depend on the level of the Official Parity, as it will be explained in the next section.
7.3. The effect of devaluation in the silver-commodity market

How does a change in the Official Parity affect the commodity-silver market?

It depends on the level of the Official Parity (minimum oligopsonistic price). Actually, we can distinguish three cases, summarised in table 7.1:

<table>
<thead>
<tr>
<th>Official Parity value</th>
<th>Resulting equilibrium on hoarded quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First case</strong></td>
<td>Not higher than the oligopsonistic price</td>
</tr>
<tr>
<td></td>
<td>Unchanged from oligopsony</td>
</tr>
<tr>
<td><strong>Second case</strong></td>
<td>Higher than the oligopsonistic price but not higher than the price of the intersection of the curves of marginal expenditure and marginal value</td>
</tr>
<tr>
<td></td>
<td>Hoarded quantity declines</td>
</tr>
<tr>
<td><strong>Third case</strong></td>
<td>Higher than the price of the intersection of the curves of marginal expenditure and marginal value</td>
</tr>
<tr>
<td></td>
<td>Hoarded quantity increases</td>
</tr>
</tbody>
</table>

CASE 1: Figure 7.5. shows the first case, when the official parity is lower than the oligopsonistic price. We point out three points on this Figure: O, C and M. O is the utility maximizing price-quantity of silver combination for the oligopsony \((p_{\text{oligop}}, q_{\text{oligop}})\). C is the utility maximizing price-quantity of silver combination when the commodity-silver market is perfectly competitive \((p^*, q^*)\). M is the point at which marginal expenditure and marginal value intersect, which locates the quantity of silver to be purchased by the oligopsonistic. It identifies the minimum level at which the official parity can be set and still increase the hoarded quantity of silver. But in this case official parity \((\bar{p})\) is lower than the oligopsonistic price \((p_{\text{oligop}})\) and, therefore, the
minimum price (official parity) does not have any effect on the silver-commodity market.

**Figure 7.5.: CASE 1- Money-silver market and commodity-silver market when the official parity is lower than the oligopsonistic price**

CASE 2: Let us introduce a devaluation which fixes the official parity ($p_0$) at a level higher than the oligopsonistic price ($p_{olig}$) but not higher than the price at the intersection of the curves which equals marginal expenditure to marginal value (price at point M), for example at the competitive price ($p^*$) (Figure 7.6.).

How does the devaluation change the money-silver market? If the devaluation makes that the unit of account represents less quantity of silver than before, the effect is an increment of the general price level. The general price level is driven by the alteration in the relation between the unit of account and the quantity of silver. Then, the devaluation implies an increment in money demand to maintain the purchasing
capacity, i.e. the money demand curve moves to the right (to the left in our figure, as the graph is reversed). This entails that the general price level is driven by the quantity of silver (number of coins) instead of by the number of units of account: “Sums of Money contracted for under such denominations, shall be of such a value, that is, shall have in them so much Silver. For ’tis Silver and not Names that pay Debts and purchase Commodities” Locke (1691).

*Figure 7.6.: CASE 2- Money-silver market and commodity-silver market when the official parity is fixed at the competitive price*

How does the devaluation change the commodity-silver market? The portion of the supply curve lying below the official parity (dotted line) is supplanted by the official parity flat curve (solid line). That is, the new supply curve consists of the official parity solid line from $p^*$ to C, at which point $q^*$ is the quantity of silver purchased; thence it
continues at the (solid) portion of the original supply curve. As to the marginal expenditure curve, that portion of the ME curve lying between the vertical axis and C (dotted line) is supplanted by the official parity flat curve, and the remainder of the ME curve remains unchanged (grey dotted line). There is a discontinuity in the ME curve when the exchanged quantity of silver is $q^*$. The oligopsony is forced to act as the case of perfect competition. That is, the oligopsony pays $p^* = \bar{p}$ and smuggles $q^*$, exactly the same price and quantity that would occur in the case of perfect competition. If the devaluation fixes the official parity at the competitive price, the mark-down is eliminated, but then the hoarded quantity falls down to zero as the smuggled quantity is equal to the competitive quantity.

When the devaluation fixes the official parity ($\bar{p}$) at a level higher than the oligopsonistic price ($p^{\text{oligop}}$) but not higher than the price at intersection of the curves that equals marginal expenditure to marginal value (price at point M), the hoarded quantity is lower now than before the devaluation.

CASE 3: Let us introduce now a devaluation which fixes the official parity ($\bar{p}$) at a higher level than at the point of intersection of the curves that equals marginal expenditure to marginal value (price higher than the point M). In this case, the hoarded quantity increases (Figure 7.7.). It is only when the official parity is fixed at a higher level than point M that the smuggled quantity declines from $q^{\text{oligop}}$ to $q^*$ and the hoarded quantity increases $q^{\text{oligop}} - q^*$. Here is now the bullionist benefit of the devaluation.
Figure 7.7.: CASE 3- Money-silver market and commodity-silver market when the official parity is fixed at higher level than the point which equal marginal value to marginal expenditure

Summing up, when the official parity is below $p^{\text{oligop}}$ there will be no effect on the hoarded quantity (case 1); when the official parity is higher than $p^{\text{oligop}}$ but lower than the M point, the hoarded quantity will decline (case 2); and only when the official parity is higher than the M point, the hoarded quantity will increase (case 3).

What did happen in practice? At what level did the government fix the new official parity in the devaluation of 1737? Graph 7.3. shows that the government fixed official parity at the same level than international price.
The devaluation fixed the official parity to the international price (case 2). Then, the oligopsonistic power decreased because the mark-down disappeared (graph 7.2.), but the hoarded quantity should have dropped to zero, as the smuggled quantity should have increased to the competitive quantity and, therefore, the devaluation should not have achieved the bullionist goal. But in practice London price has to be adjusted by arbitrage cost (see graph 7.4.). The official parity ($p$) was higher than the competitive price including arbitrage cost ($p^* - cost$), but we do not know whether it was lower or higher than the point of intersection of the curves that equals marginal expenditure to marginal value (point M). Thus, including arbitrage cost, we are not able to determine whether we are in the case 2 (official parity lower than M point, so the hoarded quantity declines) or the case 3 (official parity higher than M point, so the hoarded quantity increases). Focusing on our source, we observe that the frequency of the silver quotations provided by correspondents decreased after the devaluation (graph 7.2.)
shows the number of blanks). Although there was frequent correspondence, there were not quotations; and we consider this evidence as an indication of no arbitrage. This means that the devaluation fixed the official parity ($\bar{p}$) at a higher level than M point (case 3) and, therefore, the devaluation was effective to achieve the bullionist goal of increasing the hoarded quantity. The long-run effectiveness would depend on the evolution of international price levels. The problem of the exchange rate policy is that the international price is not a parameter but 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.

Graph 7.4.: Linear trend of market price adjusted by arbitrage cost of Mexican old pieces of eight in London, 1729-1741 (half-monthly observations), pesos de plata antigua/Mex old piece of eight

Source: see Appendix 2
The most important implication of the model 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.
CONCLUSIONS

This dissertation has attempted to answer the following question: how did the specie-point mechanism work in the Early Modern Period? The specie-point mechanism had been previously analysed for a later period, the end of the 19th century, i.e., the Gold Standard period. The efficiency of the Classical Gold Standard has long been part of the conventional wisdom of economic historians. Efficiency was defined by the scarce and non persistent “violations of gold points, that is, observations of the exchange rate outside the gold point spread and hence profitable opportunities for gold arbitrageurs” (Officer, 1986, p.1039).

The old textbook wisdom maintained that bimetallism was a knife-edge, i.e., a system that tended to end up as the facto gold or silver monometallism. But Flandreau (1996, 2004) demonstrated that gold arbitrage, silver arbitrage and bimetallic arbitrage was efficient in France during the period immediately before the classical gold standard. In order to understand bimetallism, it was necessary to analyse the topic according the target zones framework, i.e, to understand bimetallism as a band whose boundaries are represented by arbitrage costs (Flandreau, 2002). Efficiency was not caused by the gold standard, but by financial integration and exchange rate stability. But, what do we know about bullion market efficiency before the 19th century? The dissertation deals with this question.

Moving back to the Early Modern period, the Castilian case is paradigmatic. Being the bullion mining producer of the 86% of total world silver and 48% of total world gold during the Early Modern period (1493-1820)\textsuperscript{176}, what did we know about

\textsuperscript{176} Merril, C.W. (1930) and Ridway, R.H. (1929).
the logic of the bullion flows? More or less nothing. While the historiography has estimated the quantities of gold and silver that were transferred from the New World to Asia through Europe, we lacked an explanation of the logic of these flows.

The dissertation aimed at reconstructing the specie-point mechanism for Castile, in order to understand the logic of bullion flows. However, when studying arbitrage in Castile a basic problem arises: being the main origin of precious metals, Castile was dominated by the strategy of controlling gold and silver flows from the American colonies. Bullion was identified with wealth, and bullionist laws were present in Castile from the late middle Ages until the beginning of the 19\textsuperscript{th} century. It was a realm subjected to the stagnant legislation and the immobile institutions which preserved bullionism. Indeed, the conceptual doctrine of bullion as wealth was just the excuse to justify the bullionist rules of the law because, in fact, the Castilian Treasure acted as a rent-seeking agent during nearly three centuries. The government was not only satisfied with the direct remittances of bullion from the American mines, but it also wanted to get profits from the bullion that was sent from the colonies by private agents. Being the bullion imports charged with a very high tax, the bullionist laws attempted to prevent the entrance of bullion without registration and, therefore, without paying the duties. The control on precious metals consisted of two main measures: fixed prices and bans on exports.

Those measures prevented the creation of a bullion market, but a black bullion market was developed. One of the main goals of this dissertation has been to provide black market prices for silver in Cadiz. Dealing with black markets is always tough, because, due to their informal condition, getting systematic quantitative evidence is really difficult, and many times, impossible. But, fortunately, the international character
of the arbitrage business forced agents to permanently exchange information. Because the different agents were geographically separated, the way to transmit information in the 18th century was through correspondence. Letters between correspondents have been, therefore, an excellent source, full of data and qualitative details about arbitrage. In this regard, the archive of the merchant house Roux (Marseille), probably the best preserved 18th-century private banker’s archive in Europe, has allowed the reconstruction of the specie-point mechanism for silver – for the Old Mexican piece of eight- between Cadiz and London for the period 1729-1741. This is the first research which tests empirically the incidence of bullionist regulations on the specie-point mechanism.

Through the study of the way in which contemporaries practiced arbitrage, we have obtained some important conclusions. First, bullion flows responded to arbitrage opportunities, and not to the payment of commodities. The traditional historiography has inferred that Spanish suffered a very long-run commercial deficit with Europe by using as evidence the bullion outflows. However, bullion was not sent from Castile to Europe as a direct payment for commodities, because European trade was based upon multilateral bill of exchange payments. Therefore, commodities were paid with bills, not with specie, and specie was traded in Europe as any other commodity. On the basis of bullion flows it is not possible to infer bilateral commercial deficits.

