

TITLE PAGE

Informative Title: Managing the Fishery Commons at Marseille: How a Medieval Institution Failed to Accommodate Change in an Age of Globalisation

Running Title: Fishery Commons and Globalisation

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ABSTRACT

This paper offers a socio-historical study of the *Prud'homie de pêche* (the “*Prud'homie*”), a common-pool institution (“CPI”) that has managed the fishery commons at Marseille since the Middle Ages. The evidence presented here sheds light on specific challenges faced by the *Prud'homie* during the early stages of globalisation: one challenge is the import of a new fishing technique (the *madraque*) in the early 17th century, and another challenge is the arrival of migrant fishermen from Catalonia throughout the 18th century. On this basis, this paper explores the ways in which globalisation has impacted the *Prud'homie* and identifies the mechanisms through which these challenges might threaten the functioning of CPIs.

KEYWORDS

Fishery Commons, Globalisation, History of Fisheries, Institutional Design, Migrations, Technologies

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1 INTRODUCTION

2
3 In November 1622, King Louis XIII visited the city of Marseille while touring his Kingdom of
4 France. A fervent hunter and weapon master, Louis XIII allocated time in his busy schedule to
5 fish Atlantic bluefin tuna (*Thunnus thynnus*, Scombridae) with local fishermen. The fishing
6 party occurred on 8 November 1622 in the natural harbour of Morgiou in the South of
7 Marseille. However, the harbour of Morgiou had not submitted to the King's jurisdiction; since
8 1452, it had been the property of the local fishermen, who also elected their representatives,
9 raised taxes and exercised their own jurisdiction over the fishing disputes that invariably arose
10 along the coasts of Marseille. Morgiou was, in other words, a small island of private
11 governance within the Kingdom of France.

12 For the fishermen of Marseille, the visit from the King was critical. The fishermen were hoping
13 that Louis XIII would confirm the rights and privileges that they had slowly accreted since the
14 Middle Ages. According to legend, the fishermen dug stairs in the stone of the cliffs
15 surrounding Morgiou so that Louis XIII could safely descend to the beach. Curious visitors can
16 still see, 400 years later, remnants of the "stairs of Louis XIII" in Morgiou.

17 The fishing occurred in a special tuna trap called "*madrague*," a source of immense pride for
18 the local fishermen: it was their latest fishing technique from Spain that could catch up to 800
19 bluefin tuna and had just been installed in Morgiou. Archival documents report that Louis XIII
20 killed "more than 25 tuna" with a golden trident on that excursion, which lasted until the night
21 and that he "had never seen anything that pleased him so much during his trip" (Lapierre,
22 1938:38).

23 It was not long before the King translated his satisfaction into concrete action: on 30
24 November 1622, approximately three weeks after the fishing party, the King confirmed all the
25 rights and privileges that the fishermen of Marseille enjoyed over a large territory that spread

across more than 20 miles of coastlines (AM HH370). These rights included the possibility to elect their own representatives to a special organization called the *Prud'homie de Pêche* (or the *Prud'homie*), which exercised a broad range of competencies over the legislation of the fishery, its police and the settlement of disputes.

Beyond this success story unfolded another process that neither the fishermen nor the King could fully appreciate in 1622. It was the outcome of decades, perhaps centuries, of human development, and it ignored the artificial frontiers that human beings had patiently built between their communities. This process, which is now universally known as globalisation, was in its early stages at the beginning of the 17th century. At that time, the entire Mediterranean region experienced a “concentration and expansion of industry, a more rational division of labour, and increased production” (Braudel, 1972:432). In addition, an “itinerant labour force” swept across the Mediterranean during this period (Braudel, 1972:43). Marseille played a key role in this burgeoning globalisation as a major port from which “barques and galleons [...] were sailing over the entire Mediterranean” (Braudel, 1972:220). The contemporary observer might find this process to be too restricted to be part of globalisation, as it primarily concerns the Western Mediterranean basin and its neighbouring countries. However, the reader should keep in mind that the “scale” of globalisation has evolved over time (Sassen, 2006:10-11) and that what might seem “local” or “regional” from our modern perspective was already part of the globalisation process several centuries ago. In fact, historians have termed these early, regional, stages of globalisation “proto-globalisation” (Hopkins, 2002). This “proto-globalisation,” which unfolded in the 17th and 18th centuries, is a key stage of the globalisation process characterized by the progressive growth of trade across nations, the migration of techniques and workers, and technological changes.

In this paper, I will explore how “proto-globalisation” impacted the *Prud’homie* and use this case study to build upon an important stream of literature concerning the governance of the commons. This work has emerged from scholars operating at the intersection of several social science disciplines. Among them, Elinor Ostrom designed a rich analytical apparatus blending political and economic theory that concluded that “common-pool institutions” (“CPIs”) are sometimes better equipped to solve the “tragedy of the commons” (Hardin, 1968) than other entities such as the state and corporations (Ostrom, 1990). Ostrom’s ground-breaking theory of CPIs has broadly influenced academic scholars in various disciplines (Rose, 2011) as well as policy makers and social activists (Saunders, 2014), and it earned her the Nobel Prize in Economics in 2009. Specifically, Ostrom identified a list of “design principles” that characterise the successful operation of CPIs. In short, her theory rests on a rational choice analysis of how individuals voluntarily choose to cooperate and preserve the long-term benefits of resource exploitation when social games are repeated indefinitely, discount rates are low, and information concerning the past performance of social actors is freely available (Ostrom, 1990). Ostrom emphasized how “successful” CPIs could be (Ostrom, 1990:59-60) by “enabling individuals to sustain long-term, productive use of natural resource systems” (Ostrom, 1990:1).

Ostrom focused on communities that are limited in size or that operate within a relatively small territory, such as fishermen in Alanya (Turkey), farmers in Valencia (Spain), or villagers in Törbel (Switzerland) (Ostrom, 1990), and she emphasised the challenges posed by globalisation for CPIs (Ostrom et al., 1999). For instance, she pointed out how “having larger number of participants in a CPR increases the difficulty of organizing, agreeing on rules, and enforcing rules” (Ostrom et al., 1999:281).

This paper builds upon Ostrom's scholarship to analyse the ways in which globalisation processes affect the functioning of CPIs. Because of its rich archival records that date back to the early 13th century, the *Prud'homie* offers a relevant case study to assess the socio-economic strains faced by a CPI confronted with the early stages of globalisation. The evidence presented here sheds light on specific challenges faced by the *Prud'homie* during "proto-globalisation": one is the import of a new fishing technique (the *madrague*) in the early 17th century, and the other is the arrival of migrant fishermen from Catalonia throughout the 18th century. Both events illustrate the difficulties that CPIs can face when addressing socio-economic changes arising out of "proto-globalisation."

1. WHAT IS THE PRUD'HOMIE?

The *Prud'homie* is a unique institution: it has been the legislator, judge and police force of the fishery of Marseille since the Middle Ages. Although it was imitated in 32 other fisheries along the French Mediterranean coast, the *Prud'homie* of Marseille is the oldest one that offers the most complete and best-preserved archives. In this section, I will describe the regulatory functions of the *Prud'homie* (A) before assessing its features against Ostrom's design principles for CPIs (B).

A. The main features of the *Prud'homie*

The *Prud'homie* has developed three main regulatory functions since the Middle Ages: the creation of rules, their collection, and their application.

Creating rules

Each year after Christmas, the fishermen of Marseille elected four of their peers for a yearly mandate as members of the *Prud'homie* (also known as the *Prud'hommes*), and the *Prud'hommes* would quickly engage in the creation of norms in two main ways. They submitted resolutions including specific rules to be voted on by the other fishermen, and

adjudicated disputes in accordance with these rules on a weekly basis (each Sunday after mass). I will return to the second task later and focus on the first one here. This first task typically arose when the community faced internal conflicts such as when groups of fishermen used competing techniques or operated in overlapping geographical zones. Over the years, the *Prud'homie* generated rules leading to a very rich regulatory corpus addressing the wide variety of techniques used in the Marseille fishery. The *Prud'homie* also designed rules aimed at organizing the social life of the community. For instance, the *Prud'homie* prohibited fishing on Sundays and religious holidays. This prohibition had an obvious religious inspiration in a highly spiritual society, but it also guaranteed the availability of the fishermen on Sundays when the *Prud'homie* held its meetings.

