

**The Organization of Rome's Wine Trade**

**by**

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## Chapter I Introduction

### “Wandering Drunk on the Shore”

Roman authors cared little about the drinking habits of Rome’s general population.<sup>1</sup> There was no Roman Charles Buxton, who in an 1868 jeremiad against drunkenness, argued that, “the best thing...for the improvement of the morals of the working classes...was the closing of the public houses on the Saturday night” and that “undoubtedly the State can do much to lessen the temptation to drunkenness.”<sup>2</sup> The upper-class Romans declaimed through their silence a rousing “who cares” when responding to the habits (drinking and otherwise) of the lower social orders. Nevertheless, glimmers of light emerge from that general obscurity and make clear that, as in later societies, drinking in quantity was commonplace among Rome’s population by the high Classical age.

This silence on lower-class drinking initially seems especially surprising because Roman authors certainly observed and at times criticized alcohol’s effects on their peers. As early as the mid-2<sup>nd</sup> century BCE, a certain Gaius Titius argued for the passage of the *Lex Fannia*, a sumptuary law, because so many men were carrying out business in the Forum while drunk.<sup>3</sup> Cicero likewise inveighed against his opponents by accusing them

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<sup>1</sup> Noted by D’Arms (1995: 304-17).

<sup>2</sup> Buxton (1868: 27, 54).

<sup>3</sup> Macrob. *Sat.* 3.16.14-15: *describens enim homines prodigos in forum ad iudicandum ebrios commeantes, quaeque soleant inter se sermocinari sic ait: ludunt alea studiose, delibuti unguentis, scortis stipati....inde*

of drunkenness and identified such drunkenness as a form of insanity.<sup>4</sup> Such aspersions were not uncommon: Seneca criticized one of Caesar's assassins, Tillius Cimber, for being a violent drunkard, and the young Octavian used Antony's association with Dionysus as an excuse to accuse him of orgiastic drunkenness.<sup>5</sup> The vast majority of references to drunkenness was in reference to upper-class behavior and is usually indistinguishable from broader, moralizing observation and criticism.

Yet the ancient sources are not wholly silent on drinking among Rome's populace. The lengthiest description comes from the 4<sup>th</sup> century historian, Ammianus Marcellinus. Visiting Rome with the emperor Constantius II, he described the frivolity of Rome's upper classes and then offered a precious description of Romans' propensity to drink:

*Ex turba vero imae sortis et paupertinae in tabernis aliqui pernoctant vinariis, non nulli velariis umbraculorum theatralium latent...aut pugnaciter aleis certant turpi sono fragosis naribus introrsum reducto spiritu concrepantes; aut quod est studiorum omnium maximum ab ortu lucis ad vesperam sole fatiscunt vel pluviis, per minutias aurigarum equorumque praecipua vel delicta scrutantes*

But from the throng of the lowest and impoverished class, some stay up all night in wine shops, others lie in the shadows of the theaters' sails; either they compete rowdily at dice making a foul-sounding racket by their noisy inhalations or in minutely appraising the strengths and defects of the horses and charioteers—and they wear themselves out at this with the greatest zeal from sunrise to sundown rain or shine.<sup>6</sup>

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*vadunt ad comitium ne litem suam faciant. Dum eunt, nulla est in angiporto amphora quam non impleant, quippe qui vesicam plenam vini habeant.*

<sup>4</sup> E.g., *Verr.* 2.5.63.16; *Pis.* 13; *Phil.* 2.67.5, 2.105.18, 3.12.6.

<sup>5</sup> *Sen. Ep.* 83.12. For Antony's association with Dionysus and accusations of drunkenness, see Pliny *HN* 14.22, Scott (1929: 133-41) and Zanker (1988: 60).

<sup>6</sup> *XIV* 6.25.

We cannot know the extent to which Ammianus' rhetoric has exaggerated the drunken idleness of Rome's population, but it has the ring of truth.<sup>7</sup> Somewhat earlier, for example, he had mentioned civic unrest which had occurred because of a dearth of wine (*inopia vini*), which roused the wine-greedy masses to drunken discords (*motus crebri*).<sup>8</sup>

We need not associate that description narrowly with late imperial Rome. The first century author Seneca made reference to the debauches of the Roman population as part of his broader disapproval of the morals of his age:<sup>9</sup>

... Voluptatis causa ac festorum dierum vestem mutavimus. Si te bene novi, arbitri partibus functus nec per omnia nos similes esse pilleatae turbae voluisses nec per omnia dissimiles: nisi forte his maxime diebus animo imperandum est, ut tunc voluptatibus solus abstineat, cum in illas omnis turba procubuit: certissimum enim argumentum firmitatis suae capit, si ad blanda et in luxuriam trahentia nec id nec abducitur. Hoc multo fortius est, ebrio ac vomitante populo siccum ac sobrium esse...

We have changed our clothing for the sake of pleasure and holidays. If I know you well, having discharged the parts of judgment, you would have wished neither to be wholly similar to the freeman crowd nor wholly dissimilar. Unless it happens that on these days particularly the soul must be enjoined that it alone then should abstain from pleasures, since the whole throng hastens into them. For it will certainly find the strongest argument for its constancy in not being led astray to alluring things and thence to decadence. This is considerably stronger, to be dry and sober while the populace is drunk and vomiting...

In a later letter, Seneca censured the behavior of vacationers at Baiae, asking Lucilius why he would want to see drunks wandering the beach (*videre ebrios per litora errantes... quid necesse est*).<sup>10</sup> Although Baiae was a pleasure retreat for wealthy Romans, not the urban poor, Seneca's comparison of life at Baiae to one spent in a bar

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<sup>7</sup> On Ammianus at Rome, see Matthews (1989: 8-13).

<sup>8</sup> XIV 6.1.

<sup>9</sup> *Ep.* 18.2.

<sup>10</sup> *Ep.* 51.4.



(*habitare...inter popinas*) leaves little doubt that he was equating his peers' comportment with that of the denizens of Rome's drunken haunts.<sup>11</sup>

These "gloomy" haunts (the word is Cicero's) were a common if not generally noteworthy feature of Rome's urban fabric, a place where "the cheapest of men" whiled away the hours.<sup>12</sup> Horace contrasted his own love of the country life with his bailiff who loved the city's "oily bars and wine taverns" (*uncta popina incutiunt urbis desiderium... vicina subest vinum praeberet taberna*).<sup>13</sup> When Martial praised Domitian for cleaning up Rome, he particularly applauded his sweeping away the "dark bars had taken up entire streets" (*occupat aut totas nigra popina vias*).<sup>14</sup>

Pompeian architectural remains and preserved graffiti add to that impressionistic tableau culled from stray literary references. Though the total number of hospitality establishments in Pompeii is debated, the lesser estimate is of ninety-four establishments that served food and drink (*popinae* and *tabernae*), forty-two that had rooms for lodgers and may have served food and drink (*hospitium* and *cauponae*), nine lodging houses with stables for horses (*stabula*), and forty-seven of indeterminate function.<sup>15</sup> Pompeii's estimated population was only 10,000-12,000 people and would have therefore had roughly one drinking establishment for every hundred people.<sup>16</sup> A similar density in

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<sup>11</sup> *Ibid.* See D'Arms (2003: 52) for an introduction to Baiae and its ill-reputed licentiousness.

<sup>12</sup> *Pis.* 18: *tenebricosa popina*. *Sen. Prov.*: *cum illo tempore vilissimus quisque in popina lateat*.

<sup>13</sup> *Ep.* 1.14.21-24.

<sup>14</sup> *Epigramm.* 7.61.

<sup>15</sup> DeFelice (2007: 483).

<sup>16</sup> This is a higher density than any modern city I can find by order of magnitudes: Chicago, a city of about 2.7 million people has about 1800 active bars (see the list assembled at [www.chibarproject.com](http://www.chibarproject.com)), a ratio of 1:1500 bars/person.

Rome would imply a total number of 7,500-10,000 drinking establishments, enough that Martial's image of their taking over whole streets does not seem totally absurd.<sup>17</sup>

The Pompeian graffiti provide examples of the activities of those who frequented these establishments. The writer of one graffito cursed the innkeeper (*copo*) who sold water while he himself drinks *merum* (wine mixed the honey).<sup>18</sup> We learn of a self-proclaimed body of *seribibi*—late night drinkers—who frequented one drinking establishment.<sup>19</sup> A certain Festus, for example, commemorated his and his friends' sexual frolics at an inn (*Festus hic futuit cum sodalibus*),<sup>20</sup> which reminds one of the late-night revels at the *deversorium* in the *Satyricon*, all washed down by copious Falernian wine (*vino etiam Falerno inundamur*).<sup>21</sup>

Excessive drinking led to its own set of problems: Another inscription records a guest's apologies for wetting the bed.<sup>22</sup> This inscription might raise a wry smile, but the *Digest*, in fact, preserves an excerpt, in a title dealing with drunken slaves, on drunken bed-wetters.<sup>23</sup> No surprise that when Pliny lamented humanity's inventiveness at discovering new ways to become drunk, it was not restricted to any one class of people.<sup>24</sup> The humorous pomposity of the Pompeian inscription that invokes *mater Ebria*—Mother Drunkenness—is the final reminder that drinking, often heavily by our standards—must have been a common feature of urban life for all classes, as it was in 18<sup>th</sup> century France

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<sup>17</sup> The projection based on an estimated population of 750,000-1,000,000 people during the 1<sup>st</sup> two centuries CE. See below for further on Rome's population.

<sup>18</sup> *CIL* IV 3948.

<sup>19</sup> *CIL* IV 581.

<sup>20</sup> *CIL* IV 3935.

<sup>21</sup> Petron. *Sat.* 21.

<sup>22</sup> *CIL* IV 4957.

<sup>23</sup> *D.* 21.1.14.4.

<sup>24</sup> *HN* 14.14.

where “taverns were the ruin of the peasants.”<sup>25</sup> Roman authors largely ignored the fact simply because its existence was uninteresting to them.

### **A Brief History of Wine’s Diffusion Among the Romans**

By the late Republic (1<sup>st</sup> century BCE) and into the imperial age, wine drinking was a general if unremarked upon feature of life at Rome. Wine’s diffusion through all strata of Rome’s population was a lengthy process, much of which is shrouded in mystery. Though this process and wine-drinking prior to the high classical age is not a topic of this dissertation, the brief description here serves as a reminder that the conditions of the upcoming chapters did not arise *ex vacuo*.

Romans had, from their earliest days, access to wine and the respective cultures that grew up around its consumption both to their north and south. Both the Etruscans to Rome’s north and the inhabitants of *Magna Graecia* in the south had grown, imported and consumed wine on the Italian peninsula well before Rome’s rise as an Italian and then Mediterranean power. The Greeks introduced wine-making into southern Italy and Sicily. Certainly Corinthian-style coarse wares are common in *Magna Graecia* from a relatively early period, and sympotic culture, imported from Greece, gave wine an important place in south-Italian, Greek society.<sup>26</sup>

Images of wine appear commonly in Etruscan art, for example, in the art of “The Tomb of the Leopard” at Tarquinia from the early 5<sup>th</sup> century BCE or on an Attic-style, black-figure cup by the “Chiusi-painter” showing a detailed tableau of a grape-harvest.<sup>27</sup> Etruscan wine amphorae and coarse ware also attest to their interest in wine: numerous Etruscan vessels, presumably for wine, have been discovered at sites within Italy and

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<sup>25</sup> *CIL* IV 5062. Braudel (1981: 236).

<sup>26</sup> Frederiksen (1984: 73); Forti (1988: 309-11).

<sup>27</sup> VI, 7.

without, for example, in Ampurias (near Barcelona) and the wreck off Cap d'Antibes (Southern France).<sup>28</sup>

Wine was available at Rome at a relatively early period.<sup>29</sup> By the classical period, Romans believed that Romans knew wine by the early monarchy. Pliny, for example, doubted that Romulus knew of wine because he sacrificed with milk but noted an injunction of Rome's mythical second king, Numa Pompilius, against using wine from un-pruned vines for religious rites.<sup>30</sup> We should not of course accept these stories of Rome's imagined early days literally, but Numa's injunction against "un-pruned vines" may reflect dimly remembered days when wine-like beverages must have been commonly made from the wild *Vitis vinifera sylvestris* rather than the cultivated *Vitis vinifera*.<sup>31</sup>

More refined vines were probably grown by the mid-5<sup>th</sup> century BCE: there is a fragment from the remains of Rome's earliest codified laws, the 12 Tables, which enjoined against removing a beam used for propping vines (*tignum iunctum aedibus vinea[e]ve [et concapit] ne solvito*).<sup>32</sup> Fabius Pictor, a very early historian of the 3<sup>rd</sup> century BCE, told of a Roman matron who was put to death by her husband for stealing the keys to the wine-store, and Pliny knew of a similar story of a Roman woman whose husband killed her for opening a closed cask of wine.<sup>33</sup> Both these stories must date to an

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<sup>28</sup> Cristofani and Carrieri (1979: 51), Turfa (1986: 67-8, 75).

<sup>29</sup> On the origins of wine in Italy, see Flobert (1992: 289-300).

<sup>30</sup> Plin. *HN* 14.

<sup>31</sup> It has recently been argued that *Vitis vinifera sylvestris* continued to be cultivated alongside *Vitis vinifera* around Narbo during the Roman period. Bouby, Terral, Figueiral (2010: 129-39).

<sup>32</sup> For the text, see Riccobono (1941), Crawford (1996) *ad loc.* VI, 8 for commentary.

<sup>33</sup> Plin. *HN*. 14.96.

early time, when marriage *cum manu*, where the bride passed into the power of the groom, was practiced, a form of marriage totally obsolete by the classical period.<sup>34</sup>

Although wine was known generally, used for religious purposes, and drunk by the wealthy, it is unlikely to have been so widely available that the general populace drank it regularly. This does not mean, of course, that they drank no alcoholic beverages. Wild-fruit *faux* wines can be made, which Pliny enumerated, and Ulpian provided a lengthy paragraph of things properly and improperly counted as wines: *zythum*, *camum*, *cervesia*, and *hydromeli* are provided as examples.<sup>35</sup> Tchernia also described grape-derived drinks, such as *posca* and *acetum*, which were available to a broader social swath than wine proper.<sup>36</sup>

The plays of Plautus, written in the late 3<sup>rd</sup> and early 2<sup>nd</sup> century BCE, illuminate formerly hidden aspects of the opaque development of wine drinking at Rome. In particular, his plays suggest that wine drinking was common and had already generated a specific vocabulary relating to its trade and consumption although Italian wine production was still in the early stages of development. To be sure, using Plautine comic society as an historical source spawns interpretive problems, but these have not proved crippling.<sup>37</sup> The most problematic aspect of his comedies is the extent to which social practice in *Magna Graecia* may have influenced Plautus' dramatic societies; since wine

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<sup>34</sup> Gaudemet (1953) 323-53; Treggiari (1991: 16-7).

<sup>35</sup> *D.* 33.6.9.

<sup>36</sup> Tchernia (1986: 11-19).

<sup>37</sup> On Plautus' relationship to contemporary social and economic realities, see Leo (1912) and Fraenkel (1960); Watson (1971) used Plautus in reconstructing early (ca. 200 BCE) Roman law.

was certainly long established in Greek Italy before making its way north, his plays may exaggerate the degree of wine's diffusions through Rome's population.<sup>38</sup>

But the vocabulary of wine-commerce in Plautus was remarkably similar to that of the high classical period and this may suggest some degree of temporal continuity. Many words of Greek origin appear and remained in Latin wine-drinking vocabulary—the word *cadus*, of which there are several examples,<sup>39</sup> *lagoenam* (equivalent to classical *lagona*),<sup>40</sup> *amphora*,<sup>41</sup> and *oenopolium*, a word which did not catch on.<sup>42</sup> This could speak to the possibility raised above of south-Italian, Greek influence, but that is impossible to determine since all those words save the last were taken over by the Romans. Moreover, Plautus already knew the word *dolium* (a capacious storage vessel) as applied to wine, a word not of Greek origin thus suggesting that Roman Latin was already developing a specialized wine-vocabulary.<sup>43</sup>

Highly interesting, not just for the language but also the situation described, is a scene in the *Asinaria* between two slaves, Libanus and Leonida:<sup>44</sup>

*Leon: Eho, ecquis pro vectura olivi rem solvit?*

*Lib: Solvit.*

*Leon: Cui datumst?*

*Lib: Sticho vicario ipsi tuo.*

*Leon: ...sed vina quae heri vendidi vinario Exaerambo iam pro eis satis fecit.*

*Lib: Fecisse satis opinor, nam vidi huc ipsum adducere trapezitam exaerambum.*

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<sup>38</sup> See Harvey (1986: 297-304) for the importance of understanding south Italy's Greek societies in discussing Plautus' relationship to contemporary history.

<sup>39</sup> E.g., *Amph.* 429, *Mil. Glor.* 850-852, *Stich.* 721.

<sup>40</sup> *Curc.* 78.

<sup>41</sup> But not with wine: *Cas.* 120, *Mil. Glor.* 823 (of nard). Naevius in the mid 3<sup>rd</sup> century already knew the word (frag. 124 *Bilbit amphora*—*bilbit* is an onomatopoeic verb describing the sound an amphora makes).

<sup>42</sup> *As.* 200.

<sup>43</sup> Ernout & Meillet (1979: 181) for a tentative etymology.

<sup>44</sup> *As.* 426-434 contains the most interesting details.

*Leon: Hey, did anyone pay for the shipment of olive-oil?*

*Lib: Yes*

*Leon: Who'd he give it to?*

*Lib: To Stichus himself, your proxy.*

*Leon: ...But what about the wine which I sold yesterday to Exaerambus the wine-trader—has he made good with Stichus?*

*Lib: Yeah I think so—I saw Exaerambus himself bringing a banker here.*

The situation used here for comedic purposes is (and I avoid using loaded terms such as sophisticated, elaborate, or complicated) remarkably similar generally (i.e., slaves, bankers, proxy-agents) to that we see much later in, for example, the *Sulpicii* tablets, and specifically in the vocabulary—*vinarii*, *vicarius*, *trapezita*.<sup>45</sup> Not just Plautus' words but the scenarios themselves—the existence of wine-traders, for example--suggest an existing commercial framework, not dissimilar to that seen much later.

But if the structural conditions for Rome's supply of wine existed prior to the 2<sup>nd</sup> century, the wines themselves did not.<sup>46</sup> In Plautus, named wines were invariably Greek.<sup>47</sup> Cato, producing wine and composing advice for estate owners in the mid-2<sup>nd</sup> century BCE, lived when Italian wine production as an enterprise of significant scale was still in its infancy. True, he advocated careful viticulture lest “the wine lose its name” (*vinum nomen perdat*),<sup>48</sup> but Tchernia rightly pointed out that, although Cato was growing reasonable quantities, he did not seem to know by name a characteristic Italian wine any more than Plautus.<sup>49</sup> Pliny claimed that the first Italian wine worth remembering postdated Cato by a few decades and appeared in the consulate of Opimius

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<sup>45</sup> For the *Sulpicii*, Camodeca (1999); on the importance of slaves and slave-agents, Aubert (1994), Petrucci (1991), Serrao (2002). On the role of bankers in commercial transactions, Barlow (1978); Andreau (1987), (1996:267-275), 1999).

<sup>46</sup> Tchernia (1986: 60-6) for the development of Italian viticulture.

<sup>47</sup> E.g., *Curc.* 78, *Poen.* 699, *Rud.* 588, *passim*.

<sup>48</sup> *Agr.* 25.

<sup>49</sup> Tchernia (1986: 61).

in 121 BCE,<sup>50</sup> though Cicero's *Brutus* suggests that a Falernian wine may have been known in the consulate of Anicius, in 160 BCE.<sup>51</sup> Tchernia was inclined, therefore, to suggest that wine suitable for commercial distribution was grown in central Italy somewhat before textual attestation appears and suggested a date-range in the early 2<sup>nd</sup> century BCE.

Local production on a reasonable scale was certainly a precondition for the rise of general consumption at Rome. Imported wine would have been too expensive for most. According to Pliny, even in the time of Lucullus' father, it was unusual for more than one bottle of Greek wine to be provided at a dinner.<sup>52</sup> Exploring the factors that led to wine's downward social diffusion would be a separate book, well outside the scope of serious investigation here.<sup>53</sup> We can briefly point to three key factors in that development over the Republic's last two centuries: the use of wine in provisioning the army; the distributions of wine through nobles' handouts and through the *collegia*; and intensification of medicinal practices in which wine played an important role.<sup>54</sup>

It is not entirely clear when the Roman army began drinking wine, but it seems to have been a feature of military life from at least the mid-2<sup>nd</sup> century BCE.<sup>55</sup> This consumption must have introduced numerous young Italians to wine-drinking.<sup>56</sup> Sallust,

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<sup>50</sup> *HN* 14.94-97.

<sup>51</sup> *Brut.* 287: *ut si quis Falerno vino delectetur, sed eo nec ita novo ut proximis consulibus natum velit, nec rursus ita vetere ut Opimum aut Anicium consulem quaerat—'atqui hae notae sunt optumae.* Tchernia (1986: 61).

<sup>52</sup> *HN* 14.

<sup>53</sup> Tchernia (1986: 58-59) on expanding consumption of wine during the 2<sup>nd</sup> century. Purcell (1985: 13-16) gives a short narrative of the rise in wine drinking at Rome. Both are inclined to see it fundamentally as a function of increased urbanism.

<sup>54</sup> For comparison, see Braudel (1981: 231-38) on the diffusion of drinking wine in 16<sup>th</sup> and 17<sup>th</sup> century France,

<sup>55</sup> Though the Roman army also drank *posca*, a mixture of vinegar and water, its habitual drinkers "likely remained the exception." Tchernia (1986: 19).

<sup>56</sup> For the numbers of Italians used in the late Republic's army, see Brunt (1971), Hopkins (1978).



for example, blamed Sulla for having been the first to habituate the Roman army to drink (*insuevit exercitus populi Romani...potare*), which, if true, would date army drinking to the very late 2<sup>nd</sup> century BCE.<sup>57</sup> Roughly contemporaneously, when Metellus arrived in Africa in 109 BCE, he found the army engaged in exchange with, among others, wine merchants (*mercatores vini*).<sup>58</sup> The presence of these merchants at the army camp suggests that supplying the army with wine was already an established practice. This is bolstered by Tchernia's observation of a passage in Appian that, in 153 BCE, the army of Lucullus in Spain suffered from lack of wine, in addition to other viands.<sup>59</sup>

Many veterans must have returned to Rome with an acquired taste for wine, and it is likely not a coincidence that we begin to see evidence of more regular distributions of wine, both public and private. When Lucullus returned from the East, he distributed more than a hundred-thousand jars (*cati*) of wine, and Caesar, when dictator, distributed amphorae of Falernian at the dinner for his triumph (*cena sui triumphi*).<sup>60</sup> This latter, in my believe, is the first mention of distributions of Italian wine, rather than Greek, and suggests that Italian wine had reached both sufficient quality and quantity for Caesar to use it at a public dinner—Pliny stated that he still served *cati* of Chian wine at his *convivia*.<sup>61</sup>

In addition to these irregular distributions, growing numbers of urban dwellers had access to *collegia*, associations something like clubs which, among their other

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<sup>57</sup> *Iug.* 44.5; *Cat.* 11.6

<sup>58</sup> *Iug.* 44.5.

<sup>59</sup> Tchernia (1986: 16); Appian *Iber.*, 54.

<sup>60</sup> Plin. *HN.* 14.96-97. On public dining, see Rodriguez (2009: 13-82), focusing on municipal dining; see also Hugoniot (2008: 319-333); (2007: 207-235). For comparative perspective on the importance of public dining and distributions for diffusing wine, see Francis (1972: 10-11), who pointed out that, in medieval London, "The common man could not often afford wine, but he could sometimes push forward to have a taste of it...[at social events]...and if he were a dependent of a nobleman...[he could enjoy]...some share of the luxuries of his betters. Custom decreed that kings, great men, and church dignitaries should be generous hosts and liberal purchasers of wine."

<sup>61</sup> *Ibid.*

services, often provided members with dinners and wine.<sup>62</sup> Though these clubs were dominant features of Italian urban life of the empire, they date back to the Republican period.<sup>63</sup> Our knowledge of them is intertwined with polemic about their purported roles in that era's political turmoil, and, though their numbers were "considerable" by the time of Cicero, we know little about them.<sup>64</sup> If it is safe to assume that they played a similar social role during this time as they did later on a larger scale, then we should not discount their role in accustoming many Romans to wine-drinking though we can say almost nothing about the details of this process.

The medicinal use of wine was important both for its social diffusion and in legitimizing its consumption by bestowing on it an air of respectability. In the 2<sup>nd</sup> century BCE, Nicander of Colophon's poems popularized Apollodorus' work on theriacs—wines with substances added which allegedly counteracted poisons. Though some suspected such concoctions were the nostrums of quacks, ridiculed them for having fifty-four ingredients of ludicrous proportions, and condemned them as a "specious display of learning" (*venditatio scientiae*),<sup>65</sup> wine-based potions became increasingly popular from the 1<sup>st</sup> century BCE onwards. A bilingual 1<sup>st</sup> century BCE inscription from Antinum, for example, commemorated a doctor (originally from Tralles in Asia Minor) who bore the epithet "wine-giver." Such evidence speaks both to the status of wine-giving doctors starting in the early first century BCE and to their geographic distribution.<sup>66</sup> In particular,

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<sup>62</sup> *Collegia* have been interpreted as everything from proto-medieval guilds, proto-Italo-fascist *corporazioni*, and social clubs—Perry (2006). See in particular Clemente (1991: 83-91).

<sup>63</sup> On the importance of *collegia* in the civic transformation of 2<sup>nd</sup> century CE Italy, see Patterson (1994: 227-38).

<sup>64</sup> Waltzing (1895: 56); on their role in late Republican politics and the *senatusconsultum* of 64 which banned them, see *Ibid.*, 91-113.

<sup>65</sup> *HN* 29.24-25.

<sup>66</sup> *CIL* 10.388. Also Nutton (2004: 164).

Asclepiades, a doctor from Prusa who flourished in the first half of the first century BCE, was instrumental in popularizing medicinal wine.<sup>67</sup> He departed from Hippocratic humoral medicine and instead advocated medical treatment based on exercise and diet. Pliny claimed that Aesclepiades was the one who discovered how to make wine healthful,<sup>68</sup> and Tchernia argues that Pliny's hierarchy of wines is taken, not from agricultural sources, but rather from medical writings.<sup>69</sup>

Even Pliny, generally a skeptic, conceded that wine in moderation could have medicinal value,<sup>70</sup> and many others were much more enthusiastic than he. Celsus praised wine's ability to reduce fevers in numerous places.<sup>71</sup> Indeed, medicinal wine was imported by barrels to the legionary camp at Aquincum (Budapest); the wood was later reused to line wells, and some preserve the stamp: "Duty free for the hospital."<sup>72</sup> We should not underestimate medicinal wine's importance in increasing wine consumption at Rome and diffusing its popularity from the wealthier classes down into the general populace. The combination of these factors allowed wine to gradually diffuse throughout the entirety of Roman society such that, by the beginning of the Empire, drinking wine was a feature of every social stratum.

Surprisingly, not everyone has been convinced of wine's importance for Rome's non-elite population. The chief argument against such an expansive view of urban wine consumption at Rome relies on wine's expense relative to the low income of most of

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<sup>67</sup> Nutton (2004: 167-70).

<sup>68</sup> *HN* 7.37: ...*summa autem Asclepiadi Prusiensi condita nova secta, spretis legatis et pollicitationibus Mithridatis regis, reperta ratione qua vinum aegris medetur...* Also relevant is *Sext. Emp. Math.* 7.91: τούτῳ δὲ τῷ λόγῳ. δυνάμει καὶ ὁ Ἀσκληπιάδης εὐρίσκειται κατακεχρημένος ἐν τῷ πρώτῳ τῶν περὶ οἴνου δόσεως

<sup>69</sup> Tchernia (1995: 299).

<sup>70</sup> *HN* 14.7.58 & 23.19-26.

<sup>71</sup> *Celsus Med.* 1.8, 2.18.11, 2.28, 2.30, 3.13, 4.12.

<sup>72</sup> *Immune in r[ationem] valetudinarii leg[ionis] II Adi[utricis]*. See Davies (1970) 105. The *Legio II Adiutrix* was stationed at Aquincum from 106 to at least 269.

Rome's populace and has been most forcefully articulated by Peter Garnsey.<sup>73</sup> Though he acknowledged that wine was a dietary staple for the Mediterranean's population generally, he did not believe it ever reached this status in Rome. He admitted that "...special reasons have to be found for denying their presence to some degree in the diet of ordinary people of Rome" but then argued that "...extreme poverty and unemployment...count as special reasons. Until free oil and wine were added to grain in the distributions...these commodities had to be purchased."<sup>74</sup> The argument holds, therefore, that even bad wine was frequently too expensive to form an important part of the Roman diet.

Garnsey's argument is thought provoking but ultimately misguided, largely because it relies on an injudicious comparison of the wine prices between Rome and areas around the Bay of Naples, as provided by Duncan-Jones.<sup>75</sup> In 153 CE, the college of Aesculapius and Hygia on the Via Appia outside Rome was left a bequest from which periodic distributions of money and meals would be provided.<sup>76</sup> The cash allotted combined with the quantities of wine provided imply that the price of wine was expected to range between 61-88.5 sesterces per amphora (the variation arises from our ignorance of the rate of return on the initial foundation). Duncan-Jones compared this figure to seven prices for retail wine recorded on inscriptions from *tabernae* at Pompeii and Herculaneum. Those prices ranged from an implied price of 12 HS per amphora through 54 (implied because the figures are prices per *sextarius*, about half a liter, not *amphorae*).

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<sup>73</sup> Garnsey (1998: 241).

<sup>74</sup> *Ibid.* 241.

<sup>75</sup> I summarize the comparison, found in Duncan-Jones (1982: 364-65).

<sup>76</sup> *CIL* 6.10234=*ILS* 7213; *AE* 1937, 161.

That comparison was enough for Duncan-Jones to suggest that the average price of wine at Rome was significantly higher than at other major Italian cities.

Taking these isolated prices as representative of broader patterns may be unduly stretching the evidence. Even if we let that pass, Garnsey's subsequent interpretation faces problems on three fronts. First, Garnsey followed Duncan-Jones and assumed that the lower Roman price (61 HS/L) was toward the bottom of Rome's price-range because "the wine is not stated of being of a particular quality."<sup>77</sup> This is a strange argument: the range of prices depended on the investment's expected interest and had nothing to do with its quality. Quite the contrary, it is more plausible that the college's benefactress expected her money to suffice for wine of at least middling quality—certainly not the worst unless she was a particularly stingy philanthropist. We should therefore hesitate in assuming that this figure is on the low end of Rome's prices. Second, the Campanian prices come from *tabernae* and *popinae*, retail establishments partially dedicated to selling wine; it is possible (though not provable) that their owners paid a wholesale price for amphora significantly less than a college would have to pay to buy that same amphora retail. The price differential due to differing modes of acquisition would accentuate the perceived regional price variation.

The third and in my view most serious problem arises from the conclusions drawn from the prices. The Campanian wine prices are as follows (in HS/L): 12, 24, 24, 36, 48, 48, 54. The sample has an average value of 35 and a standard deviation of 16 (each rounded to the nearest whole number). Remember that a standard deviation of 15 HS/L simply means that 68% of wine prices should fall between 19 and 51 HS/L and 95% between 3 and 67 HS/L. In other words, the lower end of the Roman price value fell

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<sup>77</sup> Duncan-Jones *ibid.*

within one standard deviation and even the higher price within two standard deviations. These figures do *not* demonstrate that the average price of wine at Rome was significantly (i.e., several standard deviations) larger than in Campania; rather, the data show such high fluctuation that the Roman prices could easily be part of the same general population distribution.

Moreover, the comparative average prices are actually less informative about wine's accessibility than is the variance in cost. For example, imagine that Gaius can spend 4 HS per week on wine and the average cost of wine at Rome is 5 HS/week. Does that mean Gaius can buy no wine? Not necessarily: If he had access to five types of wine, costing 1, 2, 6, 7, and 9 HS/week (high variance), then he can purchase wine and in fact has two options even though the average price exceeds his purchasing power. If all five types range between 4.5 and 5.5 HS/week (low variance), he would be hard pressed to purchase wine consistently. Thus, the most telling feature of the Campanian numbers is their high variance, and the mean is less important. It would be very strange if Rome's wine, even if of a higher average price than that sold in Campanian taverns, did not exhibit similar variance. If so, there is every reason to believe that most inhabitants could purchase at least some percentage of the available types of wine. Rhetoric though Seneca's "drunk and vomiting populace" assuredly was, the rhetoric gained power from a core of truth.<sup>78</sup>

We cannot say with any certainty how much wine the city of Rome, in its mature phase, consumed. But comparisons to other pre-industrial, Mediterranean societies lead one to believe that it was quite a lot. In 18<sup>th</sup> century Valladolid, consumption was about

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<sup>78</sup> Ep. 18.4: *ebrium et vomitans populum*.

100 liters/year, and in Paris, before the Revolution, 120.<sup>79</sup> Figures elsewhere during the medieval and early modern period range from 83 liters/year to a staggering 419 liters in 14<sup>th</sup> century Sienna, with quantities in the 200s/year the most common.<sup>80</sup> These figures have led to per-capita estimations of approximately 182 liters per year.<sup>81</sup>

As a rough figure, it allows us to explore what those consumption levels imply when taken in aggregate. If we accept that imperial Rome's population was nearing a million residents, then annual, urban consumption of wine would be approximately 1.5 million hectoliters.<sup>82</sup> Remembering that (conservatively) 10-20% of wine must have spoiled before consumption, Rome's total demand for wine would have been somewhere around 2-2.5 million HI, a quantity sufficient to fill between eighty to one hundred Olympic-sized pools year in and year out.

This dissertation ultimately asks one simple question: what were the economics of Rome's wine commerce which made possible the consistent supply of that impressive quantity to Rome's populace. The study spans the classical period, (roughly) from the very late Republic to the upheavals of the 3<sup>rd</sup> century, and it definitively terminates at the reign of Aurelian (270-75), in whose reign wine was finally added to the *annona*, the supplies of grain, oil, and meat which were supplied free to a percentage of Rome's

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<sup>79</sup> Braudel (1981: 236-7).

<sup>80</sup> Tchernia (1986: 22-3) for the comparative evidence.

<sup>81</sup> For Rome, Tchernia (1986: 26) estimated an annual consumption of 182 liters/year. Fleming (2001: 59) revised that down to 87 L/year, but that estimation assumes that that 1) pre-adolescents and adolescent females drank no wine 2) that adolescent males and adult females drank almost no wine (on women and wine, see Purcell 1994: 191 and 3) that adult males drank only 1.5 *sextarii* per day (app. ¾ of a liter). But in the inscription of the College of Aesculapius and Hygia, even the college's ordinary members received 2 *sextarii* a day while senior members were given 9! None of Fleming's assumptions seem warranted or even likely; I suspect his revision stems more from unwarranted skepticism that ancient Romans drank so very much more than modern Italians. In fact, based on Tchernia's own *comparanda*, his estimations could well be an underestimation.

<sup>82</sup> For Rome's population see Brunt (1971: 376-88); Lo Cascio (1994: 23-40). For recent reevaluations of the Augustan census figures and their relationship to Italy and Rome's population, see Morley (2001: 50-62); Scheidel (2004: 1-26).

citizens, and the state's involvement in the city's wine supply decisively changed its commercial structure.<sup>83</sup>

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<sup>83</sup> On the late Roman *annona*, see Tengstrom (1974); Sirks (1991).



## Chapter II

### Methods and Models for the Study of Roman Wine

#### Free-Market or Embedded Trade?

Let me begin with a problem fundamental for an economic study of Roman wine: are the production, transportation, and supply of Roman wine properly considered as market driven or not? The arguments for and against that view will suggest that the question itself is flawed, and the rest of this first chapter will show what sort of models are better suited for an economic study of Rome's wine supply. Chivying these out generates the fundamental premises of the rest of this dissertation.

Suetonius gives the following account which nicely encapsulates the formal relationship between Rome's populace and the emperor's involvement in its wine supply.

The emperor is Augustus, the time sometime after 19 BCE.<sup>1</sup>

*Sed ut salubrem magis quam ambitiosum principem scires, querentem de inopia et caritate vini populum severissima coeruit voce: satis provisum a genero suo Agrippa perductis pluribus aquis, ne homines sitirent. Eidem populo promissum quidem congiarium reposcenti bonae se fidei esse respondit.*

But so that you may know that the emperor was restrained rather than demagogic, he sternly rebuked the people when it was complaining about the dearness of wine, saying that provision enough had been made against the people going thirsty by the many aqueducts which his son-in-law, Agrippa, had built. But to the same people, demanding its promised food-distribution, he responded that he would keep his promise.<sup>2</sup>

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<sup>1</sup> The date can be deduced from comparison with Dio 54.11.7, which specifies that the aqueduct mentioned is the *Aqua Virgo*, completed in 19 BCE.

<sup>2</sup> *Div. Aug.* 42.

Augustus' abnegation of responsibility for the city's supply of wine was not unique. Some half century later, in Claudius' reign, there was a food shortage which became so severe, said Seneca, that only eight days' supply was left.<sup>3</sup> Suetonius again commented that Claudius always took such problems seriously: he insured shippers who contracted to transport grain during the dangerous winter months against loss.<sup>4</sup> Yet this same emperor unsuccessfully tried to close Rome's taverns, the chief source of wine for much of its populace.<sup>5</sup> Until Aurelian, emperors' attitudes towards Rome's supply of wine varied from mild indifference to complete heedlessness.<sup>6</sup>

The emperors showed an equivalent lack of concern for the merchants (*mercatores/negotiatores*) who transported wine throughout the Mediterranean and to the city itself. Papirius Justus recorded a rescript of the emperors Marcus Aurelius and Verus which reads as follows:

*Imperatores Antoninus et Verus Augusti Sextio Vero in haec verba rescripserunt: "Quibus mensuris aut pretiis negotiatores vina compararent, in contrahentium potestate esse: neque enim quisquam cogitur vendere, si aut pretium aut mensura displiceat, [praesertim si nihil contra consuetudinem regionis fiat]."*

The emperors Antoninus and Verus wrote the following to Sextius Verus: "By what measures or at what prices merchants buy wine is in the power of the contracting parties, for no one is compelled to sell if either the price or measure is displeasing, especially if nothing is done contrary to the region's general practice."<sup>7</sup>

<sup>3</sup> *De Vit. Brev.* 18.5: *Modo modo intra paucos illos dies, quibus C. Caesar periit, si quis inferis sensus est, hoc gravissime ferens, quod sciebat populo romano superstiti septem aut octo certe dierum cibaria superesse.*

<sup>4</sup> *Div. Claud.* 18: *Vrbis annonaeque curam sollicitissime semper egit...nam et negotiatoribus certa lucra proposuit suscepto in se damno, si cui quid per tempestates accidisset.*

<sup>5</sup> Dio 60.6.7: *καὶ ὀρῶν μηδὲν ὄφελος ὄν ἀπαγορεύεσθαι τινα τῶ πλήθει μὴ ποιεῖν, ἂν μὴ καὶ ὁ καθ' ἡμέραν αὐτῶν βίος μεταρρυθμισθῆ, τὰ τε καπηλεῖα ἐς ἃ συνιόντες ἔπινον κατέλυσε.*

<sup>6</sup> For Aurelian, *HA Aur.* 48.1; for an exception, *HA Anton. Pius.* 8.11: *Vini, olei, et tritici penuriam per aerarii sui damna emendo et gratis populo dando sedavit.*

<sup>7</sup> *D.* 18.1.71. The last clause is likely an interpolation which does not affect the general interpretation of this passage.

We cannot reconstruct the letter which prompted the emperors' response except in surmise. One of the two parties, either the merchants or he selling the wine, must at some point have objected to the process by which the transaction was occurring; the specificity in the *responsio* of *vina* leaves little doubt that the initial petition arose from a problem arising within the wine trade.<sup>8</sup> But the co-emperors made clear that they had no interest in setting any general operating rules beyond the (non-binding) advice that procedure should follow a region's customary practice. Beyond that, contracting parties were unregulated.

Even what appears to have been active imperial engagement with wine production proves to be only superficial. Suetonius, Philostratus, and the *Chronica* of Jerome record an edict promulgated by Domitian which forbade new vines from being planted in Italy and enjoined that provincial vines be cut down or, in some cases, reduced by half (*edixit, ne quis in Italia novellaret utque in provinciis vineta succiderentur, relicta ubi plurimum dimidia parte*).<sup>9</sup> A reader accustomed to debates over commercial protectionism might naturally assume that Domitian had something similar in mind, intending either limiting new production to protect Italian vineyards or to keep the price of wine from falling due to increased production: this is precisely what, for example, Rostovtzeff argued.<sup>10</sup>

Yet Suetonius reported that the emperor was dismayed by the volume of wine production in comparison with grain (*ad summam quondam ubertatem vini, frumenti vero*

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<sup>8</sup> This process could be lengthy, as it generally included the sale itself (*emptio-venditio*), tasting (*degustatio*), measuring the wine (*mensura*), and final transfer of the wine between the parties (*traditio*). *D* 18.6 preserves quite a bit on this process and shows that it could take some time to complete. See chapter 3 for further detail on contracts of sale.

<sup>9</sup> Suet. *Dom.* 7.2, 14.2; Philostr. *VS* 520, *VA* 6.42; *Chron.* 91-92.

<sup>10</sup> Rostovtzeff (1963: 190) is typical when he claimed, "The protective measures saved Italian viticulture, at least to a certain extent."

*inopiam existimans nimio vinearum studio neglegi arva*).<sup>11</sup> This fact led first Sherwin-White and, following him, Finley to refute the earlier argument that Domitian was fundamentally concerned with wine.<sup>12</sup> Since then, scholars have further connected Domitian's edict with grain, in particular, with the famine in Asia Minor that prompted the edict of Lucius Antistius Rusticus in Pisidian Antioch.<sup>13</sup> Given the civic instability wrought by famines, we might be reminded of Philostratus' claim that Domitian ordered the vines in Asia destroyed because wine-drinkers were especially likely to revolt.<sup>14</sup> The emperor's concern was not wine production in and of itself but rather some combination of his more usual care for maintaining civic order and the supply of grain, the food traditionally of imperial concern.<sup>15</sup>

These passages show that emperors consistently refused to involve themselves in organizing, regulating, or steering the production, transportation, and distribution of wine. Under this view, one would seem justified in claiming that Rome's supply of wine was organized by a free-market and should be placed "*dans le cadre d'un commerce libre*."<sup>16</sup> Yet there is another perspective in which the presence of the imperial court at Rome was instrumental in shaping the nature of the Roman market.

Pliny presented a diverting story of a freedman wine-taster of the imperial house charged with sampling wines which were destined for a banquet of Augustus. At one wine, he sneered that "the taste is new to me and not fine, but Caesar will drink it

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<sup>11</sup> Suet. *Dom.* 7.2.

<sup>12</sup> Sherwin-White (1966: 258); Finley (1999: 244).

<sup>13</sup> For this edict see Syme (1983: 359-374) and Wiemer (1997: 195-215). For the connection with Domitian's edict see Levick (1982: 72). The connection depends in part on whether Suetonius' dating of the edict is followed or that of the *Chronica*.

<sup>14</sup> VS 520: ἐδόκει τῷ βασιλεῖ μὴ εἶναι τῇ Ἀσίᾳ ἀμπέλους, ἐπειδὴ ἐν οἴνῳ στασιάζειν ἔδοξαν.

<sup>15</sup> Tchernia (1986: 28).