Second, the fact that specie was traded as a commodity means that the payment for specie was done with bills of exchange. Therefore, arbitrage should be understood as arbitrage between specie and bills, and not according to the traditional knife-edge view of arbitrage of silver in exchange of gold and vice versa. Concretely, arbitrage was
practiced as follows: three partners had a joint-arbitrage-account in a main center, for example, Amsterdam. In the first step, the correspondent bought the silver in Cadiz in exchange for a bill in Cadiz on Amsterdam. The seller of the silver in Cadiz cashed the bill to have a credit balance in Amsterdam, while our arbitrageurs had one entry on the debit side of the joint-account ledger. In the second step, the correspondent in Cadiz sent the silver from Cadiz to some European bullion market, for example, London. The correspondent in London sold the silver in exchange for a bill in London on Amsterdam. The buyer of silver reduced his credit balance in Amsterdam, while our 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. Net profit was shared among the partners. Then, arbitrage was arbitrage between bullion and bills.

Finally, arbitrage was practiced in a multilateral way, as we have just described. Cadiz was the main world destination of the American silver, but a secondary bill of exchange centre. Therefore, agents who dealt with silver preferred to have credit balances in the main centres, rather than in Cadiz. But multilateralism did not create profitability, because the market of bills of exchange was integrated. This is a marginal but interesting result of the dissertation. Neal (1990) has demonstrated that the London-Amsterdam financial market (stock market) was integrated in the 18th century. With free movements of bills of exchange, we demonstrate here that the financial market (bill market) was also integrated in 18th century Europe, not only among the main centres (London-Amsterdam), but also including secondary and more distant markets, i.e. Cadiz. Therefore, as the bill market was integrated, the profitability of the bilateral and the multilateral arbitrage did not differ, because sending a bill from London to Cadiz
was equivalent to sending a bill from Cadiz to Amsterdam plus a bill from London to Amsterdam.

On the other hand, the results of my research have raised a puzzle regarding our understanding of arbitrage: from 1729 to 1737 there was a systematic bias between the implicit spot exchange rate and the arbitrated parity, which made arbitrage systematically profitable. But from 1737 to 1741 the bias was corrected because the Spanish government reacted to illegal bullion outflows with a devaluation. Why was it possible to maintain a long-run profitability during nine years without price adjustments? Could we assume that there were some unexploited opportunities for arbitrage, despite we know that smuggling connected markets? And what was the role of devaluation in the specie-point mechanism?

The common understanding of the operation of the specie-point mechanism refers to an institutional setting such as that of the late 19th century of free bullion movements. But, what was the effect of bullionist restrictions on the performance of silver points? In order to answer this question, we have first analyzed the specie-point mechanism in a case with free bullion movements: Amsterdam and London (1734-1758). We have seen that in the case of free bullion movement, gold arbitrage, silver arbitrage and bimetallic arbitrage worked as expected, and only occasionally specie-point violations occurred. This is a very illustrative result that helps to eradicate the traditional knife-edge logic of arbitrage based on the export of one metal (gold or silver) and the import of the other (silver or gold), responding to the diverging legal bimetallic ratio (Redish, 1990, 2000). The limitation of this approach lies in the consideration of the legal bimetallic ratio as a determinant factor for arbitrage, i.e., in the assumption that
the legal bimetallic ratio was equal to the market bimetallic ratio, which implicitly means that legal prices for bullion -named mint prices by the literature- are assumed to have been equal to market prices. In the case of London-Amsterdam, while the legal bimetallic ratios were different in each centre, the market bimetallic ratios were similar because free bullion movements made market prices equal in both centres. Market prices are different from mint prices and, for this reason, it is so important to work with market prices, because the mint price is a wrong proxy for the market price. With free bullion movements, the money market (bullion market) was integrated between London and Amsterdam because free bullion trade made bullion market prices equal in both centres.

Therefore, we have seen that, in the case of free bullion movements, the specie-point mechanism was efficient and only few and non persistent violations of the specie-point occurred. But, by contrast, in the case of bullionist restrictions, we have observed an apparent silver “mispricing”, because there was a systematic bias between the exchange rate and the arbitraded parity. Despite smuggling, we do not observe adjustment. The explanation is that the law of one price only holds if markets are competitive. The apparent “mispricing” of silver means that markets were not competitive.

The literature has sometimes used mint prices instead of market prices: Officer (1986); Canjels, Prakash-Canjels and Taylor (2004) and Esteves, Reis and Ferramosca (2007). We have showed that the mint price is a wrong proxy for the market price for all cities and periods considered in this study. See Appendices 2 and 5: London silver prices, 1729-1741 (see Graph A2.1.), Cadiz silver prices, 1729-1741 (see Graph A2.2.), London gold prices, 1734-1758 (see Graph A5.1.), London silver prices, 1734-1758 (see Graph A5.2.), Amsterdam gold prices, 1734-1758 (see Graph A5.3.) and Amsterdam silver prices, 1734-1758 (see Graph A5.4.) We have used market prices as contemporaries used them. Only Flandreau (1996, 2004) considered market prices according to evidence obtained from contemporary arbitrageurs. Therefore, we have followed the arbitrage equation as defined by Flandreau (1996, 2004).
The study of the structure of the silver market in Cadiz has shown that it was an oligopsony, which explains that prices in Cadiz were lower than the international price. The silver market separated agents by nationality: Spanish merchants introduced the bullion in Cadiz while foreign merchants sent it to other centres. Trade with America was legally restricted to Spanish nationals, but foreign merchants in Cadiz were powerful enough as to assume the extraction of the bullion abroad. On the basis of the study of fiscal sources we have discovered the dominant position of French merchants in Cadiz. They represented one quarter of all merchants and obtained 50% of the total annual net income per wholesale trade in the mid 18th century. And our smugglers were the most important French merchants in Cadiz. Comparing the names of the smugglers that appear in our source (Marseille Roux banker) with a contemporary French report which ranked French merchant houses in Cadiz, we conclude that the smugglers who led the business of silver extraction were a first class group of French merchants settled in Cadiz. Coming back again to the Spanish fiscal information, we have analyzed the distribution of income among Cadiz merchants. The top 1% of all merchants earned nearly 15% of the total net income, i.e., each one of the top merchants had a net income more than 10 times higher than the average income of all Cadiz merchants.

Only the most powerful merchants could smuggle because smuggling needed an international network to extract and distribute the bullion outside Cadiz. The most important merchants in Cadiz were members of international societies with partnership companies abroad. They constituted an oligopsony in Cadiz: organized in long-run family and partnership networks, they had enough market power as to drive down the
silver prices. As the contemporary reports recognized, silver smugglers were the price-markers.

Secrecy was preserved because both sides of the bullion market cheated on the Spanish government: importers saved the import tax and exporters ignored bans on exports. The introduction of the bullion from Spanish America into Cadiz was charged with a very high tax, more than 7% for gold and more than 10% for silver, and bullion importers had incentives to introduce the bullion without registration. The control of the Cadiz coast was too expensive for the government, and merchants illegally introduced bullion without difficulty, except for the periods of “excess of contraband” when the government decided to tighten its control.

The control increased when fiscal receipts decreased. But even in those cases, the leaders of smuggling were not condemned. As very important foreign merchants, they were granted diplomatic immunity and they could not be judged by a Castilian judge. The existence of special judges for foreign merchants was a safeguard for smuggling bullion. The privileged treatises had weakened the Spanish control over foreign residents and had opened the way to systematic fraud. Bullionist bans on exports, networks and privileged treatises for foreign merchants had configured the oligopsonistic silver market structure in Cadiz.

Nevertheless, oligopsonistic power had a lower bound, which was the official parity, i.e., the number of units of account per coin. Below the official parity, the pieces of eight were used as money and went out of the commodity market. Therefore, the
devaluation of 1737 should be understood as an increase in the official parity addressed at eliminating the oligopsony power.

The dissertation concludes with a static model of partial equilibrium for the market of commodity-money, which is aimed at clarifying some concepts. The model explains the operation of the oligopsonistic silver-commodity market and the effect of devaluation. The main intuition behind the model is that 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 was zero at the international competitive price. 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 a commodity. The lower limit of the commodity-silver market price gave the government the possibility to apply an exchange rate policy oriented to the bullionist aim of avoiding silver flows. When the government increased the official parity at a higher level that the point of intersection of the curves that equalled marginal expenditure and marginal value, the smuggled quantity decreased and the treasured quantity increased. The devaluation was effective to achieve the bullionist goal of increasing the treasured quantity, but its long-run effectiveness would depend on the evolution of the international price levels. The problem of this kind of exchange rate policy was that the government had to change the official parity according to the fluctuations of the international price. Therefore, exchange rate policy was not independent, but it was subject to international prices in order to maintain the political bullionist goal.
The most important implication of the model 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 higher. 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. The lesson emerged from this dissertation is that understanding the specie-flow mechanism in the Early Modern period demands the comprehension of the bullion market structure for the place and time examined.
ARCHIVES

* Archives Départementales de la Gironde (Bordeaux):

- Répertoire Numérique du Fonds des Négociants, 7 B, liasses 1304, 1322, 1597, 1774, 2061 and 2162

* Archivo General de Indias (Sevilla):

- Compradores de oro y plata. Contratación S.32. 4951a-4959; Contratación S.32, SS.1-SS.2; Consulados, 1606ª, 1606B, 1607, L.887.

- Expediente sobre la comisión de don Tomás Pinto Miguel para averiguación y castigo de los excesos de contrabando cometido por varios sujetos de Cádiz, 1738-1744, sección 5ª, Gobierno, Legajo Indiferente General 2479 (microfilms C-1557 and C-1558)

* Archivo Histórico del Banco de España (Madrid):

- Banco de San Carlos (AAJG. L186).

* Arxiu Municipal de Barcelona (Barcelona):

- Diario de Barcelona (1792-1799): microfilms DB 292-H to DB 299-H

* Biblioteca de Catalunya (Barcelona), Castilian legislation:

- Recopilación de la Leyes destos Reynos (1640), Catalina de Barrio y Angulo and Diego Diaz de la Carrera Printers, Madrid

- Recopilación de Leyes de los Reynos de las Indias (1681), Ivlian de Paredes Printer, Madrid

- Autos Acordados (1772), Joachin Ibarra Printer, Madrid.

- Leyes de la Nueva Recopilación (1777), Pedro Marin Printer, Madrid.

- Novísima Recopilación de las Leyes de España (1805), Imprenta de Sancha, Madrid
- Ordenanzas de Bilbao (1737), in Códigos Españoles Concordados y Anotados (1851), vol. 12, Imprenta de la Publicidad, Madrid.

* Biblioteca Nacional de España (Madrid):

- Correo mercantil de España y de sus Indias (1792-1808), Microfilm HN/2739
- Almanaque mercantil o Guía de Comerciantes (1795), Viuda de D. Joaquín Ibarra, Madrid.

* Bibliothèque nationale de France (Paris):

- Almanach Général des Marchands, négociant & commerçants de la France et de l’Europe (1772), Chez Valade, Paris, Tolbiac V- 25865

* British Library (London):

- The Course of the Exchange, 1720-1730 (MIC.A.787), 1731-1741 (MIC.A.788), and 1742-1759 (MIC.A.789).

* Chambre de Commerce et d’Industrie (Marseille):

- Fond Roux (L.IX): Section II- comptabilité, comptes courants d’arbitrage, à demi ou à tiers, liasse 53. Section IV- correspondance passive Cadix, liasses 810-856. Section VI- monnaies d’or et d’argent: factures, liasses 1261-1264.