Collecting rules

The *Prud'homie* not only generated rules, it also collected them. The *Prud'homie* carefully preserved the numerous documents that contained the rules of the fisher community. For instance, it compiled the decisions of the fishermen's community from 1489 until 1759 in a manuscript called the "Red Book" (AD 250E4). The collection of these documents was a crucial stake in the life of the community. In fact, as a product of its long-term history, these documents evidenced and guaranteed the autonomy of the *Prud'homie* and served as a reference point for members who were called to solve disputes that sometimes required precise technical knowledge. To preserve secrecy (and its autonomy vis-à-vis the state), the *Prud'homie* was reluctant to codify its rules but did so in 1725 when it entrusted a doctor named Jean-André Peyssonnel with this task (AD 250E2). Peyssonnel's manuscript can still be found in the archives of the *Prud'homie*, and it provides a unique window into its past regulations. It also provides useful information concerning the species targeted by the fishers and their fishing techniques. Their main activity was in-shore fishing of small species such as

sardine (*Sardina pilchardus*, Clupeidae) or anchovy (*Engraulis encrasicolus*, Engraulidae), but the fishers also targeted larger species such as gilt-head bream (*Sparus aurata*, Sparidae), red mullet (*Mullus surmuletus*, Mullidae), turbot (*Scophthalmus maximus*, Scophthalmidae), bass (*Dicentrarchus labrax*, Moronidae), and of course, Atlantic Bluefin tuna. The fishers of Marseille mobilised various techniques to capture these species but seemed to favour purse seine nets for smaller species that they used with row-boats at shallow (*bregin*) or deeper depths (*eyssaugue*). I describe *bregin*, one of the most popular techniques at the time, in further detail in Part B. For the larger species, the fishers of Marseille used small dragnets called *gangui* and larger ones called *tartanes* that were pulled by sailboats. In Section 3, I further present the techniques for tuna fishing, the use of lines called *palangres* in the 18th century, and the type of boats used in Marseille.

Applying rules

In addition to generating and collecting rules, the *Prud'homie* was also directly involved in their application by adjudicating disputes and enforcing its judgments. The *Prud'homie* performed the first task every Sunday after mass, and its jurisdiction extended to any fishing dispute that occurred over its territory. The procedure was as follows: The plaintiff would place two coins in a special box to summon the defendant to appear before the *Prud'homie* the following Sunday. Both parties would then present their respective arguments before the *Prud'hommes*, who would render their decisions immediately after the hearing. The process was entirely self-contained as decisions could not be appealed by the losing party before French state courts. The procedure was oral; the judgment was swift; and its enforcement was immediate: Most parties complied voluntarily with the judgments of the *Prud'homie* to avoid ostracism and the loss of social status (AD 250E1, 8 January 1512). However, losing parties did not always comply, and in such cases, a non-complying member could be excluded

from the community, stripped of his voting rights and/or exposed to public criticism. The *Prud'homie* also provided the possibility to fine non-complying fishermen starting in the 15th century (AD 250E6, 13 October 1431; AD 250E3, 7 April 1489) but did not implement that option until later in its history.

B. The *Prud'homie*: a CPI à la Ostrom

In light of the above, the *Prud'homie* appears to fulfil all the design principles for CPIs identified by Ostrom: its jurisdiction was limited to fishermen in a specific territory (design principle 1: clearly defined boundaries); the rules of the *Prud'homie* were tailored to the types of fishing techniques and species found in this territory (design principle 2: congruence between rules and local conditions); all members of the community were eligible to elect the members of the *Prud'homie* and to participate in the modification of the rules through discussions and votes (design principle 3: collective-choice arrangements); the *Prud'homie* monitored the behaviour of fishermen and their compliance with the collective rules (design principle 4: monitoring); it used a wide range of graduated sanctions, including fines, public criticism, deprivation of voting rights and group exclusion (design principle 5: graduated sanctions); the *Prud'homie* provided a full-fledged tribunal that met every Sunday after mass to solve conflicts arising among fishermen (design principle 6: conflict-resolution mechanisms); the French state recognized the autonomy of the court by forbidding state courts from hearing appeals of the judgments of the *Prud'homie* (design principle 7: minimal recognition of rights to organize); and some of the fishing techniques were categorised according to specific rules nested within the broader governance system (design principle 8: nested enterprises). Individuals in successful CPIs also display low discount rates; they value long-term gains more than short-term benefits (Ostrom, 1990:88). Although Ostrom did not add low discount rates to her list of “design principles,” she noted how design principle 1

169 (“clearly defined boundaries”) increases the long-term stability of the CPI, a key in maintaining
170 discount rates at low levels (Ostrom, 1990:91).

171 In light of the above, the *Prud’homie* appears to be a CPI as defined by Ostrom. In fact, the
172 rich archival record of the *Prud’homie* is replete with references to the long-term
173 management of the fishery, thus confirming Ostrom’s finding that this type of institution
174 actively engages in the preservation of natural resources. In addition, the fishermen of
175 Marseille created collaborative mechanisms akin to those examined by Ostrom to exploit the
176 fishing stocks. Consider, for instance, a traditional fishing technique used on the coasts of
177 Provence since the Middle Ages called *bregin*. This technique involves 15 to 20 fishermen who
178 split into two groups: one group stays on shore and secures one end of a net while the other
179 group boards a boat and unfolds the same net while circling back to the shore, where the net
180 is pulled by the entire crew (Baudrillart, 1827:75; AD250E2, 1725:47). *Bregin* can only be used
181 close to shores (Doynel, 1886:6-7; AD250E2, 1725:47) at shallow depths and on sandy beds
182 (so that rocks do not tear the nets), and it targets small fish such as anchovies or sardines
183 (Baudrillart, 1827:76). A collective action problem arose from the fact that fishermen could
184 only operate in a limited number of areas and would therefore compete over their occupation,
185 leading to a race to the best areas. To solve this collective action problem, the *Prud’homie*
186 designed rules to determine which fishing crew would have priority over these areas. The first
187 group of fishermen who declared an interest in a specific area would have priority over the
188 other groups, but once this group was done fishing, it would have to surrender its position to
189 the second group who had previously declared an interest in the area (AD250E2, 1725:6). The
190 ship’s boys gathered information concerning the “rank” of each group by circulating from
191 house to house every evening prior to the fishing day (AD250E2, 1725:6). These collaborative
192 mechanisms resemble those identified by Ostrom in Turkey, where fishermen took turns in

fishing zones by moving in a certain order, with the initial position of each fisherman determined through an annual lottery (Ostrom, 1990:18-21).

2. HYPOTHESIS

As briefly mentioned above, Ostrom found that long-enduring CPIs are characterised by a set of specific features which she called “design principles” (Ostrom, 1990:90). She also identified some of the difficulties that arise when one or several of these “design principles” are undermined, for instance in the context of globalisation (Ostrom et al., 1999). Building on Ostrom’s scholarship, this paper sheds light on these difficulties, and illustrates the ways in which CPIs might be affected when confronted with the early stages of globalisation.

Although the ultimate causes of globalisation are unclear, its symptoms and effects are relatively well identified. In particular, the increasing degrees of interdependence and the interactions prompted by economic globalization have intensified cross-border exchanges, which have, in turn, accelerated the speed and intensity of globalisation processes (e.g., (Archibugi & Iammarino, 2002)). These cross-border exchanges can be material or immaterial: goods, services, technologies and individuals swarm across borders in an age of globalisation. To test my hypothesis, I examine the ways in which the *Prud’homie* addressed two of these exchanges: the circulation of techniques, and labour migrations. In my view, both events can affect the cooperative basis of CPIs in ways that undermine their successful character (as measured by their ability to preserve the commons from overexploitation).

A. Technological innovations and social breakdown

The impact of new technologies on the depletion of fish populations have been well-documented in the literature (Pitcher, 2001; Kennelly & Broadhurst, 2002). Ostrom was also well aware of the potential effects of technological changes on CPIs; she pointed out, for instance, how “rapid changes in technology” could lead to a “threatened resource without

217 adequate institutional means to respond to the new incentives facing the fishers” (Ostrom,
218 1995:272-3). My first sub-hypothesis is that technological innovations can undermine the
219 cooperative equilibrium established within CPIs by threatening their “clearly defined
220 boundaries” (Ostrom’s first design principle).

221 New technologies that emerge *outside* of the fishers’ community (and do not necessarily
222 relate to fishery techniques) can impact insiders’ behaviour by creating new economic
223 opportunities outside of the CPI. Indeed, the “marginal opportunity cost of capital in
224 alternative investments” tends to grow in a “technologically expanding economy” (Clark,
225 1971:632). Ostrom stated that “[a]ppropriators who are involved in activities that take them
226 away from their [CPI] and into an economy in which other opportunities exist are most likely
227 to adopt a high discount rate than are appropriators who presume that they and their children
228 are dependent on the local CPR for major economic return” (Ostrom, 1990:206). In other
229 words, fishers may find it beneficial to accelerate the extraction process in order to invest the
230 resulting proceeds in other higher-yielding opportunities outside of the fishery (Clark et al.,
231 2010:215).

232 The operation of new technologies *within* the CPI might also affect insiders’ behaviour in
233 several ways. For instance, the use of new technologies can modify the perception by fishers
234 of short-term risks. It has been emphasised that a “[n]ew technology is assumed to be riskier
235 than that which has been well established, in that the usual market risks are compounded by
236 uncertainties in installation, throughput, performance and the like” (Ashford et al., 1988:638).
237 Higher risks typically result in higher discount rates (Lopez & Norris, 1997:132). In addition,
238 capital-intensive technologies might encourage fishermen (who usually lack financial capital)
239 to borrow funds on the outside market. Financiers might demand, in return, rates that are in

240 line with market rates, thus encouraging fishermen to increase the profitability of the fishery
241 (notably by increasing catch levels).