<sup>16</sup> *Ibid.*

*(pertissimum e libertis...dixisse hospiti de indigena vino, novum quidem sibi gustum esse eum atque non ex nobilibus, sed Caesarem non aliud poturum).*<sup>17</sup> Pliny included this story as evidence for Augustus' somewhat rustic taste in wine: after all, his favorite, according to Pliny, was the less than noble wine of Setinum. The statement reminds us that the emperor's court was a great consumer of wine.

We should not underestimate the size of the imperial household. The emperors' courts were not restricted simply to the expansive residence on the Palatine. They also had residences scattered throughout the city, such as those in the Gardens of Maecenas, Lucullus, and Sallust, where Vespasian apparently preferred to live.<sup>18</sup> In addition to residences within the city itself, the emperors had numerous villas and retreats in Latium: at Lanuvium, Praeneste, Alba, Antium, and, of course, Tibur, the site of Hadrian's palatial villa.<sup>19</sup> These buildings needed upkeep. Staffs had to be fed. And stores had to be kept in a state of sufficient readiness for when the emperor and his retinue made an appearance.<sup>20</sup>

The cumulative effect of that demand was considerable. Pliny praised the comparative abstemiousness of Trajan's retinue and contrasted it with Domitian's, which purportedly devastated those responsible for its provision.<sup>21</sup> There is ample papyrological attestation for the types of items needed in preparation for an emperor's arrival: pigs, figs, dates, camels, sheep, oil, olives, vehicles, rooms, and wine.<sup>22</sup> Similar stocks must have

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<sup>17</sup> *HN* 14.72

<sup>18</sup> Cass. Dio. 66.10.4 on Vespasian's living preference.

<sup>19</sup> For imperial residences in Rome and Italy, see Millar (1977: 18-28).

<sup>20</sup> *Ibid.* 59-131 for the emperors' entourage.

<sup>21</sup> Plin. *Pan.* 20: *Nullus in exigendis vehiculis tumultus, nullum circa hospitia fastidium; annona, quae ceteris; ad hoc comitatus accinctus et parens: diceris magnum aliquem ducem, ac te potissimum, ad exercitus ire: adeo nihil, aut certe parum intererat inter imperatorem factum, et brevi futurum. Quam dissimilis nuper alterius principis transitus! si tamen transitus ille, non populatio fuit.*

<sup>22</sup> *E.g., PSI* 683, *BGU* 266, *P. Panop. Beatty* 1.1. Cf. Millar (1977: 32-6).

been kept ready at the emperors' permanent residences: Suetonius censured the role reversal occurring under Nero whereby the emperor forced his friends to give him expensive dinners, in one case amounting to four million sesterces. Dio remarked upon how unusual it was that Septimius Severus did not frequently give expensive dinners for his friends.<sup>23</sup> If it is true that Nero's *Domus Aurea* had wheat and wine implantations along with animals, this likely served the dual purpose of mimicking a country-style, gentleman's estate within the city and helping to supply food for the banquets held there.<sup>24</sup>

We can glean an impressionist account of how much wine this may have entailed by comparing some accounts of non-imperial wine stores with the records of purchases by extremely wealthy potentates of a later period: Medieval British kings. Nineteenth century excavations on the Pincian Hill and near the Trinità de' Monti (areas of the city marked out by their expensive houses) revealed subterranean cellars with "an infinite number of earthen jars...belong[ing] to the class of wine amphorae or *diotae*."<sup>25</sup> "Infinite" is hyperbolic but the point stands: Lucullus, for example, was of sufficient means to distribute to the Roman *plebs* more than 100,000 jars (*cadi*) of Greek wine, and Cicero's rival, the orator Hortensius, left 10,000 bottles of wine to his heir.<sup>26</sup> These distributions could be on a large scale: Suetonius tells us that in the early, restrained years of Nero's reign, he limited the expenditures allowed on public dinners (*publicae cenae*).<sup>27</sup>

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<sup>23</sup> Cass. Dio. 77.3: "καὶ ἐν μόναις ταῖς πάνυ ἀναγκαίαις ἡμέραις τὰ πολυτελεῖ δέϊπνα συνεκρότει"; Suet. *Nero* 27: "*Indicebat et familiaribus cenas, quorum uni mitellita quadragies sestertium constitit.*"

<sup>24</sup> Suet. *Nero*. 31: *domum a Palatio Esquilias usque fecit... rura insuper arvis atque vinetis et pascuis silvisque varia, cum multitudine omnis generis pecudum ac ferarum*. On the layout of Nero's *domus* and its gardens, see Fraioli (2007: 85-106).

<sup>25</sup> Lanciani (1897: 426).

<sup>26</sup> Plin. *HN* 14.96.

<sup>27</sup> Suet. *Nero*. 16.

As we saw above, the emperor had household members dedicated to procuring wine. The amounts procured were likely significant, as a comparison with later English kings' wine supplies suggest. The records of the King's Butler, responsible for procuring wine for the King and used *inter alia* for provisioning his household, royal castles, tournaments, and military expeditions, reveal the impressive amounts that this single consumer acquired.<sup>28</sup> In 1212, for example, King John bought 262 tuns<sup>29</sup> (ca. 300,000 liters); in 1300, Edward I bought two consignments of wine totaling 1567 tuns (ca. 1.8 million liters) and his son, Edward II, bought 1000 tuns (ca. 1.1 million liters) for his marriage with Isabella.<sup>30</sup>

Though on a lesser scale, non-royal nobles also consumed sizeable volumes of wine: the Archbishop of York's house consumed 80 tuns (ca. 90,000 L) annually, and even Edward II's chaplain, for example, was granted 3 tuns (ca. 3400 l) per year.<sup>31</sup> As a simple thought experiment, imagine that Rome's six hundred senators' households consumed between twenty-five and one-hundred percent of the Archbishop of York's annual needs and that the emperor consumed two to six times the amount of the average senator.<sup>32</sup> We can express these ranges as a percentage of Rome's total consumption of wine (estimated above at 2-2.5 million hectoliters).

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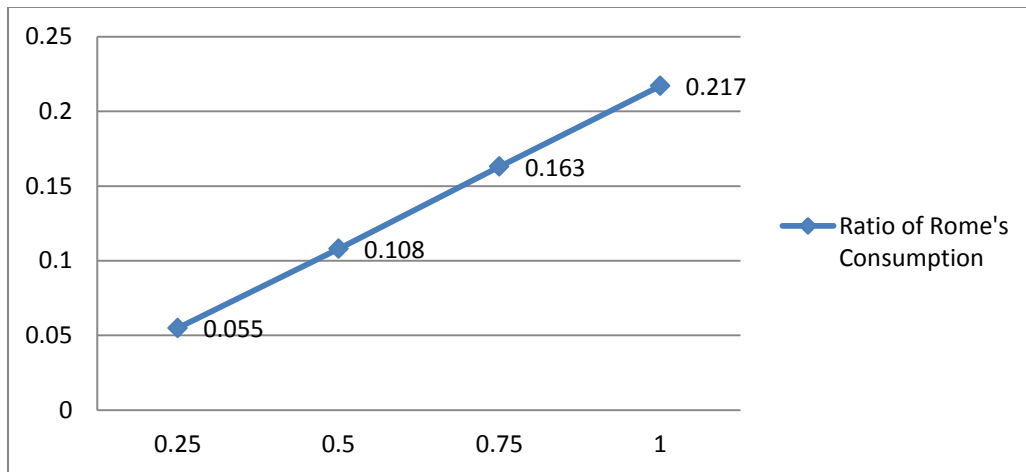
<sup>28</sup> James and Veale (1971: 6).

<sup>29</sup> Unwin (1991: 366). The statutory capacity of an English tun was 252 wine-gallons, or about 1145 L (the old wine-gallon is somewhat more voluminous than a modern, imperial gallon).

<sup>30</sup> Francis (1972: 6-11).

<sup>31</sup> *Ibid.* 11.

<sup>32</sup> These broad ranges indicate the extreme degree of uncertainty about any specific figure we have.



**Figure 2.1: Ratio of Rome's Consumption**

In this table, the x-axis estimates senatorial consumption on a continuous scale from twenty-five percent to one-hundred percent of the archbishop of Canterbury's consumption and estimates the imperial consumption flatly as twice the archbishop's (I prefer not to peg the emperor's consumption to senatorial consumption since that compounds the already considerable margin for error further but simply take it as a constant). Those totals are then taken as a proportion of Rome's total consumption (upper bound). The ratios therefore should be taken as cautious estimates. Even so, I think it is safe to estimate that senatorial and imperial households annual wine acquisitions was somewhere within (the extremely broad range) of five to twenty percent of Rome's total annual consumption of wine.

Just as the wealthiest minority of Rome's population was responsible for a large proportion of total wine imports, so too did the imperial period see a gradual increase in wine-production on the imperial estates themselves. This was not a result of conscious policy but came into existence by dribs and drabs, ultimately deriving from a concomitant increase in senatorial activity in wine production from the Julio-Claudian period on. By the time of the younger Pliny, he and his friends all owned vineyards and sold their wine



to unspecified *negotiatores*.<sup>33</sup> This increased senatorial involvement necessarily increased imperial vineyards because much of the lands forming the imperial *patrimonium* were acquired through gifts, bequests, and confiscations of landholders of the senatorial (or slightly below) class.<sup>34</sup>

Scattered references confirm this impression. Martial described some Alban wine, from a town near Rome and the site of many luxurious villas, as sent from “Caesar’s cellars” (*Hoc de Caesareis mitis vindemia cellis misit*).<sup>35</sup> Fronto made several references to the vineyards on imperial estates and, in one rather touching vignette, even described the emperor, Marcus Aurelius, working alongside the laborers during the vintage.<sup>36</sup> The jurist Aurelius Charisius simply stated that those who received wine in Africa (*susceptores vini per provinciam Africam*) were discharging a duty to the *patrimonium*, though admittedly this short sentence fails to specify whether these *susceptores* were collecting wine from imperially or privately held properties (or both).<sup>37</sup>

These facts beg the following question: to what extent did the emperors’ own produce meet their demands? We can surmise, from *tituli* (inscriptions painted on ceramic vessels after firing) that at least some wine came directly from the emperors’ estates, for they are designated as belonging to the imperial *fiscus* (and therefore free

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<sup>33</sup> For the increase in senators’ involvement in wine production, see Purcell (1985: 5). Cf. Pliny *Ep.* 8.2: “*Vendideram vindemias certatim negotiatoribus ementibus. Invitabat pretium, et quod tunc et quod fore videbatur*” (cf. chapter two for more on this letter of Pliny). For friends’ vineyards, *Ep.* 8.15, 9.16, 9.20, 9.28.

<sup>34</sup> Generally on the emperor’s *patrimonium* and *fiscus*, see Millar (1963: 29-42); Brunt (1966: 75-91; Millar (1977: 189-201). On the formation of the *patrimonium* see Millar (1977: 153-174) and Caliri (2007: 27-41).

<sup>35</sup> *Epigramm.* 13.109.

<sup>36</sup> *Ep.* 4.6. Cf. 2.9, 4.4.

<sup>37</sup> *D.* 50.4.18.20.

from paying custom duties).<sup>38</sup> The strict dichotomy implied by the question is, in fact, probably misleading. Senators and emperors doubtless employed a range of options.

A good comparison might be the various uses English kings put the wine they took via prisage.<sup>39</sup> On the one hand, prisage wines have been called “essentially instruments for the supply of the sovereign’s table.”<sup>40</sup> Though much prisage wine was used in this context, some was sold directly to merchants; alternatively, the collection right was farmed out among the nobility such that the Marquis Ormond, for example, “did not esteem any part of his revenue so much as he did that which arose from the prisage of wines.”<sup>41</sup> Comparably, Galen spoke of Cretan herb growers on imperial properties which sent herbs to the imperial *fiscus* but which later appeared in the markets of the dealers at Rome; there is also evidence that the emperors sold balsa from their land near Jericho.<sup>42</sup>

Emperors were not hidebound and employed a range of tactics to profit from their landholdings and supply themselves with produce. There was no hard and fast divide between products designated for raising revenue and those for personal use. Imperial estates, for example, employed a variety of techniques to manage their land, ranging from direct management to leasing parcels to tenants.<sup>43</sup> Kehoe, in fact, argued that tenancy agreements from the Bagradas River Valley in North Africa encouraged tenants to grow

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<sup>38</sup> *CIL* XV 4102, 4111, 4124-36: *fisci rationis patrimony provinc(iae) Baeticae*. These, like most of Monte Testaccio’s oil amphorae, are Dressel 20 oil amphorae, but it stands to reason that imperial estates also would have shipped wine in the same way. *D.* 39.4.9.8: *Fiscus ab omnium vectigalium praestationibus immunis est.*

<sup>39</sup> *Prisage*, or butlerage, was the kings’ right to take two tuns of wine from ships entering English ports of more than 20 tuns, and 1 tun from ships between 10-20 tuns capacity. *OED* s.v. “butlerage.”

<sup>40</sup> Unwin (1991: 189).

<sup>41</sup> James and Veale (1972: 5) on selling prisage wine. The quote is from *Carte Ormonde* II. 219 (1736).

<sup>42</sup> Galen (Kühn) 14.9, 10, 53; Pliny *HN* 12.111-113. On these and other examples vis-à-vis general patterns of production on imperial estates, see Millar (1977: 185).

<sup>43</sup> *Ibid.* 185-187.

profitable crops like vines, olives, and figs.<sup>44</sup> Similarly, in 1212, when King John bought those 262 tuns of wine, he also obtained another 86 through prisage.<sup>45</sup> Just as English kings used a combination of commercial and non-commercial streams to obtain their wine and disposed of it both for revenue and personal consumption, so too did Roman emperors. Regardless of the purpose for which elites brought wine to Rome, it created a relatively constant source of demand, a sometime source of supply, and made the Roman market considerably more stable than in a similarly large but non-capital city such as Alexandria or Antioch.

There are therefore two fundamentally different ways of seeing the operation of Rome's wine commerce. The first would see an absence of active imperial involvement at every level of commercial wine production, transport, and distribution. The second would claim that this absence is illusory, that the invisible hand guiding Rome's wine supply was not fundamentally that of the market but that of the emperors' long reach. Which picture one adopts will greatly affect the types of models chosen: the first would lend itself to fairly pure, economic analysis; the second to models drawn from sociology or anthropology.<sup>46</sup>

But both viewpoints are defensible: there was certainly an unregulated, free-market in wine at Rome, but the shape of this market owed a great deal to background forces and institutions shaping the market's operation. Existing histories of Roman wine commerce do not successfully bridge that divide. In contrast, this dissertation offers an economic study of Rome's wine supply focusing precisely on these sorts of problems: the

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<sup>44</sup> Kehoe (1988: 41, 62, 106). See Duncan-Jones (1990: 117) for a critique of this claim.

<sup>45</sup> James and Veale (1972: 7).

<sup>46</sup> For an overview of the distinction between economics and economic sociology, see Smelser and Swedberg (2005: 3-26).

relationship between individuals' economic activity and the institutions providing the framework for those actions.

### **“At the Distance of Centuries...”**

We can trace post-classical antiquarian interest in Roman wine to Andreas Bacci's seven volume treatise *De naturali historia vinorum*, published in 1596. This work differed from earlier works, for example, Pietro Crescenzi's early 14<sup>th</sup> century *opus ruralium commodorum* (see below), by treating the history of wine as a subject worthy of study in and of itself rather than as précis for handbooks and advice to contemporary growers. Among English writing antiquarians, we can mention Dr. John Arbuthnot's *Coins, Weights, and Measures* (1754), Sir Edward Barry's treatise *Wines of the Ancients*, (1775), Alexander Henderson's *The History of Ancient and Modern Wine* (1824), and Cyrus Redding's *History and Description of Modern Wines* (1833). These antiquarian histories continued into the early 20<sup>th</sup> century with, for example, Dr. Basserman-Jordan's *Die Geschichte des Weinbaus* (1907), and Billiard's *La vigne dans l'antiquité* (1913). Even today there are studies produced in the same antiquarian spirit, for example, Pellechia's (a long standing owner of a New York wine shop) *Wine: The 8,000-Year-Old Story of the Wine Trade* (2006).

Though these works are not without interest—Bacci for example made oblique reference to certain structures for storing wine within the city of Rome still extant in the 16<sup>th</sup> century, and the others culled material from ancient sources with wide-sweeping, if not critical, eyes—they are all fundamentally antiquarian in nature, in Momigliano's definition of antiquarians. He defined antiquarians as those who “collect all the items that

are connected with a certain subject whether they help solve a problem or not.”<sup>47</sup> Their perspectives on Roman wine, uniformly different from modern and colored by the world of pre-modern wine production, repay reading them.

It was not until the 19<sup>th</sup> century that we first see wine discussed as an economic rather than agricultural product, a result of the development of the modern study of economics. Historians noticed wine because of its potential profitability and its need for capital investment.<sup>48</sup> Thus Niebuhr, though not mentioning wine in particular, gave a short description of the declining economic fortunes of the Roman people and sadly notes that it is a condition “towards which, at present, unfortunately all Europe is hastening.”<sup>49</sup> Mommsen made the connection between the growth of the wine industry and changing agricultural regimes on the Italian peninsula more explicit, saying that wine, “under the favorable climate of Italy, had no need to fear foreign competition...there is some ground for assuming that capital invested in land was reckoned to yield a good return at 6 per cent... the vineyard gave the best return.”<sup>50</sup>

The connection between wine, capital, and labor which Mommsen reported was part of the broader interest in those latter two topics which we find in Smith, Ricardo, and Mill. Marx too picked up on the close connection between wine and capital investment in *Das Kapital* where he gave wine as an example for a typical type of “capital production.”<sup>51</sup> Weber too implicitly invoked wine, the capital agricultural product *sans pareil* when analyzing the use of unfree labor in profit making establishments.<sup>52</sup> None of

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<sup>47</sup> Momigliano (1950: 286).

<sup>48</sup> Blaug (1997) on the history of economic theory since Adam Smith.

<sup>49</sup> Niebuhr (1849 2: 279).

<sup>50</sup> Mommsen and Dickson (1862 2: 375).

<sup>51</sup> Marx (1906: 654).

<sup>52</sup> Weber (1978: 133).

these writers offered new, independent research into the nature of Roman viticulture or wine commerce itself but used the development of Italian viticulture as a proxy subject for evaluating the development of labor and capital regimes on the ancient peninsula. This use of wine as a proxy economic subject has had, as we shall see below, a long life.

This stage also largely coincided with the birth of non-antiquarian archaeology. The publications of Rodolfo Lanciani, in particular in his serial *Storia degli scavi*, and his more “popular” works, *Ancient Rome in the Light of Recent Discoveries* (1888) and *The Ruins and Excavations of Ancient Rome* (1897), were as far as I can tell the first since Bacci’s casual references to describe wine storage and distribution within ancient Rome. For example, Lanciani reported on previous excavations, indicating “that wine cellars were established not only in a place naturally...shaded from the sun but wherever the building of the substructures afforded an opportunity to create subterranean vaults.”<sup>53</sup> His works on topography and archaeology added an important element to the study of commerce within the city of Rome generally and on wine specifically. Moreover, several of his reports treated structures no longer extant, and they remain useful sources.<sup>54</sup>

The epigraphist Heinrich Dressel, who in 1878 became a professor at the German Archaeological Institute at Rome, tried to bring typological order to the daunting numbers of clay vessels he found at Rome (primarily at *Castra Pretorio*) in order to further his study of the those with *tituli picti*—painted inscriptions on the vessels’ rims.<sup>55</sup> Although his focus on amphorae found in urban contexts has been mildly censured for “starting at the wrong end” (i.e., with amphorae’s distribution point rather than

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<sup>53</sup> Lanciani (1897: 427).

<sup>54</sup> See the report on the remains of a large storage area with large, buried wine containers, uncovered during the construction of the Tiber embankments is highly interesting: see *NSc* (1880: 140).

<sup>55</sup> His typology of amphorae can be found in *CIL* XV (1899).

production points), he ended up providing the foundation for Roman amphorae studies which have proved to be the single most important material for studying Roman commodity trade.<sup>56</sup>

Historical accounts of wine commerce in the last century have been influenced by all three of those approaches. The antiquarian interest in the details of the wine trade has remained, but those details have often been used in service of theses about much broader economic topics. Material evidence has remained the most important and often only type of data used. We see this combination as early as 1908, in a lecture given by the historian and journalist Guglielmo Ferrero at the White House and subsequently published in 1909 as *Characters and Events of Roman History*. In lecture seven, “Wine in Roman History,” he credited the Italian wine industry with a foundational role in establishing and stabilizing Augustus’ principate. He wrote:

*At the distance of centuries, these vine-growing interests do not appear even in history; but they actually were a most important factor in the Roman policy, a force that helps us explain several main facts in the history of Rome. For example, vineyards were one of the foundations of the imperial authority in Italy. That political form which was called with Augustus the principality, and from which was evolved the monarchy, would not have been founded if in the last century of the Republic all Italy had not been covered with vineyards and olive orchards. The affirmation, put just so, may seem strange and paradoxical, but the truth of it will be easy to prove.<sup>57</sup>*

Though Ferrero’s interpretation would seem to us today shockingly hyperbolic, its detailed use of ancient sources along with contemporary economic thought marks a new stage in the history of Roman wine.

Ferrero’s willingness to equate ancient and modern economic factors in wine commerce was part of a much broader tendency to analyze ancient economic behavior

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<sup>56</sup> For the quote, Patterson (1988: 241).

<sup>57</sup> *Ibid.* 188.

with uncritically modernizing models.<sup>58</sup> Thus Rostovtzeff, an exile of the economic upheavals of late Czarist Russia and the Bolshevik revolution, thought himself uniquely qualified to analyze what he saw as the strikingly similar process of economic development and struggle in late Republican Rome.<sup>59</sup> He ascribed to mid-Republican Romans an imperialist spirit driven by capitalistic acquisitiveness and argued that the push for Carthage's destruction in the mid-2<sup>nd</sup> century BCE was encouraged by wine and oil producers who wanted to remove their fiercest rival.<sup>60</sup> Tenney Frank saw Italian villas' wine production as evidence for "capitalistic specialization...chiefly under slave labor."<sup>61</sup>

In the later 20<sup>th</sup> century, archaeological evidence continued to solidify its dominance as the source *par excellence* for the study of Roman wine, and the topic itself continued to be shaped by larger developments in ancient economic history, though less so by extra-disciplinary economic developments. In particular, the wine trade was a battleground in the interpretive war between the so-called primitivists—followers of Moses Finley who argued that ancient economic activity was limited in scale and motivated by non-economic goals—and modernists, who were more inclined to see evidence of economic-growth, long-distance trade, and rational economic behavior in the ancient world.<sup>62</sup>

Wine, the prime example of a profit-oriented agricultural product for prior historians, became a *champ de bataille*. Columella's proof of viticulture's profitability

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<sup>58</sup> Conison (2012).

<sup>59</sup> Rostovtzeff (1922: 18).

<sup>60</sup> Rostovtzeff (1957: 21).

<sup>61</sup> Frank (1920: 413).

<sup>62</sup> The history and characteristics of the debate have been described by many historians. See in particular Finley and Morris (1999: ix-xxxvi).



become proof, for Finley, of the nature of Roman accounting and was characterized as “nonsense...merely a perfunctory desk exercise.”<sup>63</sup> By extension, this became evidence for lack of ancient economic rationality. Carandini, a Marxist historian especially interested in the growth of slave mode of production, the development of Italian viticulture, and the economics of the villa system,<sup>64</sup> tried to adopt Kula’s model of bi-sectorial economy to preserve the rationality of Columella’s accounts.<sup>65</sup> Against this there was, said Finley, “neither a shred of evidence nor a shred of probability.”<sup>66</sup> The economics of wine production and trade became a birdie batted around by historians fundamentally interested in much broader structural questions.<sup>67</sup>

Against the backdrop of these debates about the general characteristics of ancient economic activity, the increasing sophistication of undersea archaeology, and the corresponding development of amphorae studies, the archaeologist André Tchernia published *Le vin de l'Italie romaine: Essai d'histoire économique d'après les amphores* (1986). Its most important achievement was to redefine the narrative of the development of wine commerce in Italy. For the historians described above, the story of wine in Roman Italy was one of intensive capitalist investment and trade, the rise of provincial competition, and subsequent crisis and collapse. Tchernia decisively showed that Italy’s wine commerce was more complicated than previously thought and not well described by

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<sup>63</sup> *RR* 3.3.8-10; Finley (1999: 117). This argument was actually anticipated, though possibly Finley was unaware of it, by Mommsen and Dickson (1862 2: 376) who drew attention to the “somewhat illusory” profitability Columella’s accounting showed.

<sup>64</sup> See in particular Carandini (1985); with a special emphasis on wine, (1989a : 505-521), (1989b: 16-24) . For brief overview of the influence of the slave mode of production on Italian historians, see Rathbone (1983: 160-68).

<sup>65</sup> Carandini (1983: 177-204).

<sup>66</sup> Finley and Morris (1999: 181).

<sup>67</sup> Whittaker (1985: 49-75) , for example, tried to argue that many of the underwater amphora finds may have been shipments of wine between aristocrats, either from one property to another or as gifts between different people but were not necessarily market driven trade.

a crisis-narrative. For example, Tchernia showed, from the distribution of Lamboglia 2 amphorae, that late Republican Italy imported Apulian wine, some of which was re-exported east.<sup>68</sup> In other words, even in the period where the export “balance of trade” in wine supposedly favored peninsular Italy, the same groups could be both importing and exporting the same wine. Such a relationship was likely not restricted to the republican period.<sup>69</sup>

Moreover, Tchernia argued that the rumors of the death of Italy’s wine-industry in the imperial period were exaggerated.<sup>70</sup> Amphorae became more standardized, which makes it more difficult to specify a vessel’s provenance. Barrels, poorly preserved archaeologically, were becoming increasingly common by the second century (indeed, the earliest dates for barrels seem to be pushed earlier with each subsequent publication).<sup>71</sup> Moreover, local wines at Rome, which by a recent estimation constituted about 33% of the total, probably were transported neither in amphorae or barrels but in skins (*cullei*), which held twenty-five amphorae and were more suitable for land transport than rigid, clay containers.<sup>72</sup> Tchernia’s book was a culmination of the topical threads traced above, but also departed decisively from the economically reductive view of ancient wine characterizing much earlier work and remains the only substantial, synthetic history of the Roman wine trade.<sup>73</sup>

Tchernia’s work is unquestionably the best history of Roman wine yet written, but its emphasis on archaeological remains, amphorae in particular, necessitated leaving

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<sup>68</sup> Tchernia (1986: 74).

<sup>69</sup> See Bezecky (2005: 51-53) on Campanian amphorae at Ephesus.

<sup>70</sup> Tchernia (1986: 230-1, 251-3, 264-70).

<sup>71</sup> For example, Brun (2005).

<sup>72</sup> For this estimation, de Sena (2009) 1-15.

<sup>73</sup> There are a few other, more recent works, that I would call quasi-syntheses. For example, Amouretti and Brun (1993); Tchernia and Brun (1999); Brun (2004).

many fundamental questions unanswered. The Romans' ability to transform grapes on a vine in Spain into wine in an amphora at Ostia raises questions about the organizational structure of commerce which allowed this trade to occur: to what extent did were production, shipment, distribution, and sale vertically integrated? At which, if any, of those stages was there a tendency to integrate horizontally? If commerce in wine was relatively un-integrated, were enforcement mechanisms primarily contractual or more informal? What were the most important driving forces in both the production structures and retail markets? The latest stage of historical accounts of Roman wine—i.e., since Tchernia—has not tackled these questions because amphorae studies dominate the field.<sup>74</sup>

Rather than tackling broad historical questions, research has become increasingly narrow. The tendency toward specialized studies of individual amphorae and kiln sites with little synthetic analysis has engendered some puzzlement among archaeologists: recently, Kevin Greene suggested that, “increased self-esteem amongst pottery specialists might bring to the surface thoughtful economic and cultural discussions which are currently rather difficult to locate.”<sup>75</sup> On the rare occasions when these studies are considered in combination, it is predominately to answer questions about the large-scale nature of the Roman economy, to investigate whether “...long-distance trade operate on a scale sufficient to increase the overall size of markets in certain goods...enabling specialization and division of labour, and thus Smithian growth?”<sup>76</sup> Once again, the

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<sup>74</sup> The bibliography is unmanageably vast. For an overview and references to more specific works, see Peacock and Williams (1986); the collection of articles published by the *Ecole Française* (1989); Panella and Tchernia (1994: 145-165); Brun (2004); Ejstrud (2005: 171-81); Wilson (2008:213-249). The Roman Amphora Project website, run by the University of Southampton, is extremely useful and can be found at [http://ads.ahds.ac.uk/catalogue/archive/amphora\\_ahrb\\_2005](http://ads.ahds.ac.uk/catalogue/archive/amphora_ahrb_2005).

<sup>75</sup> Greene (2005: 52).

<sup>76</sup> Wilson (2008: 213).

Roman wine trade becomes a method for making far-reaching claims about the Roman economy as a whole.

These are worthwhile questions and the growing sophistication of historians' answers enriches our view of ancient Rome's economic development.<sup>77</sup> But they do not get us closer to the more modest and perhaps more creditable goal of understanding how Rome's supply of wine operated. Offering such an account is the goal of this dissertation and demands a fairly different set of questions, models, and evidence than we find in contemporary treatments of Roman wine. The rest of this chapter gives an overview of the sources I use, a brief narrative of the growth of wine consumption at Rome, and a picture of the engine driving the city of Rome's market for wine.

## **Models**

Ancient economic histories have been underpinned by one of two dominant theoretic approaches, often referred to as primitivism versus modernism or substantivism versus formalism. Good descriptions exist describing the historical development and contours of the debate between adherents of these two schools, and there is little to be gained by repetition here.<sup>78</sup> In short, the primitivist/substantivist approach advocates that models drawn from sociology and anthropology work better than economic models for analyzing ancient economic behavior because the cultural conditions and "*mentalités*" of pre-moderns were so different that modern economic theory has little explicative value.<sup>79</sup>

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<sup>77</sup> See Saller (2005: 223-38); Temin (2006a: 133-51); Scheidel (2007: 322-46); Bowman and Wilson (2008: 3-84) for examples of current approaches to quantifying the Roman economy on a large-scale (i.e., macro-economic) level.

<sup>78</sup> The best history of the debate is Morris (1999).

<sup>79</sup> See, for example, Andreau, France, and Pittia (2004).

The opposing pole can be described as economic modernism, which “describes a heterogeneous set of approaches for studying ancient economic behavior.”<sup>80</sup> In short, modernists assume that economic models are not historically contingent and therefore apply the concepts, techniques, and models of economic theory to analyze the contours and performance of ancient economic activity. Problematically, these approaches have been used primarily to demonstrate the similarity between ancient and modern economic activity; in other words, it smooths away differences. Economic modernism therefore has a problematic ambiguity because it has been both a methodology and, implicitly, an interpretive theory.

This ambiguity is problematic because it should go without saying that ancient economic activity faced considerably different problems and behavioral constraints than in the modern world, and the solutions developed should correspondingly differ. Economic theory, as a methodology, should not be limited to homogenization but should be equally adept at explaining differences between two (or more) economic systems. In my view, the fundamental goal of a work of ancient economic history should be to find appropriate models for explaining how, in a Rankean sense, it actually worked and not just to elucidate similarities between the ancient and modern world.

The search for such models leads us to the economic approaches blanketed by the appellation of New Institutional Economics (hereafter NIE). Though NIE encompasses a range of differing theoretical approaches, they all share a common core which accepts most neo-classical premises but believes that market mechanisms are costly to use. Institutions, both formal and informal, play a large role in determining how costly markets and their alternatives are to use and thus shape the range of plausible actions

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<sup>80</sup> Conison (2012).

available to economic actors.<sup>81</sup> Its premises and approaches are essential for understanding my dissertation. They are still mostly unknown to ancient historians even though this body of work has been the foundation of a “quiet revolution” in economics.<sup>82</sup> Therefore, I will provide an extremely brief overview, drawing attention to those features and its vocabulary most relevant to this work.

Ronald Coase unintentionally founded NIE with two seminal articles on the nature of firms and problems of social cost.<sup>83</sup> These articles introduced several key concepts. In particular, he argued that firms exist because there are costs to using markets, and these may be prohibitively high in some circumstances. To describe these costs, he introduced the notion of transaction costs.<sup>84</sup> The upshot was to suggest that individuals’ economic actions and their institutional settings could be unified— a fusion which was not successfully reached either by neo-classical economic theory or by Old Institutional Economics.<sup>85</sup>

Three distinct but closely connected approaches are important for addressing the questions about Roman wine posed above: Economics and the state, transaction cost

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<sup>81</sup> For general introductions, see Brousseau and Glachant (2008); Mñard and Shirley (2008); Drobak and Nye (1997).

<sup>82</sup> But see Frier and Kehoe (2007: 113-43); Lo Cascio (2005: 215-34); (2007: 619-47); Bang (2009: 194-206). For applications of NIE in non-Roman histories, see *inter alia* North (1973), (1996), (2009); Greif, Milgrom, Weingast (1994: 745-76); Fafchamps (1996); Bernstein (2001: 1724-90); Greif (2006). For, as far as I can tell, the singular example of its application to a topic of Roman history (interest bans in early Christianity) see Rubin (2009: 761-77). The quote is from Demsetz (1997: 426-29).

<sup>83</sup> Coase (1937: 368-405); (1960: 1-44).

<sup>84</sup> This is a shortened version of the famous Coase theorem, which makes two propositions : “1) If there are zero transaction costs, efficient outcomes will occur regardless of legal (or more, broadly, institutional) rules; 2) If there are positive transaction costs, the efficient outcome may not occur under every legal rule...the preferred legal rule is the rule that minimizes the effects of transaction costs...” (Polinsky 1989: 12-3). For analysis and critiques of the Coase theorem see Regan (1972: 429-430); Spitzer and Hoffman (1980: 1187-1223); Demsetz (1988: 141-161).

<sup>85</sup> On the relationship between Old and New Institutional Economics, see Medema, Mercurio, & Samuels (1999: 418-55). Old institutional economics was highly influenced by American pragmatism and habit-psychology; though never a coherent theory, it tended to argue that premises made by economists were actually contingent on historically conditioned institutions and that these, not the mythical rational actor, should be the focus of analysis.

theory (TCT) and incomplete contract theory (ICT), also called property rights theory.<sup>86</sup> Though my primary procedure will be to introduce concepts as needed, a brief overview here will save repetitious explication later. These approaches are unified by their reliance on the concept of distortions from perfect efficiency introduced by transaction costs.

Douglas North was most interested in economic history writ large and argued that certain premises of neoclassical models made them unsuitable for studying historical economic operation. Rather, he used as building blocks a theory of property rights (i.e., a transaction cost theory—“TCT”), a theory of state functioning “since it is the state that specifies and enforces property rights” and “a theory of ideology that explains how different perceptions of reality affect the reaction of individuals to the changing ‘objective’ situation.”<sup>87</sup> North’s approach is most concerned with the way state power structures create the rules of the game under which any economic activity occurs.<sup>88</sup>

The notion of transaction costs has also had a great deal of success in explaining why firms form and how they can allow economic actors to avoid problems associated with the open market. In this theory, firms and markets are alternatives; generally, firms arise when the costs of using the market become excessively high.<sup>89</sup> TCT tries to explain how trading partners form arrangements that protect their relationship-specific investments at the least cost.<sup>90</sup> Williamson helpfully defined asset specificity as “durable investments that are undertaken in support of particular transactions, the opportunity cost

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<sup>86</sup> On TCT see Williamson (1975), (1985), (1996) & (2000: 596-613); Joskow (1985: 33-80), (1987); Joskow and Watterson (2004). On ICT, Alchian and Demsetz (1973: 16-27); Grossman and Hart (1986: 691-719); Hart (1995); Barzel (1997); Anderson and McChesney (2003).

<sup>87</sup> North (1981: 7-8).

<sup>88</sup> In Roman History, Lo Cascio has been especially interested in application of North’s strain of NIE: see Lo Cascio (2005: 215-234) and (2007: 619-47).

<sup>89</sup> Garrouste and Saussier (2008: 27).

<sup>90</sup> Klein (1999: 468).

of which investments is much lower in next best alternative uses or by alternative users should the original transaction be prematurely terminated.”<sup>91</sup> Asset specificity leads to a number of potential problems, the most notable (and subject to the most economic research) is the hold-up problem.<sup>92</sup> Hold-up can occur when two partners both make *ex ante* investments in a specific good but one partner places a higher *ex post* value on the good than the other. In such a case, there are rents available for appropriation by the other partner, i.e., he can hold his partner up.

We can give a specific example where the hold-up problem may have arisen in the buying and selling of Roman wine. Gaius, discussing the relationship between a wine-seller and a wine-merchant, said:

This is true if he is a vendor for whom those containers are not necessary except at the new vintage. But if he is a merchant, who is accustomed to buy and sell wines, the time should be observed when they can be removed at the seller’s convenience

*Hoc ita verum est, si is est venditor, cui sine nova vindemia non sint ista vasa necessaria: si vero mercator est, qui emere vina et vendere solet, is dies spectandus est, quo ex commodo venditoris tolli possint).*<sup>93</sup>

Let us call the vendor Sextus and the merchant Stichus and ask what problem lurks behind this short excerpt from Gaius. First, we note that *vasa*, large storage vessels from which wine would be decanted into smaller containers, have a high degree of asset specificity, in other words, they have a fairly restricted range of uses.<sup>94</sup> Imagine a situation where Stichus contracted to buy wine from Sextus, who agreed to preserve it until an appointed time in his *vasa*. Problematically for him, the value of these *vasa* is

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<sup>91</sup> Williamson (1985: 55).

<sup>92</sup> Che and Sákovics (2008) s.v. “hold-up problem.”

<sup>93</sup> *D.* 18.6.2.pr.

<sup>94</sup> *D.* 32.93.4 and *D.* 34.2.19.10 for the legal definition of *vasa vinaria*.



contingent on his deal with Stichus: in other words, the containers' notional market value is less than their value under the terms of the specific contract.

Stichus, knowing this, has the opportunity to behave opportunistically and demand an *ex post* adjustment to their agreement, one which unfairly favors his interests (more technically, Stichus will want to appropriate the quasi-rents accruing to the *vasa*).<sup>95</sup> For example, he might insist on leaving the wine in Sextus' *vasa* for a longer period than initially agreed upon, thereby increasing his opportunity to sell the wines downstream at a higher price but negatively impacting Sextus' ability to re-use his *vasa* for future transactions. Sextus, fearful of such opportunistic behavior, might refuse to enter into such an arrangement in the first place although, with a credible commitment mechanism, the transaction's outcome would be Pareto efficient (i.e., both parties would be better off).

TCT predicts that when contracts lack credible commitments—as they will when uncertainty is high, assets are specific, and the potential for market sanctions low—substitute governance arrangements will emerge, for example, vertically integrated industries, long-term contracts, or partial ownership arrangements to avoid these potential problems.<sup>96</sup> The legal stipulation is one potential source of forcing the merchant to make a credible commitment, though the credibility of the legal rule would depend on a host of other variables.

In contrast to TCT, which focuses on asset specificity and intra-firm costs as key variables separating the firm from the market, property rights (incomplete contract

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<sup>95</sup> Klein, Crawford, Achian (1978: 297-326) on such quasi-rents.

<sup>96</sup> On long term contracts, see, for example, Joskow (1988: 47-83); (1990: 251-74); on partial ownership, Pisano (1990: 109-26).

theory—“ICT”) economics offers an integrated view of their relationship.<sup>97</sup> ICT makes a distinction between economic property rights and legal property rights. The former is simply one’s ability to benefit from something; the latter is what a government assigns and guarantees to an individual.<sup>98</sup> Property rights economics focuses predominately on the former and points out that they “...are not constant; they are a function of their [*i.e., the owners*] direct efforts at protection, of other people’s capture attempts, occasionally of formal and informal non-governmental protection.”<sup>99</sup> Legal property rights may help ensure economic property rights but they are neither necessary nor sufficient: throughout this dissertation, property rights refers to economic property rights unless otherwise specified.

An example will make this distinction clear and demonstrate some of its implications. Grapes on the vine are liable to theft. Ulpian, discussing legated goods, said “and he says that a guard must be placed by the heir for guarding those things which are unable to be secure without security, for example, flocks, or grain and grapes if the harvest and vintage has not occurred (*Idem ait ad custodienda ea, quae sine custodia salva esse non possunt, custodem ab herede ponendum (ut puta pecoris, et si nondum messis vindemiave facta sit)*).<sup>100</sup> The heir to the grapes has full legal rights over them, but he cannot ensure their full use and enjoyment without additional cost: security.

Therefore, the legal owner does not have full economic property rights over the grapes: in the argot of economists, there are residual rights over the grapes which have partial owners, or residual claimants: the legal owner and potential thieves. The price (or

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<sup>97</sup> See Barzel (1997: 3-15) for an overview of this model and its distinctive characteristics.

<sup>98</sup> Alchian (2008) s.v. “property rights.”

<sup>99</sup> Barzel (1997: 4).

<sup>100</sup> *D.* 37.9.1.25.

effort) it would cost the owner to secure these residual rights (i.e, protect against theft) constitutes the value of those residual rights. The cost of discovering and securing those rights are a form of transaction costs.<sup>101</sup> In the real world, where transaction costs are positive, some residual rights will invariably be left unclaimed or contractually unspecified because, relative to the object's value, measuring and securing them are prohibitively costly.<sup>102</sup>

In many cases, moreover, the value of these residual rights is not distributed evenly. In the example given by Ulpian, the value of the grapes may be worth considerably more to the heir than to a potential thief. Imagine that the value of the vintage to the heir was 1000 sesterces but only 100 sesterces to the thief. Further, imagine that the cost of hiring guards is 500 sesterces. Under these highly idealized conditions, there is considerable incentive for the grape owner to purchase the thief's residual rights for, say, 250 sesterces, and a corresponding incentive for the thief to accept. More generally, Grossman and Hart argued that the assignment of these residual rights is the cause of firm formation because it will often be impossible or too expensive to specify *ex ante* the parties' specific rights; sometimes it is cheaper for one party to purchase all residual rights of control rather than attempt to contract on every specific right.<sup>103</sup>

This dissertation uses approaches from all three of those theories but not arbitrarily. Rather, each has comparative advantages for certain types of questions. Oliver Williamson has offered a four-part diagram, illustrating the levels of social and

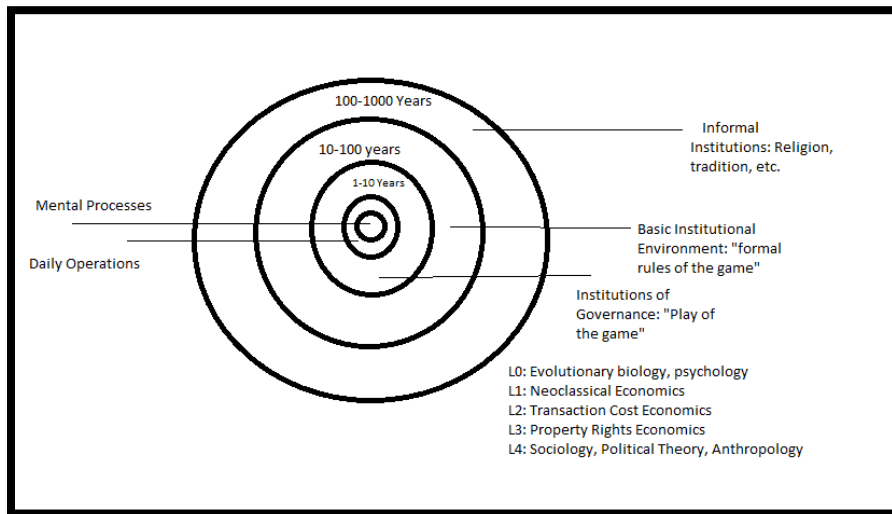
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<sup>101</sup> Allen (1991: 1-18).