* Hemeroteca municipal (Madrid)

- Diario Mercantil de Cádiz (1800-1840), F. 13 9 (100), incomplete collection.
* Koninklijke Bibliotheek (The Hague):
  - Oprechte Haarlemsche Courant, 1737-1741, microfilm C.37

* Nederlandsch Economisch-Historisch Archief (Amsterdam):
  - Kours van Koopmanschappen tot Amsterdam, 1734-1758, Bijzondere Collecties 674 (6.1-6.5)

* The Making of the Modern Economy (MOME), Goldsmiths’ Kress Library:
  - Newton, I. (1717) [1731]: Table of the Assays, Weights and Values, of most Foreign Silver, and Gold coins, actually made at the MINT by Order of the Privy Council, (updated table 28 March 1729)
BIBLIOGRAPHY


- Bustos Rodríguez, Manuel (2005): *Cádiz en el Sistema Atlántico. La ciudad, sus comerciantes y la actividad mercantil (1650-1830)*, UCA-Sílex ediciones, Cádiz.


- Cantillo, A. (1843): *Tratados, convenios y declaraciones de paz y de comercio que han hecho con las potencias extranjeras los monarcas españoles de la Casa de Borbón: desde el año de 1700 hasta el día: puestos en orden é ilustrados muchos de ellos con la historia de sus respectivas negociaciones*, Imprenta de Alegría y Charlain, Madrid.

- Cantos Benítez, P. (1763): *Escrutinio de maravedises, y monedas de oro antiguas, su valor, reducción y cambio a las monedas corrientes, deducido de escrituras, leyes y pragmáticas antiguas, y modernas de España*, Antonio Marín, Madrid.


- Carranza, A. (1629): *El ajustamiento i proporcion de las monedas de oro, plata y cobre y la reduccion destos metales a su debida estimacion*, Francisco Martínez, Madrid.


- García Cavallero, J. (1731): *Breve Cotejo y Valance de las Pesas y Medidas de varias Naciones, Reynos, y Provincias, comparadas, y reducidas á las que corren en estos Reynos de Castilla*, Imprenta de la Viuda de Francisco del Hierro, Madrid.


- Innocencio Aparici, J. (1741): Norte Fixo y Promptuario Seguro, para la mas clara y breve inteligencia del valor de todas las monedas usuales, y corrientes del Continente de España, assi en sus propios Reynos, como en los demás de ella, arreglado á la ultima Real Pragmatica expedida en 16 de Mayo de 1737, Imprenta de la Gaceta, Madrid.


- Larruga, E. (1787-1800): Memorias políticas y económicas sobre los frutos, comercio, fábricas y minas, con inclusión de los reales decretos, órdenes, aranceles y cédulas expedidas para su gobierno y fomento, Imprenta de B. Cano, Madrid, 45 volúmenes.


- Locke, J. (1691): Some Considerations of the Consequences of the Lowering of Interest and the Raising the Value of Money. In a letter sent to a Member of Parliament,
- Locke, J. (2004) [1696]: Further Considerations Concerning Raising the Value of Money Wherein Mr. Lowndes’s Arguments for it in his late Report concerning An Essay for the Amendment of Silver Coins, are particularly Examined, Kessinger Publishing, LLC.


- Mateu y Llopis, F. (1958): Bibliografía de la historia monetaria de España: con suplementos referentes a los países con ella más relacionados, Fábrica Nacional de Moneda y Timbre, Madrid.


- Pérez, A. (1803): Tablas aritméticas del valor de las monedas de oro y plata: y reducción de pesos y medidas, Joseph Esteban Imp., Valencia.


- Pradeau, A. (1938) [2001]: Numismatic history of Mexico, Snaford J. Durst, New York.


- Sáez, L. (1796): Demostración histórica del verdadero valor de todas las monedas que corrian en Castilla durante el Reynado del Señor Don Enrique III y de su correspondencia con las del señor Don Carlos IV, Imprenta de Don Benito Cano, Madrid.


- Serrano Mangas, F. (1989): Armadas y flotas de la plata (1620-1648), Banco de España, Madrid


- Surrá-Rull, J. (1869): Breve reseña histórica de la organización y régimen de las Casas de Moneda en España, Establecimiento Tipográfico de T. Fortanet, Madrid


- Villabertran, G. (1826): *Reducción recíproca de reales vellón nominales, efectivos, catalanes; libras, sueldos y dineros valencianos aragoneses y mallorquines entre sí; Reducción de pesos fuertes a vellón nominal y efectivo, libras, sueldos y dineros catalanes, de los pesos y medidas de Cataluña, a los de Castilla, Valencia y Aragón*, Imprenta de Manuel Saurí y Compañía, Barcelona, 3 ed.


APPENDIX 1: THE CONSTRUCTION OF THE SPOT EXCHANGE RATES, 1729-1741 (LONDON-AMSTERDAM, LONDON-CADIZ AND CADIZ-AMSTERDAM)

The BILATERAL arbitrage equation of silver between London and Cadiz has been explained in Chapter 2 (equation 2.1.):

\[
(1 - c_{CL}) \frac{p_L}{p_C} \leq x \leq (1 + c_{LC}) \frac{p_L}{p_C}
\]  

(A1.1.)

where \( p_L \) denotes the market price of silver in London; \( p_C \) denotes the shadow price of silver in Cadiz; \( x \) denotes the spot exchange rate between London and Cadiz; \( c_{CL} \) 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 MULTILATERAL arbitrage equation of silver traded between Cadiz and London and settled through Amsterdam has also been explained in Chapter 2 (equation 2.2.):

\[
(1 - c_{CL}) \frac{p_L}{p_C} \leq x_{CA} \cdot x_{LA} \leq (1 + c_{LC}) \frac{p_L}{p_C}
\]

(A1.2.)

where \( p_L \) denotes the market price of silver in London; \( p_C \) denotes the shadow price of silver in Cadiz; \( x_{CA} \) is the spot exchange rate between Cadiz and Amsterdam; \( x_{LA} \) is the spot exchange rate between London and Amsterdam; \( c_{CL} \) 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 multilateral arbitrage equation (equation A1.2.) equals the bilateral arbitrage equation (equation A1.1.) when the bill-of-exchange market is arbitrated:

\[ x_{CA} \cdot x_{LA} = x_{LC} \]  

(A1.3.)

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.

The exchange rate defined in the arbitrage equation is the implicit spot exchange rate derived from the exchange rates at maturity of bills of exchange compiled in the financial and commercial bulletins and/or merchants’ correspondence. How do we derive the implicit spot exchange rate from the exchange rate at maturity?

Suppose that we know the price for a foreign bill bought in a given market \( A \) and drawn on another market \( B \) where it matures at a certain future date \( (a_{AB}) \). Suppose next that we also know the price for a “similar” bill, bought in market \( A \) and payable in market \( B \) and involving the same risks and returns, but maturing today –spot bill \( (x_{AB}) \). It is obvious that there is a relation between the price of the first and the second bill that involves the interest rate for the maturity period for a commercial loan in center \( B \) from center \( A \) between today and the maturity period \( (r_B^t) \):

\[ x_{AB} = a_{AB} (1 + r_B^t) \]  

(units of \( A \)/unit \( B \))  

(A1.4.)

We use this simple formula to calculate the implicit spot exchange rates provided we have the exchange rate at maturity and the interest rate. Since bankers
needed to keep their correspondents and partners informed of the latest moves in local markets, their correspondence and bulletins are full of indications on the price of foreign bills in a given market. According to foreign bill quotation, Amsterdam-London quoted at two maturities: sight and two usances (1 month/usance), while Cadiz-Amsterdam and Cadiz-London quoted only at one maturity: one usance (2 months). Having different kind of data, we will use a different methodology to calculate the spot exchange rate London-Amsterdam than Cadiz-Amsterdam and London-Cadiz.

**Implicit spot exchange rate in London on Amsterdam** ($x_{LA}$)

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.*, 2009) we took advantage of the two maturity quotations to produce series of commercial interest rates for Amsterdam, London and Paris in the 18th century. We reproduce here the same methodology to calculate the spot exchange rate between London and Amsterdam (concretely, the spot exchange rate in London on Amsterdam).

The long maturity exchange rate ($a_{LA}[n, days]$) and the short maturity exchange rate ($a_{LA}[n, days]$) can be rewritten in terms of the implicit spot exchange rate $x_{LA}$ according to equation A1.4. as:

\[
a_{LA}[n_i] = x_{LA} / (1 + r_a^L \cdot n_i / 365)
\]

(sterling pound/schelling bank) \hspace{1cm} (A1.5.)

\[
a_{LA}[n_s] = x_{LA} / (1 + r_a^L \cdot n_s / 365)
\]

(sterling pound/schelling bank) \hspace{1cm} (A1.6.)
Thus, substituting for $x_{LA}$ in the equations A1.5. and A1.6., we derive the implicit commercial interest rate ($r^L_A$) (equation A1.7.); and substituting $r^L_A$ on equation A1.5., we obtain the implicit spot exchange rate ($x_{LA}$).

\[
r^L_A = \frac{(a_{LA}[n_i] - a_{LA}[n_j]) \cdot 365}{(a_{LA}[n_i] \cdot n_i - a_{LA}[n_j] \cdot n_j)}
\] (A1.7.)

The exchange rate in London on Amsterdam was expressed in *schelling* and *groot* bank per sterling pound\(^\text{178}\) at 2 usances (occasionally 2 and half usances) and sight\(^\text{179}\). England used the Julian calendar but, since Amsterdam used the Gregorian calendar, we converted the dates of the Julian calendar (Old Style) into the Gregorian calendar (New Style) in order to maintain homogeneity of data. We have collected half-monthly data –the precise date corresponds to the same date as the Cadiz quotations. When quotations are in a range, we convert such ranges to the midpoint.

**Implicit spot exchange rate in London on Cadiz ($x_{LC}$)**

This method assumes that market participants had got an idea of the interest rate that was used in correspondent markets, and derives an implicit spot exchange rate. The intuition is the following: suppose that the interest rate in a given market (i.e., London) is known. Then it is possible to derive an implicit spot exchange rate in Cadiz on London, provided that Cadiz quotes London for some maturity.

\(^\text{178}\) Hayes (1739), p. 278

\(^\text{179}\) 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
Cadiz exchange rate bulletins for the 18th century have not been preserved, except for a few copies\textsuperscript{180}, and the Spanish newspapers did not report the exchange rates until the end of the 18th century\textsuperscript{181}. But Roux’s correspondents in Cadiz systematically reported the Cadiz exchange rates in the commercial correspondence (Illustration A1.1.). The exchange rate in Cadiz on London quoted at 2 months maturity in pence sterling/\textit{peso de plata antigua}\textsuperscript{182}. We have collected half-monthly data. When quotations are in a range, we convert such ranges to the midpoint.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{cadiz_exchange_rates.png}
\caption{Exchange rate quotations in Cadiz correspondents’ letters}
\end{figure}

Source: Fond Roux, L. IX liasse 811 : letter Cayla, Cabanes, Solier et Cie, 10 March 1736

\textsuperscript{180} Nederlandsch Economisch-Historisch Archief, Chambre de Commerce et l’Industrie de Marseille and Archives Départementales de la Gironde, Bordeaux.

\textsuperscript{181} Correo Mercantil de España y de sus Indias (1792) (Biblioteca Nacional de España), Diario de Barcelona (1792) (Arxiu Municipal de Barcelona), Diario Mercantil de Cádiz (1800) (Hemeroteca Municipal de Madrid).