242 Both types of technological innovations could accordingly affect the “clearly defined
243 boundaries” of the CPI by encouraging (i) insiders to seek opportunities outside of the fishery
244 and (ii) outsiders to take part in the CPI’s activities (particularly when the technology is capital-
245 intensive). In other words, technological innovations, whether inside or outside of the CPI,
246 would affect its “clearly defined boundaries” by exposing it to the wider economy.

247 B. Labour migrations and “roving bandits”

248 My second sub-hypothesis is that labour migrations generated by globalisation also
249 undermine the cooperative equilibrium found in CPIs. More specifically, the arrival of foreign
250 workers who seek to participate in a CPI potentially undermines the first design principle set
251 out by Ostrom: it threatens the “clearly defined boundaries” of the CPI, understood as the
252 ability to exclude others from its exploitation (Ostrom, 1990:91). Ostrom discussed how
253 “[m]ajor migration (out of or into an area) is always a threat that may or may not be countered
254 effectively” and that “[i]n-migration may bring new participants who do not trust others and
255 do not rapidly learn social norms that have been established over a long period of time”
256 (Ostrom, 2000:153). This threat undermines the cooperative basis of CPIs, which rests upon a
257 perfect information hypothesis and allows the exclusion of defectors. CPIs cannot successfully
258 integrate new individuals whose past records are unknown to the group because participants
259 have to determine whether new entrants are defectors or cooperators before interacting with
260 them.

261 The literature on social cooperation anticipated this potential difficulty and emphasized how
262 close-knit communities such as CPIs address the arrival of outsiders by discriminating against
263 them. For instance, Axelrod demonstrated the optimal character of a cooperative strategy

called “tit for tat” and emphasized its “maximally discriminating” character (Axelrod, 1990:66-67): tit-for-tat players do not cooperate with defectors but choose to exclude them from the outset. On this basis, Axelrod argued that social groups generating “nice” cooperative strategies (such as CPIs) can resist the invasion of individual defectors or clusters of defectors (because their strategy is “maximally discriminating” against them) (Axelrod, 1990:66-69). In the language of economists, private orders erect “sizable entry barriers” that prevent new entrants from participating in the trade (Richman, 2017:74). Prior studies of private orders provide support for this contention: for instance, Robert Ellickson showed that Shasta County ranchers ignore or exclude “outsiders” who refuse to comply with local norms (Ellickson, 1991:56-64).

This paper takes a more nuanced view of the capacity of CPIs to resist the invasion of outsiders who defect from community norms. This view finds support in recent research that highlighted the possibility of minority groups overturning community norms when they reach a critical mass (Centola et al., 2018). My sub-hypothesis is that CPIs cannot resist the invasion of defectors unless their organizational features evolve. The key reason for this institutional fragility is that “clearly defined boundaries” are never perfectly impervious to migrations as CPIs cannot systematically deny entry to outsiders. This is particularly the case when underlying globalisation forces drive migration processes. In fact, social history is replete with examples of “roving bandits” who successfully invade local groups and “overwhelm the ability of local institutions to respond” (Berkes et al., 2006:1557). Some institutions have been able to respond to these external pressures by evolving towards “rule-based governance” (Dixit, 2006). They typically centralise information concerning new actors to preserve positive-sum games based on cooperation (Milgrom et al., 1990) and/or actively generate new social norms (Stone Sweet, 1999). Another successful strategy of “rule-based governance” is to rely on a

more constraining governance entity such as the state, which has the means of imposing solutions on defectors (e.g. Donda, 2017:150) or empowering local stakeholders with the coercive authority to do so (e.g. Stoffle et al., 1994:375). It is noteworthy in this regard that Ostrom included in her list of design principles the possibility for CPIs to obtain “minimal recognition of rights to organise” from the state (Ostrom, 1990:101) (design principle 7) and to be organised in “multiple layers of nested enterprises” (Ostrom, 1990:101-102) (design principle 8).

In sum, CPIs may not operate successfully when facing societal changes incurred by globalisation processes as these changes are likely to affect the features guaranteeing their successful operation. For instance, technological innovations may increase the porosity of the CPI towards the wider economy. Labour migrations may also undermine the cooperative basis of CPIs by bringing in new members whose past record is unknown to existing members. As will be further explored below, the data provide strong support for both contentions.

3. DATA, RESULTS, AND DISCUSSION

The archival data presented in this paper highlight two social events that directly arose from proto-globalisation: one is the import of a new fishing technique called *madraque* in the early 17th century, and the other is the arrival of migrant fishermen from Catalonia throughout the 18th century. Both events are used to test the above hypothesis concerning the impact of globalisation processes on CPIs. As explained in this section, these events constrained the cooperative basis underlying the operations of the *Prud'homie* in ways that led to the overexploitation of fishing stocks.

A. Technological innovation and the introduction of *madraques*

The first example concerns the emergence of a new fishing technology called *madraque*. This technology was used to capture Atlantic bluefin tuna in various parts of the Mediterranean

313 Sea prior to the 17th century (Braudel, 1972:258), and it first appeared in Marseille in the early
314 17th century (AD 250E2, 1725:145). A *madrague* is a gigantic fish trap made of fixed nets that
315 can spread over a length of 275 m (AD 250E2, 1725:143) and is placed relatively close to the
316 coast (300 to 450 m away from the shore), to which a single net is connected (Baudrillart,
317 1827:275). *Madragues* are placed in the current, and they direct tuna towards a succession of
318 net compartments. When the fish are trapped in the last compartment of the *madrague*
319 (sometimes called the “chamber of death”), fishermen use an elaborate system of nets to
320 bring them up to the surface and capture them. Figure 1 depicts one of the *madragues* used
321 in Marseille in the 18th century.

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324 Figure 1 about here
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328 *Madragues* emerged in Tunisia before spreading to Spain and the south of France (Faget
329 2017:127), and they circulated in the Mediterranean region as technologies spread during
330 proto-globalisation (Braudel, 1973:763). The term *madrague*, which comes from a Spanish
331 word (*almadraba*) that is itself derived from Arabic (and probably from the Greek μάνδρα, the
332 “enclosed space” or “sheep barn” and the Latin aqua, “water”) bears traces of this
333 cosmopolitanism (Faget, 2017:126; Gourret, 1894:245).

334 A single *madrague* could capture up to 800 tuna during their migration periods (over the
335 summer). In addition, the tuna could be kept alive in the *madragues* for some time, allowing
336 fishermen to sell the stock progressively (and control market prices) (Gourret, 1894:266-7).
337 For these reasons, the *madragues* became extremely popular throughout the course of the
338 17th century.

In this context, the *Prud'homie* decided to set up a first *madrague* in a natural harbour called *Morgiou* (south of Marseille) in 1619 (AD 250E4, 28 July 1619:31) and a second one in another location called *l'Estaque* (north of Marseille) in 1623 (AD 250E4, 6 January 1623:64). However, the organization of the *madragues* quickly raised significant collective action problems. The main challenge raised by the *madragues* was financial: although the *madragues* could capture a high number of tuna, their construction and maintenance were extremely costly and required significant liquidity. For instance, the construction of *madragues* necessitated a significant number of nets and cork to set up the traps. The community also had to buy a house and a tract of land to store the materials necessary for the *madragues* (AD 250E4, 6 January 1623:64). These important costs combined with the prospect of big catches made freeriding more appealing. The *Prud'homie* explored two governance models to resolve these difficulties, but both were relatively unsuccessful and gravely undermined the cooperative basis of the fisher community, ultimately leading to the waste of tuna stock.

1. *The equalitarian model*

The first governance model was based on a shareholding system. When the *Prud'homie* decided to construct a *madrague* in *Morgiou*, it determined that each fisherman who owned a boat was entitled to a single share in the *madrague*. This system gave the fishermen equal shares in the profits but also required them to contribute equally to the costs. This model sought to preserve the cooperative basis of the community by implementing an equality rule among the fishermen: all social actors would be equally entitled to the profits. However, all the fishermen could not contribute equally to the *madragues* because they did not have the same financial means. As a result, the question quickly arose as to whether an equality rule was sustainable for the future of the *madragues*. For instance, in 1620, the community discussed whether fishermen should hold one share in the *madragues* or if they could obtain

363 additional shares on the basis of their personal wealth and ability to contribute financially (as
364 measured by the number of boats they owned) (AD 250E4, 5 January 1620:33). The result of
365 this debate shows the strength of the institutional path dependence in CPIs: although the
366 second shareholding structure was more optimal for addressing the important costs
367 generated by the *madragues*, the community maintained the equalitarian rule (one share per
368 fisherman, whether he owned one or several boats) to preserve its cooperative basis. For
369 instance, in 1625, 172 fishermen (arguably the entire community) held shares in the
370 *madragues* (AD 250E4, 5 January 1620:33).