<sup>102</sup> Barzel (1997): 4).

<sup>103</sup> Grossman and Hart (1986: 691-95). Note a distinction here between Williamson's TCT, where contractual incompleteness results from actors' bounded rationality and asset specificity. ICT posits that contractual incompleteness is consistent with an idealized world of perfect rationality (Brousseau 2008: 42-3). For a discussion of whether incomplete contracting is consistent with perfect rationality, see Tirole (1999: 741-81).

institutional relationships, which I have adapted in the figure below.<sup>104</sup> Each level has an body of theory particularly well suited for it.



**Figure 2.2: Institutional Analysis**

Level 4: These are a society’s socio-cultural foundations. We could include here religion, custom, ethical code, and (linguistic anthropologists would argue) language. These are unlikely to be designed intentionally but arise evolutionarily and form the backdrop in front of which all other levels operate. Economists generally take this level as a given.<sup>105</sup> This level changes the most slowly, on the order of centuries.<sup>106</sup>

Level 3: These are the institutions which, for North, constitute the “formal rules of the game.”<sup>107</sup> These institutions include legal codes, constitutions, and political systems which design and enforce property rights as well as basic tools like money, financial systems, and taxation. This level has received a great deal of focus from

<sup>104</sup> This figure is after Williamson (2000: 597). I have added an additional level (L0) which he mentions but does not formally include and, less importantly, reversed his numbering system.

<sup>105</sup> Williamson (2000: 596). For exceptions, Huntington (1996), Nee (1998).

<sup>106</sup> See also, Smelser & Swedberg (1994).

<sup>107</sup> North (1991).

property rights economists. This circle spins more rapidly than Level 4, but because of its close proximity to it, changes still occur fairly slowly, on the order of decades.

Level 2: Given the rules set out in level 3, level 2 is the governance arrangements by which actors play the game. Markets, labor relations, and contracts are defined and established; boundaries between markets and firms are established as are the latter's internal organizations. Choices are made in order to economize on transactions such as vertical or horizontal integration, ad hoc market transactions or long term contracts. Though directly below Level 3 and influenced by it, changes in governance arrangements happen much more quickly, on the order of years. Much of Williamson style TCT analysis occurs at this level.

Level 1: This is the level where day-to-day economic activity occurs. Neoclassical market economics' concepts of supply and demand, wage and labor markets, and prices work well at this level.<sup>108</sup> The adaptation of new strategies occurs continuously and organizations are treated as a production function, a black box which converts the traditional triad of land, labor, and capital into output.<sup>109</sup> We generally lack the information necessary to examine this level with any detail for the Roman period.

Level 0: Call this the "instinct" level. *Homo sapiens*, like any other living organism, has been subject to millions of years of adaptive pressures, and the ways in which these pressures manifest themselves in human behavior, mentalities, and decision making processes have been of interest to behavioral psychologists, biologists, anthropologists, and increasingly, economists.<sup>110</sup> For example, should models be built off

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<sup>108</sup> Joskow (2008: 8).

<sup>109</sup> Williamson (2000: 600).

<sup>110</sup> Arruñada (2008: 81-99).

notions of “instinctive rationality” rather than perfect rationality?<sup>111</sup> Why do we so easily fall prey to “irrationalities” like the Gambler’s fallacy, the Concord fallacy, or the Sunk Cost fallacy?<sup>112</sup> These analyses are rightly receiving increasing attention in the economic framework of human actors.<sup>113</sup> Although not dealt with explicitly, it is worth remembering that they exist.

Roman wine history has produced several centuries of works ranging from outright antiquarianism to sophisticated analyses of the shifting patterns of trade and Italian viticulture. But many questions, fundamental to understanding the driving forces behind the wine-trade’s commercial operation and development, remain ignored. This is unsurprising, for it is only within the last thirty years that the economics of organizations has come into its own and has developed a range of robust models for tackling such questions. It would be laughably hubristic to claim that this dissertation could be anything more than a prolegomenon, but I hope it will open a new line of inquiry, both topically and methodologically into this fascinating subject.

## **Sources**

Of course, all the models in the world will be unable to help if we cannot find appropriate evidence for using them. There are several types of evidence at our disposal, each with its own advantages and disadvantages. The biochemical properties of grapes and the fermentation process necessarily constrain a wine maker’s behavior within a relatively narrow range of acceptable actions. Grapes must be ripened appropriately. They must not be picked before there is enough sugar for the yeasts (which naturally occur on the skin of grapes) to ferment. But they must not be allowed to ripen excessively

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<sup>111</sup> Damasio (1994).

<sup>112</sup> See Piatelli-Palmarini (1994) for analysis of these “mental-tunnels.”

<sup>113</sup> Williamson (2000: 600).

and become subject to rot. These wines, lacking acidity, are prone to bacterial contamination and taking on an off-putting “jammy” flavor.<sup>114</sup> Juices, once pressed from the grapes, must be allowed to ferment and then mature in environments allowing the proper oxidative reactions to occur.<sup>115</sup> Containers must be found to protect the wines as much as possible from various types of acidification and decay. These constraints have dictated that wine production, prior to the 19<sup>th</sup> and, especially, 20<sup>th</sup> centuries’ developments in chemistry, biology, and engineering, have followed fairly similar contours. This similarity offers us at least one advantage: we can draw on a chronologically diffuse range of sources on production.

Roman written sources focus predominately on viticulture and wine production with very little explicit discussion of topics such as selling, shipping, or marketing the wine: Stray references to those latter topics can be found sprinkled throughout the literary corpus though never in any lengthy or particularly coherent framework. In addition, papyri and legal sources frequently preserve interesting aspects of both wine specifically and commercial practice more generally.

The extant Roman agronomists—Cato, Varro, and Columella—offered manuals, most likely composed with two audiences in mind: the wealthy landowners like Niger and Silvinus to whom Varro and Columella respectively dedicate their works and also for the use of slaves—the foreman (*vilicus*) particularly.<sup>116</sup> These works overwhelmingly focus on the proper running of an estate, giving advice on topics ranging from the types of vines to plant, the orientation of vineyards, how many vine-dressers to use, the

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<sup>114</sup> Hornsey (2007: 163).

<sup>115</sup> *Ibid.*, 297.

<sup>116</sup> On the Roman agronomists through Varro see White (1973: 439-497); for the remains of the lost agronomists, such as the two Sasernas, see Reitzenstein (1884). On Columella (but with some relevant discussion of previous writers) see Noé (2002).

procedures for vinification, and what part of the estate *vinum novum* should be stored in. For reasons likely both of genre and intended audience, very little can be gleaned about the future of these wines once made, for example, how and when to sell it or the relationship between the estate owner and wine merchants. But for questions of production, these are some of the most useful sources available.

Later agronomists too can be useful. Because they were adapting and sometimes outright copying those agronomists cited above, places where the later agronomists diverge may suggest that a functional change had occurred in wine production or commerce. Among these writers we can include the late Roman Palladius, and those of the 12<sup>th</sup>-15<sup>th</sup> century Italian agronomists Pietro de' Crescenzi, Paganino Bonafede, Corniolo Della Cornia, and Michelangelo Tanaglia.<sup>117</sup> For example, Crescenzi drew a clear distinction between varieties typical to the coast and those of the plains and made a clear separation between their respective qualities, a distinction not made (at least not explicitly) by the Roman agronomists.<sup>118</sup> Though I do not draw on them frequently, distinctions between them and their Roman sources often open suggestive avenues for exploration.

The Elder Pliny's encyclopedic natural history, with over a thousand references to wine, is also useful. Book XIV deals exclusively with vines, viticulture, and wine and provides many details about the history of wine in Italy. Though we cannot separate his interest in wine and viticulture from his work's broader artistic and cultural aims, his

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<sup>117</sup> For Palladius, see the edition of Rodgers (1975); on his relationship to late-Roman, Italian agriculture see White (1979: 39-45); Frézouls (1980: 193-210). On viticulture in medieval Italian agronomists and their relationship to Roman authors, see Gaulin (1989: 93-118). These works, chronologically, are the *Liber ruralium commodorum* (early 14<sup>th</sup>), the *Thesaurus rusticorum* (mid-14<sup>th</sup>), the *Divina Villa* (early 15<sup>th</sup>), and the *De Agricultura* (end of 15<sup>th</sup>).

<sup>118</sup> Gaulin (1989: 103).



details are informative even if they cannot be considered a proper account of Roman viticulture, let alone wine commerce, in any sense.<sup>119</sup> After this, literary sources primarily offer nothing more than scattered details in support of some topic of radically different context, though Cicero's *In Verrem, Pro Fonteio*, and the Younger Pliny's *Epistulae* do offer a notably high level of detail about aspects of Roman wine commerce.

I have already indicated that archaeological remains have, in the course of the last 50-75 years, gradually obtained a preeminent place in the study of the Roman wine trade. The most visible archaeological remains are amphorae—clay vessels designed to transport produce—commonly found on sites, both underwater and on land throughout the Roman Empire and, to a lesser extent, dolia—very large clay vessels, ranging in capacity from several hundred to nearly a thousand liters.<sup>120</sup> There were, however, quite a few other types of containers which leave traces of variable visibility in the archaeological record.

Visual representations of barrels appear with some regularity from the first century on, but their wooden frames preclude them from preservation at anywhere near the rate of ceramics.<sup>121</sup> The Italian agronomists do not mention them, though Pliny and Strabo both were aware that the Gauls stored wine in wood with hoops, and Caesar recounts the use of barrels filled with pitch and set on fire as weapons.<sup>122</sup> Though the origin, chronology, and rate of technological adoption are still debated, the general trend has been an earlier and earlier temporal revision of barrels' adoption and diffusion.<sup>123</sup>

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<sup>119</sup> On Pliny's composition and aims, see recently Murphy (2004) and Carey (2003).

<sup>120</sup> For an introduction, see Peacock and Williams (1986).

<sup>121</sup> For example, they appear on Trajan's Column at Rome (2<sup>nd</sup> century), on the so-called Neumagen Wine Ship from Trier (3<sup>rd</sup> century), the funerary stele Senitia Amanti in Spain (1<sup>st</sup> century).

<sup>122</sup> Plin. *HN* 14.132; Strabo *Geog. BC* 2.11.

<sup>123</sup> On barrels, see Tchernia (1997: 121-29), Marlière (2002); Marlière and Torres Costa (2007: 85-106).

Wine was also transported in skins—*utres*. These also are not preserved in the archaeological record (Juvenal, in fact, uses them as an example of objects easily destroyed<sup>124</sup>) but may have been important in short-distance, overland transportation.<sup>125</sup> This necessarily cautions us about leaping immediately to over-generalized conclusions about products' provenience, routes, and destination, which are unavoidably based predominately on ceramic finds.

Nevertheless, amphora studies have been fundamental tools for reconstructing Roman oversea trade since the work of Zevi and Tchernia in the mid-60s.<sup>126</sup> The combination of shipwreck archaeology, beginning with the Grand Congloué wreck in the early 50s, along with increasing care paid in differentiating fabric types of ceramics led to an increased ability to trace the movement of amphorae around the western Mediterranean and to pinpoint their production sites. Additionally, the studies of *tituli picti*, inscriptions painted on amphora after firing, and stamps, abbreviated names and symbols, has presented their own, closely connected issues.<sup>127</sup>

Shipwreck archaeology was launched by the findings (and popularization of these discoveries by Jacques Cousteau) at Grand Congloué beginning in 1952.<sup>128</sup> There was initial debate over the dating of the wreck. Confusion arose because it was eventually determined that there were, in fact, two wrecks superimposed on top of each other, the first dating to the mid-2<sup>nd</sup> century BCE and the first from the late 2<sup>nd</sup> or early 1<sup>st</sup> century

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<sup>124</sup> *Sat.* 15.20.

<sup>125</sup> There were, in fact, *copora of utricularii* though their function is still somewhat mysterious. See Kneissl (1981: 169-204); Verdin (2005: 275-284); Panciera (2009: 127-136).

<sup>126</sup> Zevi (1966: 208-247), Zevi & Tchernia (1969) 173-214.

<sup>127</sup> Methods and bibliography for amphora studies provided by the Roman Amphora Project at [http://ads.ahds.ac.uk/catalogue/archive/amphora\\_ahrb\\_2005/info\\_intro.cfm#2](http://ads.ahds.ac.uk/catalogue/archive/amphora_ahrb_2005/info_intro.cfm#2) is an invaluable resource for an entrée into these subjects. For an interesting analysis of amphora in a work of comparative history (on risk-management strategies), see Pense (2008: 61-77).

<sup>128</sup> Cousteau (1954: 1-36).

BCE.<sup>129</sup> Among the most interesting items to appear were over a thousand Dressel 1 amphorae, many stamped with the (abbreviated) name of Sestius along with symbols such as anchors, stars, and tridents and which were later shown to have been produced in the region of Cosa, in southern Etruria.<sup>130</sup> Today, there are over 1100 wrecks known in the ancient Mediterranean. Continued interest in their histories coupled with technical improvements in underwater research have increased the analytic sophistication with which the questions posed above are addressed.<sup>131</sup>

On land, archaeologists began to pay more careful attention to amphorae finds in the early 70s and, by the late 70s, the discipline had developed enough such that scholars began to hold conferences dedicated to the field.<sup>132</sup> The field witnessed an upsurge of amphora-specific studies during the 80s and considerable effort was given to synthesizing previous decades' research into broader, historical narratives: when the second major colloquium on amphorae were held in 1986, participants expressed surprise at the field's rapid development over the previous ten years.<sup>133</sup> This development fundamentally changed the way in which one could study wine.

But the growing regional specificity of amphora studies has been a double edged sword, for it has also increased the field's fragmentation and the challenges facing

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<sup>129</sup> On the wreck in general, see Benoit (1961); Lamboglia (1961: 138-154); Long (1987: 1-36).

<sup>130</sup> On the amphorae and their proveniences, see Will (1956: 224-44), (1979: 339-50); Manacorda (1978: 122-31), (1981: 3-54); Richardson (2001: 49-55).

<sup>131</sup> See the table in Parker (2008) 193. Only a small percentage of these have, of course, been excavated. On shipwrecks and undersea archaeology generally, see Parker (1992), (2002) 8-14. For an example of increasing technical ability, see McCann's description (2008: 37-50) of ongoing deep-sea explorations off Cosa.

<sup>132</sup> An early example is Panella's work on Ostian amphorae (1973: 463-633) By 1977, the first substantial publication of a 1974 conference on amphora studies hosted by the French School at Rome had appeared.

<sup>133</sup> The proceeding's title itself, *Amphores Romaines et Histoire Economique* (1989) illustrates the extent to which the subject's scope had widened in just a decade. Other notable publications are Peacock and Williams (1986); Tchernia (1986); Empereur and Garlan (1987): 58-109).

scholars attempting to use amphorae for synthetic history.<sup>134</sup> For example, a recent argument on the origin of Lamboglia 2 amphorae, a mid/late Republican transport amphora which carried oil or wine generally and developed either in Apulia, the western Adriatic, the Adriatic islands, or Dalmatia, illustrates how increased technical specialization can hinder answering certain questions.<sup>135</sup> Lindhagen argues for a Dalmatian-Adriatic origin on the basis of the similarity of mineral composition between those of Lamboglia 2 finds and the sediment of the Croatian coast.<sup>136</sup> His technical arguments are interesting, but his conclusion that “The Roman economy worked on different levels...yet the system still operated within the framework of...the State” is the type of conclusion that has prompted Kevin Greene’s complaint that ceramic studies are lacking in “thoughtful economic...discussions.”<sup>137</sup> This is perhaps somewhat unfair. The study of Roman wine without these specialized studies would be hobbled, but his observation of an imbalance between technical analysis and historical synthesis is well-taken.

Amphorae stamps and *tituli picti* have also added to our knowledge of what amphorae contained, how they were distributed, and to our ability to reconstruct the relationships between the producer of the amphora’s contents and of the vessel itself.<sup>138</sup>

The two volumes, *Recueil de timbres sur amphores romaines*, offer a panoptic survey of

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<sup>134</sup> For examples, articles on the origin of the amphora type Richborough 527 (Arthur 1989: 249-56), amphorae in Pannonia (Bezeczy 1995: 155-75), or evidence “old and new” on the content of Haltern 70 amphorae (Van der Werff 2002: 445-49) are all, in isolation, interesting but, when multiplied by 50-100 publications of this sort every year, can easily become unmanageable.

<sup>135</sup> For Apulia, Zevi (1966: 23-27). Kirgin (2006: 193-4) argues for the island of Vis, off Croatia. See Tchernia (1986: 74) on this amphora’s importance in the import and export of Apulian wine.

<sup>136</sup> Lindhagen (2009: 91).

<sup>137</sup> *Ibid.* 105-106. Greene (2005: 52).

<sup>138</sup> For general introduction Remesal Rodríguez (2004: 349-362).

the research and interpretations (through the mid-90s).<sup>139</sup> The online database, Corpus CEIPAC, hosted by the University of Barcelona, offers a database of all epigraphy related to ceramic vessels along with a searchable, bibliographic database and is probably the single most useful resource for research on this subject.<sup>140</sup> Epigraphy on ceramics, by adding people to the equation (implicitly or explicitly) significantly broadens the scope of ceramic studies generally by at least theoretically telling us something about the people behind the pots.

Literary sources present a view of Roman wine largely reflecting the attitudes of upper-class landowners and focus predominately on the agricultural aspects of production and gustatory qualities of wines for consumption. Other features are passed over or casually mentioned in problematic contexts. Archaeological sources, especially ceramic finds, speak to different aspects of the commercial process: production sites, distribution and transportation patterns, and the items subject to long-distance, over-sea movement. But these sources, whether taken on their own or in conjunction with one another, can allow us to reconstruct what economic pressures constrained and generated Romans' particular productive, transport, and distributive processes for wine. One largely ignored source provides the missing piece: Roman legal writing.

The writings of the Roman jurists provide an additional and almost wholly ignored source for studying the Roman wine trade and the economics of commerce. This is surprising: wine appears in the *Digest* over a hundred times in topics ranging from risk and sale, to legacies, and to market operation. Gaius, for example, stated that judgment

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<sup>139</sup> Carre, *et al* (1995); Blanc-Bijon et al. (1998).

<sup>140</sup> <http://ceipac.gh.ub.es/> The access to the databases themselves are restricted though this author found it unproblematic to obtain a username and password. Many articles published by CEIPAC are available publicly.

on a *condictio* (a general action on a fixed sum of money or thing) should be dependent on the judge because “we know varied prices are for things in different cities and regions, especially for wine, oil and grain” (*Ideo in arbitrium iudicis refertur haec actio, quia scimus, quam varia sint pretia rerum per singulas civitates regionisque, maxime vini olei frumenti*).<sup>141</sup>

This type of statement never occurs in the other written sources where wine appears as a topic, but it is important. The acknowledgment of variation in market price for wine and the belief that an arbiter could determine the going market price suggests, for example, that perhaps Romans’ ability to discover prices for wine (a type of transaction cost called a search cost) was not prohibitively expensive. Or, on the other hand, maybe Gaius overestimated a judge’s ability to determine a fair price; if so, contracting parties might not trust the courts to judge fairly if the contract was disputed, thus creating incentive for private-ordering arrangements.

There are, I think, three reasons why juristic writings have scarcely been used in studying Roman wine commerce. First, the texts themselves are problematic to interpret. Second, it is difficult to determine how closely connected the texts are with real-world issues. Third, and most fundamentally, the theories analyzing the relationship between law as an institution and economic performance are almost wholly ignored by ancient historians. Lacking the proper theoretical framework for interpreting the texts removes almost all the incentive for using them.

Legal writings present unique interpretive problems. At least in general, our extant jurists’ writings, with the exception of Gaius’ *Institutes* and the scattered remains preserved in the *Fontes Iuris Anteiustiniani*, all significantly post-date the classical

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<sup>141</sup> *D.* 13.4.3.

period. The *Digest* was commissioned by the Eastern Roman emperor Justinian and compiled during 529-533 by a team led by the jurist Tribonian.<sup>142</sup> To collate, organize, and condense all previous legal thought into a manageably sized tome, the compilers sifted through some 2000 classical juristic writings, picked out excerpts relevant to the title at hand, and reassembled these excerpts in more-or-less logical order.<sup>143</sup>

This editorial process raises potentially significant problems for us.<sup>144</sup> The process of excerpting often means that reconstructing the jurists' original thought-process and the original context in which the excerpt appeared may be difficult or impossible. Lenel's *Palingenesia Iuris Civilis* (1889) attempts to backwards-engineer the *Digest* fragments and is therefore an invaluable resource for dealing with this issue, but it is also limited by the small percentage of source material that appeared in the *Digest*.

The code was designed largely to fossilize classical legal thinking and, in fossilization, provide a foundation for the Byzantine legal system.<sup>145</sup> As the constitution establishing the *Digest* recorded, the task seemed nearly impossible (*res quidem nobis difficillima, immo magis impossibilis uidebatur*) and its reliance on "the providence of the highest Trinity" (*omnem spem ad solam referamus summae prouidentiam trinitatis*)<sup>146</sup> reminds us that the society that codified the *Digest* was quite different from that which produced the original laws. The codifiers' aim had two practical effects on the extant

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<sup>142</sup> On the *Digest's* history and the process of its composition, see Honoré (1978).

<sup>143</sup> Maas (2005: 6).

<sup>144</sup> For a brief but very useful overview for the problems of the *Digest* as a source for social history, see Crook (1967: 13-8).

<sup>145</sup> Humfress (2005: 166).

<sup>146</sup> *Constitutio Deo Auctore* pr., 2.

text: deletion and interpolation, and these effects render for us the reconstruction of the jurists' "original meaning" scarcely easier than Justinian's project of excerpting them.<sup>147</sup>

The first practice arose naturally from the editors' need to expurgate references to problems or practices that time had rendered obsolete. There are indications, for example, that Roman jurists were, from a fairly early time, interested in legal issues pertaining to banking; however, the *Digest* preserves relatively little on this subject—some scattered references to the necessity of providing documents in court but little of credit at auctions because many of Roman banking practices were antiquated by the 6<sup>th</sup> century.<sup>148</sup> We must always be aware that the *Digest*'s compilers may have irremediably removed pieces of the puzzle.

On the flip side, there are numerous excerpts which are highly unlikely to preserve the classical jurists' Latin faithfully because the compilers have added, often for compression or clarification, their own Latin. For example, the common parenthetical addendum *puta* ("for example") often signals an interpolation. There is scarcely a sentence in the *Digest* which some critic has not placed in the square brackets of doubt at some point.<sup>149</sup> The heyday of interpolation hunting, however, has come and gone and the philosophy articulated by Max Kaser of textual conservatism (though not blind acceptance) is today dominant, a philosophy inclined to see, even where some verbal interpolation has occurred, a "kernel" of original, judicial thought.<sup>150</sup> The loss of the excerpts' original contexts is probably worth more regret than the more formal interpolations, whatever their frequency. These problems, while real, have not proved to

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<sup>147</sup> On the factors rendering such reconstruction impossible, see Johnston (1989: 149-55).

<sup>148</sup> Andreau (1999: 67).

<sup>149</sup> Collected in the *Index Interpolationum* (1936).

<sup>150</sup> Kaser (1972).



be a decisive argument against using legal sources for social history. They necessitate caution but not cowardice.<sup>151</sup>

Using legal sources for writing social history forces us to address the following problem: to what extent were jurists' cases, reasoning, and solutions informed by and tailored to real world problems? Scholars have largely answered this question in one of two ways, some optimistically, others much more doubtfully. Watson, for example, has forcefully propounded the view that "Roman jurists argue as if they lived in a vacuum, remote from economic, social, religious, and political considerations."<sup>152</sup> Some have criticized his view for relying on ambiguous evidence from which a less isolationist picture could be drawn, but it is also true that the jurists often seem to inhabit a Laputa, governed by its own peculiar interests and logic.<sup>153</sup>

The opposing view holds that it would beggar belief if the many stray details given in the legal scenarios did not reflect the actualities of life in the Roman world. Ulpian attested the existence of smoked-cheese processing at Minturnae, and Paul not only mentioned a wine ship (*navis vinaria*) but also added that "there are many ships into which wine is poured," (*ut sunt multae, in quas vinum effunditur*).<sup>154</sup> This God-is-in-the-details approach is characterized nicely by the title for a collection of articles united by their use of law as sources for social history: *speculum iuris*—the mirror of law.<sup>155</sup> Proponents of this view maintain that "legal sources can provide an impressionistic picture of ancient realities."<sup>156</sup>

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<sup>151</sup> Frier (1980).

<sup>152</sup> Watson (1995: 66).

<sup>153</sup> For a critique of the argument for Roman judicial isolationism, see Pennington (1997: 1097-1116).

<sup>154</sup> *D.* 8.5.8.5, 47.2.21.5

<sup>155</sup> Aubert and Sirks (2002).

<sup>156</sup> Aubert (2002: 187).

Even further, there have also been efforts to find instances where “legal values ...[became]...integral to the structuring of society.”<sup>157</sup> Kehoe, for example, has argued that Roman jurists were often implicitly concerned about the economic interests of those affected by their judgments, largely Roman upper classes, and that those judgments were steered by the economic realities around them.<sup>158</sup> In an article on Augustan marriage practice, McGinn showed the extent to which jurists were both reactive and proactive: their discussions reflected, for example, general upper-class endogamy but also proactively tried to shape social hierarchies by deterring certain groups from social advancement.<sup>159</sup> These are examples of increasing efforts to bridge “the chasm between the study of Roman history and the study of Roman law.”<sup>160</sup> As those examples show, attempts to bridge that history/legal divide are most successful when they focus on activities of importance to the upper classes: landholding practices, marriage legislation, or slave-managers (*institores*).<sup>161</sup> This was apparently equally true for the housing rental market at Rome, which in sheer numbers was dominated by impoverished short-term leaseholders but whose legal discussion was strongly tilted toward the upper-class rental market.<sup>162</sup>

We should remember, however, that law itself does not exist outside the body of institutions ordering private actors’ behavior but is itself an institution.<sup>163</sup> Using Roman legal writings as a mine for information about Roman society with details to be hewn

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<sup>157</sup> Frier (1985: 256).

<sup>158</sup> Kehoe (1997: 3).

<sup>159</sup> McGinn (2002: 46-93).

<sup>160</sup> Meyer (2004: 3).

<sup>161</sup> The last topic is the subject of a lengthy book by Aubert (1994). On slave managers, see also Petrucci (1991: 326-31).

<sup>162</sup> Frier (1980: 51-5).

<sup>163</sup> North (1996: 344).

from the larger mass is akin to buying a car for its radio—one may enjoy the music while missing the point of the car. Rather, legal institutions are not “given outside the economic system but...variables within it.”<sup>164</sup> This notion is the core tenet of economic analyses of law.<sup>165</sup> This fact entails that *any* legal rule is subject to economic analysis, for example, in origin, consequences, and efficiency, not just legal topics “readily associated with economics.”<sup>166</sup>

The closest approximation of this approach to the Roman wine trade is Bruce Frier’s article, “Roman Law and the Wine Trade: The Problem of Vinegar Sold as Wine.”<sup>167</sup> Noting that juristic discussion of the problems arising from wine’s natural deterioration into vinegar, he argued that the evolution of buyer’s protection revealed “considerable doctrine but little dogmatism” and that the jurists were likely reacting to a “received standard of trade.” In this view, reciprocity existed between merchants’ business practice and legal judgments whereby the merchants’ collective business dealings influenced the institutional setting in which they occurred which in turn made established practice more favorable. Even here, a broader law and economics perspective, particularly one informed by the relationship between incomplete contracts and the formation of legal default rules, allows one to expand that analysis considerably (I offer such an interpretation in Chapter Three).

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<sup>164</sup> Mackaay (1999: 65).

<sup>165</sup> For an introduction to this topic, see the encyclopedia edited by Bouckaert & de Geest (1999), available also online at <http://encyclo.findlaw.com/>.

<sup>166</sup> Mackaay (1999: 66).

<sup>167</sup> Frier (1983: 257-95). See chapter 2 for more detail on this argument.

There is a great deal of overlap between the law and economic approach and that of the new institutional economics described above.<sup>168</sup> Indeed, there has been debate whether law and economics should be considered its own movement or part of NIE.<sup>169</sup> Narrowly, treating law as an endogenous variable in economic action, affected by and influencing economic behavior, has an important implication: we can largely avoid the problem of how explicitly concerned the jurists were with real-world problems. Regardless of their motivations or knowledge, the judgments they made would have lowered the costs of certain behaviors while raising those of others. This observation allows us to consider the potential of basically any legal ruling to affect economic behavior.

More generally, scholars of NIE have been favorably disposed to historically centered studies because such “historical studies give an empirical dimension to law and economics” and prevent the field from becoming overly theoretical.<sup>170</sup> There has not been (to the best of my knowledge) any attempt to use the approaches of NIE and law to pose questions relating the economics of Roman law and commercial activity. I hope that this study will reveal the approach’s potential for generating unasked questions fundamental to understanding Roman economic behavior to Roman historians and perhaps encourage those more skilled in economics than I to refine the models and arguments presented here.

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<sup>168</sup> In fact there is overlap, for obvious reasons, with every economic approach. There are strongly neoclassical approaches, best represented by the Chicago School and Richard Posner (2007) in particular. There are, to name a few significant approaches, those informed by the Austrian School, e.g., Krecke (1996: 19-38); on (old) institutionalism Medema, Mercurio and Samuels (1999: 418-55); on game theory, Baird, Gertner, and Picker (1995).

<sup>169</sup> Williamson (1993: 99-118); Klein (1999: 460).

<sup>170</sup> Mackaay (1999: 83).

### **“These fragments I have shorn...”**

The history of Roman wine has been of interest since the time of the Romans themselves, and modern histories, both antiquarian and scholarly, have dealt with a range of questions. Indeed, a keyword search on the words *vino*, *vin*, *Wein*, and wine on the DYABOLA database comes up with over 700 scholarly works. Nevertheless, this chapter has argued that this long scholarly history has not seriously addressed a host of questions related to the city of Rome’s wine supply, organization, and economic development and that attempting to answer such questions requires a rather different historical methodology than that generally offered by ancient historians.

The three major sources—literary, archaeological, and legal—offer unique benefits and drawbacks for studying Roman wine commerce. None on its own can offer anything approaching a holistic account. Additionally, we need an organizing principle to bring the combination of these sources into a coherent framework. It is my contention that economic models, particularly (though not exclusively) those drawn from New Institutional Economics provide the best option, both theoretically and pragmatically, for shedding light on this underexplored topic.

Let me conclude by returning to the problem with which I began this chapter: whether Rome’s supply of wine predominately driven by free commerce or surreptitiously driven by non-market, elite manipulation. For a New Institutional economist this is nearly a pseudo-question: the duality itself is an important economic feature because the state both sets the rules of the game under which economic activity occurs and because the state is an economic actor subject to the rules it sets. And in another, related sense we can agree with Justice Jackson’s contention in *Wickard v.*

*Filburn* (arguing that the Interstate Commerce Clause gives congress the power to regulate even the quantity of home-grown wheat) that,

*...such volume and variability as home-consumed wheat would have a substantial influence on price and market conditions...But if we assume that it is never marketed, it supplies a need of the man who grew it which would otherwise be reflected by purchases in the open market. Home-grown wheat in this sense competes with wheat in commerce.*<sup>171</sup>

Substitute wine for wheat, and this provides a pithy encapsulation of the problems of a dichotomous separation between market and non-market driven trade.

The questions and methods of NIE have a unique ability to show how structures and processes not traditionally subject to economic analysis can in fact be modeled economically by relaxing only a few neoclassical premises, and this realization has revolutionized economics over the last forty years. The subsequent chapters build on that observation to focus on one fundamental issue: to understand how the market in wine operated when the market itself was partly contingent on the historical specificity of the agents who set the “rules of the game” and to investigate the consequent differences in transaction costs, qualitatively and quantitatively, between the Roman period and ours. I do not believe this study is anything more (nor less) than a prolegomena: every chapter raises questions, topics, and problems which demand their own treatment not presented here. In a sense, I hope to show a path forward for any prospective reader even if I do not tread far upon it myself.

The method of argument and presentation may appear chimerical: There is a great deal more formal economic and mathematical model building than is customary among ancient historical works (though considerably less, both in quantity and sophistication,

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<sup>171</sup> *Wickard v. Filburn*, 317 U.S. 111, 128 (1942).

than in most economic histories); but these models are all used to answer questions specific to the Roman wine-trade. Where comparative material is adduced, it is more often to elucidate differences rather than similarities between Roman and non-Roman societies. I hope that the historian will not get lost in the economics nor the economist in the historical details. True, this combination may prove pleasing to neither. I find myself in response drawing again on an economist's dictum, that all "feasible modes of organization are flawed."<sup>172</sup>

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<sup>172</sup> Williamson (2009).

## **Chapter III**

### **The Scope of the Roman Wine Firm**

#### **“The Price was Inviting”**

Chapter One surveyed previous studies of Roman wine and suggested that too little attention has been given to the Roman institutions steering the wine trade. We examined one important institution, namely, the trade policies of the imperial government and saw that Rome’s imports in wine were, on the one hand, affected by the emperors’ unwillingness to ensure a steady supply but also, on the other hand, by the collected money and demand of the city’s wealthiest inhabitants. I concluded the chapter by suggesting the law and economics approach had potential for studying the economic operation and performance of Rome’s wine commerce.

*This chapter provides a broad interpretation for understanding the relationship between Rome’s body of organizational law and a narrower demonstration of how those conditions affected the law of wine specifically and, thus, its trade. This analysis will show that institutional constraints led to a relatively narrow range of organizational shapes for wine enterprises. That relatively few forms became dominant should be neither surprising nor censurable; after all, competitive pressures should favor the more efficient options and, over time, drive out the others. The chapter instead asks, after reconstructing the dominant organizational shape, whether institutional pressures encouraged efficient operation or tended to retard it.*

The point where producer met purchaser is little mentioned by extant sources. The following description, in a letter of the Younger Pliny, is unique, and I quote it in full



because it reveals an interesting separation between producing wine and its bottling, transportation, and eventual final sale and distribution (mercantile operations):<sup>1</sup>

[1] *Alii in praedia sua proficiscuntur ut locupletiores revertantur, ego ut pauperior. Vendideram vindemias certatim negotiatoribus ementibus. [2] Invitabat pretium, et quod tunc et quod fore videbatur. Spes fefellit. Erat expeditum omnibus remittere aequaliter, sed non satis aequum. Mihi autem egregium in primis videtur ut foris ita domi, ut in magnis ita in parvis, ut in alienis ita in suis agitare iustitiam. [3] Nam si paria peccata, pares etiam laudes. Itaque omnibus quidem, ne quis 'mihi non donatus abiret', partem octavam pretii quo quis emerat concessi; deinde iis, qui amplissimas summas emptionibus occupaverant, separatim consului. [4] Nam et me magis iuverant, et maius ipsi fecerant damnum. Igitur iis qui pluris quam decem milibus emerant, ad illam communem et quasi publicam octavam addidi decimam eius summae, qua decem milia excesserant. [5] Vereor ne parum expresserim: apertius calculo ostendam. Si qui forte quindecim milibus emerant, hi et quindecim milium octavam et quinque milium decimam tulerunt. [6] Praeterea, cum reputarem quosdam ex debito aliquantum, quosdam aliquid, quosdam nihil reposuisse, nequaquam verum arbitrabar, quos non aequasset fides solutionis, hos benignitate remissionis aequari. [7] Rursus ergo iis qui solverant eius quod solverant decimam remisi. Per hoc enim aptissime et in praeteritum singulis pro cuiusque merito gratia referri, et in futurum omnes cum ad emendum tum etiam ad solvendum allici videbantur. [8] Magno mihi seu ratio haec seu facilitas stetit, sed fuit tanti. Nam regione tota et novitas remissionis et forma laudatur. Ex ipsis etiam quos non una, ut dicitur, pertica sed distincte gradatimque tractavi, quanto quis melior et probior, tanto mihi obligator abiit expertus non esse apud me, “ἐν δὲ ἡ τὴν τιμῆν ἡμὲν κακὸς ἢ δὲ καὶ ἐσθλός.” Vale.*

[1] Some enter into their lands so that they return richer; I that I might be poorer. I had eagerly sold the vintage to some merchants who were buying. [2] The price was inviting, both what it was then and what it seemed likely to be. The expected price failed. It was arranged to give remittance equally to everyone but that was not fair enough. Moreover, it seemed honorable to me that just as away as at home, in great affairs and small, in others' affairs as my own, to accomplish justice. [3] For if sins are equal, so too are good deeds. And so, I yielded to everyone an eighth of the purchase price so that “no one would depart ungifted by me.” [4] Then those, who had undertaken the highest purchase-prices, I consulted separately, for they had helped me more and had suffered greater loss. Therefore, for those who had bought at more than 10,000 I added to the common and as it were general eighth a tenth of the total by which they had exceeded 10,000. [5] I fear this is confusing—an example will clarify.

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<sup>1</sup> Epist. 8.2.

If, say, some purchasers bought at 15,000, they took an eighth of the 15,000 and a tenth of 5,000. [6] Moreover, as I was considering that some had made a considerable deposit, others some other percentage, and some nothing, in no way was I truly judging that those whom faith of payment had not equalized were being made equal in the kindness of the refund. [7] Again therefore I remitted to those who had paid a tenth of the payment. For this seemed to me the best way to give a remittance to each in accord with what each deserved and in relation to past practices and seemed best for encouraging both purchase and payment in the future. [8] This scheme and its leniency were expensive but it was worth a great deal. For through the entire region the novelty of the refund and its form was praised. Even from those whom I treated not with one measuring-rod, so to speak, but particularly and by grades, as much as each was better and more upright, so much the more did he leave obliged to me, having learned that it is not the case with me that “*Les bons et mauvais trouvent le même honneur.*”

Pliny had reached a deal with an apparently unconnected and unspecified, but reasonably numerous, group of merchants to sell wine from his estate.<sup>2</sup> The merchants were speculators and offered bids on the assumption that the price for wine was going to be high that year, but they were wrong and stood to lose a great deal of money because their bids exceeded the wine’s market value. This miscalculation allows us to infer that the sale was made well before the harvest and likely even before the grapes had matured, so perhaps in the late spring or early summer. The sale of wine in advance is well known from Egypt and the Elder Pliny attests to its existence also in Italy, reporting that the aforementioned Sthenelus sold his wine while the grapes were still on the vine—*vindemia pendens*.<sup>3</sup>

Pliny, however, opted for a *post factum* reduction of purchase price in proportion both to the original bid and whether it had already been paid. He justified this solution on the basis of fairness and for more strictly economic reasons: it would hurt him down the road if some or all of his purchasers lost their shirts. Moreover, as he said explicitly, his

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<sup>2</sup> For commentary and historical reconstruction of this letter, see Sherwin-White (1966: 448-50).

<sup>3</sup> HN 14.50: ...*intra octavum annum C'C'C'C' nummum emptori addicta pendente vindemia*. On sales of wine on delivery, see Jakab (1999: 33-44).

fairness would encourage them to return in other years.<sup>4</sup> Sirago raised the interesting possibility that Pliny found himself in this position in the year after 107 when he had instituted a new share-cropping scheme for his tenants and thus found himself with a surfeit of wine to dispose.<sup>5</sup>

This is a plausible, if ultimately unprovable, proposition for several reasons. First, the letter strongly suggests that the *negotiatores ementes* were hitherto unknown to Pliny. He did not explain his generosity, for example, on the basis of having conducted previous business with them but only because of his innate sense of fairness and his hopes that they would return in later years. The latter hope, however, suggests that wine-sellers and merchants could (and perhaps often did) repeatedly transact with one another. The word *certatim* implies that the buyers competed against each other (i.e., there was not one singular buying firm) and offered bids for quantities of wine.<sup>6</sup> The bids may even have been auctioned, but the letter's lack of detail makes this only a possibility.

Unfortunately, Pliny declined to inform Calvisius how many total buyers there were. There must have been more than a few, however, given the pains Pliny took for inventing a just refund scheme for many different categories. But we can use his figures to generate a rough idea of the vineyards' sizes. Using the estimation from chapter 3 of 3380 L/ha and use the average amphora price at Pompeii and Herculaneum of 35 HS,

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<sup>4</sup> The concept of contractual ethics is an interesting one, which is not germane enough to enter into here. For an overview of the topic including the historical development of contractual morality, see Cserne and Deli (2009). For a brief but powerful demolition of the view which would see Pliny's favor-dispensing as un-economic, see Alchian and Allen (2006: 722-30).

<sup>5</sup> Sirago (1958: 118). Sherwin-White (1966: 448) found that suggestion attractive but pointed out that there is no internal evidence for dating the letter. On Pliny's share-cropping scheme, described in *Epist.* 9.37, see Kehoe (1988: 122-23). On the method by which Pliny (and by extension Roman landowners) tried to foment good-relations with their contractual partners as a method of lowering transaction costs arising from *ex ante* uncertainty, see Kehoe (2007: 109).

<sup>6</sup> For a similar use of the word, Cf. Pliny *Epist.* 6.19.25: *candidate...certatim, quidquid venale audiunt, emptitant, quoque sint plura venalia, efficiunt.*

then 10,000 sesterces would have bought wine from 8.5 *iugera* and 15,000 from 12.5 *iugera*.<sup>7</sup> True, those prices are retail prices, and the wholesale price here would have been considerably less. Even if we believe the prices differed by a factor of two, we would still be dealing with land tracts of around twenty *iugera*, by no means sprawling.

This is telling because if Pliny were selling entirely his own produce, it is difficult to understand why he would not simplify the procedure and combine his vineyards into one for the purpose of sale. It seems much more likely that the bidders' purchase prices reflect their bids on individual vineyards, namely, Pliny's tenants. Altogether, there is reasonably good circumstantial evidence that Sirago was correct: Pliny was forced to invent this plan after redesigning his rent-system. We see here some pressure toward centralization of decision-making power and sale but, since the individual tenants were still at least partially autonomous, such integration did not proceed far.

Pliny's letter illustrates the extent to which both producers and merchants' ability to make profits relied on a dubious ability to predict future markets. Both his refund scheme, which was a *novitas* in the region, and his tenancy system, described as *nova consilia* (new plans), show Pliny's inventiveness in dealing with these problems and his continued efforts to solve them in a way that encouraged repeat business and steady income.<sup>8</sup> Business operations in market conditions constrained by highly costly contracts, such as Pliny's which required significant and expensive *ex-post* readjustments to the *ex-*

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<sup>7</sup> See page 117 below for the derivation of 3380 L/ha. See Duncan-Jones (1982: 364) for the wine prices from Pompeii and Herculaneus.

<sup>8</sup> Again, see Kehoe (1997: 20), (2007: 37) on Roman landholders' efforts at achieving workable, if not economically optimal, solutions to such problems. The idea that profit is for firms a constraint whose minimum must be met rather than a variable to be maximized stems from Simon (1957) and undergirds some NIE approaches, TCE above all though not, *inter alia*, ICT. See Selten (1990: 649-58) for an argument in favor of bounded rationality models and Hart (1990: 696-702) on whether such notions are in fact necessary.