\textsuperscript{182} Giraudeau, p. 239 and 536
We have calculated the implicit spot exchange rate between Cadiz and London according to the equation A1.4 (Flandreau and Nogués-Marco, 2008):

\[ x_{CL} = a_{CL} \left(1 + \frac{n}{365} r_L\right) \quad \text{(pesos de plata antigua/ pence sterling)} \quad \text{(A1.8.)} \]

where \( x_{CL}\) denotes the implicit spot exchange rate in Cadiz on London, \( a_{CL}\) is the exchange rate in Cadiz on London at 60 days, and \( r_L\) is the commercial interest rate in London \(^{183}\).

What commercial interest rate in London do we consider? We have two options: first, we can consider the commercial interest rate applied by the Bank of England to discount foreign bills\(^{184}\); and, second, we can also consider the London market interest rate. The London market interest rate from Amsterdam is calculated according to the equation A1.7 described in the previous sub-section:

\[ r_L^A = \frac{(a_{AL} [n] - a_{AL} [n]) \cdot 365}{(a_{AL} [n] \cdot n - a_{AL} [n] \cdot n)} \quad \text{(A1.9.)} \]

The exchange rate in Amsterdam on London was expressed in *schelling* and *groot* bank per sterling pound\(^{185}\) at 2 usances and sight\(^{186}\). Data are taken from the commercial and financial newspaper *Oprechte Haarlemsche Courant*. This newspaper started to collect the Amsterdam exchange rates in July 1737. Although the period does not comprise our whole sample 1729-1741 -but only partially, 1737-1741-, the advantage of this publication is that exchange rate quoted systematically from 1737 and,

---

\(^{183}\) Long maturity for bills in Cadiz on London is 2 months (1 Usances; 1 Usance = 2 months), plus 3 days of grace at payment in London (Tate, 1819b, p. 3; Hewitt, 1740, p. 25).

\(^{184}\) The London interest rate is the discount rate of the Bank of England for foreign bills: 4% from 23 Aug 1722 to 12 Dec 1745 (Clapham 1994, vol. 1, p. 299)

\(^{185}\) Hayes (1739), p. 278

\(^{186}\) Two months maturity, plus 3 days of grace (one usance in Amsterdam on London is 1 month). Sight is 3 days. Flandreau *et. al* (2009b), p. 186
therefore, it is possible to get the quotation for exactly the same date corresponding to the Cadiz quotations. We have collected half-monthly data—the precise date corresponds to the same date as the Cadiz quotations. When quotations are in a range, we convert such ranges to the midpoint. Actually, we are calculating the market interest rate in London from Amsterdam, and we consider it as a proxy of the interest rate in London from Cadiz. Graph A1.1. compares market and bank interest rate in London.

**Graph A1.1.: market and BoE interest rate in London**

![Graph A1.1.: market and BoE interest rate in London](image)

Source: see text

Do the results differ considering market or bank interest rates? Let us see Graph A1.2. which shows the scatter diagram for the spot exchange rate in Cadiz on London (derived from BoE interest rate) and the spot exchange rate in Cadiz on London (derived from the London market interest rate).

The spot exchange rate in Cadiz on London derived from the BoE interest rate and the spot exchange rate in Cadiz on London derived from the London market interest rate...
rate are largely correlated (Pearson correlation coefficient is 0.9992). Therefore, it is not very important to consider the London market interest rate or the BoE interest rate. We take the spot exchange rate in Cadiz on London derived from the BoE interest rate for the whole period\textsuperscript{187}.

\textit{Graph A1.2: Scatter diagram spot exchange rate in Cadiz on London (derived from BoE interest rate) – spot exchange rate in Cadiz on London (derived from the London market interest rate), (half-monthly observations) 1737-1741 (pence sterling/pesos de plata antigua)}

\textsuperscript{187} We thank Stephen Quinn and Albrecht Ritschl who suggested us to compare the results of the implicit spot exchange rate in Cadiz on London (derived from the London market interest rate) and the implicit spot exchange rate in Cadiz on London (derived form the BoE interest rate) during the First Euro-clio Conference, Paris, 2008.
The silver point mechanism defined in the equation A1.1. assumes that the spot exchange rate in London on Cadiz is the same as the spot exchange rate in Cadiz on London \((x_{LC} = x_{CL})\), and we have denoted the spot exchange rate just as \(x\). Otherwise, we should consider \(x_{LC}\) in the case of transferring silver from Cadiz to London and vice versa.

We have derived here the implicit spot exchange rate in London on Cadiz \((x_{LC})\) according to equation A1.8., but what we really need is the implicit spot exchange rate in Cadiz on London \((x_{CL})\) in order to calculate the silver flow from Cadiz to London. Then, we assume that the implicit spot exchange rate in Cadiz on London \((x_{CL})\) is, by arbitrage, essentially identical to the spot exchange rate in London on Cadiz \((x_{LC})\). It is a simple arbitrage condition. But in practice, since there are delays in information delivery and transaction costs, “cross” spot exchange rates, when they exist, are not necessarily the same and assuming that the implicit exchange rates are identical is not innocent. A priori, we may surmise that the validity of this assumption is influenced by the degree of development of money markets, the efficiency of arbitrage and information technology, and the quality of expectations of what is happening in other markets.

We are not able to test the assumption of equality of “cross” exchange rates for London-Cadiz because of the lack of interest rate data in Cadiz. In the context of mid-19th century, Flandreau (1996) proved that the sight exchange-rate London-Paris and Paris-London can be used indifferently. In the context of mid-18th century, although

---

188 Flandreau (1996), p. 421, footnote 11
we are not able to test the identity of cross spot exchange rates for London-Cadiz, we can do it for the case Amsterdam-London, 1734-1758 (see Graph A1.3.).

*Graph A1.3.: Scatter diagram spot exchange rate in Amsterdam on London – spot exchange rate in London on Amsterdam, (monthly observations) 1734-1758 (schelling banco/ pound sterling)*

The spot exchange rate in London on Amsterdam and the spot exchange rate in Amsterdam on London are large correlated (Pearson correlation coefficient is 0.99), so we accept the equality of “cross” exchange rates.
We have tested the validity of the equality of “cross” exchange rate for the case of London-Amsterdam in a similar period. Then, we accept the supposition that the spot exchange rate in Cadiz on London is equal to the spot exchange rate in London on Cadiz.

**Implicit spot exchange rate in Cadiz on Amsterdam (x\_ca)**

We have calculated the implicit spot exchange rate in Cadiz on Amsterdam using the same methodology as for the implicit spot exchange rate in Cadiz on London, because the exchange rate between Cadiz-Amsterdam quoted only at one maturity, as Cadiz-London: 1 usance, i.e., 2 months (see Illustration A1.1.). The exchange rate in Cadiz on Amsterdam quoted at 2 months maturity in groot/ducat of exchange\(^{189}\). We have collected half-monthly data from Cadiz correspondence in Roux archive. When quotations are in a range, we convert such ranges to the midpoint.

The implicit spot exchange rate between Cadiz and Amsterdam has been calculated according to the equation A1.4 (Flandreau and Nogués-Marco, 2008):

\[ x_{ca} = a_{ca} \left(1 + \frac{n}{365} r_a\right) \quad \text{ (ducat of exchange/ groot)} \quad \text{(A1.10.)} \]

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\(^{190}\).

---

\(^{189}\) Giraudeau, p. 239. One ducat of exchange is equal to 375 maravedis and one peso de plata antigua is equal to 272 maravedis.

\(^{190}\) 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 derived from equation A1.7. Actually, it is the interest rate in Amsterdam from London, and we take this interest rate in Amsterdam from London as a proxy of the interest rate in Amsterdam from Cadiz.
The silver point mechanism is defined by the equation:

\[(1 - c_{CL}) \frac{p_L}{p_c} \leq x \leq (1 + c_{LC}) \frac{p_L}{p_c} \]  
(A2.1.)

where \( p_L \) denotes the market price of silver in London; \( p_c \) denotes the shadow price of silver in Cadiz; \( \frac{p_L}{p_c} \) is denominated arbitrated par of exchange; \( x \) denotes the spot exchange rate between London and Cadiz; \( c_{CL} \) 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.

In this appendix we explain the variables used to construct the lower silver point. These variables are the silver market prices in London (\( p_L \)), the silver market prices in Cadiz (\( p_c \)), the arbitrated par of exchange (\( \frac{p_L}{p_c} \)), the spot exchange rate between London and Cadiz (\( x_{LC} \)) 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 publishing in the 1690s (McCusker and Gravestijn, 1991). The silver price was measured in shillings (s) and pence (d) units of account per Standard Troy ounce\(^{191}\). The Course of the Exchange collected data on silver bars and foreign exchanges.

---

\(^{191}\) Equivalent units of account are as follow: 1 pound sterling (€-librae)=20 shilling, 1 shilling (s-solidi)=12 pennies (d-denarii). The fineness is the Sterling Standard (Old Standard), which had 92.5% fineness. Fallon (1988, p. 9). Newton (1731): “The silver Coin contains 11 Oz 2 Pennywt. Fine Silver, and 18 Pennywt. Of Alloy in the Pound”. The equivalences among the units of mass are also shown by
silver coins, specifically Pieces of Eight (Pillar and Mexican from 1721 onwards; and also Small Pillar and Small Mexican 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).

We have collected half-monthly prices of Mexican Pieces of Eight at the beginning and the middle of every month - the precise date corresponds to the same date as the Cadiz quotations (Graph A2.1.). When quotations are in a range, we convert ranges to the midpoint. England used the Julian calendar but, since Cadiz used the Gregorian calendar, we converted the dates of the Julian calendar (Old Style) into the Gregorian calendar (New Style) in order to maintain homogeneity of the data.

Graph A2.1.: 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 Mint Prices.

Newton: “That the English Pound Troy contains 12 Ounces; 1 Ounce, 20 Pennyweights; 1 Pennywt, 24 Grains; and 1 Grain, 20 Mites” (Newton, 1731). One standard Troy ounce is equivalent to 31.103496 grams in the International System of Units. Lemale (1875, p. 189)
Silver shadow market prices in Cadiz ($p_C$)

Data are taken from the correspondent’s letters kept in Merchant House *Roux*. Cadiz correspondents reported the shadow 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 at the end of the letter, together with the exchange rates and the price of cochineal, or inside the text (Illustration A2.1. shows an example of Pieces of Eight quotations inside the text of the letter).

*Illustration A2.1.: Pieces of eight quotation in Cadiz correspondents’ letters*

![Quotation in a letter](image)

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

The shadow prices of the pieces of eight were reported in letters from 1729 to 1741, usually by partner-correspondents in Cadiz. But the silver quotations stopped being reported in correspondence after 1741. The preservation of invoices and ledgers in *Roux* and *Compagnie Royale d'Afrique* archives indicate the same logic for arbitrage operations during the whole 18th century. These invoices also show that *Roux* executed the silver arbitrage through the *Compagnie Royale d'Afrique* from its foundation in 192.

---

192 Cadiz correspondence is compiled in Fond Roux L.IX. Section IV: *Correspondance passive Cadix, liasses 810-856.*
1741\textsuperscript{193}. Indeed, the correspondence from Cadiz to \textit{Compagnie Royale d'Afrique} points out that the correspondents were precisely the same individuals who worked directly with Roux banker before the foundation of \textit{Compagnie Royale d'Afrique}. Regrettably, only a few letters from Cadiz to \textit{Compagnie Royale d'Afrique} have been preserved and, therefore, the series of shadow silver prices in Cadiz is uninterrupted just from the foundation of the merchant house \textit{Roux}, in 1729, to the foundation of the \textit{Compagnie Royale d’Afrique}, in 1741\textsuperscript{194}.