371 However, this policy was highly ineffective because the fishermen were unable to contribute
372 equally to the *madragues*, and negative social outcomes arose very quickly: in 1625, the
373 *Prud'homie* reported the "great losses" incurred by the *madragues* and a cumulative debt of
374 6,750 livres (AD 250E4, 19 January 1625:81). The community was in dire need of cash, as
375 demonstrated by an attempt to force a rich fisherman (Jean-Antoine Bauduf) to financially
376 contribute to the *madragues* in 1629 (AD 250E4, 14 June 1629:106). In 1635, the community
377 allowed the *Prud'homie* to resort to borrowing to finance the increasing costs (AD 250E4, 22
378 April 1635:149), and in every subsequent year, the *Prud'homie* sought express authorization
379 from the community to solicit financial loans.

380 Until 1640 (AD 250E4, 5 February 1640:170), the *Prud'homie* maintained this model based on
381 an equal shareholding structure, notwithstanding the grave financial consequences. In 1636,
382 the debt had grown to 24,900 livres (AD 250E4, 9 March 1636:157) and caused an acute
383 political crisis. In 1636, King Louis XIII placed the *Prud'homie* under his direct control and
384 stepped into the election process to install new members of the *Prud'homie* responsible for
385 clearing the debts of the community (AD 250E4, 9 March 1636:157). It then became crucial to
386 explore another governance model.

2. The tenancy model

After 1640, the *Prud'homie* abandoned the shareholding system and explored a second governance model based on tenancy. At that time, the debts of the *Prud'homie* had reached unprecedented levels, up to 39,000 livres. It was vital to create a new governance model that could externally displace some of these costs. The tenancy model presented such an advantage: it allowed the *Prud'homie* to rent the *madragues* to an individual, thus generating rental income and decreasing its operational costs. However, this model also relocated the significant financial income generated by the *madragues* outside of the community: the tenant generated its own income by selling the tuna captured in the *madragues*. The whole CPI would therefore lose its monopoly on the exploitation of the resource, and would be increasingly exposed to the wider economic system. The emergence of the *madragues* forced the community to open to outsiders who were more likely to be able to pay significant rental costs than were fishermen who often faced liquidity problems. Alternatively, only the richest fishermen could afford to rent the *madragues*, resulting in increased inequality within the community. My argument finds support in financial data concerning the leasing of the *madragues* between 1640 and 1688, which are presented in Table 1 below.

Table 1 – The Tenancy Model (1641-1688)

Period	1641-1654	1659-1663	1664-1670	1670-1676	1676-1682	1682-1688
Lessee	Jean Broulhard	Jean Maïousse	Jean Bauduf	JB Jourdan	Pierre Giboin	Pierre Alleman
Insider/Outsider	Outsider	Insider	Insider	Insider	Outsider	Outsider
Price (per year)	2,964 livres	4,200 livres	7,200 livres	12,000 livres	8,625 livres	6,035 livres

The *Prud'homie* first leased the *madragues* to an outsider named Jean Broulhard in 1640 (for a period of 14 years) (AD 250E30, 9 November 1640:11). The tenancy consisted of a flat fee of 41,500 livres, which covered the debts of the community (39,000 livres), and a small additional payment of 2,500 livres (or a yearly fee of 2,964 livres). However, Broulhard quickly

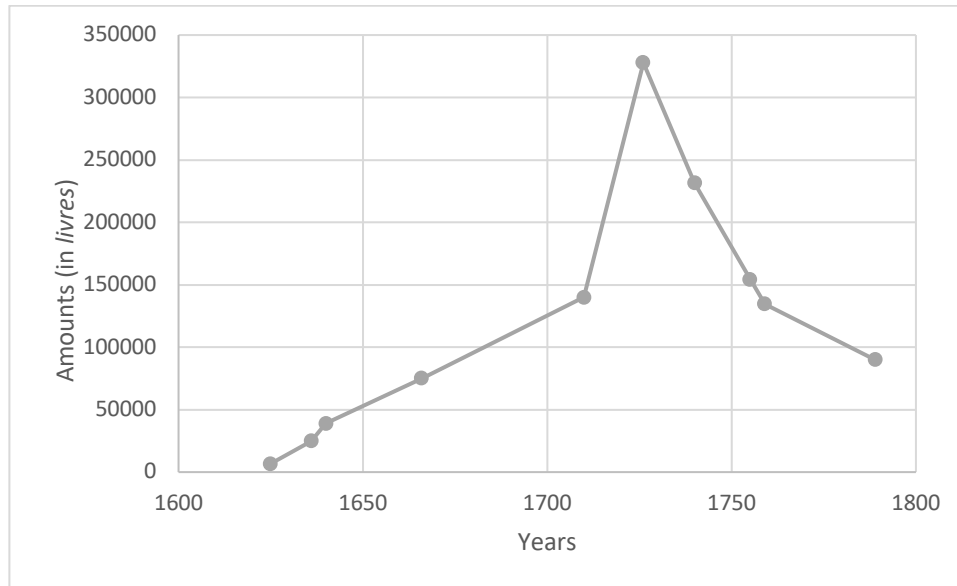
transferred his tenancy rights to three other community outsiders (Messrs. De Gastines, Martin and Durand). For reasons that do not appear in the records, the *Prud'homie* did not maintain this first tenancy for very long, and it recovered the rights to exploit the *madragues* in 1645 (AD 250E31, 9 May 1645:1). It is likely that the *Prud'homie* did so in order to re-assert the community's rights over the exploitation of the resource. However, the community was then placed in the same situation as before 1640, as it again had to subsidize the financial costs of the *madragues*: In 1657, a document from the *Prud'homie* reports "important charges and expenses" incurred by the *madragues* (AD 50E4, 7 January 1657:205). In 1659, the *Prud'homie* again turned to the tenancy model and entered into a second five-year tenancy agreement (from 1659 until 1663) with a prominent community member named Jean Maïousse for a price of 4,200 livres per year (AD 250E31, 7 January 1659:74). During a first time period (from 1659 until 1676), community insiders (fishermen) leased the *madragues* at prices that consistently increased (from 4,200 livres/year to 12,000 livres/year). However, during a second time period (from 1676 until 1688), the *Prud'homie* leased the *madragues* to community outsiders (a master tailor and a boilermaker) at prices that decreased (from 8,625 livres/year to 6,035 livres/year). It is clear that the *Prud'homie* tried but did not succeed in maintaining a monopoly on the *madragues*.

3. Growing debt, conflict and social disintegration

One would expect to see a decrease in the community's debt under the tenancy model due to the externalization of maintenance costs. However, this was not the case: the debts of the *Prud'homie* continued to grow at a rapid pace (see Figure 2), reaching 6,750 livres in 1625, 75,000 livres in 1666, 140,000 livres in 1710 and 327,789 livres in 1726. In other terms, the *Prud'homie's* debt was multiplied by a factor of 49 in one century (1625-1726), and by more than two in 16 years (1710-1726) (I disregarded inflation rates as inflation was negligible over

the relevant time period in France (Poitrineau, 1990)). The financial situation of the *Prud'homie* would only stabilise and improve around the mid-18th century, after the royal administration placed it under its direct tutelage.

Figure 2 – The Debts of the *Prud'homie de pêche* (1625-1789)



To explore the structure of this debt, I have collected data concerning 136 financial loans taken out by the *Prud'homie* between 1645 and 1788 (AD 250E94; AD 250E41; AD C2335). A review of these loans shows that creditors of the *Prud'homie* comprised not only prominent community members but also outsiders (such as various religious institutions and rich individuals). In other words, the *madragues* forced the *Prud'homie* to borrow funds, which increased the porosity of the community to the wider economy. In addition, the interest rates offered by the *Prud'homie* to its lenders ranged between 4 and 5%, which was comparatively lower than market rates (between 8 and 9%) and state loan rates (between 6.65 and 13.62%) (Weir, 1989). In this context, local fishers might have considered that a rapid exploitation of the stock (followed by reinvestment of the proceeds in the broader markets) was more advantageous to them than the long-term exploitation of the fishery. Subsequent events that are described below provide support for this argument.

451 The inexorable deterioration of debt levels can be explained by the fact that community
452 insiders progressively ceased benefiting from the *madragues* after 1676. While the
453 *Prud'homie* externalized its costs and received rental income, it no longer benefited from tuna
454 fishing. Another reason bears additional relevance here. The debt appears to have increased
455 rapidly because of a long string of cases before the royal courts that arose directly from the
456 management of the *madragues*. These cases were extremely costly for the community. For
457 instance, the *Prud'homie* took out a loan in 1635 to cover its litigation costs (AD 250E4, 22
458 April 1635:149). These cases show the disruptive effects of the *madragues* on the *Prud'homie*,
459 which was no longer able to resolve conflicts internally but had to turn to (and defend itself
460 before) an external authority. I have identified nine cases involving the *Prud'homie* in
461 connection with the *madragues* between 1624 and 1678. These cases fall into two categories:
462 the first category of cases arose out of the efforts of outsiders to participate in and reap the
463 benefits of the *madragues* (and the corresponding efforts of the *Prud'homie* to maintain its
464 monopoly thereon), and the second category concerned disputes related to the tenancy
465 agreements.