*ante* terms, are precisely the type where the greatest pressures to vertically integrate emerge:

*It may be extremely costly to write a contract that specifies unambiguously the payments and actions of all parties in every observable state of nature. We assume that integration in itself does not change the cost of writing down a particular contractual provision. What it does change is who has control over those provisions not included in the contract...the owner of an asset has the residual rights of control of that asset, that is, the right to control all aspects of the asset that have not been explicitly given away by contract.<sup>9</sup>*

Imagine, for example, an alternative arrangement for Pliny: if the merchants were his employees (or slaves) rather than independent contractors then in a year where the market price for wine was unexpectedly bad, he could choose to store most of the wine until the subsequent year. But Pliny was forced to sell before the market conditions became manifest and then was forced not only to deliver wine that might best have been laid aside but also to renegotiate the original contract at considerable expense to himself. Despite Pliny's creativity, there is no indication that he even considered the alternative.

One example can, of course, be an exception. We have, unfortunately, precious few opportunities for comparison to Pliny. We do, however, have information about the family of the Sestii, said to have controlled a "wine and pottery empire" and to have "maintained, at its height, almost a monopoly over the production and distribution of wine." This enterprise provides a comparative example where we would expect market pressures to encourage vertical integration.<sup>10</sup> The Sestii's commercial operations were of a scope significant enough that even poets at Rome noticed it. The fourth poem of Horace's *Odes* poetically references the Sestii's business interests. The poem was dedicated to L. Sestius Quirinus, a fellow rebel of Horace's at Philippi in 42. Will

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<sup>9</sup> Grossman and Hart (1986) 695.

<sup>10</sup> Will (2001: 38).

perceptively argued that much of the poem's vocabulary, for example, *regna vini*, *carinas*, *officinas*, *regumque turris*, and *beate* not only applied to Sestius' business interests generally but specifically called to mind the family's hub at Cosa.<sup>11</sup> In a later article, she claimed, "the poet almost seems to be describing... a landscape painting of Cosa and its port done in the Roman Third Style."<sup>12</sup> Let us briefly examine the nature of so singular a firm.

Evidence of the Sestii's business interests comes primarily via finds of amphorae with Sestius stamps along with mention in late Republican writers, in particular, Cicero who was a close colleague of Publius Sestius, the father of Horace's dedicatee.<sup>13</sup> The family likely shipped jars oversea by the late 3<sup>rd</sup> century BCE and continued operations into the imperial period, though ultimately switched to brick and tile manufacture.<sup>14</sup> Though the early investigators of the Grand Congloué wrecks (the shipwrecks off Marseille which produced Sestius amphorae in large numbers) had argued that the jars had held Campanian wine, it is now accepted that the manufacture of the jars themselves and the wine therein originated from Cosa and the *ager Cosanus*, in South Etruria.<sup>15</sup>

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<sup>11</sup> Will (1982: 243-44).

<sup>12</sup> Will (2001: 38).

<sup>13</sup> On the Sestii, their amphorae, their enterprises, and their relationship to Cosa see, *inter alia*, (1961); Lamboglia (1961: 138-54); Thevenot (1953: 234-9), (1954: 234-43); Manacorda (1978 :122-28); Will (1979: 339-50), (1987: 170-220), (2001:35-47); Brown (1980); Richardson (2001: 49-55). Publius Sestius appears incidentally in Cic. *Cat.* 1.21, *Div. Caec.* 61-62, *Verr.* 2.1.40, *Planc.* 28, *Fam.* 5.6 and at length in the speech Cicero delivered in his defense on a charge of *vis* (violence) from his tribuneship in 57.

<sup>14</sup> McCann & Freed (1994: 67) for the earliest known Sestius stamp; Will (2001: 43) on the switch to brick and tiles and, possible, lamps and dishes.

<sup>15</sup> The earliest interpretations, which argued for a Campanian origin, were headed by Benoit and Lamboglia while Thevenot and Will argued for a Cosan origin. The latter proved to be much more likely for four reasons (Manacorda 1978: 129). No other site shows a greater range of SES stamps, with every stamp form appearing except one (the hook); SES stamps are not found further south than Cosa which strongly argues against a Campanian origin; Etruria is the only region of Italy where SES stamps are found away in the hinterland.

Will believes that the early amphorae, Dressel 1 and 2-4, had primarily shipped wine from the Sestii's own lands up until 39 BCE when, following the restoration of the Sestii's land, new amphora types of the Will 16 variety appeared, probably for *garum* (fish sauce). By the late Republic, "the Sestius family's huge wine empire diversified into other directions."<sup>16</sup> Some points have been raised, however, that might cause us to doubt whether the Sestii's admittedly impressive operations are best characterized as a wine empire or a pottery empire. Manacorda rightly pointed out that, even if we accept that the Sestii produced the containers, it in no way necessitates that they produced the wine therein.<sup>17</sup>

Richardson contended that, "the enormous number of Sestian containers seems out of proportion to any single estate," and that "it seems not unlikely that...his [i.e. Sestius'] agents bought from small vineyards and supplied these with Sestian containers."<sup>18</sup> Further, some of the SES-stamped amphorae still have stoppers. Some of these stoppers are stamped *L. Titi C. f* (of Lucius Titius, son of Gaius). Benoit believed that Sestius was the merchant and Titius the producer, though, as Manacorda pointed out, a vice-versa relationship is the more likely interpretation.<sup>19</sup> Certainly, we know from the *Digest* that stamping an amphora was commonly part of the sale in order to identify the wares.<sup>20</sup> Once again, as in Pliny, we observe a separation between the wine-producer and the wine-purchasers.

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<sup>16</sup> Will (2001: 43).

<sup>17</sup> Manacorda (1978: 128-9).

<sup>18</sup> Richardson (2001: 55).

<sup>19</sup> Benoit (1957); Manacorda (1978: 126). For further on the relationship between stamps, owners, and producers see Aubert (1994: 245-73); Pense (2009: 44-77).

<sup>20</sup> Cf. *D.* 18.6.1.2 (Ulpian).

Further, certain contracts of wine-sale from Egypt strengthen our confidence that such a separation was common. For example, SB XVI 12486 from Hermopolis recorded a contract for an advance sale of 250 *knidia* (approximately 500-1000 liters) where the seller specified the quality of wine to be provided and the buyer supplied the vessels.<sup>21</sup> On olive oil amphorae, stamps have been lumped into two groups: stamps of “simple content” and stamps of “composed content.”<sup>22</sup> These stamps often record both the oil producer and the potter, and it was apparently common for the two not to be identical.<sup>23</sup> This should not be so surprising: making amphorae required, first, the proper materials and knowledge of how to use them, and then reasonably skilled, trained potters to execute the design. Not every landowner, or perhaps even most, could be expected to have met those requirements. It seems to me that the unifying feature of the Sestii’s enterprise was in items produced from clay—mostly containers but also lamps, bricks and tiles—not the product contained therein.

The Pliny and Sestii examples point at a similar underlying business structure. Pliny was an extremely wealthy landowner who grew, among other products, grapes for wine. He contracted with another firm which took control of the wine for transport and, possibly, downstream sale, though we cannot of course know with certainty to what use Pliny’s merchants put the wine. Pliny presumably had the money to integrate those operations if he had wished. But he did not. The Sestii, though also landowners of the highest class, apparently engaged in mercantile activities in buying up local, Cosan wine

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<sup>21</sup> On such contracts, see Jakab (1999b: 33-44).

<sup>22</sup> Millet (1996: 751-70).

<sup>23</sup> Pense (2008: 64).



for bottling in their containers and (possibly) transporting on their ships.<sup>24</sup> But there is no indication that the Sestii made any effort to integrate their operations with the scattered, regional winegrowers and gain more control over their product and operations. In both cases, there may have been integration of business practice within one sector, either production or transportation, but not between the sectors despite the fact that there were pressures conducive to such integration in both cases. The simple question thus arises: why not?

### **Business Organizations and Asset Partitioning**

The defining feature of corporate firms is its existence as a legal entity, in some sense a fictional person, an agglomeration of assets and a “nexus of contracts” which can enter into agreements, incur obligations, liabilities, and earn profits separately from the owners and managers who operate the firm.<sup>25</sup> The rights and limitations of a firm’s actions and thereby its potential structure largely depends on a given society’s body of organizational laws (for example, a legal system that prohibits direct agency will generate business forms of a decidedly different type than one which allows it).<sup>26</sup> Such entities have two fundamental features: a body of managers, agents of the owners who can authoritatively incur obligations on the firm’s behalf, and a body of assets which gives the firm the “ability to bond its contracts credibly” and which are separate from the managers’ personal assets.<sup>27</sup>

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<sup>24</sup> Whether, for example, the Grand Congloué ships belonged to the Sestii is difficult to answer. There are indications from Cicero, however, that the Sestii had many *luculenta navigia* (magnificent ships) and Horace, in the aforementioned poem, also mentioned ships (*carinas*).

<sup>25</sup> For a firm as a collections of assets, see Grossman and Hart (1986: 691-719), Hart and Moore (1990: 1119-1158). The “nexus of contracts” is from Alchian & Demsetz (1972).

<sup>26</sup> Hansmann & Kraakman (2000: 387-440). See Hansmann, Kraakman and Squire (2006: 1-59) for the historical evolution of organizational law.

<sup>27</sup> Hansmann & Kraakman (2000: 392-3).

The separation of personal assets from company assets takes two reciprocal forms: “affirmative asset partitioning” or entity shielding and “defensive asset partitioning” or limited liability.<sup>28</sup> These shielding mechanisms characterize modern firms to various degrees depending on the extent to which assets are partitioned and shielded. Entity shielding gives priority to firm creditors over the owners’ personal creditors and, in a stronger form, often includes liquidation protection so that owners and their personal creditors cannot force liquidation in their share of the firm. Defensive partitioning gives personal creditors prior (and often sole) claim to owners’ personal assets over firm creditors.<sup>29</sup>

Roman law recognized non-personal legal entities in only a few cases.<sup>30</sup> These were guild-like associations (*collegia*), towns with municipal status (*municipia*), charities (*piae causae*), un-entered estates (*hereditates iacentes*), and the companies of publicans (*societates publicanorum*).<sup>31</sup> Roman private businesses lacked even weak forms of asset partitioning. The Roman partnership was in no way a corporate form: “it was a contract creating rights and duties merely between the *socii* themselves. Nobody could therefore act for the *socius*.”<sup>32</sup> Moreover, the change of any one partner dissolved the entire

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<sup>28</sup> *Ibid.* 394-396.

<sup>29</sup> The table is a synthesis of Hansmann, Kraakman, and Squire (2006: 3-4).

<sup>30</sup> *D. 3.4.1 pr. (Gai): Neque societas neque collegium neque huiusmodi corpus passim omnibus habere conceditur: nam et legibus et senatus consultis et principalibus constitutionibus ea res coercetur. Paucis admodum in causis concessa sunt huiusmodi corpora* (For neither partnership nor a college nor a body of any type is allowed to be held by people generally, for that is checked by laws, *senatus consulta*, and the chief constitutions. But in a few cases bodies of this type are conceded...).

<sup>31</sup> See Abatino, Dari-Mattiacci, and Perotti (2011: 368) for this list. On *municipia*, see Laffi (2007); on *collegia*, see Waltzing (1968), Perry (2006). On the *societates publicanorum*, see Badian (1972); Malmendier (2002).

<sup>32</sup> Zimmermann (1996: 455). See also Arangio-Ruiz (1950: 78) on the inability of *socii* to bind their partners to third parties. Recently, see Randazzo (2005: 119-29) who stresses the extent to which it was “civil and familial obligations, consortium, rather than commercial objectives, that drove the development and diversification of Roman partnership law.”

partnership, and the remaining members had to draw up a new agreement.<sup>33</sup> Such arrangements are unstable and make it extremely difficult to determine the division of the firm's assets. Theoretically, if a firm dissolved, either through the death of a member, withdrawal, or an *actio pro socio* by one of the members, then an *actio communi dividundo* had to be brought in order to divide the partnership's joint property, which was held in common.<sup>34</sup> Even if Romans did not always rigidly adhere to the letter of the law in practice, the default legal rules placed a partnership's assets at a perpetual risk of dissolution.

Some have argued, however, that Romans developed a functional, if not legal, equivalent to modern forms of asset partitioning by acting through their slaves.<sup>35</sup> It is common in slave-holding societies for slaves to accumulate their own quasi-property besides the clothing and food provided by their owner.<sup>36</sup> The Romans, however, were unique in the extent to which they institutionalized slaves' private possessions as a *peculium*.<sup>37</sup> Carrying out business through a slave, it has been argued, "can be seen as a functional equivalent of the corporate form from an economics perspective, in that it allows a *de facto* depersonalization of business..."<sup>38</sup> This *de facto* equivalence stems from an effective asset-partitioning between the master and slave's possessions and the master's limited liability for obligations incurred on his behalf by the slave. In other

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<sup>33</sup> Gai. III.153: *Dicitur etiam capitis deminutione solui societatem, quia ciuili ratione capitis deminutio morti coaequatur; sed utique si adhuc consentiant in societatem, noua uidetur incipere societas.*

<sup>34</sup> Zimmermann (1996: 465); Kaser (1971: 590).

<sup>35</sup> This view has been especially prevalent among Italian legal scholars over the last thirty years. See, in particular, Di Porto (1984); Serrao (2002); Randazzo (2005: 119-29); Petrucci (2008); Abatino, Dari-Mattiacci and Perotti (2011: 365-89). In English, see Aubert (1994) on the development of slaves as business managers in ancient Rome and Földi (1996: 179-211) for an overview of the various forms a Roman "limited-liability company" could take.

<sup>36</sup> Though this may seem counter-intuitive, see Barzel (1997) for a property-rights explanation for why this inevitably happens.

<sup>37</sup> On the *peculium*, see Kaser (1965: 206).

<sup>38</sup> Abatino, Dari-Mattiacci, and Perotti (2011: 369).

words, the difference between ancient and modern organizational law was in in form, not in function, as neatly encapsulated here:

*A typical example...could be given by the demand of the entrepreneur to limit his own liability towards third parties to a single part of his patrimony. Such a demand, characteristic of any exchange economy, made itself felt at Rome already by the period of great commercial development...and can be considered an expression of the growing strength and expansion of commercial capital. The same demand, and certainly with greater intensity, is a point of concern for the economic broker in the modern, capitalist world [trans. from the Italian].<sup>39</sup>*

The observation that slaves were frequently and actively involved in numerous types of business activities is interesting and clearly right. However, if the use of slaves in business provided a functional equivalent to modern corporate governance structures, it is fairly mysterious why there is no example of a large or even moderately sized private firm with numerous owners, a characteristic of firms in societies which allow strong asset-partitioning.<sup>40</sup> It is possible, of course, that time has eradicated the evidence for them or that there were countervailing forces preventing the availability, thus constituting a large scale analogue to what has been called a “missing-person argument.”<sup>41</sup>

I, however, do not think such an explanation would be correct. It has been argued, quite persuasively, that the development of entity shielding has been far more important in the development of business than owner shielding.<sup>42</sup> Importantly, one can create owner-shielding via contract without an institutionalized law of limited liability; however, this does not hold true for entity shielding because the excessively high moral

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<sup>39</sup> Serrao (2002: 330). In general, one can see the characteristic effort to impute to the Romans something akin, in spirit if not in execution, to modern European commercial codes; see, for example, the ongoing series by Luchetti & Petrucci (2010-present) on the “Fondamenti romanistici del diritto europeo.”

<sup>40</sup> See the account of the historical evolution of asset-partitioned firms in Hansmann, Kraakman, and Squire (2006) 19-57.

<sup>41</sup> Finley (1999: 193) applied this term to “speculation about what would be in texts that do not exist.”

<sup>42</sup> This is the argument advanced by Hansmann and Kraakman (2000: 387-440) and a brief explanation follows below. On limited liability, see Carney (1999: 659-92).

hazard costs preclude a contractually formulated equivalent.<sup>43</sup> A survey of the evidence most frequently adduced in support of the functionalist argument reveals that there was institutionalized owner shielding but not entity shielding. The system of delegation through slaves turns out to most resemble a so-called “agency through title” alternative to institutionalized affirmative asset partitioning, which ultimately suffers from the same moral hazard problems as attempting to establish it through contract. This fact has significant economic implications and largely explains why Roman businesses generally did not have numerous owners nor acquire assets allowing them to vertically integrate their holdings despite their willingness to use slaves as proxies.<sup>44</sup>

In early Roman law, slaves (or sons-in-power, for that matter) could not bind their *paterfamilias* through their own obligations, nor could he be negatively affected by their actions.<sup>45</sup> Gaius expressed this principle succinctly, noting that “our condition can be improved by slaves but not be made worse” (*melior condicio nostra per servos fieri potest, deterior fieri non potest*).<sup>46</sup> These restrictions would have made dealing with a slave or son *in potestate* an extremely risky proposition. Over time therefore, the praetor began instituting remedies which made the *paterfamilias* liable to various degrees for obligations incurred by his slaves. These are the so-called *actiones adiecticiae qualitatis* and include the *actiones institoria, exercitoria, de peculio, tributoria, de in rem verso, and quod iussu*.<sup>47</sup>

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<sup>43</sup> *Ibid.* 406-422. Contra, for example, Posner (2007).

<sup>44</sup> Kaser (1970: 343) called this “organschaft,” comparing this to the way one uses one’s arms and hands to engage with the surrounding world.

<sup>45</sup> *Ibid.* Krüger (1979: 21); Zimmermann (1996: 51-2).

<sup>46</sup> *D.* 50.17.133.

<sup>47</sup> Arangio-Ruiz (1965: 7); Aubert (1994: 414); Serrao (2002: 290-1). It is somewhat unclear when these actions came into existence and in what order, though the 2<sup>nd</sup> century BCE seems a fair bet. De Ligt (2007: 10-25) is inclined to date them to the 3<sup>rd</sup> century BCE.

The *actiones institoria* and *exercitoria* were actions available against a master who had set someone, often though not necessarily a slave or son, in charge of a business or ship respectively.<sup>48</sup> Liability was not limited, as the Latin *in solidum* makes clear. Nor is there any suggestion that the assets of a slave placed in charge of a ship or tavern (*servus praepositus*) would be shielded from the *dominus*' personal creditors. Only the range of actions for which the master is liable is restricted: to the stated purpose of the appointment. In other words, if a master appointed a slave over a shop and the slave also engaged in some business un-related to that appointment, the master would not be liable for debts related to the latter activity under the *actio institoria*.

The *actiones tributoria* and *de peculio* differed from the previous two actions because the *dominus* did not actively direct his subsidiary's business. Moreover, these actions were restricted to operations undertaken by slaves or sons. The difference between these two actions derived primarily from whether the master had active knowledge (*scientia*) of his son or slave's transactions. Gaius explained that an *actio de peculio* made a *paterfamilias* liable for business debts incurred by a slave or son endowed with a *peculium*.<sup>49</sup> Somewhat strangely, the master himself was a privileged creditor: "...of course, when the action is on the *peculium*, a calculation of the deduction from the *peculium* owed to the master is made."<sup>50</sup>

The *tributoria* action was similar except that the master had more active knowledge that his slave was using the *peculium* in some broadly speaking commercial way. The most important consequence was the leveling of creditors—that is, the *dominus*

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<sup>48</sup> Gai IV 70-71.

<sup>49</sup> Gai IV 73. Zimmermann (1996: 52).

<sup>50</sup> Ulp D. 14.4.1 pr: *quippe cum de peculio dumtaxat teneatur, cuius peculii aestimatio deducto quod domino debetur fit.*

lost his position as a privileged creditor to the *peculium*, though he was still only liable for the amount equal to the value of the *peculium*.<sup>51</sup> In addition to these two actions, the *actio de in rem verso* was available if the *paterfamilias* had materially gained from the financial operations financed by his dependant's *peculium*.

The availability of these actions would have introduced an element of moral hazard into any contract with a slave or son because a master might be tempted to withdraw assets from the *peculium*, thus limiting his losses on risky investments. It was presumably for this reason that the praetor granted an action, the *actio de in rem verso*, in cases where a master had made a profit from his slaves but the *peculium* was unable to meet its debts.<sup>52</sup> In that case, the master was liable for the amount by which he had profited in excess of the *peculium*.<sup>53</sup> Taken wholly, these actions have become the linchpin for arguing that Romans had functional equivalents of formal corporate asset partitioning. Let us therefore examine to what extent these laws mimicked affirmative and defensive asset partitioning.

In the slave-run firm, if the functionalist argument is correct, slaves are managers operating on behalf of owner(s) with creditors in a quasi-corporate structure. It is therefore important to note, before considering the specifics of Roman asset partitioning, that “in nearly all standard-form legal entities, both affirmative and defensive asset partitioning, with respect to managers, follow a rule of exclusivity: The firm’s assets are

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<sup>51</sup> *Scientia* was apparently fairly broad. Ulpian (*D. 14.4.1.3*) said, “We take it that knowledge, which also includes volition, is not limited to that but also patience: for the master does not have to will it but simply to not un-wish it. If therefore he knows and does not protest and speak otherwise, he will be liable under the *actio tributoria* (*Scientiam hic eam accipimus, quae habet et voluntatem, sed ut ego puto, non voluntatem, sed patientiam: non enim velle debet dominus, sed non nolle. Si igitur scit et non protestatur et contra dicit, tenebitur actione tributoria*). Cf. Ulp *D. 14.4.1 pr-3*, Gai IV 72.

<sup>52</sup> Ulp *D. 15.3.1 pr*.

<sup>53</sup> On the *actio de in rem verso*, see Solazzi (1955: 247-67); MacCormack (1982: 319-39); Chiussi (2001).

not available to satisfy the manager's personal obligations, and the manager's personal assets are not available to satisfy the firm's obligations."<sup>54</sup> This was not true for slave managers.

It was, in fact, the opposite. The *peculium* simply consisted of everything in the quasi-possession of the slave beyond that which the master gave as part of normal upkeep (like food and clothes).<sup>55</sup> In the presumably common cases where slaves used their *peculia* without the master's active *scientia*, there was no asset separation within the *peculia* itself. That introduced an element of uncertainty for creditors to the *peculia* because they could not be sure what proportion of the *peculia* would be used toward the firm's operation. If a slave used his *peculium* to finance, say, a fruit-vendor but also to play dice every night, this would obviously severely impact the liquidity, credit-worthiness, and ultimate success of the fruit-trader's business.

It is fairly well accepted that these laws did defensively partition the owners' personal assets from his slaves' quasi-assets: “[*N*]egotiatio per servos communes” it was recently stated, “provided a way of achieving limited liability...the slave's creditors could only seize the *peculium* assets, while being generally barred from reaching out to the owner's personal assets.”<sup>56</sup> This conclusion seems fairly obvious and unexceptionable from the actions' descriptions and scope. We should note, however, that the *actio de in rem verso*, which allowed firm creditors to attack personal assets in certain situations and was analogous to piercing the corporate veil in modern law, may imply some degree of fluidity between personal and firm assets and the difficulty for firm creditors of effectively monitoring firm assets.

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<sup>54</sup> Hansmaan and Kraakman (2000: 398).

<sup>55</sup> Ulp *D.* 15.1.7.4.

<sup>56</sup> Abatino, Dari-Mattiacci, and Perotti (2011: 378).



Affirmative asset partitioning—entity shielding—has been largely ignored in the literature, even though “limited liability is only a secondary, and by no means universal, characteristic of legal entities.”<sup>57</sup> The already cited article by Abatino, Dari-Mattiacci, and Perotti is the only example I know where this problem has been addressed. They suggest that the rules above created a weak form of entity shielding, though they concede that, although one of their main points of evidence “...is not sufficient to prove the existence of entity shielding, it is clearly compatible with it.”<sup>58</sup> The authors’ attempt to address this problem is commendable. Their (admittedly hesitant) conclusion is, however, wrong.

Explaining their error requires us to back up and consider entity shielding broadly—what its economic costs and benefits are and what other criteria are required for its existence. After that, we can inspect arguments in favor of Roman entity shielding and explain why they do not hold up. Affirmative asset partitioning provides several benefits, namely, reducing firm creditors’ monitoring costs, reducing the transaction costs of severally-owned firms, and increasing the stability of a firm’s value; its costs primarily stem from incentive for debtor opportunism.<sup>59</sup>

A creditor (someone to whom is owed monetary or contractual obligations) incurs monitoring costs whenever he lends to a firm: knowledge of the firm’s assets, liquidity, debts, etc. are important for determining whether he should do business with the firm. Entity shielding reduces those creditor monitoring costs in two ways. First, the creditor is not responsible for evaluating and watching the firm owners’ personal finances because

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<sup>57</sup> Hansmann, Kraakman, and Squire (2006: 1).

<sup>58</sup> Abatino, Dari-Mattiacci, and Perotti (2011: 381).

<sup>59</sup> My discussion here is largely a summary of the relevant points from Hansmann and Kraakman (2000: 399-404).

the firm's assets are shielded from personal creditors. This lowers the cost of credit to the firm because it lowers the uncertainty for the creditor.

Second, imagine a vertically integrated wine firm, growing grapes in Spain, making and bottling wine, shipping the wine, and retailing the wine at Rome. The ability to partition assets within a firm into multiple distinct corporations is important because the different components of the wine-firm are almost certainly going to depend on two different classes of creditors.<sup>60</sup> A producer of amphorae in Spain will probably be fairly knowledgeable about the local vineyards' productive capacities. A lessor of urban real estate at Rome will probably be fairly knowledgeable about the profitability of wine-retailers in the city. But neither creditor is likely to be well-informed about the financial strength of the corporation at more than one or two specific points.<sup>61</sup> When the respective lenders are only responsible for knowledge of their specific point of intersection with the firm, they will offer lower credit and thus the total cost of credit for the firm is lower. Moreover, limited liability is not sufficient to achieve this effect: without entity shielding, the creditors in Spain do not have priority to the assets related to wine-production over those in Rome, and monitoring costs would still be considerably higher than they would be with affirmative asset partitioning.<sup>62</sup>

These advantages become all the more important in the case of firms with multiple owners. Recall the rule of Roman partnerships: partners did not obligate one another, and actions were against the individual and not the *societas*. This rule corresponds perfectly to a world without entity shielding, where "creditors of any single

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<sup>60</sup> *Ibid.* 399-400.

<sup>61</sup> Cf. Hansmann, Kraakman, and Squire (2006: 8-9) for an example of the benefits of entity shielding featuring a Medieval-style Florentine partnership.

<sup>62</sup> *Ibid.* 9. Cf. also Levmore (1982: 49-83).

owner would have the right to proceed against that owner's share of the firm's assets...<sup>63</sup> Even if the partner was acting through a commonly owned slave, thus limiting his personal liability to that amount of the *peculium*, the problem still remains because the *actio de peculio* would be against the individual owner, not the partnership. This situation would cause firm creditors and even the other firm owners to incur prohibitively high monitoring costs because they would have to assess both the financial viability and assets of the firm, the owners' personal finances, and any other firms in which any of the owners had financial stakes, not just once but continuously.<sup>64</sup> This would almost certainly make credit expensive and difficult to acquire.

Those advantages are available even to weakly shielded entities, like the modern general partnership, but the strongly shielded entity, with liquidation protection, has become the principal corporate form over the last two centuries because of its decisive advantages.<sup>65</sup> Even if firm creditors have priority to claim firm assets over the owners' personal creditors, a substantial risk remains that an owner's personal insolvency will cause his personal creditors to force liquidation of his shares in the firm. That risk means that the firm's fortunes are still intimately tied to its owners' personal fortunes and, if an owner's fortune turns for the worst, the firm could stand to lose a portion of its value which would injure both the other owners and the firm creditors. Roman firms definitely did not have liquidity protection.<sup>66</sup>

To be sure, the defensive asset partitioning created by the praetorian actions had important effects and the *actio de in rem verso* limited one of the chief costs of limiting

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<sup>63</sup> Hansmann & Kraakman (2000: 402).

<sup>64</sup> *Ibid.*

<sup>65</sup> *Ibid.* 403-4.

<sup>66</sup> This is noted by Abatino, Dari-Mattiacci, and Perotti (2011: 379).

personal liability, namely, if the firm acted unscrupulously towards its creditors. Owner shielding presents several advantages; I mention only two here.<sup>67</sup> In particular, owner shielding mirrors the reduction in monitoring costs created by entity shielding by allowing personal creditors to ignore the performance of personal debtors' business interests. It also shifts some of the costs of monitoring a firm's managers away from the owners (who may have limited knowledge of their managers' ability and performance) to creditors who know that they cannot lay claim to the firm- owners' personal resources to offset their own poor investments. It has become increasingly clear, however, that those benefits have not been as important in the evolution of modern corporate forms as entity shielding, "...the net benefits of which are so decisive that it is today an element of all of the law's standard forms for enterprise organization."<sup>68</sup>

The functionalist argument of Roman business practice claims that Romans developed a non-institutionalized equivalent to weak entity shielding. This claim seems *a priori* highly unlikely because the moral hazard costs of establishing entity shielding via contract are so high as to make it impossible.<sup>69</sup> Contractually negotiating for entity shielding would require a firm to guarantee a prior claim on firm assets to creditors over personal creditors with already existing claims. The firm-owners' personal creditors would therefore become secondary creditors without their consent or even knowledge.<sup>70</sup> The firm would therefore have to commit itself credibly to acquiring an agreement subordinating the claims of personal creditors, past, present, and future. The costs of writing such a contract would be prohibitively high because firm creditors would be

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<sup>67</sup> *Ibid.* 423-27.

<sup>68</sup> *Ibid.* 423.

<sup>69</sup> *Ibid.* 406-414 for a much lengthier and more sophisticated analysis.

<sup>70</sup> *Ibid.* 407.

unable to monitor the firm's compliance. This factor would engender extreme moral hazard because there would be "...strong incentive not to obtain the necessary subordination...in the circumstances in which they would be most important to business creditors—namely, when the entrepreneur is facing a substantial risk of insolvency and...(a) in strong need of further credit, and (b) in a poor position to obtain credit that is subordinated."<sup>71</sup>

Moreover, the problems arising from moral hazard would increase with the number of owners. The benefits of promising priority of credit position to firm creditors would be shared (via lower firm borrowing costs) by all the owners, but higher personal borrowing costs would be borne only by the individual who negotiated the promise. Thus, "each owner would face an incentive to omit the waivers from personal dealings opportunistically, a temptation...difficult to police."<sup>72</sup> Institutionalized entity shielding reduces the costs of writing such a contract and eliminates the moral hazard by essentially inserting a mandatory clause into every contract that subordinates personal creditors whether they wish it or not.

It would be fairly surprising if there was entity shielding at Rome since without formal organization law it should be impossible to obviate those problems. Let us briefly examine the evidence adduced in Abatino, Dari-Mattiacci, and Perotti's article. First, it is claimed that "...if the same slave was given different *peculia* or if the same master had several slaves each with a *peculium*, insulation between the different *peculia* was a direct consequence of the limited liability of the master."<sup>73</sup> It is true that this insulation allowed for some degree of asset partitioning and perhaps for quasi-subordinated forms (i.e., a

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<sup>71</sup> *Ibid.* 408.

<sup>72</sup> Hansmann, Kraakman, and Squire (2006: 5). See also Hansmann and Kraakman (2002: 406-13).

<sup>73</sup> Abatino, Dari-Mattiacci, and Perotti (2011: 379).

firm with partitioned and separate sub-firms). But these partitions were not affirmatively asset partitioned. Though the creditor to one *peculium* probably could not reclaim losses from the other *peculium*, there is no hint that either *peculia* would be shielded from non-firm creditors.

The authors draw attention to several interesting juristic passages where the jurists display interest in problems relating to affirmative asset partitioning, but I would like to begin with the following quote which illustrates the argument's tenuousness: "It remains to be verified whether the same form of entity shielding stood between the *peculium* and personal creditors of the owners; that is, if *peculium* creditors could seize *peculium* assets prior to personal creditors. Roman law scholarship considers this point to be unsettled."<sup>74</sup> But if one is going to advance a claim that entity shielding existed in Rome, then this claim is fundamental: if there is no prior claim for firm creditors, then there is no entity shielding. There are two immediate pieces of evidence against this view and one in its favor.

First is *D. 42.6.1.9* (Ulp.), focusing on a specific subtype of *peculium*, the *peculium castrense* (military *peculium*) which deals with the *peculium* of a son-in-power acquired while that son was in the army:

*Si filii familias bona veneant, qui castrense peculium habet, an separatio fiat inter castrenses creditores ceterosque, videamus. Simul ergo admittentur, dummodo, si qui cum eo contraxerunt, antequam militaret, fortasse debeant separari: quod puto probandum. Ergo qui ante contraxerunt, si bona castrensia distraherentur, non possunt venire cum castrensibus creditoribus. Item si quid in rem patris versum est, forte poterit et creditori contradici, ne castrense peculium inquietet, cum possit potius cum patre experiri.*

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<sup>74</sup> *Ibid.* 380. The chief advocates of *peculium* creditors' prior claim are Solazzi (1940: 200-3); Di Porto (1984: 264-65).

If the goods of a son-in-power, who has a military *peculium*, are sold we should see whether there should be a partitioning between the military creditors and the rest. They will be admitted that a partitioning should be made, provided that some creditors contracted with him before his military service began. And I think this is right. Therefore, those who contracted prior cannot come with the camp creditors if camp-goods are being broken up. Likewise, if some profit is made for the father's accounts, he will be able to oppose the creditor from disquieting the military *peculium* since the issue can be, rather, raised with the father.

Here, Ulpian questioned what the priority of creditors to that *peculium* was vis-à-vis other creditors (...*an separatio fiat inter castrenses creditores ceterosque, videamus*). Ulpian agreed with a general opinion that a separation should be made between the two classes of creditors and that, should an *actio de in rem verso* be brought against the *paterfamilias*, the *peculium castrense* should be protected from the creditor (*Item si quid in rem patris versum est, forte poterit et creditori contradici, ne castrense peculium inquietet, cum possit potius cum patre experiri*). This judgment endowed the *peculium castrense* with weak entity shielding. The fact, however, that Ulpian explicitly acknowledged and explained the reasoning for the priority of *peculium* creditors in this one case strongly suggests that *peculia* did not normally offer this protection to their creditors.<sup>75</sup>

We note first, with Hansmann, Kraakman, and Squire, that creditors' claims against the *peculium* were not specifically for *peculia* assets per se but for any assets equal in value, which suggests "the lack of a legally separate fund in which to recognize creditor priorities."<sup>76</sup> This introduced elements of uncertainty for firm creditors along with problems of potential hold-up. Say, for example, I go into a business with a slave-managed firm because it counts among its assets a wine-press to which I want access.

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<sup>75</sup> Solazzi (1940: 200-3).

<sup>76</sup> Kirschenbaum (1987: 51); Hansmann, Kraakman, and Squire (2006: 20).

The possibility that the slave's master might remove the press from his *peculium* and replace it with the cash value of the press will be of concern to me because I contracted to use a specific firm asset. Moreover, I might fear that the *dominus*, knowing that I have invested in his slave's business on the basis of a specific asset, may threaten to remove that particular asset unless I pay a fee.<sup>77</sup> The availability of unjust enrichment actions (in particular the *de in rem verso*) would not solve this hold-up problem: As long as the *dominus* replaced the asset with another of equal *ex ante* value, he had the ability to appropriate the quasi-rents accruing to the *peculium*'s specific assets *ex post*. This problem could only be solved through entity shielding.

Classical Roman law provided several remedies to creditors when a debtor was unable to pay all his debts, which included *cessio bonorum* (yielding of goods) and *venditio bonorum* (sale of goods).<sup>78</sup> These procedures gave guidelines for disposing of the property of an insolvent debtor for satisfying the creditors' claims. Without wishing to obscure understanding by oversimplification, these remedies can be considered the foundation of Roman bankruptcy procedures, without taking the procedures to imply the existence of a general Roman law of bankruptcy. There is, however, a key difference: in modern law, bankruptcy is a defensive device to protect assets from creditors; *cessio bonorum* was an aggressive process available to creditors. Taken in sum, the general background of remedies and procedures for insolvency were not congruent with weak entity shielding.

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<sup>77</sup> As discussed in Chapter One, this type of problem, the so-called hold-up problem or the problem of asset specificity, introduces numerous transaction costs into contractual arrangements and has been one of the linchpins of transaction cost explanations for the existence, scope, and limits of firms. See Williamson (1985: 55); Klein, Crawford, and Alchian (1978: 297-326); Joskow (1988).

<sup>78</sup> Kaser (1966: 316-17) provides a succinct description.



Given the lack of separate funds into which personal and firm assets were grouped, it does not seem that creditors were generally classed by which fund they had lent to. At first glance this may seem to be a surprising claim, for Abatino, Dari-Mattiacci, and Perotti offer apparently contradictory evidence, namely, *D. 14.4.5.15-16* (Ulp.):<sup>79</sup>

*Si plures habuit servus creditores, sed quosdam in mercibus certis, an omnes in isdem confundendi erunt et omnes in tributum vocandi? Ut puta duas negotiationes exercebat, puta sagariam et linteariam, et separatos habuit creditores. Puto separatim eos in tributum vocari: unusquisque enim eorum merci magis quam ipsi credidit. (16) Sed si duas tabernas eiusdem negotiationis exercuit et ego fui tabernae verbi gratia quam ad bucinum habuit ratiocinator, alius eius quam trans Tiberim, aequissimum puto separatim tributionem faciendam, ne ex alterius re merceve alii indemnes fiant, alii damnum sentiant.*

(15) If a slave has many creditors but some are only in certain commercial activities, should they all come into judgment jumbled together? For example, he was operating two businesses—say a clothing and a textile business and he had separate creditors. I think they should be called separately into judgment: for each one had given credit to the particular business more than to the individual himself.

(16) But if he was operating two shops (*tabernae*) and I was a computant of the shop which he had at Bucinum and his other computant was of the one across the Tiber, I think it fairest that judgment be reckoned separately, lest some are enriched from the affairs and business of another while some suffer loss.

This is an extremely interesting discussion, and Ulpian, in raising questions about fairness to creditors when one owner has multiple firms and suggesting a form of asset partitioning between them, paid heed to problems that were motivating factors in granting firms entity shielding in medieval Italy.<sup>80</sup> Although Ulpian's judgment is consistent with versions of weak entity shielding, it is not identical to it. In particular, asset separation

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<sup>79</sup> Abatino, Dari-Mattiacci, and Perotti (2011: 382).

<sup>80</sup> Medieval Italian entity shielding was "...heavily locational in nature. If a merchant was engaged in businesses at different locations or had several branches of the same business at different locations, creditors at one location enjoyed priority of claim to the assets held there," Hansmann, Kraakman, and Squire (2006: 31).

here is only with respect to the two firms' creditors. No discussion, however, followed of the creditors' priority with regard to the firm owner's (i.e., the *dominus*) personal creditors. In no way whatsoever did Ulpian affirm priority for firm creditors over personal creditors. Though judgments like this might possibly have lowered creditors' monitoring costs and, consequently, the cost of credit, it could only be a modest improvement and would have done nothing to ease the high transaction costs incurred by firms with multiple owners.

Finally, the Roman court system of determining creditor priority is not consistent with weak entity shielding. Roman courts generally followed a first-to-file payout of debt procedure whereby creditors were paid based on the order in which they filed their claims.<sup>81</sup> But the development of weak entity shielding has generally occurred simultaneously with the development of pro rata bankruptcy courts in which creditors are paid out in proportion to debt they issued as a proportion of the firm's assets.<sup>82</sup> This development has ineluctably followed the creation of entity shielding because "prioritizing creditors based on when they file claims is incompatible with weak entity shielding, which prioritizes instead based on the distinction between firm creditors and personal creditors."<sup>83</sup> In Ulpian's willingness to partition firm assets by the firms' differing locations, he acknowledged a factor that later motivated the creation of pro rata bankruptcy courts. He did not, however, fundamentally change the Roman first-to-file payment of debts. In other words, even though the creditor to the *taberna* at Bucinum did not have to compete with creditors of the *taberna* across the Tiber, the amount he would recoup would still depend on his temporal rank and not on the relative proportion of the

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<sup>81</sup> Kirschenbaum (1987: 51).

<sup>82</sup> Hansmann, Kraakman, and Squire (2006: 29).

<sup>83</sup> *Ibid.* 16., 41.

firm's assets he had supplied. The absence of pro rata bankruptcy is consistent with an absence of institutionally sanctioned entity shielding.

I have already explained why transaction costs are too high to create entity shielding via firm-negotiated contracts. Another alternative to contracts is a so-called agency with title structure, where there is a "...transfer of ownership of those assets to the manager(s) of the business, subject to a contractual commitment by the manager, acting as agent for the owners, to manage the assets for the exclusive benefit of the owners and to reconvey the assets to the owners under appropriate circumstances."<sup>84</sup> This shares some similarities to the Roman slave-manager form. In this case too, there turn out to be transaction costs that are prohibitively expensive to avoid *sans* institutionalized rules.

A Roman slave could not hold formal title to property, but the *peculium* was, by definition, property to which the slave held a *quasi*-title.<sup>85</sup> A seeming advantage of agency with title is that it avoids the problem of having to negotiate for waivers from each of the master's personal creditors by making the agent a *de facto* conditional owner of the assets. This replaces the group of prohibitively expensive contracts with one owner-agent contract and would make bonding the firm assets to creditors credible because "...it would be sufficient to show them the waivers in the agency contracts between the owners and the manager."<sup>86</sup> Although this would effectively shield the

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<sup>84</sup> Hansmann and Kraakman (2000: 414).

<sup>85</sup> D. 15.1.5.4 (Ulp): *Peculium autem Tubero quidem sic definit, ut Celsus libro sexto digestorum refert, quod servus domini permissu separatim a rationibus dominicis habet, deducto inde si quid domino debetur* (Tubero thus defines a *peculium*, as Celsus reports in his sixth book of digests, as that which a slave holds separately from his master's account with his master's permission with anything owed the master deducted).

<sup>86</sup> *Ibid.*

owner's assets from his personal creditors, it would not shield the business assets from the manager's personal creditors.<sup>87</sup>

The lack of asset separation within the *peculium*(s) would have raised a problem analogous to that of the dice-addicted slave I raised before.<sup>88</sup> But any attempt to partition assets within the *peculium* itself absent organization law would be subject to precisely the same costs and moral hazards in attempting to establish entity shielding contractually. This would lead to high monitoring costs not only for firm creditors but also for the firm's owner, both of whom would have incentive to monitor the slave-agent's management of the firm assets.

The Roman jurists were aware of issues pertaining to asset partitioning. The *actiones adiectae qualitatis* established a fairly robust form of defensive asset partitioning (owner shielding) for slave-managed firms. There was, however, no corresponding institutionally sanctioned form of affirmative asset partitioning (entity shielding) for *peculia* firms, with the exception of the *peculium castrense*. In an historical context the existence of limited personal liability without entity shielding is unique, since the development of owner-shielding in part developed to compensate personal creditors for institutionally sanctioned infringement of their rights via entity shielding. It has been suggested that the fact

*...that the Romans gave the peculium owner shielding but apparently not entity shielding suggests that Rome's legal devices for preventing debtor opportunism were less than fully effective, and therefore that commercial entity shielding may not have been feasible.*<sup>89</sup>

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<sup>87</sup> *Ibid.*

<sup>88</sup> I do not raise this problem merely as a hypothetical example but as a potential real problem: *D. 21.1.4.2* (Ulp.) deals with whether the sale of a dice-throwing slave (*aleator*) can lead to an *actio redhibitoria* on the grounds that such a slave is "defective." Cf. Zimmermann (1996: 317-18).