Cadiz correspondents’ letters in the \textit{Roux} archives reported almost half-monthly black market prices of old and new Pillar / Mexican Pieces of Eight. Letters were reported every week or two weeks\textsuperscript{195}. We collected half-monthly prices of Old Mexican Pieces of Eight (Graph A2.2.)\textsuperscript{196}. When quotations are in a range, we convert such ranges to the midpoint. Prices were reported as the percentage of premium over the unit of account \textit{peso de cambio} (also called \textit{peso de plata antigua} or \textit{peso de plata vieja}) per

\begin{flushright}
\textsuperscript{193} Fond Roux: L.IX liasse 1261; \textit{Compagnie Royale d’Afrique}: L.III liasse 1010. The \textit{Compagnie Royale d’Afrique} archive was compiled in 1860 by the \textit{Chambre de Commerce de Marseille}. Rebuffat (1965, section L.III). The \textit{Compagnie Royale d’Afrique} (1741-1793) was founded with 1,200 shares, 800 of them subscribed in Paris and 400 in Marseille (300 of them were subscribed by the \textit{Chambre de Commerce de Marseille}). The \textit{Compagnie} had the monopoly of the coral fishing and the trade of wheat, wool, wax and leathers, which were transported to Marseille to be sold there. It purchases in Barbary Coast were regulated in Pieces of Eight, the only legal tender currency, which needed a great consumption (L.III liasse 1017).

\textsuperscript{194} \textit{Compagnie Royale d’Afrique}. L. III. Liasse 364: Spanish correspondent letters. The \textit{Compagnie Royale d’Afrique} archive have also « cahiers de livraison et réception des piastres » (L. III, liasses 1014, 1015) and « reçus du caissier d'achats de piastres et copies de ces reçus, 1741-1744 » (L.III, liasse 444) and « livre de caisse des piastres, 1741-1794 » (L.III, liasses 446-448), but these sources are not useful for our research because they are organized by correspondent, without breaking down the unitary price for pieces of eight.

\textsuperscript{195} We 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.

\textsuperscript{196} The Mexico Mint started to strike the silver coin \textit{real} in May 1535, in three-reales, one-\textit{real} and half-\textit{real} pieces -and four-\textit{reales} from 1537 (\textit{Leyes de Indias} (1681), book 4, title XXIII, lawVII-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 striking 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) (\textit{Autos Acordados} (1772), book 5, title XXI, auto 59-60-61-65-70. Pradeau (2001))
Old Mexican Piece of Eight coin\textsuperscript{197}. The \textit{peso de plata vieja} is an imaginary coin whose legal equivalence with the American Piece of Eight coins was defined in Castilian Legislation as follows (see Appendix 3 for details):

\begin{itemize}
  \item from 08/09/1728 to 16/05/1737\textsuperscript{198}: 1 American Piece of Eight coin = 10/8 peso de plata antigua
  \item from 16/05/1737 to 29/05/1772\textsuperscript{199}: 1 American Piece of Eight coin = (10 5/8)/8 peso de plata Antigua
\end{itemize}

\textit{Graph A2.2.: Black market price of Mexican old 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

\textsuperscript{197} “The agio [was]… 33 1/3 per cent, more or less, this is, 100 pieces of eight are changed for 133 1/3 pieces of eight of exchange, more or less” (“l’agio [était]… de 33 1/3 pour cent, plus ou moins; c’est – à dire qu’on donne 100 piastres fortes pour 133 1/3 piastres de change, plus ou moins”) (Ricard, 1732, in McCusker, 1978, p. 100). Peso de cambio o de plata antigua = Piece of eight of exchange or Piece of eight of old silver\

\textsuperscript{198} “The piece of eight of exchange or piece of eight of old silver is worth 8 reales of old silver, 15 reales and 2 maravedis of vellòn, 272 maravedies of silver or 512 maravedies of vellòn. [...] The piece of eight of old silver, which is the most used unit of account in trade, is worth 16 quarters, 34 maravedies of old silver, or 64 maravedies of vellòn”. (“El peso escudo, de plata o de cambio, vale 8 reales de plata antigua, 15 reales y dos maravedís de vellòn, 272 maravedies de plata o 512 maravedies de vellòn. [...] El real de plata antiguo que es la moneda más usual en el comercio vale 16 cuartos, 34 maravedís de plata antigua, o 64 maravedís de vellòn”) Villabertran (1826), p. 1, and Autos Acordados (1772), libro 5, título XXI, auto 36, 04/11/1686

\textsuperscript{199} Autos Acordados (1772), libro 5, título XXI, auto 61.

\textsuperscript{199} Novísima Recopilación (1805), libro 9, título XVII, ley 8, and Innocencio Aparici (1741), pp. 24-26
The arbitrated par of exchange \( \frac{p_L}{p_C} \) and the spot exchange rate \( x_{i,c} \)

The arbitrated par of exchange between London and Cadiz is defined by the relative market prices: \( \frac{p_L}{p_C} \). London silver prices are given per unit of mass (standard ounce) while Cadiz silver prices are given per coin. We 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 (see Appendix 3). According to Roux’s invoices, coins were always weighed (see Illustration A.2.2). Abrasion was 1.5% and, therefore, we considered a net weight equal to the legal weight minus abrasion.

---


\[201\] Tale of real per Cologne Mark ingot: 67 (8 3/8 in pieces of eight) at 11 dineros and 4 granos of fineness. Ordinance 13/06/1497, Recopilación (1640), libro 5, título XXI, leyes 1-74 de las ordenanzas que han de guardar. (Céspedes del Castillo, pp. 214-215). 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.

\[202\] 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 (see Appendix 3) while it had around 27.079 grams according to Fond Roux invoices (i.e., Illustration 2.2.).
We assume that the implicit spot exchange rate in London on Cadiz ($x_{LC}$) is essentially identical to the spot exchange rate in Cadiz on London ($x_{CL}$). The implicit spot exchange rate between Cadiz and London has been calculated according to the formula (see Appendix 1 –equation A1.8- for details):

$$x_{CL} = a_{CL} \left(1 + \frac{n}{365}r_L\right) \text{ (pesos de plata Antigua / pence sterling)} \quad \text{(A2.2.)}$$

where $x_{CL}$ denotes the implicit spot exchange rate in Cadiz on London, $a_{CL}$ is the exchange rate in Cadiz on London at 60 days, and $r_L$ is the commercial interest rate in London.

Graph A2.3. shows the implicit spot exchange rate and the arbitrated par of exchange. We also added in the graph the exchange rate at 2 months in London on Cadiz and in Cadiz on London, respectively. The graph proves the existence of a gap between the arbitrated parity and the exchange rate for any exchange rate we consider.

---

203 Long maturity for bills in Cadiz on London is 2 months (1 Usances; 1 Usance = 2 months), plus 3 days of grace at payment in London (Tate, 1819b, p. 3; Hewitt, 1740, p. 25). The London interest rate is the discount rate of the Bank of England for foreign bills (Clapham 1994, vol. 1, p. 299)
Graph A2.3.: arbitrated par of exchange and exchange rate between London and Cadiz, 1729-1741 (half-monthly observations), pence sterling/peso de plata antigua
(normalized by intrinsic par 1729-1737, 54*8/10=1)

Source: see text
Costs (c_{CL}):  

Costs are taken from Roux’s invoices\textsuperscript{204} (see Illustrations A2.2. and A2.3.)

Illustration A2.2: Cost and fee account- commission agent (“compte du cout et frais”)

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

\textsuperscript{204} 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)
Illustration A2.3: Cost and fee account - partner ("compte du cout et frais")

Source: Fond Roux, L. IX liasse 1,261 : Monnaies d’or et d’argent : factures
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‰) if the intermediary was a partner (Illustration A2.3.); or a commission (1%) if the intermediary was a commission agent (Illustration A2.2.). For calculations we consider the intermediary as a partner, as it was the usual case according to invoices.

- **Freight and Insurance**²⁰⁵: When organizing a maritime voyage, French shipowners enlisted as many as sixty participants in the venture, some being merchant houses and bankers, others being professionals, nobles, or stockholders²⁰⁶. 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, they 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 run²⁰⁷.

However, freight and insurance for specie 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 vessels²⁰⁸.

²⁰⁵ Rambert (1954), pp. 556-596.
²⁰⁶ Taylor (1964), pp. 483-484.
²⁰⁷ The result of the decline in piracy was a lowering of insurance costs during 18th century. North (1968), p.960
²⁰⁸ Rambert (1954), pp. 571, 582.
Freight and insurance for specie was denominated “port on board” (“port à bord”), and it was collected directly for 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”\(^\text{209}\) (see Illustration A2.4.). Additionally, we should add the cost of transporting the sacks from home to the port (1/4‰).

\*Illustration A2.4: Cargo note, Cadiz 4 August 1741*

![Cargo note, Cadiz 4 August 1741](image)

Source: Compagnie Royale d’Afrique, L. III, liasse 1010

---

\(^{209}\) «Les Piastres en arrivant à Marseille, Gênes, Londres, Amsterdam, etc. payent un pour cent; c’est-à-dire une Piastre effective pour chaque 100 Piastres, que les Capitaines de Vaisseaux prennent des Sacs» Giraudeau, [1756] (1796), p. 460
## APPENDIX 3: CASTILIAN MONETARY SYSTEM IN THE EARLY MODERN PERIOD

### Table A3.1.: Features and official parity of pieces of eight, 1497-1737

<table>
<thead>
<tr>
<th>MONARCH</th>
<th>Catholic Monarchs-Carlos V-Felipe II-</th>
<th>Felipe IV-Carlos II</th>
<th>Carlos II</th>
<th>Felipe V</th>
<th>Felipe V</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1474-1492)</td>
<td>(1665-1700)</td>
<td>(1700-1721)</td>
<td></td>
<td>(1728-1746)</td>
</tr>
</tbody>
</table>

**ORDINANCE**

<table>
<thead>
<tr>
<th>13/06/1497</th>
<th>04/11/1686</th>
</tr>
</thead>
</table>

**SOURCE**

- Recopilación (1640), book 5, title XXI, laws 1-74 de las ordenanzas que han de guardar. Leyes de Indias (1681), book 4, title XXII, law VII-VIII
- Autos Acordados (1772), book 5, title XXI, auto 34
- Autos Acordados (1772), book 5, title XXI, auto 36

### COIN PIECE OF EIGHT

<table>
<thead>
<tr>
<th>VF</th>
<th>AMERICAN PIECE OF EIGHT</th>
<th>CASTILLE PIECE OF EIGHT</th>
<th>AMERICAN PIECE OF EIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(ESCUDO) old silver</td>
<td>(ESCUDO) new or current silver (Marias)</td>
<td>(ESCUDO) old silver</td>
</tr>
<tr>
<td>1</td>
<td>8 3/8</td>
<td>10 1/2</td>
<td>8 3/8</td>
</tr>
</tbody>
</table>

**FINENESS (dwt & grains)**

- 8 3/8
- 10 1/2
- 8 3/8

**GROSS WEIGHT PER COIN (gr)**

- 27.518
- 21.949
- 27.518

**NET WEIGHT PER COIN (gr)**

- 25.607
- 21.460
- 21.460

**NET WEIGHT PER INGOT (gr)**

- 214.460
- 214.460
- 214.460

**VALUE per coin (mrv-old or extinct silver)**

- 272
- ---
- 272

**VALUE per coin (real-old or extinct silver)**

- ---
- ---
- 8

**VALUE per coin (mrv-new or current silver)**

- ---
- 349
- 272

**VALUE per coin (real-new or current silver)**

- ---
- 10
- 8

**VALUE per coin (quartos)**

- ---
- ---
- 128

**VALUE per coin (mrv-vellon)**

- ---
- 510
- 408

**VALUE per coin (real-vellon)**

- ---
- 15 (premium 50%)
- 12 (premium 50%)