466 Court cases falling under the first category resulted from the attractiveness of the *madragues*
467 to rich outsiders and the corresponding efforts of the *Prud'homie* to maintain a monopoly on
468 their exploitation. Some outsiders sought to benefit from the shareholding system established
469 between 1623 and 1640, while others solicited the royal authority in order to set up their own
470 *madragues*. In all the cases, the *Prud'homie* aggressively asserted its rights over the
471 *madragues* by suing the outsiders, but it was unable to do so via its own court system and had
472 to resort to the royal courts. For instance, the *Prud'homie* sued four individuals who
473 pretended to be fishermen to obtain shares in the *madragues* (on the basis that each
474 fisherman was entitled to an equal shareholding) in 1623 and 1624 (AD 250E191). The case

475 was brought before the administrative authority in Marseille (*Lieutenant de l'Amirauté*) and
476 then before the royal courts in Aix (*Parlement de Provence*). Even more challenging for the
477 *Prud'homie* were the efforts of members of the aristocracy to install additional *madragues* in
478 Marseille (sometimes with the explicit approval of the King (AD 250E32, 29 June 1643:96)).
479 The *Prud'homie* reacted internally by expelling any fishermen who would assist rich outsiders
480 with the construction and maintenance of the new *madragues* (AD 250E4, 4 January
481 1632:125), but this was insufficient to discourage the outsiders. As a consequence, the
482 *Prud'homie* initiated lengthy and costly proceedings before the royal courts (*Parlements*) in
483 Aix and Grenoble to prohibit the construction of the *madragues*. Overall, the proceedings
484 were unsuccessful for the *Prud'homie*: for instance, the royal court of Aix enjoined the
485 *Prud'homie* from preventing the construction of a new *madrague* north of Marseille (AD
486 250E32, 30 April 1646:108). Even when the courts sided with the *Prud'homie* (as was the case
487 in 1673 when they denied Dominique de la Crosse, a favourite of Queen Maria Theresa, the
488 possibility of setting up a *madrague* at Sormiou (AD 250E227, 29 May 1673)), additional
489 *madragues* would nonetheless appear on the *Prud'homie's* territory; the social pressure was
490 just too great for the *Prud'homie* to handle on its own.

491 The second category of cases highlights the concrete difficulties raised by the tenancy model.
492 The *Prud'homie* brought court cases against almost all of its tenants, demonstrating the
493 weaknesses of the tenancy model: the price of tenancy appeared to be too high (or the
494 duration of the tenancy too limited) for the tenants to obtain financial benefits. Three tenants
495 requested a price reduction on the basis that they could not generate sufficient profits to
496 recoup their costs, and one (Jean-Pierre Giboin) produced data showing his revenues and
497 expenses for 1676, 1677 and 1678 during his trial (AD 250E235:9). I reconstituted the financial
498 statement of the *madragues* between 1676 and 1678 in Table 2 below.

Table 2 – Financial Statement of the *Madragues* (1676-1678)

Year	Revenues	Expenses		TOTAL
		Operational costs	Rent	
1676	13,698	10,130	8,625	-5,057
1677	12,945	8,828	8,625	-4,508
1678	4,776	9,496	8,625	-13,345
TOTAL	31,419	28,454	25,875	-22,910

499

500 Table 2 shows that the tenant operated the *madragues* at a substantial loss between 1676

501 and 1678. Giboin accumulated a total loss of 22,910 livres during this time period. The income

502 generated by the *madragues* (31,419 livres) was sufficient to cover the operating costs (and

503 generate a profit) but insufficient when the rent was added. Another tenant (Jean Bauduf)

504 sought to increase the profitability of the *madragues* by raising the price of tuna, but he faced

505 another lawsuit initiated by the city of Marseille to maintain tuna prices at constant levels (AM

506 HH372, 20 September 1664).

507 The attractiveness of the *madragues* declined as lessees appeared increasingly unable to

508 maintain sufficient profitability to operate them. The situation came to a stalemate because

509 fishermen were unable to operate the *madragues* themselves (although they could arguably

510 have generated profits if they had sufficient liquidities to make the relevant investments), but

511 tenants could not generate sufficient profits because of the high rents. In 1688, the

512 *Prud'homie* reported that no one had made a bid to lease the *madragues* for the last year and

513 a half (AD 250E4, 18 January 1688:369). The solution came from a decrease in rent levels to

514 increase the profitability of the *madragues*. For instance, the rent for the *madragues*

515 amounted to 1,674 livres in 1717 (AD 250E256, 17 July 1719), and in 1735, only one individual

516 presented a bid at a steep discount (150 livres/year) (AD 250E4, 6 February 1735:392). As a

517 consequence, the tenancy model persisted until the 19th century, but it generated decreased
518 rental income for the *Prud'homie*.

519 Another important lawsuit was brought by the *Prud'homie* against Jean Maïousse (one of its
520 tenants between 1659 and 1663). In this lawsuit before the royal court of Aix, the *Prud'homie*
521 accused Maïousse and former members of the *Prud'homie* of engaging in a conspiracy to
522 divert the profits of the *madragues*. Maïousse signed his tenancy agreement in January 1659
523 (AD 250E31, 7 January 1659:74) but entered into a counter letter with 31 individuals (who
524 were arguably the real beneficiaries of the *madragues*) shortly afterward. These individuals
525 included all the members of the *Prud'homie* in 1659 and 13 members of the *Prud'homie* who
526 were elected between 1659 and 1662 (out of 16 members elected during this time period)
527 (AD 250E31, 18 May 1660:94-109). One of these individuals was the 4-year-old son of a
528 *Prud'homme* (AD 250E31, 18 May 1660:94-109). New members of the *Prud'homie* sued the
529 tenant in 1663, arguing that he conspired with these individuals to divert the profits of the
530 *madragues* (40,000 livres according to the complaint) and channel them back to those who
531 granted him the tenancy (AD 250E213, 1663). In 1663, the royal court of Aix ordered that the
532 tenancy be auctioned (AD 250E213, 14 March 1663). This lawsuit demonstrates the difficulty
533 of maintaining cooperation when the prospects of immediate gains associated with a new
534 technology modify the temporal horizon of CPI members. In economic terms, the discount
535 rate of these individuals increased: they started valuing the immediate gains potentially
536 generated by the *madragues* more than the long-term benefits derived from their sustained
537 cooperation within the CPI. The overrepresentation of community leaders among these
538 defectors demonstrates the great appeal of the *madragues* to the community and the
539 difficulty of preserving cooperation in this context.

In sum, the experimentation with the *madragues* was unsuccessful overall: it divided the community, threatened its independence vis à vis the royal authority, and posed a serious challenge to its finances. The inability of the *Prud'homie* to manage the arrival of a new technology also led to overexploitation of the commons, thus gravely undermining its core function as a CPI.

4. Resource waste: the collapse of the CPI

As explained above, the *Prud'homie* tried but failed to maintain a monopoly over the operation of the *madragues*. As a result, the number of *madragues* quickly increased throughout the 16th and 17th century. I have counted no less than ten *madragues* that were constructed within the territory of the *Prud'homie* during this time period (see also ACCI YC/2209, 1790:21). Only two of these *madragues* were controlled by the *Prud'homie* (although leased out to outsiders); seven others belonged to wealthy aristocrats; and one *madrague* belonged to the city of Marseille. In addition, the *madragues* were installed for increasingly longer durations throughout the year over time (from May until October in the 18th century to May until January in the 19th century) (MAR/C5/27-29). The proliferation of *madragues* seems to have had a negative impact on the tuna fishing stock. There are several reasons for this result. Atlantic bluefin tuna are a migrating species that are present throughout the Atlantic Ocean and the Mediterranean region. Fishing practices in a specific location should therefore have limited impact on a stock of fish that circulate throughout a large geographic area. In fact, this was one of the arguments raised by the *Prud'homie* to justify the installation of the *madragues* in the early 17th century (AD 250E2, 1725:146). However, Atlantic bluefin tuna reproduce in warm waters (22°C to 28°C, which typically corresponds to Mediterranean near-shore areas (Ellis, 2008:48)) during the spring and summer seasons (Ifremer, 2016). This period coincides with the tuna fishing season in

564 Marseille (Braudel, 1972:258), and *madragues* were typically established in areas close to the
565 coast. The *madragues* would therefore capture tuna at a key stage and in key areas in their
566 reproduction cycle, thus maximising the impact on the stock. In fact, there are several reports
567 of a collapse in tuna stocks beginning in the 17th century (Faget, 2017:138). In 1769, a
568 contemporary observer reported that the *Prud'homie* renounced the use of a *madrague*
569 because tuna had deserted the coast of Marseille (BNF Gallica, 7 April 1769:9). A municipal
570 report for the city of Marseille emphasized the “discontinuation and demise” of the
571 *madragues* because of the collapse of the tuna stock in 1870 (AD 6S10/3, 22 June 1870). In
572 the early 20th century, an official report stated that tuna had disappeared from the coasts of
573 Marseille, and the *madragues* were subsequently discontinued (AD 6S52/1, 25 February
574 1905).