<sup>89</sup> Hansmann, Kraakman, and Squire (2006: 25). We also note that limited liability also developed at Rome in a totally reverse way from any other historical period. At Rome, the default rule was zero liability

There is also no effective alternative to institutionalized entity shielding—in other words, the functional equivalent argument of Roman commercial law, at least in regards to entity shielding, fails because there can be no functional equivalent.<sup>90</sup>

Given the lengths to which I have gone to express my skepticism of the functionalist arguments of Roman commercial law, my contention that the lack of affirmative asset partitioning had profound consequences on the Roman wine-firm should be unsurprising. Romans' ability to use slaves as agents and to develop fairly autonomous nexuses of contracts was important. Nevertheless, it has been demonstrated that, in the historical development of corporations and multi-owner firms, limited liability was “of a distinctly secondary importance.”<sup>91</sup> In particular, entity shielding drastically reduces the monitoring costs incurred by creditors to the firm owners and the owners themselves who must otherwise continuously evaluate the personal and outside business affairs of the other owners.

Rome's wine industry intuitively seems like a sector favoring integration because market imperfections and its corresponding costs were high. Pliny's letter, with which I began this chapter, gives an excellent example of one way in which a structural market imperfection (information costs) could have dauntingly expensive repercussions. Grapes are highly perishable and require “a great deal of effort to coordinate the supply between

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because masters could not be obligated by their slaves. Granting of a degree of owner liability should be seen as bowing to the reality it would be nearly impossible to use slaves in business if masters were wholly unliable for their actions. The normal historical development has run in the reverse direction: managers' default position is of full personal liability (as is today the case in the modern US general partnership) which can be limited in some circumstances.

<sup>90</sup> The question of *why* Romans never institutionalized entity shielding despite some positive pressures is outside the scope of this chapter. Suffice it to say, however, that I suspect that it is a result of some seemingly unrelated path-dependent outcomes in social relationships, governmental restrictions, and technological development.

<sup>91</sup> Hansmann and Kraakman (2000: 387).

growers and wineries at harvest time.”<sup>92</sup> But the non-existence of Roman entity shielding placed severe constraints on the size of firms: firms with multiple owners sufficient for significant capital-pooling would have been very difficult to sustain. This difficulty must have impacted the Roman wine trade, an industry that could have benefited from the ability to vertically integrate its operations at different sectors. Though it is possible that, over the several centuries in which the city of Rome imported wine from a Mediterranean wine catchment, some firm managed to vertically integrate its operations to some degree, the structural constraints generated by Rome’s system of organization law prevented such integration from being more than a fluke and was certainly never a structural feature of the Roman wine trade. Rather, firms (often based on the *familia*) would have generally focused on a particular sector, for example, production, transportation, or distribution. Pliny and the Sestii’s organizational set-up, described at this chapter’s beginning, are consistent with this prediction.

All things being equal, wine commerce favors vertical integration for a number of reasons. There are numerous sunk-costs such as presses, fermentation vats (*lacus*), and storage containers (*dolia, amphora*). Manufacturing containers required investment in clay-beds, pottery-wheels, and human capital investment, namely, skilled employees or slaves. Between the producer, transporter, and retailer there would have been problematic information asymmetries. A wine producer in Southern France wishing to sell his wine at Rome probably had neither particularly detailed nor *au courant* information about Rome’s prevailing market conditions. Such asset-specificities and information asymmetries generated expensive transaction costs for those using market mechanisms for commerce in wine. In such an environment we would expect to see an increasing

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<sup>92</sup> Fernández-Olmos, Rossel-Martínez, and Espitia-Escuer (2009: 232).

tendency toward vertical integration as the geographic catchment area from which Rome drew wine expanded.

In fact, this was the conclusion of a recent article in *Agribusiness* which analyzed upstream integration in the wine industry (i.e., vintners' acquisition and control of the grapes) from the transaction-cost style approach described above and found that

*...transaction cost economics' predictions explain upstream integration in wine industry and our hypotheses based on the transaction cost framework are strongly supported. First, grower's asset specificity has a positive impact on vertical integration. Likewise, the results show that two forms of uncertainty, behavioral and environmental, have a positive relationship with vertical integration. Conversely, size is negatively related to vertical integration. Finally, evidence is found that high added-value products are more likely to be integrated.*<sup>93</sup>

To be sure, there are some differences between the object of the *Agribusiness* study and Roman wine operations. Most importantly, this study treated upstream integration as opposed to downstream integration.<sup>94</sup> This difference is probably less important than it first appears because in considering a Roman landholder integrating downstream wine interests or a Spanish vintner integrating upstream agricultural interests, we are dealing with integration by the capital-rich party. True, the *Agribusiness* study was fairly narrow in focus, addressing only the problem of integration between grape-grower and wine-producer. But the same economic motivations should, however, hold *a fortiori* for the entire stream of wine production: As was noted in the April 2002 volume of *Wine Business Monthly*, there is today a “tendency for wine companies to be vertically integrated” in all sectors, from growing and manufacture to bottling, advertising, and distribution.<sup>95</sup>

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<sup>93</sup> *Ibid.* 244.

<sup>94</sup> See Grossman and Hart (1986: 699) for the importance of the direction of integration.

<sup>95</sup> Arno (2002) <http://www.winebusiness.com/wbm/?go=getArticle&dataId=16088>.

The tendency for consolidation within the wine industry makes sense when we consider the factors encouraging integration. Transaction cost economists explain that firms often choose to integrate when bilateral relations are prohibitively costly, for example, in relationships fraught with incentives for opportunism, a high cost of writing contracts, or an inability to force one of both parties to commit themselves credibly to *ex post* enforcement of *ex ante* contractual terms.<sup>96</sup> In such cases,

*Internal organizations are likely to better harmonize these conflicting interests and provide for a smoother and less costly adaptation process under these circumstances, facilitating more efficient ex ante investment in the relationship and more efficient adaptation to changing supply and demand conditions over time.*<sup>97</sup>

Consolidating problematic market transactions within a firm also generates costs, primarily the bureaucratic costs of organizing intrafirm activities, incentive arrangements, and monitoring employee performance. It is predicted that vertical integration will only occur when those transaction costs are less than those incurred by using the market because an economic actor's goal is to "align transactions...with governance structures."<sup>98</sup>

As I have shown, the institutional background behind Roman firms strongly constrained the extent to which vertical integration was a feasible governance structure because the lack of entity shielding made costs of integration prohibitively expensive. We would, therefore, expect that Romans made a correspondingly high effort to lower the cost of bilateral transactions, in particular, contracts. This is ineluctable: either business is

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<sup>96</sup> Traditional, neo-classical economics viewed vertical integration as an effort to gain monopoly rents by controlling supply streams in conjunction with up-river materials for production. Stigler (1951: 185-93); Elberfield (2002: 23-42). The bibliography on this subject from an NIE perspective is vast, but for a starting point see González-Díaz and Vasquez (2008: 255-71).

<sup>97</sup> Joskow (2004: 319-48).

<sup>98</sup> For a recent review of empirical studies of the "make or buy" question, see Klein (2004: 435-64); the quote is from Williamson (1991: 79).



done via contractual, market governance structures or within a firm.<sup>99</sup> If the latter is too expensive then the former must be made cheap enough to be usable. If both governance mechanisms cost more than the profits available, no one would bother being in business at all. But since we know the Roman wine industry functioned well enough to supply hundred of millions of liters of wine to the city of Rome each year, we can safely say that it met the city's demand. Understanding how requires us to examine how Romans compensated for the pressures against vertical integration.

### **“Everything is in the Power of the Contracting Parties...”**

Rome's legal system precluded the solution commonly taken by modern wine-firms to avoid the great uncertainties in contracting: extensive vertical integration. It is my contention, however, that the rules of contract, especially as regards wine, became fairly sophisticated and were market oriented. My argument analyzes how the jurists formulated the default rules governing the sale of wine and suggests that the rules were designed primarily to correct information asymmetries between buyers and sellers. Indeed, the emperors Marcus Aurelius and Verus perfectly encapsulated the *modus operandi* of Roman wine traders in decreeing that “everything is in the power of the contracting parties.”<sup>100</sup>

We have, unfortunately, only one wine contract from Italy: Cato's model contract provided in the *de agri cultura*, and it concerns wine, already pressed, stored in large vats:

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<sup>99</sup> This is, of course, an oversimplification. Combinations of the two exist; at opposite poles, for example, are long-term relational contracts (Hviid 1999: 46-72 ) and partially-vertically integrated (dual-sourced) firms (Joskow 2004: 320). Combinations rely on the potential for using either governance structure.

<sup>100</sup> D. 18.1.71 (Papir.): *Imperatores Antoninus et Verus Augusti Sextio Vero in haec verba rescripserunt: "Quibus mensuris aut pretiis negotiatores vina compararent, in contrahentium potestate esse: neque enim quisquam cogitur vendere, si aut pretium aut mensura displiceat, praesertim si nihil contra consuetudinem regionis fiat.* (emphasis mine).

(148) *Vinum in doliis hoc modo uenire oportet: uini in culleos sing. quadragenae et singulae urnae dabuntur. Quod neque aceat neque muceat, id dabitur. In triduo proximo uiri boni arbitrato degustato; si non ita fecerit, uinum pro degustato erit. Quot dies per dominum mora fuerit, quo minus uinum degustet, totidem dies emptori procedent. [2] Vinum accipito ante K. Ian. primas; si non ante acceperit, dominus uinum admetietur. Quod admensus erit, pro eo dominus rem soluito; si emptor postularit, dominus ius iurandum dabit uerum fecisse. Locus uinis ad K. Octobres primas dabitur; si ante non deportauerit, dominus uino quid uolet faciet.*

(148) Wine in *dolia* should be sold in this way: There will be forty-one urns to the *culleus*. That which is neither vinegary nor musty will be given. Let a tasting occur within the next three days according to the judgment of a good man; if he will not have done so, let the wine be considered tasted. By however many days the owner delayed from letting the wine be tasted, let the same number be added for the buyer. [2] Let the wine be received before the first of January; if he will not receive them, let the owner measure out the wine. Let the owner discharge the affair on this basis, i.e., by what he has measured. If the buyer demands it, the owner will give an oath that he has acted honestly. A place for the wines will be given by the first of October. If the buyer will not have removed them by then, the owner will do what he wishes with the wine.

It is true that Cato, writing in the mid-2<sup>nd</sup> century BCE, somewhat predates the epoch studied here. Nevertheless, his contract's basic features are consistent both with features identified by later jurists as typical features of wine-sales, and *comparanda* are found in Egyptian papyri as well, which encourage us to use Cato's description, in its general form if not in all the individual details.

Warranty clauses, for example, appear frequently in Egyptian papyri, in a type of sale commonly called sale of wine on delivery.<sup>101</sup> These contracts generally cover a full year's activity. In winter or spring, a wine-grower sells a quantity of his yet-to-be-produced-wine; generally acknowledges that he has received the full payment; and

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<sup>101</sup> See Pringsheim (1950: 494-6); Bagnall (1977: 85-96); Kruit (1992a: 265-76), (1992b: 167-84); Jakob (1999a: 33-44, (2009: 133-44).

obligates himself to provide the agreed upon quantity at the agreed upon time, commonly in the month of Mesore (July/August): vintage time.<sup>102</sup> In a sizeable percentage (about 70%) of contracts of sale on delivery, there was an additional clause in which the vendor further guarantees that he will replace any wine found vinegary, moldy, or unfermented for several additional months, usually until Tybi (Dec/Jan).<sup>103</sup>

But these guarantees were not ubiquitous, and the papyri fall fairly neatly into two categories: those with warranties and those without.<sup>104</sup> Jakob has persuasively argued that these two contract types reflect two fundamentally different types of sales. In sales without a guarantee, the buyer will have taken the must immediately after the pressing and made the wine himself.<sup>105</sup> Generally, these contracts also included a clause specifying that the buyer was responsible for providing the necessary jars.<sup>106</sup> Conversely, it seems likely that, in contracts including a guarantee, the seller fermented the wine in his cellar and took responsibility for the wine's quality. The *degustatio* and *traditio* of the wine would almost certainly have occurred no later than the date at which the guarantee terminated.<sup>107</sup>

These warranty provisions deserve a much more thorough study than is within the scope of this chapter. A primary purpose of warranties is its use as a signaling device by which consumers can differentiate high-quality from low-quality producers and as insurance devices offered by producers to encourage risk-averse consumers to make a

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<sup>102</sup> See, for example, *BGU XII 2209* (Herm. 614) for an example of a fairly complete contract of this type.

<sup>103</sup> Jakob (1999a: 33-4).

<sup>104</sup> *Ibid.* 37

<sup>105</sup> See *Ibid.* for a list of the papyri preserving contracts of this type. *SB XVI 12486* (Herm. 470) provides a good example.

<sup>106</sup> *Ibid.* 40. Cf. *D. 18.6.1.4* (Ulp.) on how problems could arise for the seller if he supplied his own vats (*dolia*) for the buyer.

<sup>107</sup> Kruit (1992a: 274). Jakob (1999a: 43-4).

purchase.<sup>108</sup> Generally, however, variable warranty lengths are the crucial signaling device. Strangely, Egyptian warranty provisions invariably terminate at the same time, the beginning of January. In addition, differing quality of wine should be reflected in the price since the buyers had an opportunity to taste the wine as part of the purchase. One might think that the warranty was actually a guarantee against the vagaries of transportation and that transportation was too undifferentiated to justify differing warranty lengths.<sup>109</sup> There is, however, nothing in the contracts suggesting that the wine-maker was responsible for transportation, and it is not likely that a producer would guarantee a factor entirely out of his control.<sup>110</sup> These warranties demand their own study, for their purpose is fairly mysterious.

More generally, it has been argued that, in a long-term, bilateral relationship where sellers sell repeatedly the same product and buyers have a broader base of past experience and reputational knowledge,

*Risk-neutral parties will approximately choose the first-best levels of quality investments and care-taking, if the discount rate of future profits is small enough. So, even in a situation where warranties are not enforceable, there is a realistic chance that parties will choose the optimal quality and care investments.*<sup>111</sup>

In other words, long-term models of warranty formation suggest that, when certain conditions hold, legal intervention will not be necessary because first-best warranties will be created through privately-ordered arrangements. This finding is broadly in line with

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<sup>108</sup> Cf. Akerlof (1970: 488-500); Priest (1981: 1297-1352); Grossman (1981: 461-83); Mann and Wissink (1990: 432-36); Wehrt (1999: 179-99); Murthy and Djameludin (2002: 231-60) provide a review of the literature.

<sup>109</sup> This possibility was suggested to me by the economist Donald Jones, email to author, September 28, 2011.

<sup>110</sup> In bilateral, one-shot contracts "the organization of warranty contracts is essentially determined by the consumer's potential influence on parts of the product" (Wehrt 1999: 188).

<sup>111</sup> Wehrt (1999: 193-4).

historical economic investigations regarding the role of reputation in private-ordered contracts.<sup>112</sup>

Strikingly, the jurists only make passing references to wine warranties. Ulpian mentioned that the vendor might accept liability for vinegary wine (*periculum acoris*), Pomponius referred to a sale of wine “with vinegars and musts excepted” (*exceptis acidis et mucidis*), and Gaius identified situations where the vendor might make guarantees about the wine’s quality (*si quidem de bonitate eorum adfirmavit venditor*).<sup>113</sup> Despite their recognition that contracts of sale might include specific warranty provisions, they did not describe them in any detail nor give any wine-specific warranty default rules. This coincidence raises the tantalizing possibility that the jurists paid little attention to wine-warranties not because they were unimportant nor through ignorance but precisely because no legal intervention was needed.

That proposition can be tested by comparing juristic discussion of warranties with that on tasting, which was, by contrast, extensive. This analysis reveals that legal intervention was useful in crafting contractual rules for tasting and that the jurists deliberately designed rules beneficial to efficient trade. Tasting wine was an equally important part of Roman wine commerce.<sup>114</sup> Cato, who was unique in describing the sale of wine, advocated a fairly short, three day period during which the buyer could taste the

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<sup>112</sup> See MacLeod (2007: 595-628) who also suggests that when a good’s quality is solely within the seller’s control, informal enforcement, via loss of reputation and future markets, may be preferable to formal court enforcement. More generally on reputation and incomplete contracts (though without an emphasis on warranty). See Greif, Milgrom, and Weingast (1994: 745-76); Fafchamps (1996: 427-48); Greif (2006: 120-83).

<sup>113</sup> *D.* 18.6.6 pr., 18.6.6.

<sup>114</sup> For wine tasting in a broader commercial context, see Olszak (1990: 361-87).

wine (*in triduo proximo uiri boni arbitrato degustato; si non ita fecerit, uinum pro degustato erit*).<sup>115</sup>

Roman winemakers were known to doctor their wine with herbs and spices including marjoram, thyme, hazelwort, juniper, myrtle, saffron, and cardamom which were undoubtedly used to obscure “the failings of an inferior wine.”<sup>116</sup> We can compare this to later medieval wine trade where “...the amateur was often duped into buying a mixture of the dregs of many good wines, or bad wines mixed with white of egg, honey, and other sweetening matter.”<sup>117</sup> Skillfully tasting the wine was crucial for adjudicating its commercial worth, and poor judgment (or skipping tasting altogether) could have dire consequences.<sup>118</sup> Moreover, the transaction costs generated by information asymmetries between the contracting parties were extremely high. It was for this reason that tasting caught the jurists’ eyes.<sup>119</sup>

We can use as a starting point Bruce Frier’s article, “Roman Law and the Wine Trade: The Problem of Vinegar Sold as Wine.”<sup>120</sup> He began with a problem presented in *D.* 18.1.9.2 (Ulp.) concerning vinegar sold as wine. That case where a buyer has purchased what he thinks is wine but, unbeknownst to him and the seller, it has turned into vinegar prior to the sale.<sup>121</sup> In short, Frier’s article advanced the following argument: early jurists considered the legal problem one of *error in substantia*, a fundamental error

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<sup>115</sup> *Agr. Cult.* 148.3.

<sup>116</sup> For these examples and others, see Pliny *HN*. Fleming (2001: 45).

<sup>117</sup> James and Veale (1971: 161).

<sup>118</sup> There is 14<sup>th</sup> century suit from the London Chancery court in which a priest claimed he was almost killed by doctored wine (James and Veale 1971: 162).

<sup>119</sup> On wine tasting see, Seckel-Levy (1927: 204-208); de Zulueta (1945: 58-59); Yaron (1959: 71-7); Harder (1975: 17-30); Frier (1983: 280-2); Zimmermann (1996: 284-7), Jakab (1999b: 90-2, 108-9), (2005: 87-110), (2009).

<sup>120</sup> Frier (1983: 257-95).

<sup>121</sup> The different problem of wine which has turned into vinegar *after* the sale is treated directly at *D.* 18.1.34.5 (Paul), 18.6.1 pr. (Ulp.), 18.6.4 pr.-1 (Ulp.) 18.6.6 (Pomp.).

in the “substance” of the object of sale (for example, if I buy a jar thinking it is gold when it is actually bronze) that voided the contract.<sup>122</sup> *Error in substantia* (as opposed primarily to *error in corpore*) has generally been viewed as a result “of the prevailing system of remedies for breach of warranty...to fill an unsatisfactory gap in the protection of the purchaser.”<sup>123</sup> Frier, on the other hand, considered the doctrine an “illogical adjunct to the rules of formation on sale through *consensus*,” which developed as a form of primitive buyer-protection.<sup>124</sup> By the late classical period, however, the law of sale had independently developed sufficient buyer protection so as to restrict the scope of *error in substantia* to all but a few specialized cases.<sup>125</sup>

Ulpian, however, differed from other late classical jurists who wished to abandon the doctrine of *error in substantia* altogether. In the case of wine, Ulpian precluded using *error in substantia* for wine which had turned to vinegar prior to the sale as a basis for voiding the sale but allowed it to be subsumed into the doctrine of “fundamental defect,” which made the seller liable for the difference in price if he was unaware of the acidification.<sup>126</sup> Frier concluded that this development should be seen as analogous to later Common Law developments whereby “Roman law was “receiving a standard of trade associated with ‘mature mercantilism’”.<sup>127</sup>

Based on the preceding analysis, we can broaden this argument to consider how the jurists engaged with the problems of the wine trade more generally. In the case above,

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<sup>122</sup> Frier (1983: 261-74).

<sup>123</sup> Zimmermann (1996: 594); Kaser (1971: 238).

<sup>124</sup> Frier (1983: 264-5). But see Zimmermann (1996: 594), who considers this argument “ingenious” but “ultimately unconvincing.”

<sup>125</sup> Kaser (1971: 557-60); Zimmermann (1996: 320): “It is now widely recognized that we can see, in the course of classical jurisprudence, an energetic move towards a generalized liability for latent defects.”

<sup>126</sup> Frier (1983: 288-89).

<sup>127</sup> *Ibid.* 291.

Ulpian's argument against using *error in substantia* to void sales of vinegar-sold-as-wine likely mirrored "standards of trade," and the rule he crafted reflected mercantile practice on the ground. In this case, the legal default rule is simply that which contracting parties would prefer. However, the legal default rule for *degustatio* generally was to assume that no tasting was necessary unless it was specifically contracted. This default rule was almost certainly the opposite of what the contracting parties would prefer, since both Cato's contract and every Egyptian record of wine sale includes tasting. This apparent strangeness, however, is not evidence for juristic ignorance or apathy toward the wine trade. Rather, this default rule was also designed to enhance the efficiency of contracting for wine.

If contracts were complete, that is, if every right and duty for both parties were made explicit for every contingency *ex ante* and *ex post*, then it would never be necessary to appeal to an exogenous body of law because the controversy could be decided by the terms of the contract itself.<sup>128</sup> In the real world, all contracts are incomplete. There are always certain contingencies either impossible to stipulate ahead of time or prohibitively costly to negotiate because their probabilities of occurrence are very low. In these cases, it behooves the law to furnish "default rules, in order to resolve any disputes that are not settled by the terms of the document itself."<sup>129</sup> How these default rules are chosen can make a great deal of difference to the efficiency of economic transactions, and the question of how default rules should be chosen has garnered a great deal of attention from those interested in the economics of law.<sup>130</sup>

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<sup>128</sup> Craswell (1999: 1).

<sup>129</sup> *Ibid.* 2.

<sup>130</sup> In general, see Goldberg (1989); Barnett (1992: 821-911); Schwartz (1994: 389-419); Craswell and Schwartz (1994); Hviid (1996: 233-45).



These analyses have both a positive and a normative component. In the normative sense, arguments over setting default rules are basically prescriptive and suggest how lawmakers ought to enhance economic efficiency in their selection of default rules. In a positive sense, the manner of default-rule creation is closely associated with arguments on the efficiency of common law. The analyses suggest, somewhat vaguely, that common law efficiency will in aggregate select efficient contract default rules.<sup>131</sup> One could use my argument that the Roman jurists' contractual rules for wine did in fact promote contractual efficiency as evidence for the positive efficiency of common law, but one should be aware that the truth of the former does not automatically entail the truth of the latter. And whether Roman jurists were intentionally (i.e., in a consistently normative sense) seeking efficient rules is an even harder question to answer.<sup>132</sup>

One approach to selecting default rules is that of hypothetical consent, sometimes called majoritarian or market mimicking rules.<sup>133</sup> In this approach, the law should try to fill in contractual gaps with what the two parties would have chosen if they had explicitly negotiated the missing piece. Ulpian's desire to eliminate *error in substantia* arguments as applied to wine that turned into vinegar prior to sale is best understood as a rule of hypothetical consent to an un-contracted for but implied warranty. Ulpian recognized that treating the wine's acidification as a problem of *error in substantia* did not favor efficient commerce in wine because in many cases the buyer would want redress but

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<sup>131</sup> I do not wish to enter the common-law efficiency debate—although the arguments advanced in its favor often have a somewhat Panglossian optimism about them, many of the arguments are not unpersuasive. Posner (2008), (1981: 775-94) draws a similar distinction between positive and normative approaches to common law efficiency. For his argument that legal codes were generally efficient in "primitive societies" see (1980: 28-53). In favor of theories of common-law efficiency see Rubin (2007).

<sup>132</sup> Frier (1994: 144) succinctly described the difficulty of answering this question, in advocating a cautious approach "...both in moving too quickly from the general to the specific, and in drawing *normative* conclusions from what is essentially a *description* of a certain legal ethos..."

<sup>133</sup> Ayres & Gertner (1989: 89-93); Craswell (1999: 3-5).

would not want the sale itself voided. Rather, Ulpian (*D.* 19.1.13 pr) considered it better to grant an *actio empti* analogous to the *actio quanti minoris* arising out of the aedilician rules of liability, thus giving the buyer redress to reclaim whatever the difference in price would have been had he known about the product's latent defect.<sup>134</sup>

Indeed, since the parties could contract for warranty provisions, we can assume that buyers did not do so only when they were either badly misinformed about the product's quality or, more likely, the market was such that negotiating for such a term engendered prohibitively high transaction costs. This is an example of one of the two economic arguments advanced in favor of majoritarian rules, namely, that in cases where it would be "costly...for the parties to make their contract more complete by specifying their own rule...selecting a default rule that matches whatever rule the parties prefer may save some parties from having to incur those transaction costs, thus producing all the benefits of the most efficient rule..."<sup>135</sup>

We note, however, that effectively establishing market-mimicking default rules depends to a great extent on a fairly homogenous, symmetrical market. If this does not hold, crafting the efficient rule becomes very difficult. Frier, for example, considers it unclear "...why Ulpian did not allow the buyer to have his choice of remedies—either avoiding the sale or preserving it and seeking compensation."<sup>136</sup> But this failure is consistent with a problem often arising when market-mimicking rules are created for imperfect markets. For example, in the presence of imperfect information, it has been asked whether "...the law [should] adopt as its default remedy the one that is in fact most

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<sup>134</sup> On the aedilician remedies, dealing with the sale of slaves, see Rogerson (1959: 112-131); Honoré (1959: 132-159); Zimmermann (1996: 311-19).

<sup>135</sup> Craswell (1999: 4).

<sup>136</sup> Frier (1983: 288).

efficient, or should it adopt the less efficient remedy that the (imperfectly informed) parties would choose if left to their own devices?”<sup>137</sup> Ulpian’s decision could be seen in this light as a paternalistic decision to remove what he considered a less efficient legal rule out of fear that many parties might choose to leave it in place.<sup>138</sup>

The confusion over which remedy to choose could more generally arise out of common market imperfections in which a single default rule might only be efficient for a percentage of contracting parties.<sup>139</sup> In such cases, the law faces a choice: should it try to tailor the default rules to create a different default rule for each type of contracting party or should a generic rule suffice, thus forcing a percentage of contracting pairs to incur the costs either of negotiating an alternative rule or accepting the non-advantageous default rule?<sup>140</sup> The higher the market imperfections are, the more difficult it will be for lawmakers to craft an effective market mimicking rule. In the first place, the transaction costs incurred by the legal system in developing tailored, market-mimicking rules may be prohibitively costly (or impossible) and usually result in “vague standards...which entail higher litigation costs...and make it hard for the parties to predict what rule will be applied to their relationship.”<sup>141</sup> Moreover, tailored market mimicking rules have been criticized for giving parties incentive to shift the contracting costs from themselves onto the courts by simply avoiding negotiation, in other words, deliberately making contracts excessively incomplete.<sup>142</sup>

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<sup>137</sup> Crasswell (1999: 4).

<sup>138</sup> Viewing Ulpian’s rule as majoritarian strengthens Frier’s contention that Ulpian not only paid great attention to the wine trade but was actively influenced by contemporaneous commercial practice.

<sup>139</sup> Crasswell (1999: 5).

<sup>140</sup> *Ibid.* On the economics of tailored default rules, see Ayres and Gertner (1989: 91); Ayres (1993: 1-18).

<sup>141</sup> Crasswell (1999: 5).

<sup>142</sup> Cf. Ayres & Gertner (1989: 118): “...tailored rules can actually exacerbate the inefficiency of strategic incompleteness.”

In consequence, there were many factors limiting market-mimicking mechanisms in the Roman law of commerce generally and wine in particular. First, as we saw in Pliny's letter, the market for wine was highly variable, differed considerably by place and time, and had severe information asymmetries between contracting parties.<sup>143</sup> These market imperfections would have made it very difficult for the jurists to craft effective majoritarian rules. Moreover, the increased cost to the courts of crafting the rules and the possible encouragement of cost-shifting contractual incompleteness would have made this approach unattractive, uncommon, and inefficient.

Rather, we consistently see the jurists adopting an opposite technique, crafting rules that conform to penalty-default rules. The penalty-default term was introduced in a highly influential article by Ian Ayres and Robert Gertner in 1989. They attempted to show, both from a theoretical and positive perspective, that in situations of great information asymmetry, the law may be better off providing a rule which is not advantageous to the parties, thereby inducing the parties to contract around the rule with the expectation that, in so doing, the better informed party will be forced to reveal crucial information to the less informed party.<sup>144</sup>

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<sup>143</sup> The jurists acknowledge the variability of the wine market at *D.* 12.1.22 (Jul.), *D.* 13.3.4 (Gai.), and *D.* 19.1.3.3-4 (Pomp.).

<sup>144</sup> Ayres and Gertner (1989: 87-130). A different version is offered by Bebchuk & Shavell (1991: 284-312), which assumes that information between contracting parties is expensive. E. Posner (2005: 563-87) considers penalty-default rules to be a "theoretical curiosity" and that "there are no clear examples of penalty-default rules." Leaving aside the observation that Posner, and the Chicago approach to law and economics, is deeply invested in the role of judges as efficient shapers of law to further efficient economic transactions and therefore also fairly invested in judges' roles in creating majoritarian default rules, I note that, even in a keynote paper delivered by Eric Maskin (2005: 557-562) at the same Florida State symposium as Posner's, which disagreed with Ayres and Gertner's identification of *Hadley v. Baxendale* (1854) as an efficient penalty-default rule, the author concedes that comparing default rules largely depends on which "particular [transaction] costs are important" Though these authors both raise valid criticisms, we need not throw the baby out with the bathwater by abandoning the notion of penalty-default altogether.

Surprisingly, the jurists made explicit their general interest in tailoring their pronouncements to the benefit of wine commerce. Indeed, it is thought that the 1<sup>st</sup> century jurist Sabinus dedicated a whole book to problems related to wine.<sup>145</sup> In his commentary on that book, Ulpian agreed with Labeo against Trebatius' ruling that a wine buyer's sealing of a container constituted an effective *traditio* (transfer of possession), because one sealed the container to identify it and protect it from substitution, a reason clearly grounded not in legal dogma but in the traders' actual intentions.<sup>146</sup>

Likewise, Ulpian pointed out that although a wine vendor might have the legal right to pour out wine if the buyer had not taken possession of it by the appointed day, it was more praiseworthy if he did not.<sup>147</sup> Gaius drew a distinction between the wine's first seller and a "merchant who is accustomed to buy and sell wines."<sup>148</sup> Papirius quoted a rescript of Marcus Aurelius and Verus who were aware (and declined to regulate) the extent to which prices and measuring standards of wine differed from place to place.<sup>149</sup> There is preserved an enticing but disappointingly short description of a problem that could arise in assessing damages for lost profit if there was a delay in the *traditio* of wine when the sale and action were brought in a different place from where the wine was to be handed over.<sup>150</sup> All this would seem to justify Frier's contention that the jurists expended

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<sup>145</sup> Lenel and Sierl (1960: 1121).

<sup>146</sup> *D. 18. 6.1.2* (Ulp): *Si dolium signatum sit ab emptore, Trebatius ait traditum id videri: Labeo contra, quod et verum est: magis enim ne summutetur, signari solere, quam ut traditum videatur.*

<sup>147</sup> *D. 18.6.1.3* (Ulp): *Si tamen, cum posset effundere, non effudit, laudandus est potius.* On the vendor's right to pour out unclaimed wine and its importance in the broader context of the Roman wine trade, see Jakab (1999b: 71-111).

<sup>148</sup> *D. 18.6.2 pr.:* *si vero mercator est, qui emere vina et vendere solet...*

<sup>149</sup> *D. 18.1.71.*

<sup>150</sup> *D. 19.1.4* (Pomp.): *Quod si per emptorem mora fuisset, aestimari oportet pretium quod sit cum agatur, et quo loco minoris sit. Mora autem videtur esse, si nulla difficultas venditorem impedit, quo minus traderet, praesertim si omni tempore paratus fuit tradere. Item non oportet eius loci pretia spectari, in quo agatur, sed eius, ubi vina tradi oportet: nam quod a Brundisio vinum venit, etsi venditio alibi facta sit,*

considerable effort “...in adapting the scaffolds of Roman private law to the peculiar needs and usages of the wine trade.”<sup>151</sup>

The jurists’ default rules regarding tasting illustrate how those scaffolds were erected. Tasting the new wine is among the most important moments in a given wine’s career.<sup>152</sup> It is here that its quality is adjudged and its potential price becomes clear. Should the wine taste vinegary, moldy, or even give the impression that spoilage is likely, severe loss will accrue to the seller. The moment’s historical importance is perfectly captured in a beautiful tableau from the Flemish Book of Hours (late 15<sup>th</sup> century) in which a nobleman takes a goblet of wine drawn from a freshly pressed barrel for tasting in preparation for purchase.<sup>153</sup> Today, it has been estimated that the tasting judgments of certain professional tasters can result in a nearly three euro per bottle variation in price.<sup>154</sup>

Several excerpts contained under title 18.6 treated *degustatio* and its effects on the allocation of risk. Ulpian stated that, in the absence of a *degustatio*, the risk for the wine going bad was entirely the buyer’s.<sup>155</sup> The seller could, however, contractually obligate himself to bear the risk for any period of time. If the seller failed to specify a precise time period, then it should be until the tasting (*quod si non designavit tempus, eatenus periculum sustinere debet, quoad degustetur vinum*). There are two important default rules set by this: first, in the absence of contractual agreement otherwise, all risk for wine

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*Brundisi tradi oportet*. A similar problem of judging the value of wine when the prevailing prices at two different places and times is raised by Julian at *D. 12.1.22*.

<sup>151</sup> Frier (1980) 290.

<sup>152</sup> For a comparative examination of the legal rules of tasting from the Roman period to article 1587 of the Civil Code, see Olszak (1990: 361-87).

<sup>153</sup> Unwin (1991: 174) reproduces the image, though unfortunately in black and white.

<sup>154</sup> Hadj-Ali, Lecocq, and Visser (2007: 1-25) available online at [http://www.wine-economics.org/workingpapers/AAWE\\_WP01.pdf](http://www.wine-economics.org/workingpapers/AAWE_WP01.pdf).

<sup>155</sup> *D. 18.6.1. pr.* This *principium* is almost certainly not Ulpian’s original but a highly compressed version of the compilers, and Beseler (1928) may have been right to bracket everything from *quemadmodum* to the end. It seems fairly evident, however, that the content is classical in judgment if not in expression and numerous other critics have bracketed off smaller portions of the passage (see *l. ltp.* 1969: 328-29).

spoilage after the sale is complete is the buyer's; second, the parties may contract around this rule, in general, by including a *degustatio* in the future unless the seller has agreed to bear the risk for a longer time.<sup>156</sup>

The effects of tasting on risk allocation are further expanded in *D. 18.6.4.1 (Ulp.)*, concerning an unspecified date for tasting. He says:

*Quare si dies degustationi adiectus non erit, quandoque degustare emptor poterit et quoad degustaverit, periculum acoris et mucoris ad venditorem pertinebit: dies enim degustationi praestitutus meliorem condicionem emptoris facit.*<sup>157</sup>

Therefore, if the day for tasting has not been stated, when the buyer will be able to taste and until he has tasted, the danger for acidifying and mold is the vendor's, for a set-day for tasting makes the buyer's condition better.

As it stands, it is difficult to make sense of this. In the first place, the text would imply that in the absence of a defined date for tasting, the seller must bear the risk indefinitely. De Zulueta explained the seeming implausibility of the vendor bearing indefinitely long risk by suggesting that the seller could “probably... put him in the wrong by giving him notice to taste within a reasonable time.”<sup>158</sup> If this is right, then the final sentence, which claims that a defined date is to the buyer's advantage, seems fatuous, so de Zulueta follows Cujas and Mommsen's erroneous emendation of *emptoris* (the buyer's) to *eius* (his, i.e. the seller).<sup>159</sup> Yaron in contrast argued that *quandoque degustare emptor poterit* meant “when the buyer is in a position to taste;” that is, *quandoque* is nearly “as soon

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<sup>156</sup> The text states that the seller will bear the risk until a specified time if he does not adopt the default time of the tasting. This would obviously be germane in a warranty situation, when the seller guarantees the wine's quality past its approval at the tasting. It would, of course, be legally possible but practically insane for the parties to agree to a date prior to the tasting since that would remove the entire point of the *degustatio*.

<sup>157</sup> Haymann (1921: 110) believed *et...pertinebit* to be an interpolation. I agree that the repetition here that the risk for spoilage is the seller's until the tasting does not seem very relevant.

<sup>158</sup> De Zulueta (1945: 59).

<sup>159</sup> Erroneous because the Ambrosian manuscript of the *Basilica* had not yet been discovered when this suggestion was made, but the Greek text confirms that *emptor* is correct (Yaron 1959: 73).

as.”<sup>160</sup> That left the seller the option of forcing an immediate tasting if no specific, later date was contractually specified.

In my view, the correct interpretation is a combination of de Zulueta’s and Yaron’s. The former’s contention that the seller could issue a notice obliging the purchaser to taste within a certain amount of time seems plausible based on a comparison with *D. 18.6.4.2 (Ulp.)* on the non-removal of purchased goods. Yaron’s assertion that a defined day should be preferred because it precluded the buyer from being forced to taste earlier than he wished is also plausible. Yaron’s belief, however, that the seller could force an immediate tasting (or nearly so) is an example of allowing logic to trump common sense. If a buyer were in a position where he could taste immediately (that is, if the sale took place at or near the wine) and if the buyer did not want to taste immediately, he would never fail to contract for a *dies adiectus*. Rather, the unspecified tasting would likely result when the point of sale was distinct from the wine’s location.<sup>161</sup>

This interpretation is made more plausible if we bear in mind that this discussion of an indefinite tasting comes in a title concerning wine sold *per aversionem* (at one price in bulk), a form of sale which Jakab identified, in the case of wine as “meistens in großem Umfang, auf den Großmärkten, meistens in Form einer Auktion gehandelt...die verkaufte Ware bleibt noch für längere Zeit, meistens für Monate, beim Verkäufer gelagert.”<sup>162</sup> In other words, wine sold in bulk could be sold at a distance from its storage location and could lay there for some time thereafter. The buyer might prefer in those cases not to specify a date for tasting. However, once the buyer was in a position to taste

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<sup>160</sup> Yaron (1959: 73).

<sup>161</sup> Cf. *D. 19.1.3.4 (Pomp.)*.

<sup>162</sup> Jakab (2005: 104): “...it was by and large traded in large markets, generally via auction...the sold ware stayed stored for some time, generally for months with the vendor.”



the wine, the vendor probably could oblige him to do so as soon as possible. There are two points to take away from this overview: first, tasting was a crucial component in the allocation of risk between the two parties; second, the contractual default rule in the sale of wine was no tasting.

This is actually somewhat counterintuitive: clearly the buyer would want to taste the wine, and it is also in the seller's interest since, *ceteris paribus*, he can charge more money for good wine if it is tasted than un-tasted.<sup>163</sup> True, as we saw above, wine was often sold prior to production, but, even in those cases, there was often a tasting at which the buyer could refuse the wine. Ulpian observed that "it is difficult to believe that anyone would contract for a sale without a tasting."<sup>164</sup> Suppose the default rule in the sale of wine is the majoritarian rule that wine has been tasted unless it has been explicitly stated otherwise. Suppose further that the seller knows that this is the default rule but the buyer does not. And allow that a buyer will generally pay a higher price for wine he has tasted than for un-tasted wine. In certain cases, the seller will have incentive to withhold that information because it allows him to engage in rent-seeking activity, profiting by the difference in price between what he could charge with a tasting and without.

We can capture this relationship with a buyer-seller game played under imperfect information.<sup>165</sup> Imagine that there can be two types of vendors (V), a competent vendor (VF) and an incompetent vendor (VD). These types are binary in that there is no in-between type. In any given game, both types can choose to play fairly (i.e., sell their product fairly) or act opportunistically (cheat). There is a probability,  $x$ , that any given

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<sup>163</sup> As mentioned above, Cato, a wine seller, recommended a tasting within three days.

<sup>164</sup> *D. 18.6.4.1: difficile autem est, ut quisquam sic emat, ut ne degustet.*

<sup>165</sup> See Pénard (2008: 166-9) for a more detailed description of a principal-agent game played under imperfect information. For a much more detailed (and highly mathematical) analysis of incentive theory and principal-agent models; Laffont and Martimort (2002).

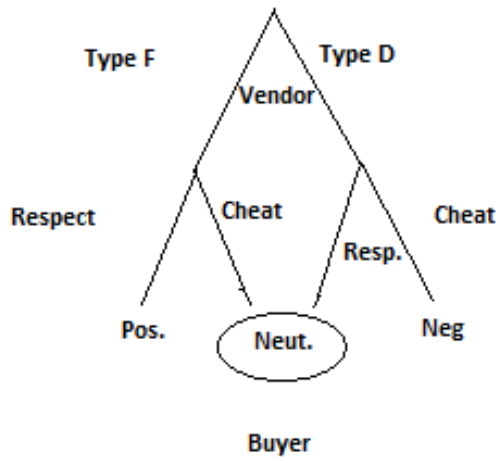
vendor is F (competent) and  $1-x$  that he is type D (incompetent). The buyer (B) of course prefers to deal with type F but he can only infer what type of player he is dealing with by signals given to him by the vendor. The possible signals are shown in the game-tree below.<sup>166</sup>

In any given transaction, the buyer can receive three possible signals from the vendor. Either B receives a negative signal, in which case he is perfectly informed that the vendor is type D and is opportunistically taking advantage of him or B receives a positive signal, in which case he is perfectly informed that the vendor is fair. The difficulty arises with a neutral signal because it is compatible both with a competent vendor acting opportunistically or an incompetent vendor acting fairly. When faced with a neutral signal, the buyer has a choice to make: he can punish the vendor, taking the chance that he is unfairly punishing an honest (but incompetent) vendor, or he can enter into a contract, and take risk that he will come out the worst in a deal with a competent (but cheating) vendor.

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<sup>166</sup> Pénard (2008: 167).

**Vendor-Buyer Game under Imperfect Information**



**Figure 3.1: Vendor-Buyer Game**

This game has two perfect Bayesian equilibria dictated by the buyer’s initial beliefs about the *a priori* value of  $x$ .<sup>167</sup> If the buyer believes  $x$  is low, he will be willing to contract with a vendor displaying a neutral signal; a vendor will seek to preserve the buyer’s initial beliefs because this allows a vendor of type F to behave opportunistically without being punished. In this case, both opportunistic and fair vendors will elect to preserve the buyer’s initial beliefs, that is, to display a neutral signal. If the buyer believes  $x$  is high, he will punish a neutral signal—“separating equilibria thus reveals the private information...to the competitive market.”<sup>168</sup> A vendor of type F who is not behaving opportunistically will avoid displaying a neutral signal. A fair vendor of type D will have incentive to reveal private information to the buyer to avoid being unfairly punished. In

<sup>167</sup> These are perfect Bayesian equilibria: The two types are generally called “pooling” and “separating” equilibria (Laffont & Mortimort 2002: 359).

<sup>168</sup> Laffont & Mortimort (2002: 359).

the aggregate, economic efficiency is enhanced by a rule encouraging buyers to give a non-neutral signal.

## Conclusion

*Degustatio* served as such a signaling mechanism; however, only a default rule assuming it had *not* been stipulated encouraged a separating equilibrium. Under a market-mimicking default rule, the vendor's not stipulating for a tasting would be a neutral signal consistent either with a dishonest, competent vendor opportunistically seeking to capture information-rents or with an honest but incompetent vendor, poorly informed about the law. With a market mimicking rule, legal institutions would not improve the level of information on the marketplace.<sup>169</sup> The situation changes, however, under a no-tasting default rule. A competent vendor not behaving opportunistically will want a tasting because he can make more money for his product. In this case, a buyer will interpret leaving the default rule in place (no wine-tasting provision) as a signal of opportunistic behavior or as an genuine signal of poor wine quality.