**VALUE per coin (real-new silver)**

- ---
- 10 new real silver and 2 mvs. vellon (10/251)
- 10 new real silver and 2 mvs. vellon (10/251)

**VALUE per coin (real-vellon)**

- ---
- 18 reales and 28 mvs. de vellon (18/1417)
- 18 reales and 28 mvs. de vellon (18/1417)

**STANDARD DEPARTED FROM IN SPAIN**

- 272
- 349
- 349

**DEPOT MINTING**

- 8 1/2
- 9 5/8
- 8 1/2

**NO MINTED**

- 8 1/2
- 9 5/8
- 9 5/8

**FINENESS (%)**

- 93.056%
- 93.056%
- 93.056%

**FINENESS (%)**

- 93.056%
- 93.056%
- 93.056%

**NET WEIGHT PER INGOT (gr)**

- 214.460
- 214.460
- 214.460

**VALUE per coin (mrv-old or extinct silver)**

- 272
- ---
- 272

**VALUE per coin (real-old or extinct silver)**

- ---
- ---
- 8

**VALUE per coin (mrv-new or current silver)**

- ---
- 349
- 272

**VALUE per coin (real-new or current silver)**

- ---
- 10
- 8

**VALUE per coin (quartos)**

- ---
- ---
- 128

**VALUE per coin (mrv-vellon)**

- ---
- 510
- 408

**VALUE per coin (real-vellon)**

- ---
- 15 (premium 50%)
- 12 (premium 50%)

**VALUE per coin (real-new silver)**

- ---
- 10 new real silver and 2 mvs. vellon (10/251)
- 10 new real silver and 2 mvs. vellon (10/251)

**VALUE per coin (real-vellon)**

- ---
- 18 reales and 28 mvs. de vellon (18/1417)
- 18 reales and 28 mvs. de vellon (18/1417)
Table A3.2.: Devaluations and debasements in Castile in Early Modern Period, 1497-1786(*)

<table>
<thead>
<tr>
<th>Date</th>
<th>Devaluation Gold</th>
<th>Devaluation Silver (**)</th>
<th>Debasement fineness Gold</th>
<th>Debasement fineness Silver (**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13/06/1497</td>
<td></td>
<td></td>
<td></td>
<td>Definition of Castilian Monetary System</td>
</tr>
<tr>
<td>29/06/1537</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23/11/1566</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23/11/1609</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>March 1625</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30/04/1636</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07/09/1641</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/01/1642</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>(revaluation)</td>
</tr>
<tr>
<td>01/10/1642</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15/10/1642</td>
<td>✓ (revaluation)</td>
<td>✓ (revaluation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23/12/1642</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/01/1643</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/03/1643</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov 1643</td>
<td>✓ (revaluation)</td>
<td>✓ (revaluation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>March 1644</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>March 1645</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov 1645</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov 1646</td>
<td>✓</td>
<td>✓ (revaluation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov 1648</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 1649</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>May 1649</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sept 1649</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dic 1649</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dic 1650</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>14/11/1652</td>
<td>✓ (revaluation)</td>
<td>✓ (revaluation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/01/1655</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>July 1655</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Devaluation Gold</td>
<td>Devaluation Silver (**)</td>
<td>Debasement fineness Gold</td>
<td>Debasement fineness Silver (**)</td>
</tr>
<tr>
<td>----------</td>
<td>------------------</td>
<td>-------------------------</td>
<td>--------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Oct 1655</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 1657</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>April 1657</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov 1657</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb 1658</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>April 1658</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 1658</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov 1658</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 1659</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>March 1659</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>April 1659</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May 1659</td>
<td>✓</td>
<td>✓ (revaluation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>July 1659</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov 1659</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 1660</td>
<td>✓ (revaluation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>July 1660</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June 1661</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 1661</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov 1661</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dic 1661</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 1662</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb 1662</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>May 1662</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>April 1663</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/05/1663</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31/05/1663</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/06/1663</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20/06/1663</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/07/1663</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20/07/1663</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Devaluation Gold</td>
<td>Devaluation Silver (**)</td>
<td>Debasement fineness Gold</td>
<td>Debasement fineness Silver (**)</td>
</tr>
<tr>
<td>------------</td>
<td>------------------</td>
<td>-------------------------</td>
<td>--------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>August 1663</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sept 1663</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 1663</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov 1663</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec 1663</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/01/1664</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31/01/1664</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb 1664</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>March 1664</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>April 1664</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>May 1664</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June 1664</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>July 1664</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>August 1664</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sept 1664</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14/10/1664</td>
<td>✓ (revaluation)</td>
<td>✓ (revaluation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31/10/1664</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/11/1664</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22/11/1664</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/12/1664</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>08/12/1664</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20/12/1664</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28/12/1664</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/01/1665</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15/01/1665</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21/01/1665</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25/01/1665</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>08/02/1665</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21/02/1665</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03/03/1665</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Devaluation Gold</td>
<td>Devaluation Silver (**)</td>
<td>Debasement fineness Gold</td>
<td>Debasement fineness Silver (**)</td>
</tr>
<tr>
<td>------------</td>
<td>------------------</td>
<td>-------------------------</td>
<td>--------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>25/03/1665</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18/04/1665</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/05/1665</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22/05/1665</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/06/1665</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24/06/1665</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/08/1665</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/09/1665</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/11/1665</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/04/1667</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June 1667</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sept 1667</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov 1667</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec 1667</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/02/1668</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>March 1668</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sept 1668</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb 1669</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb 1670</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 1670</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 1671</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>August 1671</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 1671</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>April 1672</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 1673</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>May 1673</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 1674</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>June 1674</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 1674</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Nov 1674</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Devaluation Gold</td>
<td>Devaluation Silver (**)</td>
<td>Debasement fineness Gold</td>
<td>Debasement fineness Silver (**)</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------</td>
<td>-------------------------</td>
<td>--------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>01/01/1675</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb 1675</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June 1675</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>August 1675</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 1675</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>May 1676</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>July 1676</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Oct 1676</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec 1676</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>March 1677</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May 1677</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>July 1677</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>August 1677</td>
<td>✓ (revaluation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>May 1678</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June 1678</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Sept 1678</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec 1678</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb 1679</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June 1679</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>August 1679</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Sept 1679</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov 1679</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Jan 1680</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>01/02/1680</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>10/02/1680</td>
<td>✓ (revaluation)</td>
<td>✓ (revaluation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14/10/1680</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>26/11/1686</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14/01/1726</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>08/02/1726</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>09/06/1728</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
Devaluation means an increment of units of account per coin. Debasement means a reduction of the pure metal per coin. We refer only to American silver coins, i.e., the table does not count the devaluations and debasement of silver coins minted in Castilian mints.

<table>
<thead>
<tr>
<th>Date</th>
<th>Devaluation Gold</th>
<th>Devaluation Silver (**)</th>
<th>Debasement fineness Gold</th>
<th>Debasement fineness Silver (**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18/09/1728</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16/05/1737</td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18/03/1771</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>17/07/1779</td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25/02/1786</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

Sources: Recopilación de las Leyes destos Reynos (1640), Recopilación de Leyes de los Reynos de las Indias (1681), Autos Acordados (1772), Leyes de la Nueva Recopilación (1777), Novísima Recopilación de las Leyes de España (1805) and Surrà-Rull (1868)

The arbitrage equation of silver between London and Cadiz is:

\[
(1 - c_{CL}) \frac{P_L}{P_C} \leq x \leq (1 + c_{LC}) \frac{P_L}{P_C}
\]  

(A4.1.)

where \( P_L \) denotes the market price of silver in London; \( P_C \) denotes the shadow price of silver in Cadiz; \( x \) denotes the spot exchange rate between London and Cadiz; \( c_{CL} \) 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 equation of the multilateral arbitrage with silver traded between Cadiz and London and settled through Amsterdam is:

\[
(1 - c_{CL}) \frac{P_L}{P_C} \leq x_{CA} \cdot x_{LA} \leq (1 + c_{LC}) \frac{P_L}{P_C}
\]  

(A4.2.)

where \( P_L \) denotes the market price of silver in London; \( P_C \) denotes the shadow price of silver in Cadiz; \( x_{CA} \) is the spot exchange rate between Cadiz and Amsterdam; \( x_{LA} \) is the spot exchange rate between London and Amsterdam; \( c_{CL} \) 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.

Results for the equations of the bilateral and multilateral arbitrage are shown in Graph A4.1. (graph A4.2. compares the unitary net profitability). Results do not differ considering bilateral or multilateral arbitrage, because the market of bills of exchange was integrated.
Graph A4.1.: 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*8/10=1)

Source: Appendix 2 and Appendix 5

Graph A4.2.: Unitary net profitability of the silver arbitrage from Cadiz to London

Source: Appendix 2 and Appendix 5
APPENDIX 5: THE CONSTRUCTION OF THE GOLD, SILVER AND BIMETALLIC POINTS (LONDON-AMSTERDAM, 1734-1758)

The arbitrage equation measures bullion flows between two centres:\[ (1) \]

\[
\text{Gold points:} \quad (1 - c_{La}^{g}) \frac{p_{A}^{g}}{p_{L}^{g}} \leq x \leq (1 + c_{AL}^{g}) \frac{p_{A}^{g}}{p_{L}^{g}} \quad (A5.1)
\]

where \( p_{A}^{g} \) denotes the market price of gold in Amsterdam; \( p_{L}^{g} \) denotes the market price of gold in London; \( x \) is the spot exchange rate between Amsterdam and London; \( c_{La}^{g} \) is the cost of trading gold from London to Amsterdam; and \( c_{AL}^{g} \) is the cost of trading gold from Amsterdam to London.

\[
\text{Silver points:} \quad (1 - c_{La}^{s}) \frac{p_{A}^{s}}{p_{L}^{s}} \leq x \leq (1 + c_{AL}^{s}) \frac{p_{A}^{s}}{p_{L}^{s}} \quad (A5.2)
\]

where \( p_{A}^{s} \) denotes the market price of silver in Amsterdam; \( p_{L}^{s} \) denotes the market price of silver in London; \( x \) is the spot exchange rate between Amsterdam and London; \( c_{La}^{s} \) is the cost of trading silver from London to Amsterdam; and \( c_{AL}^{s} \) is the cost of trading silver from Amsterdam to London.

\[
\text{Bimetallic points:}
\]

\[
\text{Max} \left[ (1 - c_{La}^{g}) \frac{p_{A}^{g}}{p_{L}^{g}}; (1 - c_{La}^{s}) \frac{p_{A}^{s}}{p_{L}^{s}}; (1 - c_{La}^{g}) \frac{p_{A}^{g}}{p_{L}^{g}} \right] \leq x \leq \text{Min} \left[ (1 + c_{AL}^{g}) \frac{p_{A}^{g}}{p_{L}^{g}}; (1 + c_{AL}^{s}) \frac{p_{A}^{s}}{p_{L}^{s}}; (1 + c_{AL}^{g}) \frac{p_{A}^{g}}{p_{L}^{g}} \right] \quad (A5.3)
\]

In this appendix we will explain the variables used to calculate the gold, silver and bimetallic points, i.e., gold and silver market prices in London ($p_L^g$ and $p_L^s$), gold and silver market prices in Amsterdam ($p_A^g$ and $p_A^s$), the gold and silver arbitrated par of exchange ($\frac{p_A^g}{p_L^g}$ and $\frac{p_A^s}{p_L^s}$), the spot exchange rate between London and Amsterdam ($x_{LA}$ and $x_{AL}$) and the cost of trading gold and silver from London to Amsterdam ($c_{LA}$ and $c_{AL}$) and from Amsterdam to London ($c_{AL}$ and $c_{LA}$).