575 Although it is difficult to highlight causal relationships in the evolution of fishing stocks (which
576 can be explained by a myriad of factors, including biological ones), it seems clear that the
577 *madragues* negatively impacted the stock of tuna. The *Prud'homie* was unable to preserve its
578 “clearly defined boundaries” and maintain a monopoly over the *madragues*, which resulted
579 in their proliferation and the over-exploitation of the fishing stock. In addition, the
580 intervention of outsiders and the division of the community appear to have modified the
581 behaviour of insiders, who seemed to favour short term profits over long term benefits (as
582 shown for instance by the attempts of the *Prud'homie* to divert the profits of the *madragues*).
583 In economic terms, individual discount rates within the fishery appear to have increased. The
584 introduction of the *madragues* in the Marseille fishery confirms Ostrom’s argument that CPIs
585 might be ill-equipped to handle changes incurred by globalisation, so they require support
586 from more traditional governance entities, such as the state, when facing these changes. In
587 the case of the *madragues*, however, the support of the state was wavering and insufficient

to cope with these changes. The arrival of Catalanian fishermen throughout the 18th century provides, I believe, even stronger support for this argument.

B. Labour migrations and the arrival of the Catalans

Beginning in the 1720s, the *Prud'homie* faced yet another challenge when groups of Catalanian fishermen progressively settled in Marseille. The reasons why these fishermen left Spain for France are unclear (Faget, 2012:160-1), but their settlement in Marseille was part of successive streams of migration that unfolded beginning in the late 16th century in an overpopulated Mediterranean Europe (Braudel, 1972:415-8). In other words, the arrival of Catalanian fishermen in Marseille is another manifestation of the proto-globalisation that occurred in the 17th and 18th centuries. The Catalans deeply affected the life of the *Prud'homie* in a context that was already challenging for the local fishermen: their finances had been gravely affected by the *madragues*; the *Prud'homie* even introduced a tax on the sale of fish (the so-called “half share”) in 1725 to bring its finances back into equilibrium; and finally, the fishermen suffered heavily from the Great Plague that struck the neighbourhoods surrounding the port of Marseille in the years 1720-1722. The Spanish fishermen quickly demonstrated their reluctance to abide by the norms of the *Prud'homie*. Therefore, the arrival of foreign fishermen in Marseille throughout the 18th century provides a useful case study of the invasion of a CPI by a group of defectors. After describing the scope of these migration processes, I will show that the *Prud'homie* had great difficulty addressing this arrival and offered unclear policy responses that oscillated between the exclusion and assimilation of these newcomers. My empirical observations contradict the dominant literature on the solidity of cooperative strategies when faced with an influx of defectors (Axelrod, 1990:66-7). I will then retrace the negative social outcomes of these ambiguous policy responses.

1. The arrival of the Catalans

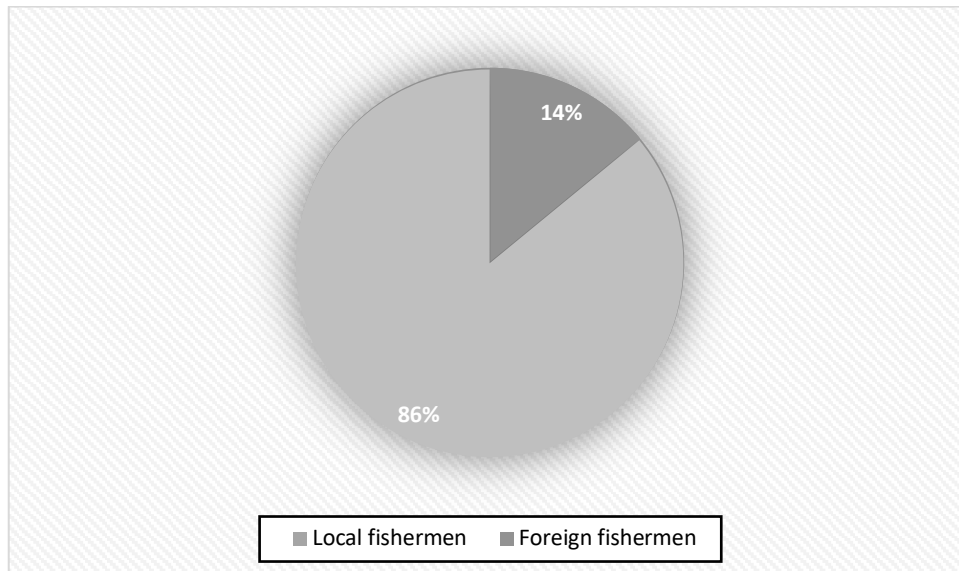
As stated above, Catalanian fishermen arrived in Marseille in successive migration streams starting in the 1720s. These migrations did not raise opposition on the part of the French state (probably because they were limited in size) and were even allowed following an alliance treaty with Spain in 1761.

The Catalonians settled in the southern part of the port of Marseille (while the local fishermen traditionally occupied the northern part). The competitive pressure exerted by these migrants over the CPI can be assessed by their relative number, but this assessment is rendered difficult by the lack of precise data concerning the population of Catalans who settled in Marseille. Faget reported the arrival of 39 Catalanian fishermen (presumably with their children and wives) between 1722 and 1792 on the basis of notary records (Faget, 2011:357). In contrast, the *Prud'homie de Pêche* reported the presence of 102 Catalanian boats with 812 crew members in 1787 (clearly an exaggeration based on political motivations) (AD 250E8, 1787:89).

However, the police department of Marseille provided a precise accounting of the population of Catalanian fishermen in 1826 (AM 18F6, 31 March 1826). It established a list of 117 individuals, the majority of whom (83 individuals) were born in Marseille. All the individuals listed by the police were fishermen (AM 18F6, April 1826). This estimate is consistent with my own accounting of the community based on an exhaustive review of the fishing boats based in the port of Marseille between 1816 and 1818 (ASHD 13/P10/3, 1819). My data set shows 22 Catalanian boats with 115 crew members (112 of whom were described as "Spanish"). This empirical evidence allows a comparison between the size of the Catalanian community and the overall community of local fishermen: the local fishermen operated 141 boats with 683 crew members. Therefore, the Catalanian fishermen represented 14% or 16% of the entire

community (depending on whether this proportion is measured by number of crew members or boats) approximately 100 years after their first arrival.

Figure 3 – The fishermen’s community in Marseille (1816-1818)



Although they do not allow one to track the demographic evolution throughout the 18th century, these figures provide a snapshot of the community and of its size immediately after the relevant time period (18th century). They show that the Catalan fishermen represented a non-trivial proportion of the entire population of fishermen in Marseille and that their arrival represented an invasion by a cluster of newcomers for the community (Axelrod, 1990:66-7). I will now assess the response of the *Prud'homie* to this invasion of new entrants.

2. The response of the Prud'homie: exclusion or assimilation?

The response of the *Prud'homie* to the progressive arrival of foreign fishermen throughout the 18th century is comparable to its management of the *madragues*: it shows a lack of long-term vision and an inability to manage conflicts arising within and outside the community. When they progressively settled in the territory of the *Prud'homie*, the Catalans played a classic freeriding game: they started fishing in the territory without paying the costs associated with the maintenance of the commons. For instance, the Catalans refused to pay

the tax imposed by the *Prud'homie* on the sale of fish (the “half-share”) and did not comply with its rules. In addition, the Catalans brought a fishing technique from Spain that was already practised in Marseille, although less intensively. This technique, called *palangre*, consisted of floating a long line to which several smaller lines and hooks were attached, but its practice by the Catalans differed from that by the fishermen in Marseille. For instance, the Catalans used smaller hooks than those allowed by the *Prud'homie*, resulting in the capture of smaller species and younger individuals (thus impacting the fishing stocks more aggressively). They also used their *palangres* further from the shore due to their use of boats (Faget, 2011:45-8) that were narrower and faster than the boats used by the local fishermen and could therefore cover more distance in the same day. Figures 4 and 5 allow the reader to compare the types of boats used by local and foreign fishermen based on old drawings (AN MAR/C/4/178, 1785), and it can be seen that the boats used by local fishermen were wider than the ones used by foreign fishermen, which made them more stable but slower than the Catalanian boats. As a result, the local boats were suitable for coastal, net-based fishing (the preferred technique of the local fishermen, as highlighted in Section 1.B) while the Catalanian boats were particularly fit for *palangre* fishing further from the coasts.

Figures 4 & 5 about here

In other words, the Catalanian fishermen used more aggressive fishing techniques based on their equipment and boats which presented yet another challenge for the long-term preservation of the fishery resources. In this sense, the arrival of the Catalanian fishermen could be likened to a technological shock comparable to the emergence of the *madragues* in the 17th century.