The codification of *degustatio* as a penalty-default rule, however, introduced a new element of moral hazard by giving an incentive to the buyer to behave opportunistically by penalizing good wine. He could, in other words, engage in rent-seeking activities on the difference in value between tasting-approved and unapproved wine. The jurists were aware of this problem: Pomponius raised this as a possible issue and followed Proculus' decision, which Yaron considered likely to have been derived from an actual case:<sup>170</sup>

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<sup>169</sup> A classic example of the effects of imperfect information on buyers' selection is found in Akerlof (1970: 488-500) on adverse selection in the used-car industry.

<sup>170</sup> D. 18.6.6. Yaron (1959: 74): "Probably this was an actual case decided by Proculus, and we cannot know what was the factual situation underlying it." I think we can.

*Si vina emerim exceptis acidis et mucidis et mihi expediat acida quoque accipere, Proculus ait, quamvis id emptoris causa exceptum sit, tamen acida et mucida non venisse: nam quae invitus emptor accipere non cogereetur, iniquum esse non permitti venditori vel alii ea vendere.*

If I have bought wines with the vinegars and musts excepted and it is expedient for me also to accept the vinegars, Proculus says that, although the exception was made for the buyer's sake, nevertheless the vinegars and musts are not sold, for it is unfair that the seller not be permitted to sell those things, which the buyer is not compelled unwillingly to accept, to another.

Yaron found this case peculiar since it reversed the usual problem: here the seller wanted to void the sale because wine was adjudged as vinegar.<sup>171</sup> Frier noted this case only in passing because it showed the jurist's recognition that "wine and vinegar are... alternative marketable substances" derived from a common origin.<sup>172</sup> In fact, the case is considerably more interesting: in a world where at least some jurists considered the sale of vinegar sold as wine as valid, there was incentive for the buyer to engage opportunistically at the *degustatio* by rendering negative judgment against good wine and bringing a subsequent action on the sale for a refund of the difference between the payment price and what he would have paid had he known it was vinegar.<sup>173</sup> Proculus' case solved that problem of moral hazard by removing the buyer's incentive to lie. Proculus' rule forbade the buyers from keeping products on which he had rendered negative judgment. The jurists thus ensured that the buyer could not have his wine and drink it too.

We can see, therefore, the jurists' setting of default rules as an attempt to induce the better informed party to reveal information *ex ante*—signaling—to the other party to reduce transaction costs derived from uncertainty and the ensuing *ex post* renegotiation or

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<sup>171</sup> *Ibid.*

<sup>172</sup> Frier (1983: 277).

<sup>173</sup> Cf. *D. 19.1.13 pr (Ulp.): ...qui pecus morbosum aut tignum vitiosum vendidit, si quidem ignorans fecit, id tantum ex empto actione praestaturum, quanto minoris essem empturus si id ita esse scissem.* Cf. Zimmermann (1996: 320).

litigation. This method of creating default rules belongs to a class of penalty default rules and promoted economically efficient sales of wine by reducing contractual transaction costs. But the jurists were also minimalists: they did not deal with the extremely puzzling warranties on wine. This should be explained by remembering the warranties, unlike tasting, can often reach first-best outcomes without legal intervention.

In conclusion, Rome's body of organizational law was not a first-best solution to economically efficient commerce. It had no system of entity shielding, so there were significant constraints on the number of owners, pooled capital, and degree of integration that wine firms exhibited. Rome's supply of wine depended to a remarkable degree on bilateral relations between unintegrated sectors of the industry: production, transportation, and distribution. That this system worked as well as it did owed something to the jurists who, like Teddy Roosevelt, tried to do what they could with what they had where they were. Those attempts are particularly visible in their detailed consideration of Rome's wine commerce and sensible solutions to those problems least solvable through private bargaining.

## Chapter IV Wine Production

### “Quality, Quality, Quality: What is Quality to Me?”

In the previous chapter, I argued that Roman wine commerce, though driven by private enterprise and lacking active state intervention, depended a good deal on the city of Rome’s great wealth, embodied first and foremost in the imperial court and senatorial elites. In this chapter, I will show that wine production was also disproportionately shaped by elites who had little active interest in the results of their actions on the general populace. Not only does this chapter reveal the importance of capital in the sphere of production but demonstrates that Roman wine production fundamentally differed from its early-modern counterparts.<sup>1</sup> Moreover, this argument helps explain why there was never sufficient pressure placed on the Roman legal system to develop a body of organization law more conducive to efficient commerce: the elites who had the most control over the legal system had relatively little at stake in changing the institutions.

The chapter consists of five parts. It is fairly discursive so a brief summary here will be helpful. The first section explores the assertion that Roman viticulture followed a path comparable to that of late medieval/early modern western European viticulture, in particular, in France. Next I argue that this view, while initially plausible, is ultimately wrong. In the third part, I describe three differences between Roman and early-modern commerce causing these differences. I then show how a basic economic model of

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<sup>1</sup> There is a great deal of bibliography on the physical process of producing wine but very little on the economic motivation and structure of production. On the former topic, however, see the examples given in the collection *Archéologie de la vigne et du vin* (1990), Boissinot (2004: 190-201), Brun (2004: 5-59).

“international” trade can help isolate explanatory variables for understanding the contours of Roman wine commerce which are more relevant than those offered in previous Roman historical scholarship. In the final section, I show how using that information along with a fundamental model of New Economic Geography can help us make sense of the overall dynamics of the Roman wine trade.

We can begin with the thesis of Nicholas Purcell, the only English language author who has taken up the question of how Roman wine production compared with its medieval/early-modern operation.<sup>2</sup> He argued that the development and practice of viticulture on peninsular Italy should be understood as an evolution of growing wines of quality towards quantity.<sup>3</sup> He adopted this distinction between growing grapes for quality wine versus those for wine in quantity from the seminal work of the French historical geographer Roger Dion, whose *Histoire de la vigne et du vin en France* made that distinction a decisive variable in the development of French viticulture.<sup>4</sup> Purcell’s thesis therefore sees Roman viticulture as structurally similar to western European medieval and early-modern periods.

Purcell explicitly claimed that the development of French wine, as traced by Dion, could be instructive for scholars of the Roman wine trade. He drew attention to “some of the similarities between the French and Roman experience,” which might generate a “not

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<sup>2</sup> Purcell (1985) 1-19. I pass over the interpretations of many Italian scholars, particularly Carandini and his followers. Their interpretation of Italian viticulture is driven by a Marxist narrative of the growth, crisis, and decline of the slave mode of production, a model which is difficult to justify empirically and problematic theoretically. For the example *par excellence* of Marxist analysis of Roman production see Giardina and Schiavone (1981). See also Carandini and Rosella Filippi (1985). For a critique of this theory applied to Roman history, see Rathbone (1983: 160-8) for approaches to ancient slavery. More generally on Roman slavery and persuasive argument against seeing ancient slavery as fundamentally a mode of economic production, see Finley and Shaw (1998).

<sup>3</sup> Purcell (1985).

<sup>4</sup> Dion (1959).



unrewarding account.”<sup>5</sup> However, he never elucidated what these similarities were but relied on untested assertions to equate the two wine-growing regimes—an understandable method for a short article but not rigorous enough to allow us to adopt his contentions without further examination.

For example, Purcell suggested that Roman vintners used a system similar to *complant*, a medieval system of vineyard tenure designed to convert wasteland into viticulture or to make capital improvements and with a specific profit-sharing scheme.<sup>6</sup> The evidence for this is a story in an epistle by Seneca, who wrote that, while visiting Scipio’s antiquated villa at Liternum, he saw the land’s current occupant (*agri possessor*) working on a *vetus arbustum* and replanting a *vitem annosam*.<sup>7</sup> In Purcell, this single vine has become a “vineyard in Campania which had been allowed to become exhausted” and claimed that the solution—the occupant restoring the vines—resembles *complant*. But there is no evidence that this was wasteland (Scipio’s villa was apparently dilapidated but that is not germane); the land was not being converted to viticulture (one vine was being replanted); nor can we say anything at all about the contractual system under which this gentleman was *possessor agri*. Purcell’s use of the term *complant* gives the impression of having uncovered a significant structural similarity in the operation of vineyards, one unjustified by the evidence.

The claim that, “the multiplication of fine wines led to a more complex range of regional *appellations*...by the mid-1<sup>st</sup> century B.C.” is similarly problematic.<sup>8</sup>

*Appellation*, a word betokening the French regulatory system of *appellation d’origine*

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<sup>5</sup> Purcell (1985: 2).

<sup>6</sup> Berman (1995: 246). See also Borrero-Fernandez (1989: 135-40) on systems of agricultural exploitation.

<sup>7</sup> *Ep.* 86.14-20.

<sup>8</sup> Purcell (1985: 18).

*controlée*, implicitly equates the regional variation of Italian wines with the regional variation of French wines and, by extension, with the high level of quality of the best varieties. But the development of France's *appellation d'origine controlée*, Italy's *denominazione di origine controllata*, and the USA's American Viticultural Areas in the 19<sup>th</sup> and 20<sup>th</sup> centuries did not result from "a more complex range" of varieties. Rather, it was created as a method of protecting producers of quality wine who were encountering growing competition from growers elsewhere imitating their product.<sup>9</sup> These two preceding examples do not mean that Purcell's thesis is unjustified but encourage us to investigate it more rigorously before accepting it.

Purcell's argument runs as follows: Roman elite attitudes towards vines and wine were ambiguous: growing them was labor and capital intensive. Therefore, there was no senatorial involvement on any large scale prior to the imperial period.<sup>10</sup> He then claims that a reasonably important commerce in wine already existed in Campania by the 2<sup>nd</sup> Punic War (218-202 BCE), when gradually spread north. He claims that this production aimed at "consistent, relatively high quality" wine.<sup>11</sup> The civil wars, combined with elites' "depressing lack of concern" for good agricultural practice, proved a lethal combination and "ensured that Italian viticulture could not cope with rising production."<sup>12</sup> These factors then led to the spread of vineyards of low-quality wine aimed at mass consumption rather than high-quality wine for maritime export.<sup>13</sup>

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<sup>9</sup> On the development of the French quality laws (on which other countries modeled theirs) see Vialard (2001: 119-32).

<sup>10</sup> Purcell (1985: 1-6).

<sup>11</sup> *Ibid.* 7.

<sup>12</sup> *Ibid.* 9.

<sup>13</sup> *Ibid.* 17.

We can begin by clarifying the distinction between quality and quantity wine. This distinction is usually considered the fundamental production choice because the growing, pressing, aging, storing, and bottling practices differ. Taken wholly, producing quality wine generally demands greater financial resources than cheaper, more voluminous production.<sup>14</sup> The most colorful description of the vintner's choice comes not from a wine-grower or a historian but from Balzac's *Lost Illusions*, in a conversation between one of the two main characters, David Sechard, and his father, the "Old Bear." David has come to ask his stingy father for money, but his father refuses to speak of anything but the progress of his vines and the prospects for the upcoming vintage. This is how he expresses his philosophy of viticulture:

*'They all tell me that I ought not to put on so much manure,' replied his father. 'The gentry, that is M. le Marquis, M. le Comte, and Monsieur What-do-you-call-'em, say that I am letting down the quality of the wine. What is the good of book-learning except to muddle your wits? Just you listen: these gentlemen get seven, or sometimes eight puncheons of wine to the acre, and they sell them for sixty francs a piece, that means four hundred francs per acre at most in a good year. Now I make twenty puncheons, and get thirty francs a piece for them—that is six hundred francs! And where are they, the fools? Quality, quality, what is quality to me? They can keep their quality for themselves, these Lord Marquises. Quality means hard cash for me, that is what it means.'*<sup>15</sup>

This description is interesting not only because it emphasizes the greed of the elder Sechard but also because it shows the extent to which growing wines of quality was an agricultural practice characteristic of nobles: people of high quality grew quality wine, people of lower status grew wine for quantity. To test Purcell's thesis then we must also ask: Were Roman producers' attitudes more akin to the attitude of a Sechard or a Monsieur le Marquise?

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<sup>14</sup> Unwin (1991: 268-9).

<sup>15</sup> Balzac (2006: 180-1).

We can begin by noting that the thesis exhibits fuzzy internal logic—that these pre-Augustan elite growers both produced wines of quality and displayed a “depressing lack of concern” for careful agricultural practice does not seem particularly consistent.<sup>16</sup> Leaving that aside, we can consider the two fundamental questions posed by Purcell’s narrative: First, did the conditions leading to the quantity-quality schism in French viticulture (and ultimately to Balzac’s description) sufficiently exist in Roman Italy such that a similar split occurred; second, can the growth of provincial viticulture in the 1<sup>st</sup> century be explained by Italian vineyards’ inability to cope with rising demand?

As a point of comparison, one notes that it was not until the beginning of the 17<sup>th</sup> century that *grands crus*—first growth wines of careful production and of the highest qualities— appeared in France.<sup>17</sup> Prior to that “*le vignoble francais a connu une production relativement indifférenciée, et le plus gran nombre s’est satisfait du vin local ou regional.*”<sup>18</sup> The earliest mention of a *cru* identified by the name of its proprietor comes from *Les Graves* in Bordeaux, mentioned in the journal of Samuel Pepys, who in 1663 wrote, “...And here drank a sort of French wine called Ho Bryan that hath a good and most particular taste that I never met with.”<sup>19</sup> “Ho Bryan” is Pepys’ charming phonetic rendition of wine from the *Château Haut-Brion*, the domain of Arnaud de Pontac who, as president of the parliament of Bordeaux, was a foundational figure in establishing the first-growth wines, comprising Château Lafite-Rothschild, Château Margaux, Château Latour, Château Haut-Brion, and Château Mouton-Rothschild.<sup>20</sup>

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<sup>16</sup> Purcell (1985: 7, 9).

<sup>17</sup> Pijassou (1980).

<sup>18</sup> Lachiver (1989: 221).

<sup>19</sup> Pepys (1946: 601).

<sup>20</sup> Lachiver (1989: 222).

Thus, it was not until the 17<sup>th</sup> century that the quality-quantity schism had sufficiently developed in Western Europe for it to appear in our sources. This late appearance should make us cautious about automatically believing that Roman production exhibited it. Of course, undifferentiated production does not mean that wine of the same quality was produced everywhere. Producers differentiated grape varieties, methods of growing and propagating them, and techniques of vinification. But, as we shall see, the differences in wines' qualities depended on the quality of the grapes, the nature of the land on which they were grown, and on the care of the viticulturist. During the Roman period, there was little effort to manipulate any of those variables in a way that would produce wine of higher than natural quality at the expense of the potential volume of lower quality wine.

Among the agronomists, Columella came the closest to making a modern distinction between quality and quantity in his advice on choosing a vine for the vineyard, suggesting that, "Such a vine, even of middling productivity, should be selected only if a place is held in which taste is esteemed and expensive; for if it is common or cheap it is better to sow one which is extremely productive so that return is increased by the quantity of the yield" (*Talis nobis eligatur vel mediocriter fecunda, si modo is locus habetur, in quo gustus nobilis pretiosusque fluit; nam si sordidus aut vilis est, feracissimam quamque serere conducit, ut multiplicatione frugum reditus augeatur*).<sup>21</sup> Even here, Columella envisaged only a limited number of situations where choosing a low-yield vine made sense. But his distinctions were entirely based on exogenous

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<sup>21</sup> *Rust.* lii. 2.5.

variables, for example, on geography and soil type rather than, for example, on proximity to an urban market, transportation conduits, or local tastes.<sup>22</sup>

Likewise, grape varieties were considered fecund or barren by nature. There was no recognition that the same variety could produce wine of either high or low quality or that “Falernian” could be grown anywhere but on Mt. Falernus. The task of the Roman vintner was to select the proper vine for the proper soil in the proper climate. Human manipulation of these variables was hardly considered. We can contrast this attitude to those of the 19<sup>th</sup> century Californians, who, in 1861, sent Agoston Haraszthy to report on “the ways and means best adapted to the...culture of the grape-vine in California” by traveling through and observing the workings of Europe’s vineyards.<sup>23</sup> No Roman agronomist would have duplicated Haraszthy’s acquisition of 100,000 European vines of 1400 varieties, purchased on the assumption that “California can produce as noble and generous a wine as any in Europe.”<sup>24</sup> Even Columella, one of the few Romans to distinguish sharply between high and low quality viticulture believed that the distinction relied mostly on soil and variety. He made an exception when he advocated planting the Aminean vine fairly ubiquitously and cautiously suggested that it could be made to produce fruitfully in many places but conceded that his confidence in the vine’s ability to produce everywhere was contrary to nearly everyone else’s belief (*cui nostrae sententiae scio paene omnium agricolarum diversam esse opinionem*).<sup>25</sup>

The distribution of wine-presses in and around Pompeii also suggests that investment was not a function of the quality of wine grown but that any wine-maker of

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<sup>22</sup> *Rust.* li. 1.5.

<sup>23</sup> Haraszthy (1862).

<sup>24</sup> *Ibid.* xv-xx.

<sup>25</sup> *Rust.* 3.7.2.

sufficient means would choose to make as much wine as possible. The basic purpose of a press is to dramatically increase the amount of must obtainable from the grapes.<sup>26</sup> Around Pompeii, wine processing installations have been found with presses and without, within the city and outside of it.<sup>27</sup> Rossiter claimed that “a farmer would have probably invested in a press only if he was making wine on a large commercial scale.”<sup>28</sup> But presses were also used for small vineyards, like that of *Villa Regina*, too and were even found in the city itself, like the vineyard in Regio II Insula 5, occupying only about .65 hectares.<sup>29</sup> Given this variation, it is difficult to believe that the use of presses depended on the quality of the wine produced rather than whether the land-owner could afford one.<sup>30</sup> Once again, growers preferred to produce as much as possible on whatever size parcel of land they had regardless of wine-type.

Thus far the argument has advanced by using literary and archaeological sources to argue that there is very little evidence that Roman wine-growers ever aimed at manipulating their production to improve the innate quality of their wine at the expense of quantity. On the contrary, they seemed to prefer to grow as much wine as possible of whatever quality the grapes and land naturally allowed. We can also approach the problem in two other ways: from peninsular Italy’s productive capacity and from the economics of the choice between quality-quantity wine growing.

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<sup>26</sup> On the role of the press in winemaking see Hornsey (2007: 170-4).

<sup>27</sup> For a list see Rossiter (1981: 348-9). For olive and wine presses in Rome’s *suburbium*, see Corrente (1985: 112-18).

<sup>28</sup> Rossiter (1981: 348).

<sup>29</sup> Jashemsky (1970: 62-67); Brun (2004: 22).

<sup>30</sup> It is also likely that sharing occurred—another wine producing intramural site is found in Pompeii in Regio I Insula 20, and given the smallness of these urban parcels, some economies of scale could be achieved by sharing a press. Similarly, medieval peasants would have used their lord’s press for a fraction of the wine produced. See Dion (1959: 192); Unwin (1991: 171).

Recall Purcell's claim that, as the number of wine drinkers grew, Italian production of quality wine was no longer able to meet consumer demand, and producers therefore shifted to making wines in quantity.<sup>31</sup> In other words, the productive capacity of Italian land becomes a key variable in driving this development. As a point of comparison, however, one notes that in 1828 (the first year of good statistics), Italian vineyards took up 428,000 hectares, and we can use this number as a baseline for Roman Italy's potential cultivatable area. If the average hectare produced 3380 L,<sup>32</sup> then Italy's annual output would be about 1.5 billion liters of wine. If we accept the plausible estimate of Italy's population at the time of Augustus' census in 28 B.C.E. as 5-6 million people, then we arrive at a potential per-capita wine production of about .7 L, more than sufficient to meet our estimate of average per-capita wine consumption given in chapter one.<sup>33</sup> We have no idea, of course, how much land had vines on it at the time of Augustus, but these numbers show that there was potential, arable land that could have been brought into wine production if demand rose high enough without a drastic shift in the type of wine produced. Moreover, my average value for volume produced was based on quality-production values. Production of lower quality wine would considerably lower the estimated land necessary for supplying the population.

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<sup>31</sup> Purcell (1985: 16).

<sup>32</sup> A recent estimate, de Sena (2005 : 6-7) estimated Roman Italy's production per hectare at 3310 L, based on Cato's figures in combination with estimations of production at Boscoreale and Settefinestre. My estimation is based on a somewhat arbitrary estimation of average production of 2.5 tons of grapes per acre, which is on the low end of contemporary average production but towards the high end of the 50 hL/hectare limit set by the AOC. That production converts to 3380 L/ha. The congruence of these two estimates should reassure us that these estimates' order of magnitude is in the right ballpark. I should stress that I do not dismiss the much higher productive capacities attested by Varro and Columella, but doubt that these were achieved on any but the best land and certainly not by the small growers who must have produced a sizeable percentage of Italy's total wine.

<sup>33</sup> For a review of the relevant arguments on how to interpret the Augustan census figures, see Morley (2001: 50-62); Scheidel (2004: 1-26).



That observation suggests that if such a quality to quantity evolution occurred in Italy, it was not constrained by land but was driven by another variable(s). We can approach the problem from a more formal, economic perspective to try to identify these variables. It should be intuitively obvious that quality and quantity are, in some sense, flip sides of the same coin, if that “coin” is revenue. We flesh out this quantity-quality dichotomy by examining the relationship between two grapes of different values in California. In 2009, Cabernet Sauvignon grapes were sold in California for an average of \$4780/ton whereas Chardonnay grapes sold for an average of \$2400/ton, a ratio of 2:1; yet, the more expensive Cabernet made up 52% of California’s vineyards while the cheaper Chardonnay took up only 13%.<sup>34</sup> We can calculate the cost to produce a bottle of wine, with these figures at about \$5.37/bottle-Chardonnay and \$11.57/bottle-Cabernet.<sup>35</sup>

Comparing the bottles’ production costs with their average retail costs reveals that a bottle of Cabernet sells for about 1.5 times the price of a bottle of Chardonnay; subtracting the cost of production from the price for each bottle of wine reveals that Cabernet has a profit margin of 1.4:1 over Chardonnay despite the fact that its grapes are considerably more expensive. In this case, quality pays. We can also posit some predictions about Chardonnay growers in this environment. For example, we might expect them to be less financially well-endowed and unable to afford the higher initial outlay (more expensive grapes) or the longer duration of cask-aging (two years instead of one). If wine growing land is equally well suited for both grapes, we would expect Chardonnay growers, *ceteris paribus*, to occupy more marginal land.

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<sup>34</sup> Statistics are from California’s “Agricultural Crop Report” (2008: 10-13).

<sup>35</sup> See <http://www.bergmanvineyards.com/glswn.html> for an example of how to calculate the cost of producing a bottle of wine.

Let us generalize that example into a model for Roman wine growing under the following assumptions and use it to test Purcell's narrative. Imagine there are two grape types,  $G_1$  and  $G_2$  from which wine can be produced. We can write two Cobb-Douglas production functions for these grapes.  $Y_{G1,G2} = AL^\alpha N^\beta$ , where, as usual,  $Y$  is the total production,  $A$  is a coefficient representing total factor productivity,  $L$  is land,  $N$  is labor, and  $\alpha, \beta$  are output elasticities. Allow that, when all inputs are identical,  $Y_{G2} > Y_{G1}$  due to endogenous characteristics of the grapes. Let us make the further simplifying assumptions that labor and land are undifferentiated. It should be immediately clear that under these conditions  $Y_{G2} = Y_{G1}$  simply means that the same amount of labor can be applied to the same amount of land to result in the same quantity of wine produced, regardless of the initial grape chosen.

Of course it is highly unrealistic to assume that land suitable for grapes is undifferentiated: some land is simply unsuitable because of damp, cold, or lack of sunlight while some land is particularly well suited for grapes.<sup>36</sup> Let us add therefore that land must be of a minimum rent (i.e., value)  $r^*$ ,  $r < r^*$ ,  $Y = 0$ , sufficient for growing either grape varietal and that  $r^*_{g1} > r^*_{g2}$ , that is,  $G_1$  needs land of higher value than  $G_2$ . Further, let us call  $p$  the price at which output is sold and that  $p_{g1} > p_{g2}$ . At this point, we can turn to a profit maximizing equation which give us an output  $Y$  in terms of output price for ( $G_1$ ) and the two input prices,  $w$  and  $r$ :  $Y = A[(pA\alpha/w)^{\alpha/\alpha-1} + (pA\beta/r)^{\beta/\beta-1}]$ .<sup>37</sup> This equation crystallizes the relationships between variables nicely, and we can use it to examine the

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<sup>36</sup> See Hornsey (2007)

<sup>37</sup> This formula is derived from a rearrangement of the constrained optimization (Lagrangean) of the profit-maximizing function  $\Pi = pQ - wN - rL + \lambda[Q - A(N^\alpha + L^\beta)]$ ; Jones (forthcoming).

following question: what variable(s) would have to change for the quantity produced,  $Y$ , to increase at a given output price,  $p$ ?

Remember that we are assuming that labor is undifferentiated and that wages are basically a constant (all the more realistic an assumption if we believe that labor was dependent on slavery, though, even if not, it is highly unlikely that wages offered were much higher than the minimum anyway), so we can ignore the left side of the equation within the brackets. This leaves four variables that will raise total output: 1)  $A$ , the coefficient of technical change or, rather, the rate at which technological change alters the capacity to produce more output, could increase; 2)  $r$  could decrease; 3)  $\beta$  could increase; 4) Producers could shift from  $G_1$  to  $G_2$ . Let us ignore possibilities one and three on the grounds of *a priori* implausibility and turn our attention rather to two and four.<sup>38</sup>

On consideration, we can observe that two, the value of the land, and four, the potential value of the grapes, are functional equivalents. To see why, consider: a land's rent is a function of the land's worth. There is a range of  $r \geq r^*_{g1}$  for which it is possible to grow either varietal of grape. If one is a grower of  $G_1$  and the value of one's land falls beneath  $r^*_{g1}$  but remains higher than  $r^*$ , he will be compelled to switch to  $G_2$ . Likewise, if more marginal lands turn to viticulture, we would not be surprised that they produce  $G_2$  grapes, either because the lands were not of sufficient quality to produce  $G_1$  or because enough land could be bought to produce a high enough volume of  $G_2$  wine so as

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<sup>38</sup> While there may have been some technological improvement during the relevant time periods, in particular with the spread and improvement of wine presses, there is no reason to think that the rate of these changes was such as to alter dramatically the quantity of wine produced holding all other factors constant. On the evolution of presses, see White (1975: 230-32); Humphrey, Oleson, and Sherwood (1998: 154-5). On the possible ramifications of the changing press-technology as it appears in the jurists, see Frier (1979: 204-28). As for  $\beta$ , since Purcell's model holds that the initial phase of Roman viticulture was one of quality production, this in turn implies that the most productive lands were already under cultivation and any expansion was likely to be onto inferior lands, which would tend to drive  $\beta$  down.

to exceed the smaller area able to be planted with G1 (this is analogous to the California example above). Whether this development occurred in Roman Italy is an empirical question, though difficult to test, and I know of no evidence suggesting that such a change occurred. The second possibility is that landowners capable of growing G2 willingly switched to G1 for some reason. The problem here is that it essentially leaves rent on the table by growing grapes of less than the land's potential sustainable value: Over time, we would expect for these holders to sell their land to buyers willing to pay its actual value and then buy more marginal land on which the same grapes could be grown.

The example of Remmius Palaemon, who bought marginal land for producing high quantities of wine, shows that the model has predictive power, and nicely ties together the preceding economic and literary expositions. Palaemon was a famous grammarian of the mid Julio-Claudian period. He bought a vineyard in Rome's *suburbia* and hired a certain Acilius Sthenelus to oversee and improve the property.<sup>39</sup> He improved it so much that ten years later, Seneca bought the property for quadruple Palaemon's purchase price. In other words, Palaemon took advantage of differentiated, initial land values to grow grapes at a higher volume than the land previously sustained.

Yet Palaemon's subsequent behavior and Roman attitudes towards his actions reveal that Roman growers must have operated on a radically different set of growing assumptions than our Chardonnay growers above. True, he improved the land's yield, but no mention is made of the wine's quality either before or after his improvements. Rather than use that improved yield to purchase more land or vines or to develop an enterprise in wine, Palaemon simply sold the land. There is no evidence that any Roman was inspired by Palaemon to attempt a similar effort. Pliny snipped that Palaemon was not motivated

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<sup>39</sup> Plin. *HN*. 14.48-52; Suet. *Gram*. 25; see also Kolendo (1984) 407-418.

by gentlemanly zeal but only by vanity (*non virtute animi, sed vanitate primo*)<sup>40</sup> and was shocked at Seneca's purchase because he was not a man generally accustomed to flummery.<sup>41</sup>

Pliny's objection apparently stemmed from his belief that such capital-intensive improvements were a waste of money, and we might remember his striking advice given elsewhere: "farming well is necessary, farming outstandingly is prodigal (*bene colere necessarium est, optime damnosum*)."<sup>42</sup> And farming well was linked with the product's quantity, not its quality.<sup>43</sup> Thus Varro, writing in the mid-1<sup>st</sup> century, praised a certain Marcius Libo for having an estate that yielded 300 amphorae/*iugerum* (over 300 hL/hectare).<sup>44</sup> Perhaps more realistically, Columella praised an estate which produced 160 amphorae/*iugerum* (170 hL/hectare).<sup>45</sup> We can contrast this praise with the modern censure of over-growing grapes because of the corresponding decrease in quality: A French vineyard's product with an *appellation d'origine* can be downgraded to *vin de pays* if its production exceeds the prescribed maximum of 2.5 tons per acre (equivalent to only 32 amphorae/*iugerum*).<sup>46</sup>

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<sup>40</sup> There is some echo here of Suetonius' (*Claud.* 20) description of the draining of the *Lacus Fucinus*, which was motivated both by Claudius' concern for money and by his hope for glory (*spe gloriae*).

<sup>41</sup> *HN* 14.51: *minime utique miratore inanium*.

<sup>42</sup> *HN* 14.37.

<sup>43</sup> Tchernia (1995: 297-98).

<sup>44</sup> *Rust.* 1.2.7. The yield is difficult to believe, though we should not automatically dismiss the potential high-yields of ancient vineyards: "The town of Colmar...has records showing that it exported 100,000 liters in the fourteenth century, which compares with a figure of only 500,000 liters for all the vineyards Alsace in modern times" (Francis 1972: 10).

<sup>45</sup> *Rust.* 3.3.3

<sup>46</sup> The allowed yields vary by wine type but never exceed 2.5 tons/acre and are often lower (for example, Châteauneuf-du-Pape is restricted to 368 gallons/acre or about 2 tons) cf. MacNeil (2001). A general table of obligations for French vintners to maintain AOC status can be found at [http://www.inao.gouv.fr/repository/editeur/pdf/PPCVINS/Tableau\\_des\\_obligations\\_declaratives\\_et\\_de\\_t\\_enue\\_de\\_regist\\_Vins.pdf](http://www.inao.gouv.fr/repository/editeur/pdf/PPCVINS/Tableau_des_obligations_declaratives_et_de_t_enue_de_regist_Vins.pdf).

To summarize thus far: the combination of literary evidence, the productive capacity of Italy, and the predictions of a simple quality-quantity model all point in the same direction—the quality-quantity dichotomy that began to develop in western Europe in the late Middle Ages and became its dominant feature through the 17<sup>th</sup> and 18<sup>th</sup> centuries did not characterize Roman viticulture. Rather, the Roman agronomists make clear that the viticulturist should always aim to produce as much as possible under the constraints of climate, soil, and varietal. There is really very little evidence that Roman elites *ever* grew wine with an eye toward quality in the modern sense, the foundational split for Purcell’s narrative.

Under the umbrella of that broad distinction, we can draw two more contrasts, one in production and one in consumption. On the production side, let me advance a perhaps surprising proposition: the Romans did not have commercial vineyards in the modern sense of an agricultural enterprise dedicated to the growing of grapes and manufacture of wine. We see evidence for this proposition both in the setup of the vineyards themselves and in the way Romans used the profits accruing from them. Columella strongly advised against planting only one type of grape. Rather, he suggested:

*Sed illud etiam...dicendum est: uniusne an plurium generum vites habendae sint...sed et providentis est diversa quoque genera deponere. Neque enim numquam sic mitis ac temperatus est annus, ut nullo incommodo vexet aliquod vitis genus...at si varii generis vineta fecerimus, aliquid ex iis inviolatum erit quod fructum perferat...ea causa nos debet compellere...quod deinde proximum a primo; tum quod est tertiae notae vel quartae quoque. Eatenus velut athletarum quodam contenti simus tetradio.*

But this also must be addressed: whether vines of one or several varieties ought to be held...But it is characteristic of the provident man to set different types. For no year is so gentle and temperate that one type of vine is not troubled by some molestation in some way...and if we have made vineyards of varied type, there will be something unharmed from the

lot and which bears fruit...this reason forces us to that which is next to first-place, thence to that considered third or fourth. Thus let us be content in a foursome of athletes, as it were.<sup>47</sup>

In contrast, French *cru* vineyards were specialized to an extent that Roman vineyards apparently were not. The Californian Haraszthy, whom we met above, when visiting Chateau Rauzan in Bordeaux noted, “I was really astonished how they could make any wine at all, the vines were so much affected by disease...the proprietors, however, take it very coolly, saying that they will make it all up next year.”<sup>48</sup> This sentiment is precisely the opposite of that observed in Columella. But this makes sense; such a sentiment is only possible when one is producing wine not simply as a method of making money from agricultural produce but as its own enterprise.

Italy’s wine-growing hub provides not one example of an enterprise given over *wholly* or even predominately to wine production. Campania was famous for its wines, in particular *Falernum*, *Massicum*, and *Surrentinum*. Many villas have been excavated from this region and “*pas une seule villa qui n’ait produit du vin.*”<sup>49</sup> But these same villas also provide evidence of growing nearly *every* type of produce. The *villa* of Pisanella, for example, has preserved evidence of a winery with a lever-press and seventy-two *dolia* for storing wine, which suggests a vineyard of 13-20 hectares but also preserves evidence of olive growing (about 3000 trees) as well in addition to the usual subsistence crops.<sup>50</sup> The *Villa Regina* preserves a *cella vinaria* with 18 *dolia* ranging from 200-700 liters and corresponds to a vineyard of 1.5-2.5 hectares, and the area around the vineyard had

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<sup>47</sup> *Rust.* 3.19.20.

<sup>48</sup> Haraszthy (1861: 107).

<sup>49</sup> Brun (2004: 12).

<sup>50</sup> *Ibid.* 16. Brun gives the range of the vineyard’s size as 13-23 ha, but even if all the *dolia* were of the largest size preserved there (800 L), the vineyard would not exceed 20 ha based on our posited 2.5 tons of grapes per acre estimation given above.

plantings for figs, walnuts, peaches, apricots, almonds, olives, and pine.<sup>51</sup> These two villas are typical: viticulture never emerged as a pursuit separate from the general pattern of agricultural diversification.

There is also little indication that profits from vineyards were generally reinvested in production. Remmius Palaemon, having improved his vineyard, sold it. Did he consider reinvesting his profits in it to maintain or even expand it as a profitable enterprise? It is impossible to say for sure, but it is doubtful. This pattern was not necessarily un-economic.<sup>52</sup> Romans' wealth was predominately in land, and viticulture is risky. It is unsurprising that most preferred to diversify their land portfolio and maintain a fairly steady return rather than engage in more speculative uses which could dramatically backfire. But that development was essential in later periods for the creation of vintage wines and the emergence of the quality-quantity schism.<sup>53</sup>

One of the most interesting features in the development of the wine trade in the early modern period was the way in which consumer demand drove producers to grow wine for specific markets. During the Middle Ages, wines of Bordeaux, in particular the *vins clarets*, were popular in England.<sup>54</sup> These wines were quickly fermented, usually for less than 48 hours, and similar in color to a contemporary *rosé*.<sup>55</sup> For numerous reasons, wine from the Mediterranean, in particular from Spain and Portugal, became increasingly accessible from about 1400-1700.<sup>56</sup> These wines tended to be much sweeter and more alcoholic than those produced in more northerly regions. Over time, sweet wines became

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<sup>51</sup> *Ibid.* 19-20.

<sup>52</sup> For opposing viewpoints of whether Petronius' character's actions should be characterized as economic or not, see Finley (1999: 50-1, 115-16); D'Arms (1981: 97-120).

<sup>53</sup> Lachiver (1989: 224).

<sup>54</sup> James and Veale (1971).

<sup>55</sup> Unwin (1991: 229-30).

<sup>56</sup> Francis (1972: 99-116, 161-79); Unwin (1991: 252-54).



preferred, and Bordeaux growers began to age their wines longer on the skins to produce a fuller-bodied wine and to experiment with methods of increasing their wines' alcohol. The reciprocal relationship between productive investment and taste was exemplified by Arnaud de Pontac, who sent his son to London to open an expensive restaurant serving his wines from *Chateau Haut-Brion*.<sup>57</sup>

Roman Italy never witnessed a strong connection between the qualities consumers esteemed in wine and qualities sought by manufacturers. Romans certainly differentiated numerous wines and recognized that their quality was highly variable. For example, the Younger Pliny criticized a contemporary practice of serving wines of differing qualities at dinner parties corresponding to the rank of the guest,<sup>58</sup> and this would seem to mark an extension of a well-established practice of using wine (along with other foods and objects) to establish and reinforce notions of rank.<sup>59</sup> Petronius' Trimalchio took absurd pride in serving a ca. 150-year old wine to his dinner guests and told them how lucky they are for "yesterday I served a not so good wine, and they were of much higher rank."<sup>60</sup> Tchernia is surely right to characterize such examples as showing a general rule, that "*à un rang social différent correspond une catégorie de vin différente.*"<sup>61</sup>

A Roman wishing to differentiate between his dinner guests by the wine served would have had plenty of choices. Pliny began his list of wines by noting that "no one could doubt that some wines are more pleasant to some, others to others and that even from the same vat a wine may surpass its twin somehow, whether from the container or from chance. For this reason, let every man set himself as judge of what is best" (*genera*

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<sup>57</sup> Lachiver (1989) 223.

<sup>58</sup> *Epist.* 2.6.

<sup>59</sup> D'Arms (1990: 308-320).

<sup>60</sup> *Sat.* 34.

<sup>61</sup> Tchernia (1995: 299).

*autem vini alia aliis gratiora esse quis dubitet aut non ex eodem lacu aliud praestantius altero germanitatem praecedere sive testa sive fortuito eventu quam ob rem de principatu se quisque iudicem statuet).*<sup>62</sup> He goes on to list 50 types of decent, Italian wines divided into four ranks, 38 foreign wines, 7 salted wines, 18 wines with resin, and three second-rate wines, all of which are made by using the dross and lees, and 12 wines of “miraculous” properties.<sup>63</sup>

But there was no apparent connection between the wines esteemed by consumers and those esteemed and discussed by producers. Pliny’s list of wines may seem peculiar to a modern reader, for it is basically a catalogue of different regions and the wines produced there. He ranks the quality of different regions but does not give any information that we would consider helpful. For example, he made no effort to link his list of wines with his list of vines (14.4). He mentioned some of the emperors’ preferred wines which reflected his and his readers’ curiosity about imperial habits, but he never—even haphazardly—discussed general consumption preferences either by region or generally, let alone different wines’ respective, prevailing prices despite Romans’ knowledge that these prices could vary considerably.<sup>64</sup> Not only do these observations reinforce the argument that wine was a regional affair but also demonstrates that it did not even occur to Pliny, who gives the lengthiest exposition of wines, to consider the possible relationship between wine production and consumption.

In sum, wine production was basically uniform, differing primarily in scale but not in its fundamental goals and techniques. Some areas naturally produced better wines than others. These were praised, but there was no attempt to develop any form of

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<sup>62</sup> *HN* 14.18

<sup>63</sup> *HN* 14.18

<sup>64</sup> Cf. *D.* 13.4.34, 12.1.22 for jurists’ knowledge of regional price variation in wine.

viticulture in the modern or pre-modern sense which could reproduce higher value wines or which reacted to consumer preference. There were no *crus*; there were no *appellations*. Roman vintners were certainly eager to appropriate the surplus wealth that arose naturally from certain wines but made no effort to create it themselves. Unwin, describing the state of French wine production in the 18<sup>th</sup> century says that “in a manner remarkably similar to the evolution of the Roman wine trade 1800 years previously, wine producers throughout France and Germany increasingly turned their attention to the production of low quality wines for the rapidly growing urban population.”<sup>65</sup> Unlike their French and German counterparts, however, the Roman wine grower never considered any alternative.

I have dealt with this question at some length not just because of its foundational importance but also because my contention completely opposes Purcell’s narrative, which (though offered tentatively) has entered the literature as an acceptable general framework. The comparison seemed *prima facie* reasonable given the many structural constraints on pre-modern trade, but it does not hold water. Roman farmers were not stupid: they took advantage of different *terroirs* and recognized that wine came in various qualities but never made an effort to produce high-quality wine systematically. Closely connected is my assertion that there was no such thing as a commercial vineyard in the modern sense. Therefore, speaking of wine production on a “large commercial scale” gives the wrong impression about the nature of the enterprise.<sup>66</sup> Vineyards, whether producing a great deal of commercial surplus or not, were always part of one’s diversified, agricultural production. Yes, large landholders could and assuredly often did

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<sup>65</sup> Unwin (1991: 269).

<sup>66</sup> Rossiter (1981: 348) for the quote.

produce a great deal of wine for sale, but these were not atomized, commercial enterprises—there is no evidence that Roman wine-growers conceived of or ran their vineyards as pursuits separate from the totality of their agricultural holdings generally.

The quality-quantity distinction, crucial in the development of European wine from the 1600s on, simply did not exist the Roman period. The question becomes, why did the shape of Rome's wine trade differ so strikingly from that of later periods? Answering this will help us formulate a method for analyzing why Rome's trade followed the contours it did. A full exposition of these differences is beyond the scope of this paper, so the following is limited to two variables I consider critical: differing environment and trade regulations.

### **Differences between the Roman and Medieval Wine-Trade**

In different climactic conditions grapes and their wines can differ considerably. Climate and soil are among the most important factor in determining the quality of wine grown.<sup>67</sup> Columella introduced his treatment of vines by acknowledging that “its growing pattern is not the same under every sky or on every soil nor is there only one variety; it is not easy to say which is the best of all, since practice teaches us that each is more or less fitted to its own region” (*Neque enim omni caelo solove cultus idem, neque est unum stirpis eius genus: quodque praecipuum est ex omnibus non facile dictu est, cum suum cuique regioni magis aut minus aptum esse doceat usus.*)<sup>68</sup> More specifically, grapes thrive in regions where the average annual temperature is around 15° C, winter minima of around 4° C and summers are hot.<sup>69</sup> Rainfall needs vary depending on the region's

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<sup>67</sup> De Blij (1983: 81); Hornsey (2007: 390) on the influence of soil type on quality of wine.

<sup>68</sup> *Rust.* 3.4.

<sup>69</sup> Unwin (1991: 42).

average temperatures, but in general 38-76 centimeters of rain is needed, the bulk of which should fall during the winter and early spring with dry summers and falls.<sup>70</sup>

Grapes grown in hot climates will be less acidic and therefore more alcoholic (because the yeast has more available sugar to ferment) than vines planted in cooler climates. It was common in Roman Italy to train vines onto trees, in particular poplars and elms.<sup>71</sup> In hot climates, this method keeps the grapes from over-ripening because the grapes are further removed from the hot soil and the shade from the trees keep the grapes cooler.<sup>72</sup> Climate's effect on grapes is a key background variable in the different development of wine in the medieval period and later.