**Market prices for gold and silver in London ($p_L^g$ and $p_L^s$)**

Data are taken from *The Course of the Exchange*. The price of gold was measured in pounds (£), shillings (s) and pence (d) units of account per standard ounce Troy; and the silver price was measured in shillings (s) and pence (d) units of account per standard ounce Troy\(^{211}\). The Course of the Exchange collected data of gold in bars and gold in coin \(^{212}\), and data of silver in bars and Pieces of Eight.

---

\(^{211}\) The equivalences among the units of account are: 1 pound sterling (£-librae)=20 shilling, 1 shilling (s-solidi)=12 pennies (d-denarii). The fineness for silver is: Sterling Standard (Old Standard) had 92.5% fineness. Fallon (1988, p. 9). Newton (1731): “The silver Coin contains 11 Oz 2 Pennywt. Fine Silver, and 18 Pennywt. Of Alloy in the Pound”. And the fineness for gold is: 91.66% fineness, i.e. 22/24 carats. Newton (1731): “The present English Standard for Gold coin is 22 Carats of fine Gold, and two Carats or 1/12 of Allow”. The units of mass are: Newton (1731): “That the English Pound Troy contains 12 Ounces; 1 Ounce, 20 Pennyweights; 1 Pennywt, 24 Grains; and 1 Grain, 20 Mites.”. One standard ounce Troy is equivalent to 31.103496 grams in the International System of Units. Lemale (1875, p. 189)

\(^{212}\) Gold in coin refers to foreign coins, because the export of domestic coins was forbidden until 1819 (Viner, 1955, p. 4). Gold in coins quotation was restricted to Portuguese gold coins in February 1798
We have collected monthly prices of gold and silver bars around the middle of the month from 1734 to 1758—the exact date corresponds to the same date than Amsterdam quotations (see Graphs A5.1 and A5.2). When quotations are in a range, we convert ranges to the midpoint. England used Julian calendar until 2 September 1757—followed by 14 September in Gregorian calendar—but, as Amsterdam used Gregorian calendar, we corrected the dates of the Julian calendar (Old Style) into the Gregorian calendar (New Style) in order to maintain the homogeneity of data.

Graph A5.1. Price of Standard Gold Bars in London Stock Exchange, 1734-1758

(monthly observations) pounds/std. ounce Troy

Market prices for gold and silver in Amsterdam ($p_A^g$ and $p_A^s$)

Data are taken from Kours van Koopmanschappen tot Amsterdam. We collected monthly prices of fine gold and silver bars around the middle of the month from 1734 to 1758 (see Graphs A5.3 and A5.4). When quotations are in a range, we convert such ranges to the midpoint. Gold bars were measured as the percentage of premium over 355 gulden/Dutch mark\textsuperscript{213}. Silver bars were measured in gulden and stuiver\textsuperscript{214}.

\textsuperscript{213} 1 Dutch Mark = 0.246084 kg. Hayes (1777, p. 253), Kelly (1835, vol.1, p. 9), and Lemale (1875, p. 48). 355 gulden/mark is the Amsterdamsche Wisselbank price. Gillard (2004), p. 145

\textsuperscript{214} 1 gulden=20 stuiver. McCusker (1978), p. 44
**Graph A5.3.: Price of fine Gold Bars in Amsterdam Stock Exchange, 1734-1758**

(monthly observations) gulden/Dutch mark

Source: *Kours van Koopmanschappen tot Amsterdam* for market prices and Gillard (2004, p. 145) for Wisselbank price

**Graph A5.4.: Price of fine Silver Bars in Amsterdam Stock Exchange, 1734-1758**

(monthly observations) gulden/Dutch mark

Source: *Kours van Koopmanschappen tot Amsterdam* for market prices and Gillard (2004, p. 145) for Wisselbank price
Arbitrated par of exchange \( \left( \frac{p_A^g}{p_L^g} \text{ and } \frac{p_A^s}{p_L^s} \right) \)

The arbitrated par of exchange is defined by the relative market prices \( \left( \frac{p_A^g}{p_L^g} \text{ and } \frac{p_A^s}{p_L^s} \right) \).

Amsterdam had three types of money in the 18th century: current money, accounting money and bank money. Current money and accounting money had a fixed equivalence according to the official parity, while current money and bank money fluctuated according agio (see Illustration A5.1.)

**Illustration A5.1: Types of money in Amsterdam in 18th century**

<table>
<thead>
<tr>
<th>CURRENT MONEY</th>
<th>ACCOUNTING MONEY</th>
<th>BANK MONEY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Silver</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ducatoon (63 stuiver)</td>
<td>1 pond = 20 schelling = 240 groot</td>
<td>1 pond = 20 schelling = 240 groot</td>
</tr>
<tr>
<td>Rijksdaalder (50 stuiver)</td>
<td>1 gulden = 20 stuiver = 320 penning</td>
<td>1 gulden = 20 stuiver = 320 penning</td>
</tr>
<tr>
<td>Leeuwendaalder (42 stuiver)</td>
<td>1 pond = 6 gulden</td>
<td>1 pond = 6 gulden</td>
</tr>
<tr>
<td>Gulden current (20 stuiver)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gold</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>March 1645 – March 1749</td>
<td>1 pond = 20 schelling = 240 groot</td>
<td>1 pond = 20 schelling = 240 groot</td>
</tr>
<tr>
<td>(12 guld 12 st)</td>
<td>1 gulden = 20 stuiver = 320 penning</td>
<td>1 gulden = 20 stuiver = 320 penning</td>
</tr>
<tr>
<td>March 1749 – December 1806</td>
<td>1 pond = 6 gulden</td>
<td>1 pond = 6 gulden</td>
</tr>
<tr>
<td>(14 gulden)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ducat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>March 1645 – March 1749</td>
<td>1 pond = 20 schelling = 240 groot</td>
<td>1 pond = 20 schelling = 240 groot</td>
</tr>
<tr>
<td>(4 guld 15 st)</td>
<td>1 gulden = 20 stuiver = 320 penning</td>
<td>1 gulden = 20 stuiver = 320 penning</td>
</tr>
<tr>
<td>March 1749- December 1806</td>
<td>free fluctuation</td>
<td>free fluctuation</td>
</tr>
</tbody>
</table>

CURRENT MONEY & ACCOUNTING MONEY
fixed equivalences (in brackets)

CURRENT MONEY & BANK MONEY
fluctuated equivalences (graph A5.5)

Bullion was expressed in current money\textsuperscript{215} while the exchange rate between London and Amsterdam was expressed in bank money\textsuperscript{216}. As our aim is to compare the arbitrated parity with the exchange rate, we need to transform current money units of the arbitrated parity in bank money units. We convert current money to bank money according to agio\textsuperscript{217}. 

Agio data are taken from \textit{Kours van Koopmanschappen tot Amsterdam} (Graph A5.5. shows the fluctuation between bank and current money in Amsterdam):

\begin{align*}
\text{Current Money} &= (1+\text{agio}) \times \text{Bank Money} \tag{A5.4} \\
\end{align*}

“By the Term Current Money, or Cash, is to be understood, the Money that goes in a Kingdom from Hand to Hand in Payment, which the Merchants, Negociators, and Bankers call Cash, or the Money they keep in Bags or Chests. Besides, the Current Money is expressed by Florins, Sols, and Deniers, which is what we call Guilders, Stivers, and Pennings. To reduce Current Money into Bank Money, the Rule is this: As 100 Current Money, with the Agio added to it, is to 100 Bank Money, so shall the given Current Money be to the Bank Money produced by the Operation of this Stating” (Hayes, 1719, p. 12)

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{GraphA5.5.png}
\caption{Current money fluctuation in Amsterdam (bank money =1), 1718-1786}
\end{figure}

\textsuperscript{215} Hayes (1739), p. 285
\textsuperscript{216} Hayes (1739), p. 278
\textsuperscript{217} Hayes (1719), pp. 12-14, Quinn and Roberds (2009), p. 60.
Spot exchange rate ($x$)

The spot exchange rate in London on Amsterdam is calculated according to Flandreau et al. (2009b) methodology (see Appendix 1-equations A1.5 to A1.7- for details):

\[
a_{La}[n_t] = x_{La}/(1 + r_d^L \cdot \frac{n_t}{365}) \quad \text{(sterling pound/schelling bank)} \quad (A5.5.)
\]

\[
a_{La}[n_t] = x_{La}/(1 + r_d^L \cdot \frac{n_s}{365}) \quad \text{(sterling pound/schelling bank)} \quad (A5.6.)
\]

where $a_{La}[n_t \text{ days}]$ is the long maturity exchange rate in London on Amsterdam, $a_{La}[n_s \text{ days}]$ is the short maturity exchange rate in London on Amsterdam, $x_{La}$ is the implicit spot exchange rate in London on Amsterdam and $r_d^L$ is the implicit interest rate in Amsterdam from London. Thus, known $a_{La}[n_t]$ and $a_{La}[n_s]$, combining equations A5.5. and A5.6., we derive the implicit spot exchange rate in London on Amsterdam ($x_{La}$) and the implicit interest rate in Amsterdam from London ($r_d^L$)

The exchange rate in London on Amsterdam was expressed in *schelling* and *groot* bank per sterling pound\(^{218}\) at 2 usances (occasionally 2 and half usances) and sight\(^ {219}\). We have collected monthly data from *The Course of the Exchange* –the precise date corresponds to the same date as the Amsterdam quotations. England used Julian calendar until 2 September 1757 -followed by 14 September in Gregorian calendar- but, as Amsterdam used Gregorian calendar, we corrected the dates of the Julian calendar (Old Style) into the Gregorian calendar (New Style) in order to maintain the homogeneity of data. When quotations are in a range, we convert such ranges to the midpoint.

\(^{218}\) Giraudeau (1796) [1756], p. 220.

\(^{219}\) 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
The spot exchange rate in Amsterdam on London is calculated using the same methodology as the spot exchange rate in London on Amsterdam:

\[
a_{al}[n_l] = x_{al} / \left(1 + r_L^A \frac{n_l}{365}\right) \quad \text{(schelling bank/sterling pound)} \quad \text{(A5.7.)}
\]

\[
a_{al}[n_s] = x_{al} / \left(1 + r_L^A \frac{n_s}{365}\right) \quad \text{(schelling bank/sterling pound)} \quad \text{(A5.8.)}
\]

where \(a_{al}[n_l \text{ days}]\) is the long maturity exchange rate in Amsterdam on London, \(a_{al}[n_s \text{ days}]\) is the short maturity exchange rate in Amsterdam on London, \(x_{al}\) is the implicit spot exchange rate in Amsterdam on London and \(r_L^A\) is the implicit interest rate in London from Amsterdam. Thus, known \(a_{al}[n_l]\) and \(a_{al}[n_s]\), combining equations A5.7. and A5.8., we derive the implicit spot exchange rate in Amsterdam on London \(x_{al}\) and the implicit interest rate in London from Amsterdam \(r_L^A\).