682 In addition to using more aggressive fishing techniques, the Catalan fishermen also refused
683 to abide by the fundamental rules of the *Prud'homie*, such as the prohibition on fishing on
684 Sundays and the obligation to submit to the jurisdiction of its court on that day. Therefore,
685 the arrival of the Catalan fishermen within the territory of the *Prud'homie* provides a
686 concrete case study of a CPI faced with an invasion of defectors. The prior scholarship on the
687 subject teaches us that CPIs typically exclude defectors to maintain control over their territory
688 and preserve their long-term commitment to the preservation of resources. The case of the
689 *Prud'homie* evidences a more complex response from a CPI that combined strategies of
690 exclusion and assimilation without a clear vision for the way forward.

691 The *Prud'homie* first reacted to the arrival of Catalonians by seeking to exclude them from the
692 fishery. Shortly after the arrival of the first such migrants in the 1720s, the *Prud'homie* noted
693 the negative effects of *palangres* on the fish stock and began prohibiting the use of small
694 hooks. For instance, a document from 1727 reflects the concerns of the *Prud'homie* over the
695 fishing practices of the Catalans:

696 It has been only since 1722 that they [the *Prud'hommes*] have been scandalized to see
697 foreigners from Catalonia come in their seas with *palangres* furnished with small
698 hooks. The *Prud'hommes*, seeing the harm done to the seas by taking away small fish
699 through the use of small hooks, renewed their prohibitions and their regulation
700 according to which only hooks that are numbered 13 or 14 and that cannot harm [the
701 fish stocks] can be used for *palangre*. (AD 250E2, 1725:45)
702

703 The archival record also shows that the *Prud'homie* was unable to independently manage the
704 activities of foreigners who did not comply with their regulations. They quickly turned to the
705 French state to exclude the Catalonians from the fishery (without success). For instance, a
706 letter from the Ministry of Naval Affairs (De Maurepas) to its delegate in Marseille dated 15
707 November 1735 mentions a request from the *Prud'homie* to regulate the *palangres* (with the
708 ultimate goal of excluding the Catalans from the fishery):

709 [...] by forcing the Catalans to fish with boats and nets similar to those used by the
710 fishermen in Marseille and to have the same number of crew members, it is believed
711 that they will no longer fish with *palangres* on their coasts in order to avoid the
712 expenses incurred by new boats and new nets [...] (AD 250E5, 15 November
713 1735:320bis)

714
715 Another example of the *Prud'homie's* discriminating strategy concerned the attempts by the
716 Catalans to dry their fishing nets in locations used by the local fishermen and the subsequent
717 steps taken by the *Prud'homie* to exclude the Catalans from these locations (AD 250E276, 19
718 September 1777).

719 However, this exclusion strategy failed entirely as it became evident that the Catalanian
720 fishermen would stay in Marseille. The *Prud'homie* became overwhelmed by the competition
721 from a foreign group that rejected its rules and jurisdiction, so it attempted to assimilate the
722 group instead of excluding it. In fact, these foreign fishermen progressively became
723 indispensable to the supply of food for the city of Marseille. By supplying more (and arguably
724 better) fish, the Catalans were able to attract the sympathy of local stakeholders such as the
725 municipal administration of Marseille. On 7 November 1790, the city council issued a
726 declaration defending the Catalanian fishermen on the basis that they could be credited with
727 the "affluence of better fish" in the previous 50 years (AM 18F6, 7 November 1790). In this
728 context, the *Prud'homie* combined its discriminating strategy with an assimilation strategy
729 that consisted of attempting to encourage the Catalans to submit to its jurisdiction and rules.
730 For instance, the *Prud'homie* tried to force the Catalans to pay the "half-share," its special tax
731 on the sale of fish (see, e.g. AD 250E5). To bring the Catalans under its jurisdiction, the
732 *Prud'homie* actively sought the support of the French state by building a de facto alliance with
733 the royal authority. The Council of the King, which was the main advisory body, rendered no
734 less than 5 decisions between 1738 and 1786 to clarify the powers of the *Prud'homie* over the
735 Catalans. The King even sent a special envoy to Marseille, Mr. de Chardon, who was

responsible for regulating the fishing techniques (particularly the *palangre*) and resolving the disputes between the French and Catalan fishermen. The *Prud'homie* also initiated expensive trials against the Catalans before the royal courts. For instance, the *Prud'homie* sued the Catalan fishermen who used the *palangre* before the royal court of Aix in 1774 (AD 250E276). This trial is symptomatic of an institution that was no longer able to internally manage its disputes. At the same time, the *Prud'homie* actively lobbied public officials to advance its cause vis-à-vis the Catalans. These lobbying activities included gifts (usually tuna (AD 250E4, 8 September 1740)), the organization of festivals for public officials (AD 250E39, January 1743), and the preparation of written memorials in support of their position (AD 250E36, 1786). For the latter activity, the *Prud'homie* enjoined the services of numerous lawyers including Portalis, one of the leaders of the bar and the main drafter of the future Civil Code (AD 250E8, 1787:146). All these steps were intended to assert the jurisdiction of the *Prud'homie* over the Catalans by seeking the support of the state. The Statute of 12 December 1790 eventually gave satisfaction to the *Prud'homie* by submitting the Catalans to its jurisdiction and the payment of the “half-share” tax as well as granting them the same rights as local fishermen (for instance, the right to be elected as a member of the *Prud'homie*) (ACCI E/159, 12 December 1790). However, the support of the French state either came too late, or was effectively undermined by the revolution that was raging in France at the time. In fact, these measures that favoured the assimilation of the Catalans were ineffective as they persisted in forming a separate community in the subsequent decades and continued disobeying the rules of the *Prud'homie* (e.g., AM 18F6, 11 January 1817).

The overlap of various strategies vis-à-vis the Catalans caused widespread confusion within and outside the community. The difficulties raised by the arrival of outsiders who refused to comply with communal norms and brought more effective fishing techniques had a direct

760 impact on the community's management of common resources. It generated increased
761 competition both within and outside the community and led to the deterioration of the fishery
762 resources.

763 3. *Social outcomes: increased competition and deterioration of natural*
764 *resources*

765
766 As shown above, the *Prud'homie* was overwhelmed by the arrival of outsiders, and it
767 demonstrated its inability to govern the fishery under these circumstances. Some
768 contemporaneous reports depict the utter desolation of the *Prud'homie* when faced with the
769 repeated breaches of its rules by the foreign fishermen:

770 All those breaches are frequent, as are the violations of rules. They [the Catalans]
771 practice pit-lamping during the night, despite its prohibition under the laws of the
772 fishery. They never pay the "half-share" [the tax imposed by the *Prud'homie*], although
773 they recognize to be subjected thereto. The prohibition to fish on Sundays and holidays
774 does not stop them. In particular, they avoid leaving [the port] with local fishermen on
775 Sunday night in order to take their fishing spot [...] and are always one step ahead of
776 them: they are where they choose to be, occupy the fishing spots as they wish against
777 the laws of cooperation and equality which they breach without hesitation. The
778 negative consequences are significant. The escape of fish and their near destruction
779 are the least of them. What is even more noteworthy are the injured equality, the
780 insubordination, and the disorder and disastrous consequences of this insubordination
781 (AD 250E36, 1786:6).

782
783 The *Prud'homie* subsequently faced a collapse of the cooperative basis that until then had
784 supported its operations and maintenance. This social collapse primarily concerned the
785 relationship between the *Prud'homie* and the Catalans. As shown above, the Catalanian
786 fishermen were perceived as a threat. An unintended consequence of this perception was the
787 decline of the *Prud'homie's* legitimacy in governing the fishery: For instance, the city council
788 of Marseille stated in 1790 that the *Prud'homie* was no longer able to govern the fishery as
789 the Catalans were "necessarily their rivals" (AM 18F6, 7 November 1790).