In contrast to the Roman period, the political center of gravity in medieval Western Europe was in the northwest.<sup>73</sup> This change in Europe's center of gravity had important implications for wine production. The figure below shows the areas suitable for grape cultivation in Europe:<sup>74</sup>

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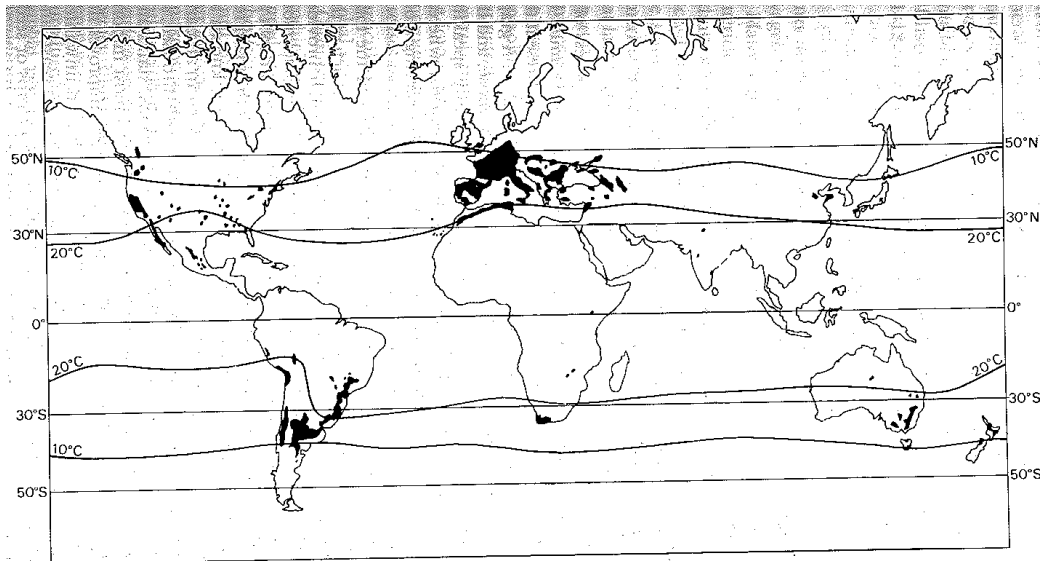
<sup>70</sup> *Ibid.*

<sup>71</sup> Col. *Rust.* 5.6.4. Also, for example, Mart. *Epigramm.* 4.13: *nec melius teneris iunguntur vitibus ulmi.*

<sup>72</sup> See Hornsey (2007: 37).

<sup>73</sup> Pirenne (1939). For the continued influence of Pirenne, see Squatriti (2002: 263-79).

<sup>74</sup> From Unwin (1991: 35). The shaded areas show grape cultivation; the wavy bars show the regions with climates suitable for viticulture.



**Figure 4.1: Areas of Wine Production**

During the Roman period, the entirety of its economic and political core lay within this region. In the medieval period and later, that core straddled the edge of climactically suitable wine growing regions. The relative climactic favorability throughout the core of the Mediterranean wine growing regions meant that wine could be produced nearly everywhere comparatively easily and of a similar quality. This homogeneity meant that the wine trade was not motivated by vastly differing qualities of wine.<sup>75</sup> But in medieval wines, significant inherent differences in quality played an important role in shaping the contours of tastes and trade. The greatest distinction was between the sweet wines from the south, first coming from Greece and its islands then, after Spain's reconquest, from the Iberian Peninsula, and the lower alcoholic wines from the north.<sup>76</sup> The difference went beyond taste: wines of higher alcoholic content could last longer without deterioration, and more Northern growers had to adapt their production to deal with southern competition in a fundamentally different type of wine.

<sup>75</sup> For a somewhat different view see Morley (2007: 17-35).

<sup>76</sup> Braudel (1981: 233-34) on the north-south trade in wine.

The political unity of the Mediterranean under the Roman Empire also lowered some transaction costs in long-distance trade relative to those in later periods. In fact, there is a sense in which the expansion of the Roman Empire can be viewed as having established a (weak) *de facto* customs-union.<sup>77</sup> It is certainly true that there was never any free-market area aside from certain privileged ports and individuals—for example Delos (in 167 BCE), shippers for the *annona*, supplies for the army and the emperor himself.<sup>78</sup> Nor was there any coordinated customs policy beyond some standardization of rates within the Empire.<sup>79</sup> But the customs dues within the empire were very low: 2%, 2.5%, 5% were the most common.<sup>80</sup> These were much lower than the customs dues on the frontier which were an exceptionally high 25%.<sup>81</sup> The fact that the Roman Empire had a common external tariff rate and that it was orders of magnitude higher than the prevailing rates within its borders justifies considering it a geographically expansive, weak customs union.<sup>82</sup>

The best description from the Roman period of the link between customs duties, trade, and profit comes from a declamation involving a stolen article not declared at customs:<sup>83</sup>

*Dic istud rei publicae... “aerarium populi Romani vectigalibus iniquis repletur, et spoliantur provinciae et sublaturum commercium est.” ... sed res*

<sup>77</sup> Contra Duncan-Jones (2006: 15): “Yet Roman political unity did not lead to a customs union...” This is true formally because the union arose through conquest rather than formal trade-pacts but the essential economic effect is the same.

<sup>78</sup> Polybius 30.31 on Delos; on shippers for the *annona* (in the late Empire) see de Laet (1949: 479-480); on “bound trade” see Whittaker (1983: 163-80); on the emperor and army, cf. *D.* 39.4.9.8 (Paul).

<sup>79</sup> Duncan-Jones (2006: 4-5).

<sup>80</sup> De Laet (1949), though duties could still become fairly expensive *in toto* depending on how many toll stations a trader had to go through (Duncan-Jones 2006: 13-14).

<sup>81</sup> For the rates, cf. P. Vindob. G. 40.822, Strabo 4.5.3, *Perip. Maris Eryth.* 19; de Laet (1949: 335, 356-60). See Duncan-Jones (2006: 5) for the comparative medieval rates which are generally on the order of 10% and max out around 15%.

<sup>82</sup> For the economic definition of a customs union, see Irwin (2008) s.v. “International Trade Agreements.”

<sup>83</sup> Ps-Quint. 341.6. On customs see de Laet (1949); Duncan-Jones (2006: 1-16); Purcell (2005: 200-34).

*publica quoque...habet quod respondeat. Primum illud, necessaria esse vectigalia civitati. Exercitus stipendium accipiunt, bella cotidie geruntur adversus barbaras et bellicosissimas gentes, defendimus ripas et limites et litora...templa extruuntur, multum impendiorum sacra ducunt, aliquid et spectacula. Opus est vectigalibus.*

Tell this to the state... “The treasury of the Roman people is being filled by unjust revenues, the provinces are being stripped, and trade is taken away.”...but the state too has a response. First this, that revenues are necessary for the state. The armies get pay, wars are waged daily against barbarians and the fiercest of peoples; we defend the riverbanks, frontiers, and shores...temples are raised, festivals bring on great expense, as do spectacles. Revenues are needed.

Merchants trading within the Roman Empire would know not only the prevailing, relatively narrow range of rates but also the process and laws applying to their passage.

Ulpian, in part of a typical laudation of the praetor’s foresight, justified his special dealing with confiscations by *publicani* by saying “Someone may ask why this edict is issued, as if the praetor did not provide for thefts, losses, and forced seizures elsewhere. But he thought it right to issue an edict especially for the *publicani* because of the reality of the situation” (*Dixerit aliquis: quid utique hoc edictum propositum est, quasi non et alibi praetor providerit furtis damnis vi raptis? Sed e re putavit et specialiter adversus publicanos edictum proponere*)<sup>84</sup> because, “everyone is aware of the brazenness and impudence of the collectors” (*quanta audaciae, quanta temeritatis sint publicanorum factions*).<sup>85</sup>

Evidence for this regularization of customs regulations also appears in non-juristic sources. In that same speech of ps-Quintilian, the advocate for the *publicani* knew and expected his audience to know of a common rule: “Now, the law holds this, that we keep the object which has passed through and has not been declared” (*nunc lex hoc continent*,

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<sup>84</sup> D. 39.4.1.2.

<sup>85</sup> D. 39.4.12.



*ut rem teneamus quae translate est et professa non est*).<sup>86</sup> Another declamation involves a woman who has not declared her four-hundred pearls at customs. The premises given at the beginning again suggest a fairly standardized procedure: “Except for the apparatus of travel, let everything owe a 2.5% charge. Let the official be allowed to make a search. Let whatever someone will not have declared be forfeit. Let it not be allowed to touch a lady” (*praeter instrumenta itineris omnes res quadragesimam publicano debeant. Publicano scrutari liceat. Quod quis professus non fuerit, perdat. Matronam ne liceat attingere*).<sup>87</sup> Uniform rules effectively lower the transaction costs incurred by trade by decreasing information costs by limiting uncertainty arising from geographically variable regulations. The Roman government, doubtless aiming to limit opportunities for provincial corruption, was keen to preserve this modest degree of consistency among its customs procedures, at least with regard to customs on the frontiers and between provinces. Thus Hermogenian stated that “it is not allowed for a governor, curator, or senate to establish or alter duties, either by addition or subtraction, without imperial permission” (*vectigalia sine imperatorum praecepto neque praesidi neque curatorum neque curiae constituere nec praecedentia reformare et his vel addere vel deminuere licet*).<sup>88</sup>

The case of Marcus Fonteius, an interesting character in the history of Rome’s wine trade, demonstrates why emperors strived to maintain some degree of uniformity. Marcus Fonteius was governor of Gallia Narbonensis probably from 76-74 BCE. He was accused by the Gauls before the Roman extortion-court (*repetundae*) of having illegally enriched himself, chiefly by the imposition of new and varied duties on wines, collected

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<sup>86</sup> 341.4.

<sup>87</sup> Ps.-Quint. 359.

<sup>88</sup> D. 39.4.10.pr.

by *publicani* stationed at new customs bureaus at Tolosa, Crodunum, Vulchalo, Cobiomachus, and Elesioduli.<sup>89</sup> Cicero described the scheme as follows:<sup>90</sup>

*Crimen a Plaetorio, iudices, ita constitutum est, M. Fonteio non in Gallia primum venisse in mentem ut portorium vini institueret, sed hac inita iam ac proposita ratione Roma profectum. Itaque Titurium Tolosae quaternos denarios in singulas vini amphoras portori nomine exegisse; Croduni Porcium et Munium ternos <et> victoriatum, Vulchalone Servaeum binos et victoriatum; atque in his locis ab eis portorium esse exactum si qui Cobiomago--qui vicus inter Tolosam et Narbonem est--deverterentur neque Tolosam ire vellent; Elesiodulis C. Annium senos denarios ab eis qui ad hostem portarent exegisse.*

The accusation, judges, has been stated thus by Plaetorius: it did not occur to Marcus Fonteius for the first time in Gaul to establish a wine-duty but the plan was proposed when still at Rome. And so it is stated that at Tolosa, Titurius exacted four *denarii* per amphora of wine as a duty; at Crodunum, Porcius and Munius exacted three and a half; at Vulchalo, Servaeus took two and a half and that, in these places, duty was exacted by these men if anyone, not wishing to go to Tolosa, turned out at Cobiomagus (a town between Tolosa and Narbo) and that at Elesioduli Gaius Annius exacted six *denarii* from those who were carrying wine to the enemy.

This text presents several interesting features which can only be touched on here.

First, the duties levied corroborate Diodorus' claims that wine in Gaul fetched a high price. A tax comparable to later standards of 3-5% would imply an amphora value of 50-130 *denarii*, several times more than the highest attested amphorae from early Imperial Italy. Second, these duties were flat rates, not *ad valorem* charges. On its own, this is not remarkable; although Roman duties were supposedly *ad valorem* they were often leveled

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<sup>89</sup> On the case and its relation to Rome's customs, see de Laet (1949: 80-3). Although various other malfeasances were accused against Fonteius, Cicero calls the *crimen vinarium invidiosissimum* and *maximum*. It has been generally accepted that Fonteius' actions were "anti-Gallic;" cf. Clemente (1974: 132); Tchernia (1983: 93)—"There can, in fact, be no other possible interpretation."

<sup>90</sup> Cic. *Font.* 19.

as if they were flat rate duties, a fact which has been attributed both as an effort to avoid disputes over value and the limited numeracy of many of the traders and officials.<sup>91</sup>

Nevertheless, if the quality of the wine passing through greatly varied we would expect the duties charged to reflect this, since either Fonteius or the publicans must have arrived at the different rates by some method, though their rationale remains unrecoverable. But the Roman government apparently disapproved not only of this method of self-enrichment at the expense of its citizens (*crimen et...magnum vectigal enim esse inpositum fructibus nostris dicitur*)<sup>92</sup> but, perhaps more importantly, the *ad hoc* installation of new customs bureaus, their variable charges, and the confusion it caused among those being charged and those profiting from it. As de Laet pointed out, “*Il semble bien qu’après le procès de Fonteius, ces bureaux ont été supprimés; on n’en trouve plus trace à l’époque impériale.*”<sup>93</sup>

Fonteius’ scheme would not be exceptionable, however, in the commercial world of the post-Roman period, where the political and economic fragmentation of the European and Mediterranean world resulted in a bewildering array of customs variations, regulations and rights with profound effects on the shape of trade generally and on wine in particular.<sup>94</sup> The following description, involving the rights of various traders in the Latin Levant, gives a taste of this range of rights and obligations:<sup>95</sup>

*Kings and lords continued well into the thirteenth century to make grants to European merchants or to reduce the dues they had to pay. In 202 Plebanus of Botrun gave privileges to Pisa and in 1203 Bohemond IV of Tripoli made a grant to Genoa. In 1217 Guy of Jubail gave rights to the*

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<sup>91</sup> Duncan-Jones (2006).

<sup>92</sup> Cic. *Font.* 20.

<sup>93</sup> De Laet (1949: 83).

<sup>94</sup> A sourcebook of translated, medieval documents relating to Mediterranean trade is provided by Lopez and Raymond (1990).

<sup>95</sup> Baker (1973: 110).

*Venetians; and in the early 1220s John of Ibelin issued an important series of charters to the Genoese, Venetians and Marseillais in a clear attempt to encourage commerce in his town of Beirut. Charters were also granted by Frederick I of Jerusalem and Bohemond V of Tripoli for Montpellier in 1229 and 1243 respectively; by Rohard of Haifa for Genoa in 1234, by the High Court of Jerusalem for Ancona in 1257 and by Bohemond VII of Tripoli for Venice in 1277.*

In addition, rights and privileges were highly changeable. Merchants could not necessarily depend on the same locations offering the same privileges and protections from year to year. So, for example, in the early 13<sup>th</sup> century, the citizens of Bordeaux (controlled then by England) were exempted from the Great Custom, an export duty on products from the Crown's property in Gascony, Poitou, and Bordeaux regions, while the rest of the Bordelais had to pay it, though at a reduced rate. Over time, the citizens of Bordeaux began, on their own, to arrogate the right of holding back wine from the *Haut Pays*, principally Bordelais, from being exported before November 11<sup>th</sup>, thus placing their own wines at a considerable advantage.<sup>96</sup>

These duties introduced significant distortions in trade patterns. In 1782, French wines imported into England paid fifteen distinct duties while non-French wines paid thirteen, and the total duties of 1784 ranged from £45 19s 1d on Portuguese wines to £96 4s 1d on French wines.<sup>97</sup> The British parliament apparently became fed up with these accumulated tariffs, some of which were functionally obsolete, and in 1787 abolished the old duties and imposed one excise tax and one customs duty across the board.<sup>98</sup>

It takes little effort to imagine the cumulative effect of all these differing rules and regulations arising from changing political alliances and boundaries, local, and civic rivalries, when added to the natural, regional variation in fitness for wine production and

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<sup>96</sup> James and Veale (1971: 2); Francis (1972: 7-8); Pijassou (1980).

<sup>97</sup> James and Veale (1971) 245.

<sup>98</sup> *Ibid.*

the types of wine produced. These variations introduced more severe trade distortions than existed within the Roman Empire. But these factors placed significant external pressures on wine growers and merchants to specialize in various types of wine which differed geographically, depending on the climate, the dominant market at which they were sold, and the trade regulations governing that commerce. If Fonteius' behavior had been the norm rather than an exception, the Roman wine-trade likely would have developed in a radically different way.

Thus, the “technical changes” and “change in attitudes” that prefigured the rise in the quality-quantity distinction in the early 17<sup>th</sup> century did not arise out of a vacuum but were preconditioned by the preceding centuries' political and economic fragmentation.<sup>99</sup> Perhaps paradoxically, the comparative political stability and regulatory homogeneity of the Roman period in conjunction with the relative climactic similarity of the littoral Mediterranean's wine-growing regions removed two sources of external pressure to differentiate products. This lack of significant differentiation in the wines traded is yet another crucial distinction between Roman wine commerce and that of later periods.

To sum up: we need to abandon any notion of Roman viticulture which renders it qualitatively equivalent to viticulture as it has developed over the last four-hundred years. Certainly the biology of the grape and the chemistry of wine-making lead to certain, ineluctable similarities, but the dominant feature of contemporary and pre-modern viticulture has been the production choice between high-quality, low production wine and low-quality high production wine, as Balzac's vintner perfectly expresses. That split was foundational for the development of viticulture in the pre-modern period and, by extension, a critical development in the modern wine industry.

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<sup>99</sup> Unwin (1991: 268) for the quotes.

## **“Surplus-Producing Areas” and International Trade**

The preceding discussion has left us in a quandary: how are we to explain the development of the wine trade at Rome, the diffuse regions from which wine came, and its changing provenance over time. After all, if vineyard production was comparatively undifferentiated then we might wonder why, for example, any significant quantity of Spanish wine ever came to Rome when transport costs should have made its price much higher than basically similar wine from Italy. We cannot appeal to Purcell’s quality-quantity distinction, nor can we appeal to regional economic and political variations which were crucial in the shaping medieval and early-modern wine trade. But those analyses, though not providing answers, provoke questions. In particular, they direct us to investigate whether there was some other type of regional comparative difference that introduced disequilibria spurring trade; the second is whether the broader socio-political system introduced rules of the game which encouraged geographically diffuse trade in wine to occur. Providing this account requires using of some basic, formal economic trade models.

Let us begin with a succinct description typifying ancient historians’ approach to trade:<sup>100</sup>

*The argument for substantial trade in commodities that has been elaborated by ancient historians should be extended to the whole of the preindustrial Mediterranean past: the proximity of surplus-producing areas to those in need of staples ought to have generated interregional trade throughout our period.*

This explanation is not unusual: Ancient historians’ trade-theory relies heavily on the existence and distribution patterns of surplus production.<sup>101</sup> This has, I suppose, some

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<sup>100</sup> Horden and Purcell (2000: 120).

<sup>101</sup> For example, Garnsey, Hopkins, Whittaker (1983: xx ): “We need to know to what extent variation in the system of production...affected the size of the surplus extracted, and the volume of trade.”

intuitive appeal and it may therefore come as a surprise that there is, so far as I know, *no* economic model of interregional trade that depends on (or even uses) any notion of surplus. On closer consideration, this makes sense because the existence of surplus product in one place but not another surely must depend on some differentiated underlying factor(s). Therefore we need to take a step back and briefly examine the models at our disposal to address questions concerning trade-flows in wine, at least in a general context, in order to identify the relevant variables.

There are two trade models that we will use: the Heckscher-Ohlin (HO) Theory, which is the standard theoretical model of international trade; and the Gravity Model (GM), which is closely associated with New Economic Geography (NEG). Like any model, both have attractive features as well as drawbacks. HO is robustly theorized with a clear delineation of predictive variables and their relationships but has had mixed empirical success in its general form.<sup>102</sup> GM has been criticized for being under-theorized but has been remarkably successful as an empirical exercise.

Basically, HO extends the Ricardian theory of comparative advantage to two factors of production (rather than Ricardo's labor model). Under HO, a region's autarchic factor endowments generate a comparative advantage in production that uses its relatively abundant factor. The model's fairly numerous (and somewhat unrealistic) assumptions make it highly idealized; I bypass the details of the model here (readers

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<sup>102</sup> Temin (2006a: 141-56) is the only example of which I know applying HO to ancient trade (in this case the "biblical" Near East). See O'Rourke and Williamson (1994: 892-916) on factor-price convergence in late 19<sup>th</sup> century America. *Ibid.* (1999: 1-68) for European trade between 1400-1800; Clifton and Marxsen (1984: 32-8). For a survey of empirical tests, see Chacholiades (1978: 298-306).

interested in a full exposition can refer to the citations below) and simply give and then briefly explore the implications of its four fundamental theorems.<sup>103</sup>

The following are the four theorems under the two-factor, two- region model, constant- returns-to-scale model. 1) A region will export the commodity whose production relatively more intensively uses the relatively more abundant factor. 2) Complete specialization in production occurs if factor prices (factors are not generally considered mobile) remain unequal or incomplete specialization in production and the equalization of factor prices. 3) An increase in the supply of one factor raises the absolute output of the factor that uses that factor intensively (the Rybczynski Theorem). 4) A rise in the relative price of a good leads to a rise in the real rate of return for the factor used most intensively in producing that good and a corresponding decline in the return of the comparatively less intensively used factor (Stolper-Samuelson Theorem).<sup>104</sup>

Proposition one simply means that, if a region (R) produces two products X and Y and the production of X is a function of capital and labor ( $K_x, L_x$ ), then we would call X the relatively capital intensive product if  $K_x/L_x > K_y/L_y$ . If R is better endowed in capital than in labor, it will export product X. The upshot of this proposition is that we need to try to understand the relative factor intensities necessary for a given product's manufacture and to estimate regions' respective factor endowments. Proposition two indicates that if there is not total specialization in a product then there must be some equalization of factor prices. In the Roman context, the relative lack of regional specialization in wine could suggest that a reasonably integrated, Mediterranean factor market existed. The Rybczynski theorem (proposition three) is interesting and, at first

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<sup>103</sup> Jones (forthcoming).

<sup>104</sup> These formulations are adapted from Horvat (1999: 13-23), who, though criticizing the theory, offers a concise and readable overview of its principles.



glance, counterintuitive. Imagine Roman Italy produced two products, textiles and grain—the latter being more labor intensive. If population increases (i.e., the labor factor increases) then the absolute production of the labor-intensive product (grain) will rise, and textile production will fall.<sup>105</sup> The Stolper-Samuelson theorem (proposition four) is basically the price-equivalent version of the previous theorem; it suggests that not everyone benefits from trade equally; those who disproportionately control a relatively abundant factor benefit disproportionately from trade in products using it.

Our first task therefore is to identify the relatively intense factor used in wine production. Since production in the ancient world as a percentage of GDP was fundamentally agrarian, it makes the most sense to compare it to a baseline agricultural product such as wheat.<sup>106</sup> So far as I know the question of relative factor intensities has not been asked explicitly, but the following quote indicates that some ancient historians consider viticulture labor intensive: “What it [i.e., viticulture] offers, however...is the opportunity for the conversion of labour...into low-bulk high-value commodities...viticulture and wine-making turn labour-glut into storage and redistribution credit.”<sup>107</sup>

I am unconvinced that this evaluation properly delineates the relative factors. The ancient agronomists (especially Columella) attribute most of the wine-growing cost to a combination of sunk costs and capital investment: vine-stocks, stakes, trenching,

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<sup>105</sup> This is because when the labor-intensive industry takes a new unit of labor, it must take some capital to go with it and the only place to acquire new capital is from the capital-intensive industry (by assumption factors are fixed and fully employed). But when that industry releases capital, it will also release a proportionate bit of labor, thus decreasing its absolute output.

<sup>106</sup> This is the comparison adopted for a somewhat different purpose (transformations of viticulture in Old Castille in the 17<sup>th</sup> century) by Brumont (1989: 267-73).

<sup>107</sup> Horden and Purcell (2000: 215-16).

drainage/irrigation,<sup>108</sup> flooring, presses, storage vats, etc. Even the purchase or hire of a skilled vine-dresser would better be considered a sunk cost or, in some cases, an investment in human capital (training for example) rather than a labor factor. Indeed, the fundamental change in viticulture in the early 17<sup>th</sup> century derived from redistribution and new investment patterns of capital, not from vastly changed labor patterns.<sup>109</sup> Likewise a recent article investigating the relationship between natural endowments versus production technologies on the quality of wine in contemporary Bordeaux production found that production technologies, which are highly capital dependent, are the decisive factor.<sup>110</sup> In other words, viticulture is not relatively intensive in labor but uses capital comparatively intensively.

To be blunt, our ability to test the HO model in the Roman world is crippled by the lack of any data. But there is one suggestive instance indicating that this model of wine production and its trade is broadly on the right track. Keith Hopkins emphasized how continuous war from about 250 BCE onwards led to a massive influx of booty.<sup>111</sup> Booty easily becomes financial capital, and the Rybczynski Theorem suggests that we should see a corresponding increase in capital-intensive output, for example, in wine as the factor used relatively intensively increases. I have already pointed out that it is not until the late 2<sup>nd</sup> century BCE that we first hear of an Italian export-wine, known from a *titulus* on an amphora.<sup>112</sup>

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<sup>108</sup> There is evidence, for example, of a drainage system on a vineyard from Fundi; Quilici Gigli (1987: 152-66). Horden and Purcell (2000: 219) consider this evidence of labor intensity because labor was used to install the drains, but this is confused—no physical capital investment materializes out of thin air and the point of production, while interesting from an organization standpoint, does not change the factor to which we assign it.

<sup>109</sup> Unwin (1991: 268).

<sup>110</sup> Gergaud and Ginsburgh (2008: 142-57).

<sup>111</sup> Hopkins (1978: 8-12) emphasizes this in his *Conquerors and Slaves* model.

<sup>112</sup> *CIL* XV 4554.

The first HO theorem states that a region with a comparative advantage in capital will export a capital-intensive product to a region with a different relative factor advantage. In this case, that factor should be labor since, in pre-industrial economic systems dominated by agriculture, land was a fairly undifferentiated factor. There are two tantalizing hints that precisely such a dynamic developed. The first is from Diodorus Siculus, writing in the mid-1<sup>st</sup> century BCE:

*διὸ καὶ πολλοὶ τῶν Ἰταλικῶν ἐμπόρων διὰ τὴν συνήθη φιλαργυρίαν ἔρμαιον ἠγοῦνται τὴν τῶν Γαλατῶν φιλοινίαν. οὗτοι γὰρ διὰ μὲν τῶν πλωτῶν ποταμῶν πλοίοις, διὰ δὲ τῆς πεδιάδος χώρας ἀμάξαις κομίζοντες τὸν οἶνον, ἀντιλαμβάνουσι τιμῆς πλῆθος ἄπιστον· δίδόντες γὰρ οἴνου κεράμιον ἀντιλαμβάνουσι παῖδα, τοῦ πόματος διάκονον ἀμειβόμενοι.*

For this reason, many Italian merchants consider the Gauls' love of wine a godsend on account of their typical love for money. For these merchants, conveying wine by boat through the navigable rivers and on wagons through the plains generally fetch an unbelievable price. For in giving a jar of wine they receive a slave and trade a drink for a servant.<sup>113</sup>

It would be ridiculous to use a stray passage from Diodorus, or any number of ancient authors, to substitute convincingly for our lack of usable statistics—how many merchants? How much wine? How many slaves? How voluminous a jar? These are all questions whose answers escape us.<sup>114</sup> Nevertheless, there is no reason to doubt the broad contours of Diodorus' description—an examination of a distribution map for Dressel 1 amphorae (the first exported Italian wine vessel) shows a concentration in southern Gaul (modern Provence) and then along the rivers.<sup>115</sup>

We can explore the implications of that trade in a rough but informative way.

Tchernia estimated that late Republican Rome was shipping about 120,000 hectoliters of

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<sup>113</sup> Diod. Sic. 5.26.3.

<sup>114</sup> Cf. Cic. *Quinct.* 6.2 on Gallic *pueri venales*. On Diodorus' passage, see Tchernia (1983: 97-99).

<sup>115</sup> For a distribution map, see Parker (2008). For the late-Republican wine trade in Gaul, see Tchernia (1983: 87-104).

wine annually to Gaul in 27 L Dressel 1 amphorae.<sup>116</sup> Say that 50% (chosen arbitrarily) of that wine was used to trade for slaves. Hopkins' table of average slave prices at Delphi shows a range of average prices between 100-53 BCE of 287-566 *drachmae* (ca. 460-900 *sesterces*).<sup>117</sup> Let us assume that Diodorus, even if ignorant of actual prices, at least accurately reflected their relationship with prices at other locations—that is, wine was dear, people cheap, and let us adopt a Gaul-slave (average) price of 450 HS and an average price for a wine amphora of 90 HS/amphora, that is, 5 amphorae per slave.<sup>118</sup>

On these figures, those exports of wine could have purchased about 3,000 slaves per year.<sup>119</sup> If this dynamic was in force for 50 years, 150,000 slaves entered Italy in exchange for wine. If it was 75 years, 225,000. If Diodorus' figure were literally true, then wine purchased about 16,000 slaves per year, 75,000 in 50 years and a million in 75. Of course, if wine were so valuable, it is possible that well over 50% of produced wine was involved in the slave trade. One might also suspect that the “true” slave-price lay somewhere between Diodorus' fairly unlikely contention and Hopkins' Delphi prices. Either way, the HO model helps us identify the relative factor intensities that underpinned the wine/slave dynamic.

The Stolper-Samuelson theorem is the price equivalent of the Rybczynski theorem and predicts that when the relative price of one good rises, the return to its intensive factor will also rise and that there will be a corresponding decrease in the return

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<sup>116</sup> Tchernia (1986: 85-87).

<sup>117</sup> Hopkins (1978: 159).

<sup>118</sup> Duncan-Jones (1982: 364-65) calculated a wine-price range at Rome from 60-88 HS/amphora—I have picked a price slightly outside his range's upper end on the assumption that if the Gallic price was the same as at Rome, few would have bothered to sell there.

<sup>119</sup> Tchernia (1983: 98) estimated a yearly total imported, Gallic slave population of 15,000. On this estimation, wine would be directly responsible for an impressive 20% of the total.

to the other production factor and is “an exceedingly useful theorem.”<sup>120</sup> In this case, if the value of Italian wine in Gaul was rising, then returns to its relatively intensive factor (capital) should also have risen. We cannot give any direct evidence for such an increase, but it was during this time that we see one of the few examples of senatorial interest in the wine trade. The sudden emergence of this collective and unusual interest is in line with a changing value in a factor disproportionately controlled by this same economic class.

In book three of Cicero’s *De Re Publica*, one of Cicero’s interlocutors, Philus, is called upon to defend the notion that justice is determined by humans and is not a naturally endowed universal. Included in his examples is the following: “But we are the most just men, we who forbid the Transalpine peoples to sow the olive and the vine so that our olives and vines are worth more. This we are said to do prudently, not justly.”<sup>121</sup> The historical context underlying the passage is “extremely perplexing.”<sup>122</sup> Traditionally scholars believed that this policy arose from Rome’s intervention on behalf of Massilia against local Ligurian tribes in 154 BCE,<sup>123</sup> though Paterson argued that these are the same, vague *transalpinae gentes* which crossed the Julian Alps in 189 BCE and settled in north Italy, around the eventual site of Aquileia.<sup>124</sup>

We need not get bogged down in the details, nor must we assume that the senate’s decree was designed as part of a cogent commercial policy. But given the different regional comparative advantages, depriving these *transalpinae gentes* from planting vines

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<sup>120</sup> Kemp and Wegge (1969: 407). The most important articles on the Stolper-Samuelson theorem are collected in Deardorff, Stern, and Baru (1994).

<sup>121</sup> 3.16: *nos vero iustissimi homines, qui Transalpinas gentis oleam et vitem serere non sinimus, quo pluris sint nostra oliveta nostraeque vineae; quod cum faciamus, prudenter facere dicimur, iuste non dicimur.*

<sup>122</sup> Tchernia (1983: 100).

<sup>123</sup> E.g., Badian (1968: 22).

<sup>124</sup> Paterson (1978: 452-8), though this view was decisively rejected by Tchernia (1983: 198).

(and olives) surely was in the senators' mind when they imposed this rule. The senatorial class itself, as the dominant controller of capital, would have been experiencing the benefits of increasing returns to products intensively using that factor, for example, wine. Though the senators did not, of course, perceive this fact technically, they would have perceived the benefits. This may explain why Gallic wine commerce came to their attention and resulted in a law unparalleled in Roman legislation.<sup>125</sup>

The Heckscher-Ohlin model has helped us hypothesize the following: production of surplus wine is not a parameter of trade; wine is comparatively intense in capital, not labor; the wine trade in Gaul in the late Republic fits broadly into an HO-type model; the fact that not all Rome's wine came from its immediate environs (i.e., peninsular Italy) implies some equalization of factor prices because no particular area developed complete specialization (this is from proposition two).<sup>126</sup> Let us therefore pursue further this relationship between capital and wine production. Roman senators, after Augustus' reforms, had to be worth at least one million sesterces and generally were worth at least eight million sesterces; some had fortunes over 200 million sesterces as, for example, did Seneca, Q. Vibius Crispus, and Sallustius Passienus.<sup>127</sup> The estimated total GDP of the Roman Empire ranges from a low of about nine billion sesterces through the mid-teens and peaks with the estimates of Goldsmith and Scheidel/Friesen who estimate it at about 20 billion HS.<sup>128</sup> If a senator's average wealth was on the order of 4-16 million

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<sup>125</sup> *Ibid.* 100.

<sup>126</sup> I have not considered the effect of transportation costs here. These are important but the HO model can be adjusted and remain intact when accounting for transportation costs: the main effect is to rule out full equalization of factor prices and lessen the magnification effect of Stolper-Samuelson and Rybczynski. It does not, however, alter the fact that regions should export the goods which use the (relatively) intensively used factors

<sup>127</sup> See Duncan-Jones (1982: 343-344) for the size of private fortunes during the Principate.

<sup>128</sup> For attempts to estimate Rome's GDP see Goldsmith (1984: 263-288); Hopkins (1995: 41-75); Temin (2006b: 31-54); Scheidel and Friesen (2009: 61-91). Goldsmith, Scheidel and Friesen both arrived at

HS and there were 600 senators, their total wealth was 4.8 billion sesterces and constituted 12.5%-50% of the Empire's total wealth (adopting the upper GDP range), though certainly the upper range seems remarkably high. Regardless, if we wish to explore the effects of capital on an economic product, senators make a reasonable proxy for our lack of hard data since, by any measure, they had access to a large amount of available capital.

We can therefore use the changing geographic distribution of senators as a rough stand-in for the geographic distribution of capital during the Roman Empire. The following table presents the distribution of senators' provenances from the beginning of the Flavians' reign in 69 CE to the end of the Severans' in 238 CE.<sup>129</sup>

Emperor	Number of Known Senators	Italian	West	East	Africa
Vespasian	178	148	21	6	3
Domitian	163	125	29	7	2
Trajan	152	100	29	20	3
Hadrian	156	88	31	26	11
Antoninus Pius	167	96	17	35	19
Marcus Aurelius	180	98	8	49	25
Commodus	114	63	4	31	16
Septimius Severus/Caracalla	479	204	41	162	72
Elegabalus/Alexander Severus	238	113	17	75	33

**Figure 4.2: Roman Senator Provenance**

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figures of roughly 20 billion HS while Hopkins and Temin estimated it to be considerably lower, around 13-14 billion HS.

<sup>129</sup> Adapted from Balsdon (1970: 134-35).

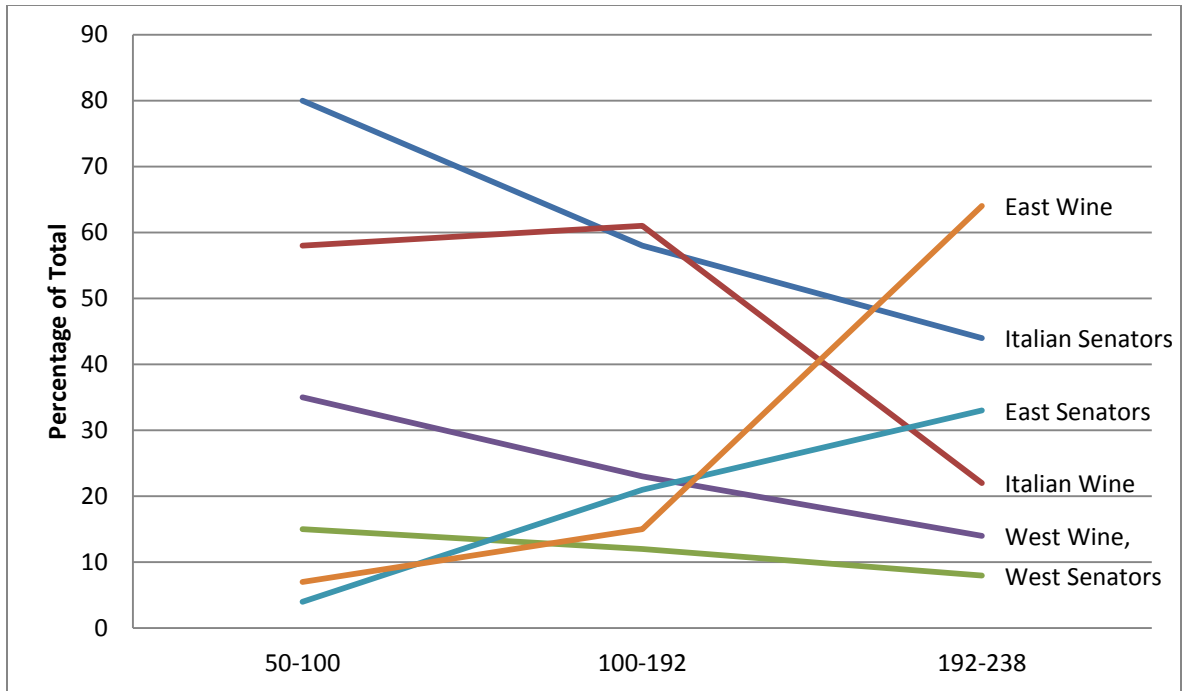


Figure 4.3: Moving Percentage of Wine and Senators

A look at this graph shows that over time, the origin of wine and the provenience of known senators were moving in the same direction and, in one case (those from western provinces) at a remarkably similar rate.

## Conclusions

This analysis leaves little doubt that the vineyards' location followed the senators' provenance, or, more precisely, vineyards producing wine for export to Rome appeared in regions with comparative advantages in capital, but these advantages derived from unrelated socio-political externalities. Wine production chased capital but capital did not chase wine. This fact, not the quality-quantity distinction, was the fundamental engine of Roman wine commerce.

That relation between wine production and broader patterns of capital distribution reminds one of the underexplored observation made by Duncan-Jones that, "we cannot make taut hypotheses about the effect of transportation costs on the price of wine from



overseas without knowing more about the trade patterns...that existed independent of the wine trade.”<sup>130</sup> The previous analysis suggests that we should take this suggestion seriously. Compare, for example, the two pie charts below, the first showing the provenience of amphora-shards at Ostia in the 2<sup>nd</sup> half of the first century CE, the second from 350-475 CE.

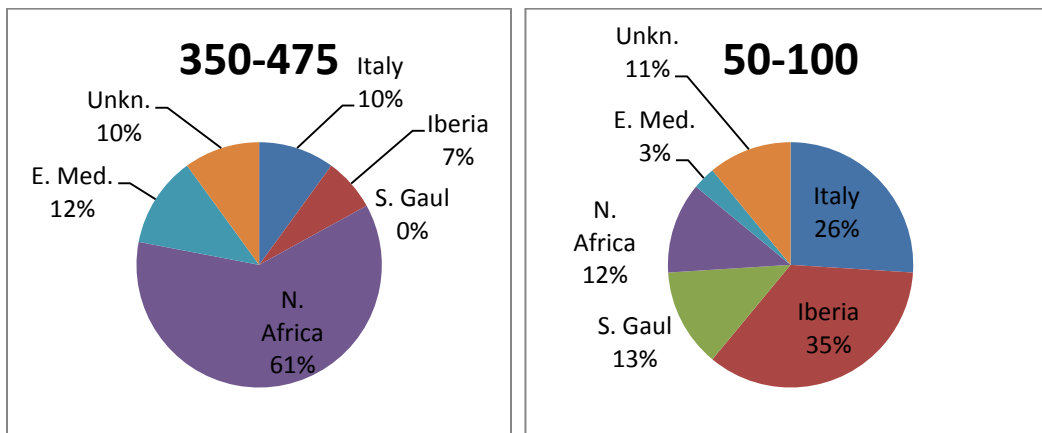


Figure 4.4: Distribution of Amphora Provenience at Ostia

We cannot, I think, explain why the later time-horizon suggests, perhaps counter-intuitively, that Rome’s wine-supply had become increasingly bilateral. This question requires us to use a model that allows us to consider multi-lateral trade and reveals that the explanation is closely related again to broader socio-political external factors.

We can use the Gravity Model (GM), the fundamental model of the so-called New Economic Geography, to show how this relationship between capital distribution and wine’s origin at Rome helps us make sense of the changing shape of Rome’s wine commerce within the Mediterranean economy writ large.<sup>131</sup> The basic form of the gravity

<sup>130</sup> Duncan-Jones (1988: 100).

<sup>131</sup> As opposed to HO, which has been a theoretical success story while producing ambiguous empirical results, the Gravity Model has been an empirical success story while having been criticized for being under-theorized. For the model and its relation to New Economic Geography, see Venables (1996: 341-359); Fujita, Krugman, and Venables (1999). For a general introduction to the model, Anderson and Van Wincoop (2003: 170-92); Van Bergeijk and Brakman (2010: 1-28). The basic

equation is:  $T_{ij} = (\text{GDP}_i^\alpha \text{GDP}_j^\beta) / D_{ij}^\theta$ , where  $T_{ij}$  represents bilateral trade between regions  $i$  and  $j$ , the numerators represent the regions' respective economic sizes in terms of GDP,  $D$  is the distance between the two regions, with parameters  $\alpha$ ,  $\beta$ ,  $\theta$ .<sup>132</sup> The key point to take away from the basic formula is that the scale of trade is directly proportional to the size of the trading partners and inversely proportional to the distance between them.<sup>133</sup>

But the model in this form still expresses a bilateral relationship, and it uses easily separable economic variables. Though relatively easy to understand theoretically, it does not give us many variables we can isolate for analysis. There is, however, a micro-economic version of this model (we can leave its derivation to the economists). The relationship it shows between variables makes it worth considering for us:<sup>134</sup>  $T_{ij} = Y_i E_j [t_{ij} / (\Pi_i P_j)]^{1-\sigma}$ , where  $Y_i$  is region  $i$ 's total output,  $E_j$  is the share region  $i$  has in the expenditure of  $j$ ,  $\Pi_i$  and  $P_j$  are the regions' respective price indices; these price indices are usually considered multivariate resistance terms.<sup>135</sup>

These resistance terms are simply the summation of all the bilateral trade costs. In other words, we can imagine that each region ships its produce to one international market and imports produce from one international market, and the costs depend on the aggregate of all bilateral trade costs—that is, “multilateral resistance thus embeds the effect of trade costs between third and fourth parties.”<sup>136</sup> One interesting implication is that two trading partners in dense, centrally located networks within the international

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gravity model is derivable in fact from HO, so using this model here does not necessarily mark a dramatic departure from the previous analysis.

<sup>132</sup> Van Bergeijk and Brakman (2010: 5).

<sup>133</sup> Distance has been measured in a variety of ways. For a brief overview and bibliography, see Head and Mayer (2010: 167-176).