The exchange rate in Amsterdam on London was expressed in schelling and groot bank per sterling pound\(^{220}\) at 2 usances and sight\(^{221}\). We have collected monthly data from *Kours van Koopmanschappen tot Amsterdam*. When quotations are in a range, we convert such ranges to the midpoint.

\(^{220}\) Giraudeau (1796) [1756], p. 205.

\(^{221}\) Two months maturity, plus 3 days of grace (one usance in Amsterdam on London is 1 month). Sight is 3 days. Flandreau *et. al* (2009b), p. 186
Costs \( (c_{La}^g, c_{AL}^s, c_{La}^f \; \text{and} \; c_{AL}^f) \)

Arbitrage costs between London and Amsterdam are broken down by main item in Table A5.1. (see Illustration A5.2):

Table A5.1: Arbitrage cost between London and Amsterdam broken down by main item

<table>
<thead>
<tr>
<th></th>
<th>London→Amsterdam</th>
<th>Amsterdam→London</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brokerage buying</td>
<td>1/8 % (a)</td>
<td>1/2 ‰ + 1/2 % (f)</td>
</tr>
<tr>
<td>Charges of loading</td>
<td>1/12 % (b)</td>
<td>1/8 % (e)</td>
</tr>
<tr>
<td>Insurance</td>
<td>see graph A5.6. (c)</td>
<td>see graph A5.6. (c)</td>
</tr>
<tr>
<td>Freight</td>
<td>1/4 %+1/12 % (d)</td>
<td>1/4 %+1/12 % (d)</td>
</tr>
<tr>
<td>Charges of uploading</td>
<td>1/8 % (e)</td>
<td>1/12 % (b)</td>
</tr>
<tr>
<td>Brokerage selling</td>
<td>1/2 ‰ + 1/2 % (f)</td>
<td>1/8 % (g)</td>
</tr>
</tbody>
</table>

(a) Hayes (1739, pp. 285-286)
(b) Hayes (1739, pp. 285-286)
(c) *Kours van Koopmanschappen tot Amsterdam* reported insurance cost from London to Amsterdam and from Amsterdam to London (see Graph A5.6.)
(d) \(1/4\%\) freight for the trip London-Rotterdam and \(1/12\%\) freight for the trip Rotterdam-Amsterdam. Hayes (1739, pp. 285-286)
(e) Hayes (1739, pp. 285-286)
(f) \(1/2\%\) brokerage and \(1/2\%\) commission. Hayes (1739, p. 276 and 285-286). Brokerage in Amsterdam was \(1\%\), the one half to be paid by the Buyer, and the other half by the seller.
(g) ABE. Banco de San Carlos. AAJG. L186, p. 127v. We have taken the value of the brokerage selling in London from a silver arbitrage operation done by the *Banco de San Carlos* in London in 1804. It is the same value than the brokerage buying in London (a).

*Graph A5.6: Insurance cost between London and Amsterdam, 1734-1758 (%)*

Source: *Kours van Koopmanschappen tot Amsterdam*
Of Money, Weights, Measures, &c. 285

Sect. XVII. An Example of the Sale Gold, &c.

Invoice of 111 Moidores in one Box, shipped on board the Fly-boat for Rotterdam, William Houghton Master, and gone consigned to Joseph Bayley Merchant in Amsterdam, for the proper Account and Rifice of Joseph Hill of London, mark'd as per Margin.

<table>
<thead>
<tr>
<th>To prime Cost of 111 Moidores,</th>
<th>l.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight 143 Ounces 3 dwt.</td>
<td>565</td>
<td>04</td>
<td>4</td>
</tr>
<tr>
<td>21 Grains, at 3 l. 19s. 6d. per</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ounce</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charges, viz.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brokerage at ¼ per Cent.</td>
<td>14</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>Bill of Loading</td>
<td>0</td>
<td>01</td>
<td>1</td>
</tr>
<tr>
<td>Charges of Entry and Shipping</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Insurance of 570 l. at ½ per Cent.</td>
<td>7</td>
<td>02</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>07</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>573</td>
<td>12</td>
<td>0</td>
</tr>
</tbody>
</table>

N. B. All Gold is bought and sold in Amsterdam at the fixed Price of 355 Gilders Cash Money per Mark fine; so that the rising and falling of the same is not in the Value, but in the Advance. See more in the following Account of Sales of the said Moidores.

Dr. Moidores for Account of Mr.

| To Freight of 5700 Gilders at ¼ per Cent. | 14 05 |
| To Commission for receiving it at Rotterdam, and forwarding to Amsterdam | 6 06 |
| Freight from thence hither | 5 14 |
| To Brokerage at ¼ per Mill. | 3 30 |
| To Commission at ¼ per Cent. | 30 10 |

To Balance carried to the Credit of your Account Current Cash Money | 6033 19

10 Gilders 6093 14

N. B. In Amsterdam Moidores are always bought and sold on the Standard of 22 Carats, and French Pistols on that of 21 Carats 7¼ Grains fine; and that the English Guineas commonly yield 11 Gilders 5 and 6 Stivers; and if they are of Weight, they commonly gain about 1 per Cent. on Amsterdam.
Of Money, Weights, Measures, &c. 287

JOSEPH HILL Merchant in London. C.

By Sale of 111 Moidores, Weight here
17 Marks 7 Ounces 11 Engels of 22 Carats, makes 16 Marks 11⅓ Grains fine, at 355 Gilders Current - - - 5845 06
Advance 4½ per Cent. - - - - - - - - - 248 08

Gild. Stiv. 6093 14

We will now suppose, that when the Gold was sent to Amsterdam, the Exchange was at 34 s. 3 d. Now to know what Profit is made, or what Loss is sustained by the aforesaid Consignment of 111 Moidores, according to the above Account of Sales. See the Operations in the following Page.

288 HAYES’S Negociator’s Magazine

The 111 Moidores yielded in Amsterdam, as per Account of Sales in Curr. Money
Agio at 5 per Cent. deducted

Shews the net Proceed in Bank Money to be

Now the Invoice, Costs and Charges of the said Moidores, when shipped on board, amounted to 573 l. 12 s. Sterling, at 34 s. 3 d. Exchange.

\[
\begin{array}{ccc}
<table>
<thead>
<tr>
<th>l. s</th>
<th>s. d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>573</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>multiply by 411</td>
<td>12</td>
</tr>
<tr>
<td>6309</td>
<td>12</td>
</tr>
<tr>
<td>229440</td>
<td></td>
</tr>
</tbody>
</table>
\end{array}
\]

\[40 \times 2357419 = 12\text{ Grotes} \]

\[\text{Makes Gild. Bo. 5893 15 Stiv. Total Cost of said Moidores} \]
\[\text{Which were sold for 5732 05 Bank Money, which deducted, Shews Gild. Banco 161 10 were lost by this Negotiation.} \]

Which according to the following Operation, amounts to about 2 l. 14 s. 10 d. per Cent.

\[
\begin{array}{c}
5893,75 \times 16150,00000 (2,740 per Cent. left by the Sale of the said Moidores; or, the Loss amounts to about 2 l. 14 s. 10 d. per Cent. \\
4362500 \\
2368750 \\
11250 \\
\end{array}
\]

Source: Hayes (1739), pp. 285-28
Illustration A5.3: Newton's Table of the Assays, Weights and Values, of most Foreign Silver, and Gold coins (updated table 28 March 1729)
### APPENDIX 6: LIST OF FRENCH MERCHANT HOUSES IN CADIZ (1724-1746)

<table>
<thead>
<tr>
<th>Class</th>
<th>1st Class</th>
<th>2nd Class</th>
<th>3rd Class</th>
<th>4th Class</th>
<th>5th Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>1724</td>
<td>Gilles Pain</td>
<td>Casabon, Béric et Cie</td>
<td>Soba, Vande et Cie</td>
<td>Masson, Lecouteulx et Lenormand</td>
<td>Lamarre, Mallet</td>
</tr>
<tr>
<td></td>
<td>Denis Le Duc</td>
<td>Masson frères</td>
<td>Magon, Porée et Cie</td>
<td>Magon frères</td>
<td>Pierre Verry</td>
</tr>
<tr>
<td></td>
<td>Guillaume Jogues</td>
<td>Magon et Lefer frères</td>
<td>Sarsfield Magon, Verduc, Vincent et Cie</td>
<td>Pottier, Sahuc et Cie</td>
<td>Pottier, Sahuc et Cie</td>
</tr>
<tr>
<td></td>
<td>Casaubon, Béric et Cie</td>
<td>Magon frères</td>
<td>Cayla, Solier, Verduc et Cie</td>
<td>Garnier, Cornabé et Cie</td>
<td>Garnier, Cornabé et Cie</td>
</tr>
<tr>
<td></td>
<td>Sobia, Vande et Cie</td>
<td>Magon, Porée et Cie</td>
<td>Vande, Vincent et Cie</td>
<td>Malgès, Bonnet, Blanc et Cie</td>
<td>Malgès, Bonnet, Blanc et Cie</td>
</tr>
<tr>
<td></td>
<td>Magon et Lefer frères</td>
<td>Magon frères</td>
<td>Magon frères</td>
<td>Magon frères</td>
<td>Magon frères</td>
</tr>
<tr>
<td></td>
<td>Béhic et Cie</td>
<td>Magon et Lefer frères</td>
<td>Magon, Porée et Cie</td>
<td>Magon frères</td>
<td>Magon frères</td>
</tr>
<tr>
<td>1736</td>
<td>Gilles Pain</td>
<td>Casabon, Béric et Cie</td>
<td>Soba, Vande et Cie</td>
<td>Masson, Lecouteulx et Lenormand</td>
<td>Lamarre, Mallet</td>
</tr>
<tr>
<td></td>
<td>Denis Le Duc</td>
<td>Masson frères</td>
<td>Magon, Porée et Cie</td>
<td>Magon frères</td>
<td>Pierre Verry</td>
</tr>
<tr>
<td></td>
<td>Guillaume Jogues</td>
<td>Magon et Lefer frères</td>
<td>Sarsfield Magon, Verduc, Vincent et Cie</td>
<td>Pottier, Sahuc et Cie</td>
<td>Pottier, Sahuc et Cie</td>
</tr>
<tr>
<td></td>
<td>Casaubon, Béric et Cie</td>
<td>Magon frères</td>
<td>Cayla, Solier, Verduc et Cie</td>
<td>Garnier, Cornabé et Cie</td>
<td>Garnier, Cornabé et Cie</td>
</tr>
<tr>
<td></td>
<td>Sobia, Vande et Cie</td>
<td>Magon, Porée et Cie</td>
<td>Vande, Vincent et Cie</td>
<td>Malgès, Bonnet, Blanc et Cie</td>
<td>Malgès, Bonnet, Blanc et Cie</td>
</tr>
<tr>
<td></td>
<td>Magon et Lefer frères</td>
<td>Magon frères</td>
<td>Magon frères</td>
<td>Magon frères</td>
<td>Magon frères</td>
</tr>
<tr>
<td></td>
<td>Béhic et Cie</td>
<td>Magon et Lefer frères</td>
<td>Magon, Porée et Cie</td>
<td>Magon frères</td>
<td>Magon frères</td>
</tr>
</tbody>
</table>

Source: Ozanam (1968, p.348)