790 In addition, the increased competition impacted the inner life of the community. The
791 emergence of a rival group of foreign fishermen who successfully competed with the

792 *Prud'homie* relegated the local fishermen to a secondary role and caused tension within the
793 community. This social disorder arose out of the practice of *palangre*, the fishing technique at
794 which the Catalans excelled. This technique targeted relatively large fish and made use of
795 smaller fish (typically sardines) as bait. Because of the efficiency and success of the Catalans,
796 the local fishermen progressively found themselves relegated to the role of suppliers of
797 sardines for the *palangre*. When the *Prud'homie* sought to prohibit the sale of sardines to the
798 Catalans, it quickly faced opposition within its own ranks because of the profits generated
799 through these sales (Faget, 2011:61). The superiority of the fishing techniques used by the
800 Catalans also encouraged the local fishermen to imitate the foreigners rather than pursue
801 their traditional activities. In a decision of 20 March 1786, the Council of the King implemented
802 a series of measures aimed at encouraging the local fishermen to practice *palangre*: those
803 who expressed a wish to fish with *palangres* would be given a boat, an exemption from the
804 "half-share" tax for three years, and an exemption from military service (ACCI E/159, 20 March
805 1786). The royal authority thus intervened directly to encourage the local fishermen to
806 address the competitive pressure exerted by the Catalans, and the *Prud'homie* also supported
807 this policy by allocating 8,000 livres for the purchase of lines for local fishermen who wished
808 to practice *palangre* (AD 250E8, 1787:52). This policy, which was ultimately unsuccessful
809 (Faget, 2011:78-9), demonstrates the weakness of a CPI faced with outside competition and
810 the impact of this competition on the cooperative nature of social relations within the CPI.
811 This increased competition, both within and outside the CPI, had a direct impact on the
812 preservation of natural resources. As with the *madragues*, it is difficult to retrace the impact
813 of a single set of historical events on the evolution of the fishing stock. It is clear, however,
814 that the increased competition between social groups favored prisoner's dilemma games in
815 which each group prioritized short-term gains over long-term profits. The repetition of social

interactions that solve the prisoner's dilemma (Milgrom et al., 1990) is premised on a level of cooperation that is deeply undermined by social conflicts. The arrival of foreigners, who arguably had a shorter temporal horizon than the locals (and therefore had additional incentives to extract resources more rapidly), compounded the problem. This situation translated to the use of more aggressive extraction techniques by the fishermen and an overall decline in the fishing stock. As a matter of fact, each group of fishermen accused the other of using aggressive fishing techniques, resulting in the decline of the fishery resource. As shown above, the *Prud'homie* accused the Catalans of using smaller hooks, operating at night and competing over the best fishing locations without abiding by the sequence rules implemented within the community. All these bad practices led, according to the *Prud'homie*, to the deterioration of the fishery resource (AD 250E36, 1786:11-12). Conversely, the Catalans accused the local fishermen of using dragnets that destroyed the seabed (including younger fish and fish eggs), thus leading to the deterioration of the fishery (ACCI YC/2209, 1790:29). Their argument found additional support in the reports of contemporary observers concerning the negative effects of dragnets in Marseille (BNF Gallica, 7 April 1769:23). The emergence of dragnets coincided with the arrival of the Catalans, and one could hypothesize that the use of aggressive techniques by the local fishermen was an attempt to keep up with the outsiders.

CONCLUSION

The present paper explores the ways in which globalisation processes can affect the functioning of CPIs. For that purpose, the data are focused on a CPI (the *Prud'homie*) at a time described by historians as "proto-globalisation," when the early effects of globalisation were felt across the Mediterranean. On the basis of these data, the paper casts light on two events that arose out of proto-globalisation: the emergence of a new fishing technique called

840 *madrague* in the 17th century and the arrival of foreign migrants who disobeyed the rules of
841 the *Prud'homie* in the 18th century. Those events directly affected the *Prud'homie's* ability to
842 preserve its "well defined boundaries," a distinguishing feature of successful CPIs according
843 to Ostrom. The paper therefore illustrates the social breakdown that arose from the early
844 globalisation and the inability of a CPI to address the primary task for which it was formed:
845 the long-term governance of the commons and the successful allocation of the fishery
846 resource.
847

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REFERENCES

Archives:

ACCI: Archives of the Marseille Chamber of Commerce (*Archives de la Chambre de commerce et d'industrie de Marseille*)

AD: Archives of the *Bouches-du-Rhône* (*Archives départementales des Bouches-du-Rhône*)

AN: National Archives (*Archives nationales*)

AM: City Archives (*Archives municipales de Marseille*)

ASHD: Military Archives (*Archives du Service historique de la défense de Toulon*)

BNF Gallica: National Library Electronic Archives (*Archives Gallica de la Bibliothèque nationale de France*, <http://gallica.bnf.fr/accueil/?mode=desktop>)

Bibliography:

Acheson, J. M. (2003). *Capturing the Commons – Devising Institutions to Manage the Maine Lobster Industry*. Lebanon, N.H.: University Press of New England.

Archibugi, D. & Iammarino, S. (2002). The globalisation of technological innovation: definition and evidence. *Review of International Political Economy* 9, 98-122. doi: 10.1080/09692290110101126

Axelrod, R. (1990). *The Evolution of Cooperation*. New York: Penguin Books.

Baudrillart, J.-J. (1827). *Traité général des eaux et forêts, chasses et pêches* (vol. 9). Paris: Arthus Bertrand.

Berkes, F. (1986). Local-level management and the commons problem: A comparative study of Turkish coastal fisheries. *Marine Policy* 10: 215-229.

Berkes, F., Hughes T.P., Steneck, R.S., Wilson, J.A., Bellwood, D.R., Crona, B., Folke, C., Gunderson, L.H., Leslie, H.M., Norberg, J., Nyström, M., Olsson, P., Österblom, U., Scheffer, M. & Worm, B. (2006). Globalisation, Roving Bandits, and Marine Resources. *Science*, 311, 1557-1558.

Braudel, F. (1972). *The Mediterranean and the Mediterranean World in the Age of Philip II*. Vol. 1. Berkeley: University of California Press.

----- (1973). *The Mediterranean and the Mediterranean World in the Age of Philip II*. Vol. 2. Berkeley: University of California Press.

Centola, D., Becker, J., Brackbill, D., & Baronchelli, A. (2018). Experimental Evidence for Tipping Points in Social Convention. *Science*, 360, 1116-1119.

Dixit, A. K. (2006). *Lawlessness and Economics – Alternative Modes of Governance*. Princeton, N.J.: Princeton University Press.

Donda, S. (2017). Who benefits from fisheries co-management? A case study in Lake Chiuta, Malawi. *Marine Policy*, 80, 147-153.

Doynel, L. (1886). *Les Prud'homies de Patrons Pêcheurs de la Méditerranée*. Paris: L. Baudoin et Cie.

Ellickson, R. C. (1991). *Order without Law: How Neighbors Settle Disputes*. Cambridge, Mass.: Harvard University Press.

Ellis, R. (2008). *Tuna: Love, Death, and Mercury*. NY: Vintage Books.

Faget, D. (2011). *Marseille et la mer – Hommes et environnement marin (XVIIIe-XXe siècle)*. Rennes: Presses universitaires de Rennes.

----- (2012). Maîtres de l'onde, maîtres des marchés et des techniques: les migrants catalans à Marseille au XVIIIe siècle (1720-1793). *Cahiers de la Méditerranée* 84, 159-172.

----- (2017). *L'écaille et le banc – Ressources de la mer dans la Méditerranée moderne XVIe-XVIIIe siècle*. Aix-en-Provence: Presses universitaires de Provence.

Hardin, G. J. (1968). The Tragedy of the Commons. *Science*, 162, 1243-1248.

Hopkins, A. G. (2002). *Globalisation in World History*. London: Random House.

Ifremer (December 12, 2016). *Le thon rouge Atlantique*. Retrieved from https://wwz.ifremer.fr/content/download/41835/file/DP-thon-rouge-2017_MiseAJour.pdf

Lapierre, M. (1939). *Les prud'hommes pêcheurs marseillais de leur origine à la Révolution*. Aix-en-Provence: F. Chauvet.

Lopez, F. A., & Norris, P. E. (1997). The Economics of Natural Resources. In N. Mercuro (Ed.), *Ecology, Law and Economics – The Simple Analytics of Natural Resource and Environmental Economics* (2nd ed.) (pp. 125-160). Lanham, MA: University Press of America.

Ostrom, E. (1990). *Governing the Commons – The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press.

----- (1995). *Understanding Institutional Diversity*. Princeton, N.J. and Oxford: Princeton University Press.

Ostrom, E., Burger, J., Field, C. B., Norgaard, R. B. & Policansky, D. (1999). Revisiting the Commons: Local Lessons, Global Challenges. *Science*, 284, 278-82.

Poitrineau, A. (1990). Prix. In F. Bluche (Ed.), *Dictionnaire du Grand Siècle* (pp. 1258-1259). Paris: Fayard.

Rose, C. M. (2011). Ostrom and the lawyers: the impact of Governing the Commons on the American legal academy. *International Journal of the Commons*, 5, 28-49.

Richman, B. D. (2017). *Stateless Commerce – The Diamond Network and the Persistence of Relational Exchange*. Cambridge, Mass.: Harvard University Press.

Sassen, S. (2006). *Territory. Authority. Rights – From Medieval to Global Assemblages*. Princeton, N.J. and Oxford: Princeton University Press.

Saunders, F. P. (2014). The promise of common pool resource theory and the reality of commons project. *International Journal of the Commons*, 8, 636-656.

Stoffle, R. W., Halmo, D. B., Wagner, T. W. & Luczkovich J. J. (1994). Reef's from Space: Satellite Imagery, Marine Ecology, and Ethnography in the Dominican Republic. *Human Ecology*, 22, 355-378.

Stone Sweet, A. (1999). Judicialization and the Construction of Governance. *Comparative Political Studies*, 32, 147-184.