<sup>134</sup> For a full derivation, Anderson and van Wincoop (2003); for a simplified derivation, van Bergeijk and Brakman (2010: 8-11).

<sup>135</sup> *Ibid.* 11.

<sup>136</sup> Anderson (2010: 72).

economy will generally have smaller bi-lateral trade than they would if they were on the periphery although each partner's per capita GDP will be lower than if it were closer to the center.<sup>137</sup>

This fact combined with inspection of the distribution charts above indicates that Italy in the 4<sup>th</sup> century had become more peripheral in international trade. This prediction jibes with our broader knowledge of the general eastward shift of Rome's political center. It also, however, raises the likelihood that Italy's real per-capita GDP fell between 100 and 400, thus giving additional evidence to "decline" narratives of the 4<sup>th</sup> and 5<sup>th</sup> centuries in at least central and southern Italy.<sup>138</sup> These analyses also remind us that, although wine was produced ubiquitously throughout the Mediterranean basin, the patterns of Rome's wine supply were highly sensitive to seemingly unrelated changes.

The quantity-quality schism which has defined the wine-growing sector for the last several centuries depends, as described above, on the opposite relationship, one where capital chases wine. In the Roman world, it never did so. Capital was invested to produce and sell as much wine as possible. There was never any effort to produce wines of quality beyond the natural quality endowed by a region's climate, soil and basic aspects of careful production. Further, there were no strong links between consumers' taste in wine and producers' production.

In my second chapter I argued that the commerce of wine at Rome, though driven by private enterprise and devoid of active state intervention, depended to an underappreciated extent on the consistent demand of the imperial court and senate. In this

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<sup>137</sup> For example, it has been estimated that the distance from markets of bi-lateral trading partners Australia and New Zealand from the OECD average may adversely affect their per capita GDP by as much as 11%. For this and empirical studies of resistance, see Buolhol and de Serres (2010) 323-353.

<sup>138</sup> Ward-Perkins (2005); Whittaker (1983: 163-80).

chapter, I hope to have shown that this wine production differed in important but hitherto unrecognized ways from its post-Roman counterparts and that these differences largely generated the broad contours of production. The conclusions reached here are in line, unsurprisingly, with my contention in Chapter One, that Roman elites demand for wine disproportionately influenced the nature of Rome's demand for wine generally. We can see that both on the demand and production side, Rome's wine commerce was disproportionately shaped by relatively few people who had little active interest in the results of their actions on the populace generally.

The conclusions reached in this chapter also allow us to understand better why Roman jurisprudence never developed a body of efficient organization law for the creation of large integrated firms. Romans would have only changed their basic legal structure if there was significant pressure from the wealthy, politically powerful classes. As we have seen in this chapter, through the analysis of wine production, these classes' productive activities never developed in a way that made integrating downstream firms attractive. They therefore never supplied the requisite pressure on the legal system to generate core, structural change. The jurists' ability and desire to reduce the transaction costs associated with this least-best system may become all the more surprising and admirable.

## Chapter V The Problem of Storage

### **“The Most Precious Gift to the Temperate and Rational Man...”**

Pliny’s letter in chapter two provided an entrée into examining Roman business law and risk in the marketplace generally. We concluded by showing that the jurists designed penalty-default rules engineered to minimize the risks inherent in wine’s uncertain and changeable quality. This risk depended both on the care producers took in making the wine but also how it was stored prior to the sale. For retailers, distributors, and consumers within the city of Rome, storage would have been a paramount problem: not only would sufficient and convenient space have had to be found but it would have had to minimize the chances of spoilage, particularly because little wine would have come to Rome during the dangerous winter season.<sup>1</sup> Unfortunately we know precious little about wine storage at Rome. This chapter tries to remedy this situation but with the forewarning the scarcity and quality of our evidence often frustrates attempts at definite, detailed answers.

Myriad products in massive quantities came to *Roma caput mundi*. The Romans themselves were aware of this. In his celebrated oration to Rome, Aelius Aristides described Rome as the world’s emporium. Every type of commerce occurs there, he said: one can see coming by land and by sea all things born by nature or worked by man all year round. Cargos from India and Arabia Felix, he marveled, reach such volumes that “it

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<sup>1</sup> We might remember that Claudius had to offer insurance to shippers who would transport grain to Rome in the off-season (Suet. *Div. Claud.* 18).

seems likely that their trees are left bare” (Φόρτους. . . τοσούτους ὄρᾶν ἔξεστιν ὥστε εικάζειν γυμνὰ τὸ λοιπὸν τοῖς ἐκεῖ λελεῖφθαι τὰ δένδρα).<sup>2</sup> The following description of the *Horrea Galbana* from excavations supervised by Rodolfo Lanciani in the late 19<sup>th</sup> century justifies Aristides’ encomium:

*Not long ago, I watched the excavation of one wing of the horrea, which some workmen were uncovering: of the four storerooms searched under my direction, the first contained huge tusks of ivory, forming a total volume of 675 cubic feet; the second contained a few bushels of lentils; the third, a bed of crystalline sand, used by stonecutters; the fourth was filled up with amphorae of various sizes.*<sup>3</sup>

The storage of wine, which was one of Rome’s staple foods along with grain and oil, whose price could be anywhere from paltry to exorbitant and whose chemistry rendered it particularly susceptible to spoilage and degradation, is of particular interest.

The sheer area required to store Rome’s wine must have been immense based on Tchernia’s estimation that Rome annually consumed something on the order of 1.5 million hectoliters of wine.<sup>4</sup> This simple thought experiment illustrates what the number entails for the area needed for storage. The outdoor trapezoidal complex, styled as the *magazzino annonario* of Ostia (Reg. v. Is. xi. 5), currently holds remains of eighty-four buried *dolia*, though there were likely around one-hundred and ten originally. A *dolium* held anywhere from seven to ten hectoliters. This building then, of approximately 615m<sup>2</sup>, held from 770 Hl to 1100 Hl. Adopting that same volume to area proportion suggest that for Rome to store all its wine in such *dolia* would demand an area of .8–1.2 km<sup>2</sup> (200-300 acres). Of course Romans stored their wines in numerous vessels of different capacities;

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<sup>2</sup> *Ad Romam* 10-13.

<sup>3</sup> Lanciani (1888: 250).

<sup>4</sup> Tchernia (1986).

however, that range gives a reasonable estimate for the area Rome's stored wine would occupy if spread out flat.

Writing in the mid-nineteenth century, Cyrus Redding, journalist and author of a compendium of the world's wines, wrote in rather turgid prose the following on storing wine:

*In treating of the cares of the wine-maker, allusion has been made to the diseases which the contents of his casks may sustain in the cellar before they go out of his hands, or are transferred to the market—in fact, while they are yet preparing for that purpose. The due care of wine in the hands of the mercantile purchaser, or in the custody of the private individual, remains to be noticed. He who has a good cellar well filled, cannot too soon make himself acquainted with its management, and with the history of that beverage which, taken in due moderation, may be reckoned among the most precious gifts of Heaven to the temperate and rational man.*<sup>5</sup>

Redding correctly recognized that, wherever there has been high volume wine trade, commercial cellars have been one of its important features. During the high Middle Ages, merchants went to great lengths to secure favorable wine cellars, and there still exist complaints of merchant vintners about English bailiffs steering them to poorly located cellars.<sup>6</sup> These cellars' importance went beyond storing wine. There, repairs of vessels, sales between merchants, and even eating and sleeping occurred as well.<sup>7</sup> Wine storage facilities at Rome were also important and potentially highly profitable. A fragment of Varro (mid 1<sup>st</sup> century BCE) states that “there are many at Rome who have built wine cellars for a profit” (*aliquot Romae sunt qui cellas uinarias fructuis causa fecerunt*).<sup>8</sup>

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<sup>5</sup> Redding (1851: 325-26).

<sup>6</sup> James and Veale & Veale (1971:76).

<sup>7</sup> *Ibid.* 76-77; (1971: 138-39). Even today these issues arise in commercial wine cellars, which can be a lucrative business. A recent case in Illinois involved Heritage warehouse, which owned and operated a wine storage facility. Heritage not only purchased wines from vineyards around the world, it paid transportation fees including insurance, taxes, and customs. It even determined whether the transportation equipment was to be refrigerated or not. Collins v. Heritage Wine Cellars, Ltd. 2008. US district court for the Northern district of Illinois, Eastern division.

<sup>8</sup> *Men.* 530.

Unfortunately we are almost wholly ignorant where and how wine containers were stored. So far as I know, the only chapter length discussion of wine storage is chapter 5 of Dr. Edward Barry's *Observations Historical Critical and Medical on the Wines of the Ancients and the Analogy between Them and Modern Wines*, published in 1775. Except as an historical curiosity, the chapter is of little modern interest. Barry combines descriptions of *cellae vinariae* from Vitruvius, Pliny, Columella, and Varro and scraps of poetry combined with a somewhat bizarre theory of temperature's effects on wine to give an arresting if less than elucidating account of Roman practice.<sup>9</sup>

The limited modern discussion does not advance our understanding. The following nicely illustrates the problem:

*It is natural for us to want to move beyond a mere catalogue. . . and to ask further questions: what was stored, who was responsible, how was it stored. . . An example of the problems raised by posing such questions can be seen in the case of wine or oil. . . The major problem which has of course preoccupied scholars has of course been grain...<sup>10</sup>*

The questions posed here provide a veritable program of study. Yet, after posing the question, the author immediately turns his attention to grain. Was the storage of wine similar to the storage of grain? We cannot dismiss the possibility out of hand. There are numerous references to storing wine in *horrea* in the juristic sources,<sup>11</sup> so perhaps our task will turn out to be a relatively straightforward adaptation of the scholarship on grain storage. Yet quotes like the following should make us suspicious that storing the two products was basically identical:

*One final group of buildings in Ostia, quite unlike the horrea so far described, remains to be discussed. The buildings concerned each consist simply of a walled area, in which a number of great earthenware jars*

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<sup>9</sup> Barry (1775: 68-87).

<sup>10</sup> Rickman (2002: 358-59).

<sup>11</sup> E.g., *D.* 18.1.74, 33.7.7, 41.1.9.6; *CJ* 4.48.2.



*were embedded in the ground almost up to their necks. . . [i]n Rome itself cellae vinariae might very often have been provided with such dolia defossa of their own . . . [t]he interest of the Ostian examples is that they show how in an area where the majority of inhabitants lived in insulae, without their own storage space, storage for liquids tended to be concentrated at specific points and that the storage capacity could be quite considerable.<sup>12</sup>*

The volume of wine coming to Rome demanded ample storage space. The method of storing wine would have been intertwined with factors of transportation, security, distribution, and wine's biochemistry. Any investigation wine storage ought to take these into account. Unfortunately there is little to go on. The earliest accounts are curiosities, and more recent scholarship has not offered a cogent account but limited itself to short, often platitudinous, pronouncements. Nevertheless, I will try to offer a correction and if my conclusions disappoint by their lack of certitude, it may be worth remembering the observation of theologian and logician Isaac Watts, who cautioned that, "There are a hundred things wherein we mortals . . . must be content with probability, where our best light and reasoning will reach no farther."

### **An Overview of Urban Storage**

The study of perishable food storage in the city of Rome has focused predominately on *horrea* and has primarily limited itself to the study of grain. This product has received the most attention because Rome's government intervened in its supply as early as the Gracchi, and we are comparatively better informed about its supply and distribution than other commodities. There have been two branches of *horrea* studies: material remains (i.e., archaeological remains, inscriptions, and topographical) and the study of how *horrea* were operated, which has primarily used juristic texts.

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<sup>12</sup> Rickman (1971: 73-76).

Scholarship on the former dates back to the late 19<sup>th</sup>/early 20<sup>th</sup> century, and work by Lanciani, Calza, Gatti, Becatti, and Meiggs all deserve mention.<sup>13</sup> On the latter, Alzon & Dumont's *Problèmes relatifs à la location des entrepôts en droit romain* along with articles by Wubbe, Wacke, and Macqueron are essential.<sup>14</sup> The only book length study of *horrea*, Rickman's *Roman Granaries and Store Buildings*, treats both these subjects and remains the subject's fundamental synthetic study.<sup>15</sup> Material remains are more helpful for the present purpose of examining where and in what wine was stored.

The most important early work and the one which launched modern *horrea* studies is Staccioli's article, "Tipi di *horrea* nella documentazione della *Forma Urbis*."<sup>16</sup> In that article, Staccioli examined buildings identifiable as *horrea* from the Severan Marble Plan and compared those representations with archaeological remains, mostly from Ostia. His comparison led him to propose a tripartite typology of *horrea*. It is important to bear in mind, however, that Staccioli was first and foremost interested in Roman topography. His schema tries, therefore, to improve scholars' ability to identify the purpose and location of unnamed and unplaced fragments of the Marble Plan. His article is not at all interested in the socio-economic functions of these building types nor in broader historical issues generally. Somewhat surprisingly, Rickman, whose work does try to place *horrea* in larger historical contexts, more or less adopts this typology, although he considers the most important distinction that between the corridor type and the courtyard type. Because Staccioli's typology has dominated *horrea* scholarship, it is useful to outline briefly *horrea* characteristics and give a few examples.

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<sup>13</sup> Calza and Nash (1960); Gatti (1885); Lanciani (1888), (1897); Meiggs (1960).

<sup>14</sup> Alzon (1965); Macqueron (1979: 199-212); Wacke (1980: 299-324); Wubbe (1959: 508-20).

<sup>15</sup> Rickman (1971).

<sup>16</sup> Staccioli (1962: 1430-40).

The first type of *horrea* takes the form of a long corridor bordered by individual rooms along its length and with a wall surrounding three of the four sides. The figure below presents an example of this type from the Marble Plan. In the center of the fragment, one observes a corridor with an opening on the bottom left with individual rooms along its length. It is comparable to the following small, unnamed *horrea* from Ostia (Reg. I Is. XIII. I).<sup>17</sup>

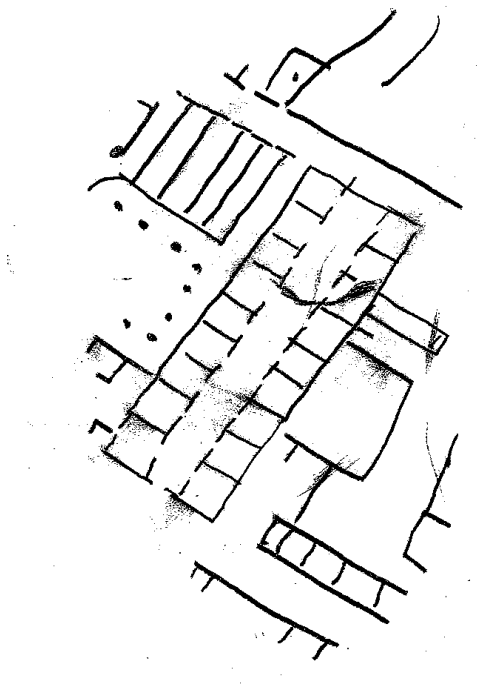


Figure 5.1: Unnamed Corridor Horrea

The second type of *horrea* has three rows of rooms rather than two, and the central corridor is widened into an (often colonnaded) central courtyard. Facing away from the courtyard along the outer walls are often *tabernae* as observed below. In addition these *horrea* could be multi-storied as the two triangles near the entrance below indicate. The *Horrea di Hortensius* in Ostia seems to have been of this type.<sup>18</sup>

<sup>17</sup> After *Pianta Marmorata* (PM) 1960, plate 49 (Frag. 421).

<sup>18</sup> After PM (1960) Pl. 36.

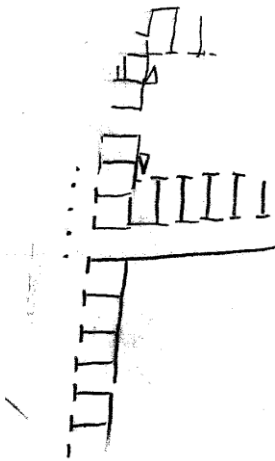


Figure 5.2: Courtyard Horrea

Staccioli's third and final type is basically just a doubling of type two in which one finds two courtyards surrounded by rooms. The two courtyards are connected by interior passageways as the fragment below of the *horrea Lolliana* exemplifies:<sup>19</sup>

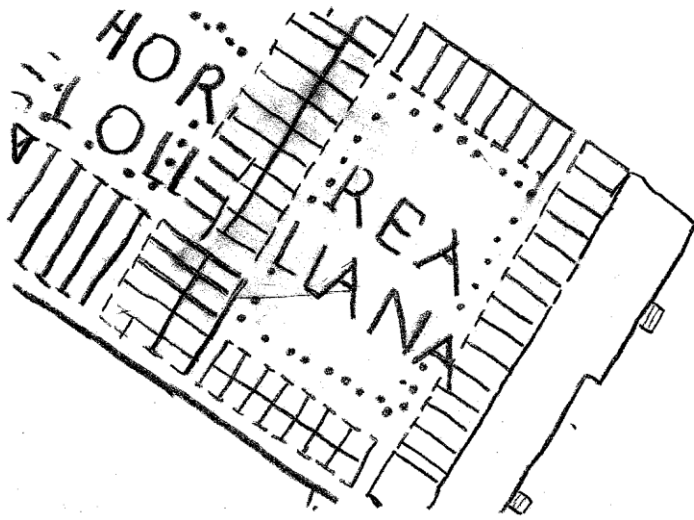


Figure 5.3: Horrea Lolliana

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<sup>19</sup> After *PM* (1960) Pl. 25.

The premise that Ostian evidence can be used as a proxy for missing evidence from Rome underlies Staccioli's types, as the figures above illustrate. Moreover, the method assumes that physical remains can be correlated with the Marble Plan. The case of *insulae* should caution us. One of the most common Ostian types of *insulae* is the so-called *Medianum*, which appears nowhere on the Marble Plan.<sup>20</sup> This is not to say that Ostian evidence cannot be used to discuss Rome. But it must be done carefully. The following section provides an overview of the evidence Ostia provides for storage generally and wine storage particularly.

## Ostia

During the reigns of Trajan and Hadrian the city of Ostia was substantially rebuilt and enlarged, and its urban fabric changed.<sup>21</sup> Under Hadrian bricks became the dominant building materials for surfacing walls.<sup>22</sup> The forum was built up with monumental architecture; the area to the north of the forum was rebuilt, its roads widened, and all earlier remains were swept away.<sup>23</sup> Region II was substantially altered as were areas in the city's southwest, and Ostia's urban fabric changed in countless ways.<sup>24</sup> By the reign of Antoninus Pius, Ostia's transformation was largely complete. This rebuilding was concomitant with Trajan's construction of Portus and the subsequent rerouting of much of Rome's annonal grain from Puteoli.

Attention ought also to be paid to excavation processes and the concerns of the excavators in order to identify confounding variables for discussing Ostian horrea. The first excavations date to the early 19<sup>th</sup> century, but did not begin seriously until, in 1885,

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<sup>20</sup> Reynolds (1996: 168).

<sup>21</sup> Meiggs (1973: 64-78, 133-146).

<sup>22</sup> Meiggs (1973: 68).

<sup>23</sup> Pavolini (1983: 30), "pazzando il resto."

<sup>24</sup> *Ibid.*

P.E. Visconti, under papal dispensation from Pius IX, began a series of excavations that continued until Italian unification in 1871. The first scholarly treatment of Ostia was published in 1912.<sup>25</sup> Over the next twenty years excavations proceeded rapidly under Guido Calza to such an extent that, by the early 1940s, approximately two-thirds of the city had been unearthed. However, these excavations typify some of the worst characteristics of early archaeology: rushed work, poor documentation, and dubious restorations.<sup>26</sup> Moreover, the excavators were only interested in excavating to the Hadrianic levels; consequently, many features of the late-antique city and, in some cases, the earlier city were obliterated.

In the years since archaeologists have become more careful, and there have been new studies of individual structures and of pre-Hadrianic stratigraphic levels. Nevertheless, the city's excavated area is not much more expansive in area than in the 1940s. Moreover, the buildings receiving attention tend to be those of either monumental or art historical interest: temples, baths, *domus*, *insulae*, etc. Relatively few have treated quotidian commercial architecture.<sup>27</sup> On *horrea* in particular, little new has happened. A new project led by Catherine Virlouvet and Brigitte Marin does hope to re-evaluate and, in some cases, (re)excavate Ostian storehouses, but so far the group has only published some preliminary reports on the *Grandi Horrea*.<sup>28</sup>

Moreover, Ostia's unexcavated regions are bunched along the ancient course of the Tiber, areas where we would expect to find commercial docks, loading zones, and

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<sup>25</sup> Paschetto (1912).

<sup>26</sup> Pavolini (1983: 36).

<sup>27</sup> Though see Delaine (2005: 29-47).

<sup>28</sup> For the preliminary report see Bukowiecki and Rouse (2007: 283-86).

buildings.<sup>29</sup> There is some evidence of several more *horrea* on the Tiber's right bank, which is thus far unexcavated.<sup>30</sup> Rickman has called this area a potential Ostian "Trastevere" and claims it is, "an extra warning to us not to draw too many general conclusions about storage at Ostia from the evidence which happens to be available to us."<sup>31</sup>

We are further cautioned by a comparison with Rome, where twenty-seven *horrea* are known by name from epigraphic and literary sources.<sup>32</sup> But Rome's Regionary Catalogues (the *Notitia* and the *Curiosum*) record 290 *horrea* within the city of Rome. In other words only 10% of the Rome's *horrea* are known at all. Further, distinguishing private, non-monumental *horrea* from *tabernae* or other small buildings is difficult. Differentiation at Ostia has relied, *inter alia*, on room size and the construction of rooms' thresholds: identifiable *horrea* tended to have doors that pivoted out from the center whereas *tabernae* had grooves for sliding screens.<sup>33</sup>

This method of identifying and differentiating *horrea* types is problematic. Thresholds are not always well preserved, and the early excavators, generally uninterested in these buildings, did not always record this information. The method also relies on an exceptionally homogenous view of the *horrea* type, which sacrifices potential complexity on the altar of epistemic closure. As we will see in reviewing the Ostian *horrea*, it is quite likely that we have only a small and unrepresentative sample of the city's storage units. And unfortunately, these were not likely where wine was stored.

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<sup>29</sup> These areas are in the Northwest of the city past the *Via del Serapide*, in Region I near the *Horrea Epagathiana*, an area directly to the North of the *Grandi Horrea* as well as an area in between it and the *Piazzale delle Corporazioni*, and in the city's far East. See Coarelli (1996: 108-9).

<sup>30</sup> Pavolini (1986: 99); Heinzelmann (2001: 313-28) thinks there are around ten.

<sup>31</sup> Rickman (2002: 356).

<sup>32</sup> *LTUR s.v. horrea*.

<sup>33</sup> On this, Reynolds (1996).

### *Review of the Identifiable Horrea*

Rickman identifies eleven *horrea* of Ostia and presents a fairly brief outline of the magazine style storehouses at Portus.<sup>34</sup> Subsequent excavation and geophysical survey allows us to identify, with variable degrees of certainty, several others.<sup>35</sup> At Ostia, four are of the corridor variety and six of the courtyard variety. There are several “miscellaneous” types as well. It should be stressed, however, that only one of these warehouses is actually identified as such by contemporary evidence: the *Horrea Epagathiana*, whose name we know from an inscription. Though there is no need here for a detailed repetition, a brief survey is in order to clarify my disagreements with some of Rickman’s conclusions and set the stage for my subsequent interpretation.

There are four corridor-style *horrea* within the walls, none with any identifying inscription. Figures are provided below (for convenience, I refer to these, clockwise, as 1, 2, 3, &4).<sup>36</sup> Buildings 1 & 2 are not “to be compared with the great state warehouses” but are on a more modest scale.<sup>37</sup> All except 4 date from the first half of the 2<sup>nd</sup> century (Trajan/Hadrian); Number 4 was built entirely in *opus reticulatum* and therefore can be dated to the early 1<sup>st</sup> century CE.<sup>38</sup>

Of these, none fit into what we would call a generally commercial urban context. 1 is located on the western side of *Semita dei Cippi*, which intersects the *Decumanus Maximus* about 110m to the north. From there it continues as the *Via dei Molini* towards the river and past the *Grandi Horrea* on the east. *Horrea 2* is also a small building

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<sup>34</sup> Rickman (1971: 15-76, 123-32).

<sup>35</sup> See Heinzelmänn (2001: 313-328) and (2002: 103-121).

<sup>36</sup> After Rickman (1971: 38, 40, 54, 59). Clockwise, these are located in Reg. I. Is. XIII. I, Reg III. Is. XVII.I, Reg. III. Is. II.6, & Reg. IV. Is. V. 12.

<sup>37</sup> Rickman (1971: 40).

<sup>38</sup> Rickman (1971: 59).



located at the western end of the *Via degli Aurighi*. *Horrea* 3 is to the SE of 2, near the intersection of the *Via degli Aurighi* and the *Decumanus Maximus*. It was, however, somewhat bigger than 1 and 2 (two-storied) and preserves evidence of locking devices on its interior cells. 4 was a very small *horrea*, isolated by the Hadrianic period. Surrounded by the *Schola del Traiano*, a bath, and several houses, it had no easy access. Though the building must have still been in use under the early Flavians, the builders clearly did not consider the building of any great importance.

These buildings' location makes them less than likely candidates for bulk storage for items arriving on the river. *Horrea* 1, though facing a larger street, was ca. 400m from the Tiber—a long walk and inefficient use of time for heavy goods unloaded at the quays. *Horrea* 2 was in a more decisively worse location for river traffic. The main, south entrance faced away from the river across the road from the “*Casa a giardino*.” The building's later, north entrance opened onto an alley with access to the *Via del Serapide*, which was narrow and presumably quite crowded. Like 1, 3 had good street access but was even further from the river. Moreover, its locking system might suggest that it catered to clients storing more valuable goods (or for longer periods) than, for example, grain. *Horrea* 4 was far from the river, but the lack of information on its original urban environment makes it difficult to say much more. It is difficult to ascribe any of these to river-oriented, bulk storage.<sup>39</sup>

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<sup>39</sup> After Rickman (1971) 38, 40, 54,59.

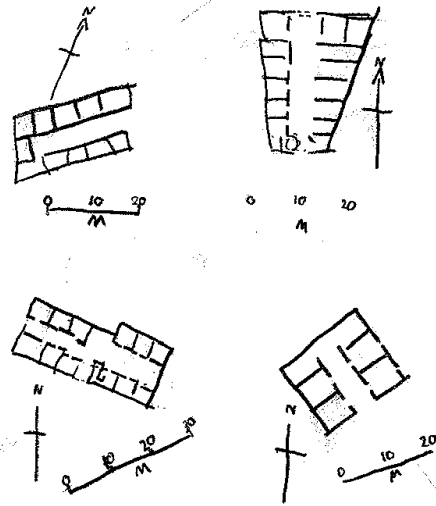


Figure 5.4: Ostian Corridor Horrea

Rickman identifies seven courtyard style *horrea*. In addition, there are two more in the unexcavated, western part of Region III identified by geo-physical survey, whose location is indicated on the figure below.<sup>40</sup>

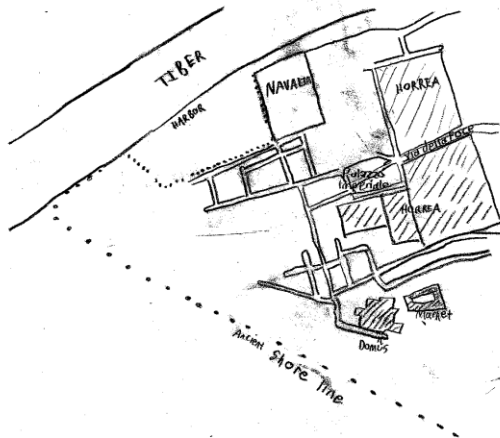


Figure 5.5: Unexcavated Ostian Horrea

<sup>40</sup> After Heinzelmann (2001).

The figures below give the ground plans for the five best preserved Ostian courtyard *horrea* (from left to right: *Horr. I.VIII.2*, *Epagathiana*, *horrea di Hortensius* (V.XII.1), *Horrea dell'Artemide* (V.XI.VIII), and the *Grandi Horrea* II.IX.7)).

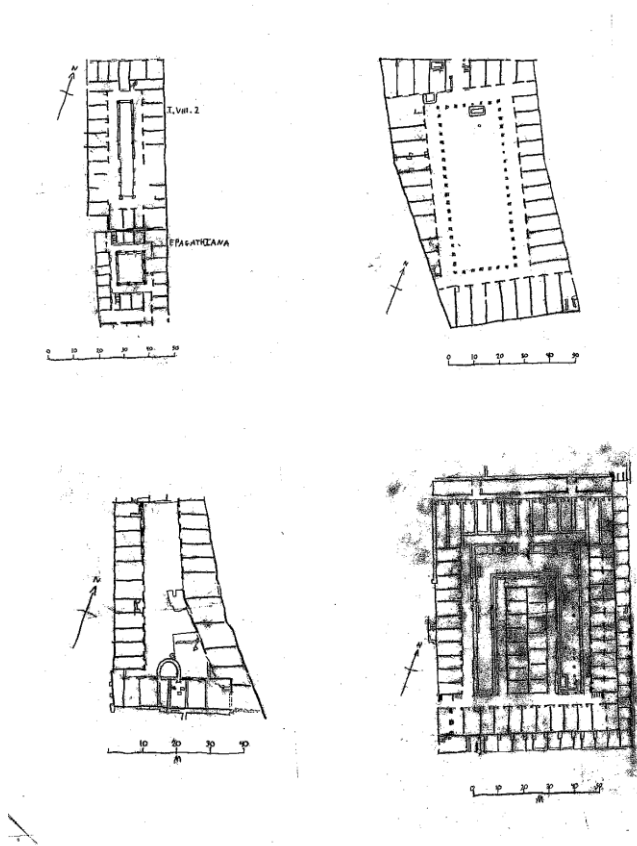


Figure 5.6: Ostian Courtyard Horrea

Of these, the majority run parallel to the Tiber at a distance of ca. 100m from its banks, though presumably less from its wharves. The postulated *horrea* of *Regio III* more than likely had access to both the harbor to the northwest and to the *navalia* to their direct north.<sup>41</sup> Further into the city are four *horrea* in various states of excavation in *Regio V*. Three run along the south edge of the *Decumanus Maximus*: the *Horrea dell'Artemide*, *Horrea di Hortensius*, and a mostly unexcavated but apparently fairly large *horrea* to its immediate east. Though further from the river, frontage onto the *Decumanus* would have

<sup>41</sup> On the harbor and *navalia*, see Heinzelmänn & Martin (2002: 5-19).

made them fairly accessible, and the main entrance to the *Horrea di Hortensius* seems to communicate with the north end of the *Via delle Corporazioni* which terminated at the river.

The most poorly positioned *horrea* is a partially excavated one of *Reg. V Is. I.2*. It was fairly large: its two excavated outer walls measure 59 x 45m. It was situated at the far south end of the *Semita dei Cippi* at its intersection with the *Cardo Maximus*. The walls were primarily of *opus reticulatum*, and it has been therefore dated to the mid-1<sup>st</sup> century CE. The structure's northwest corner preserves a curved wall in *opus latericum*, likely from the 4<sup>th</sup> century, and which Heinzelmann has suggested formed the corner of a small amphitheater.<sup>42</sup> The building was roughly contemporaneous with the first phase of the *Grandi Horrea*, and they are the earliest courtyard *horrea* for which we have evidence.

But Ostia is unusual because it also furnishes examples of storage facilities beyond those two *horrea* types, a type which was used for storing wine: storage in *dolia* (buried and otherwise). Reference to these most often comes in agricultural contexts. Pliny, enumerating regional differences in storing wine, said that residents of milder climates often used buried *dolia*.<sup>43</sup> There are quite a few examples of agricultural *cellae vinariae* which typify this procedure.<sup>44</sup> Burying *dolia* offered several benefits. Most importantly, it kept the wine's temperature reasonably constant, and underground storage kept the wine relatively cool. There are fewer examples of buried *dolia* in urban areas, but they assuredly existed. The jurist Paul says, "if *dolia* buried in *horrea* are not

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<sup>42</sup> Bibliography on this *horrea* is difficult to come by because it has been scarcely excavated, but see the pictures, plan and summary written by Jan Baker at <http://www.ostia-antica.org/regio5/1/1-2.htm>.

<sup>43</sup> *NH* 14.133: *mitiores plagae doliis condunt infodiuntque terrae tota aut ad portionem situs*.

<sup>44</sup> For examples, see especially Brun (2004).

excepted name by name, then they seem to be yielded in the sale of the *horrea*” (*dolia in horreis defossa si non sint nominatim in venditione excepta, horreorum venditioni cessisse videri*).<sup>45</sup> Ostia provides three extant examples of this type of storage plus one known only through archaeological report.<sup>46</sup>

The first is the so-called *Caseggiato dei Doli* (Reg. I.IV.5):<sup>47</sup>

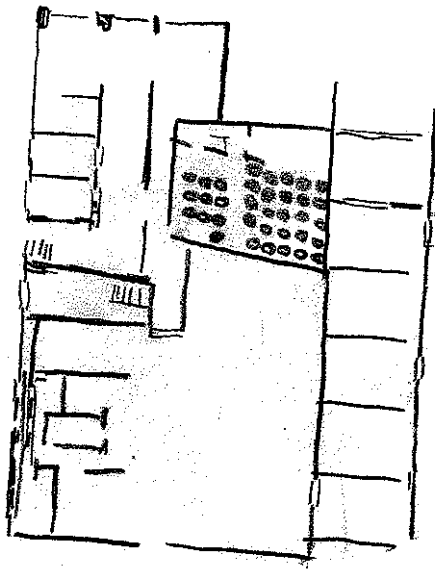


Figure 5.7: Caseggiato dei Doli

It is a late Hadrianic or early Antonine structure, and in it are remains of thirty-five containers with an average capacity of forty amphorae (ca. 1,000 l).<sup>48</sup> On the structure's north side there are two open areas. It is tempting to think that these areas may have had equipment for maneuvering the *dolia* and its wine, but this is speculative without on-site investigation. There were two entrances into the structure, one on the north and one on the southwest leading to an alleyway behind several *tabernae*. To the south was an

<sup>45</sup> *Dig.* 18.1.76.

<sup>46</sup> A fourth building was excavated in the 18<sup>th</sup> century near the *Horrea dei Mensores* (Rickman 1971: 75). It is unfortunate that it no longer exists.

<sup>47</sup> After Pavolini (1986: 78).

<sup>48</sup> Rickman (1971: 75).

apartment complex. Neither the shops nor apartments seem to have had direct access to the wine.

In *Regio III*, on the *Via di Annio*, is another Hadrianic storage facility in which *dolia* have been discovered (III.XIV.3):<sup>49</sup>

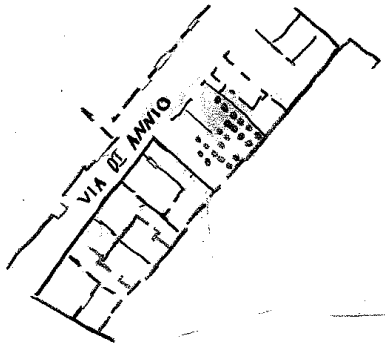


Figure 5.8: Dolia Defossa (Via di Annio)

There are remains of twenty-one *dolia* currently though it is likely that thirty-six *dolia* originally stood there, since other examples show a general preference for symmetrical arrangement. Interestingly, these were not true *dolia defossa*; their current position is due to the ground level's rising, not to an original burial. The building's purpose has been connected with the *Caseggiato di Annio*, adjacent to it and owned by Annius, who was a local merchant.<sup>50</sup>

The largest such storage area is next to the *Horrea dell'Artemide* (V.XI.5).<sup>51</sup>

<sup>49</sup> After Pavolini (1983: 134).

<sup>50</sup> *Ibid.* Annius was an oil-merchant in point of fact, which might suggest that wine was not the *dolia*'s principal item of storage, but this is tentative. Even if true it should not make any difference for including it here.

<sup>51</sup> After Pavolini (1983: 217).

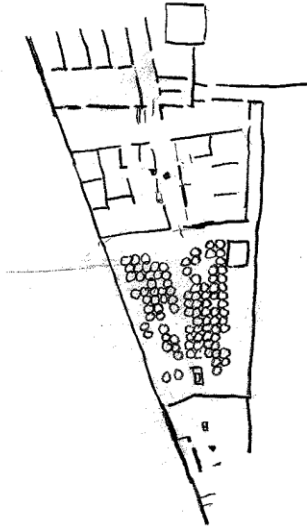


Figure 5.9: Dolia Defossa (V.XI.5)

There were over a hundred *dolia* here, with a total storage capacity of 750 to 1000 hL. As in the previous two examples, the building itself was simply an open area. Access was apparently restricted to the north, though the area to the south with the staircase and columns is not totally excavated. Coming from the *Portico del Monumento Repubblicano*, a narrow alley led past a row of four *tabernae* and into a large hall (the division here into rooms dates to a later remodeling) and thence into the courtyard. It is possible that this complex was associated with the *horrea* next door, though the lack of any communication between the two renders this somewhat unlikely. It is more likely that the *dolia* were designed for longer term storage for local consumption.<sup>52</sup> If we assume that half the *dolia* were used for wine and adopt a personal consumption estimate of .5 – 1 liter per day, then that volume of wine would supply 1,000-2,000 people for a year. That said, it is unlikely that local consumers accessed this store directly: not only was the courtyard not convenient to traffic but also the density of the *dolia* make it difficult to imagine how one reached the items stored in the middle *dolia*.

<sup>52</sup> This was Rickman's interpretation as well, though based primarily on its distance from the Tiber.

The final one was located on the bank of the Tiber in *Regio I* not far from the *Horrea dei Mensesores*, perhaps in between the *Piccolo Mercato* and the *Palazzo Imperiale*, and excavated in the late 18<sup>th</sup> century.<sup>53</sup> Very little is known because the Tiber had already eroded the section's north section. Also, the excavators dug a limited area and left much untouched to the south. Carcopino has given the only description of the building, of which the following is a summary.<sup>54</sup> On the east, Carcopino identified a series of rooms which he identified as magazines based on their shape and dimensions and, to the west, a house about which details are completely lacking. The cellar was apparently accessible on two sides, on the river-side (north) and to the south. The only visual depiction comes from the 1925 *Blue Guide* and is the area labeled *deposito di Olii*.<sup>55</sup>



Figure 5.10: Deposito di Olii

These few nuggets of information are interesting for a few reasons. First, this storage facility may have been more closely tied to river traffic than the other three. That said, like the other three courtyards, this was perhaps closely allied with a non-commercial building: a house. Thus, like the *dolia defossa* of *Reg. I.IV.5* which were also north of the *Decumanus*, these apparently demanded little space and existed separately

<sup>53</sup> Rickman (1971: 75).

<sup>54</sup> Carcopino (1909: 360-61).

<sup>55</sup> The map found at, <http://www.ostia-antica.org/dict/topics/excavations/excavations15.htm>; the identification of this *deposito* from its geographic position along with Carcopino (1909: 361).



from *Regio I*'s large *horrea*. Finally, this site was relatively close to the area Coarelli considers the most likely location for Ostia's *Forum Vinarium*, which he is inclined to situate somewhere in or north of the unexcavated area of *Reg. I.XIV*.<sup>56</sup>

We can use the variation in storage facilities' features to comment more broadly about urban storage in general. Janet Delaine, in a perceptive article published in 2005 on commercial architecture in Ostia argued that, "complexity and potential for multi-functionality have emerged as key characteristics of many commercial spaces."<sup>57</sup> More importantly, she explicitly criticized Rickman's hypothesis that courtyards in Ostian warehouses became more constricted over time due to increasing space constraints. She based her critique on an analysis of the ratios between *horrea*'s open and closed spaces in both the courtyard and corridor type.<sup>58</sup> She then posited that the courtyard served a "specific function, vital to the identity and use of the building."<sup>59</sup> Adopting her definition of open and closed spaces, I push her analysis further. My argument shows that she was correct that warehouses' organization of urban space was their defining feature, not the amount of space itself. Further, I argue that courtyard and corridor *horrea* should not be thought of as two variations of some *horrea* ur-type but as two fundamentally different storage methods.

Delaine astutely realized that the relationship between closed space and open space in *horrea* is a defining (and measurable) feature. There are, however, more sophisticated statistical methods available for interpreting what these ratios mean. What we need is a method for directly comparing those measurements. My method was as

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<sup>56</sup> Coarelli (1996).

<sup>57</sup> Delaine (2005: 45).

<sup>58</sup> *Ibid.* 41.

<sup>59</sup> *Ibid.* 42.

follows: onto nine *horrea*—five courtyard style and four corridor<sup>60</sup>—I overlaid a grid, any point of which was definable by x/y coordinates. I then used a random number generator to generate, for each *horrea*, ten sets of coordinates. For each point, I determined whether it fell in an open, closed, or ambiguous space.<sup>61</sup> Each assignment received a number: 1 if open, 2 if closed and 1.5 if ambiguous. For each space, the value of what might be called its Closed-Ratio (CR) was determined by summing those numbers. As a control and further point of comparison, I determined the same values for five areas of the Ostia.<sup>62</sup> Thus, CR values range from 10 (perfectly open) to 20 (perfectly closed). The following table summarizes the results:

Sample	CR_City	CR_Courtyard	CR_Corridor
1	15	13.5	18
2	14.5	17	17
3	17	15	18
4	16.5	13	14.5
5	15.5	15	17
Mean	15.7	14.7	16.9

Figure 5.11: Interior Spatial Distribution

These raw numbers are unsurprising: the city taken wholly is neither radically open nor closed; courtyard style *horrea* are somewhat more open than the city generally,

<sup>60</sup> *Piccolo Mercato, Horrea dell'Artemide, Horrea di Hortensius, Horrea Epagathiana*, and that of *Reg. I. VIII.2*; for the corridor, *Reg.III.XVII.1, III.II.6, IV.V.12, I.XIII.1*.

<sup>61</sup> Open spaces include courtyards, roads, porticos, etc. Closed spaces are anything narrowly defined by walls, e.g., *cellae*, rooms of *insulae* and *domus*, etc.

<sup>62</sup> Two from *Reg. I*, two from *Reg. II*, and I from *Reg.III*. I avoided areas that had large unexcavated areas because excavations tend to favor areas that have a high percentage of “closed” space, so there was too high a chance of sampling bias by indiscriminately using all regions of the city. The corridor-*horrea* of *Reg. III.XVII.1* was sampled twice.

both of which are more open than corridor *horrea*. It is unclear from these data, however, whether these differences are particularly significant. We can make more precise the meaningfulness of the variation in spatial distribution recorded above by analyzing the significance of the difference between the variances.<sup>63</sup> The results are summarized in the table below:

Group	F(Fisher Value = $t^2$ )	$\rho$ (Significance)
All	3.26	.07
City-Courtyard	1.41	.27
City-Corridor	2.30	.17
Courtyard-Corridor	5.37	.05

Figure 5.12: Significance of Difference

This analysis allows us to generalize Delaine’s observation that the percentage of closed spaces on roads and *caseggiati* was not uniformly different from corridor style *horrea*.<sup>64</sup> The lack of strong, statistically discernible distinction between the CR values for the city as a whole and corridor style *horrea* implies that the city itself must have offered a great deal of storage space in non-architecturally distinct forms. In other words, there is no statistically discernible distinction in the spatial variation of the buildings standardly identified as storage buildings. There were plenty of non-architecturally distinct locations within the city equally suitable for storage. The areas for *dolia* storage furnish just such an example. As we have seen, fairly impressive volumes could have

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<sup>63</sup> We can compare the difference between these means by using a one-way ANOVA to test the null hypothesis that these three samples came from three populations with the same means as a way of comparing the underlying populations. For these three means, F(Fisher Value)=3.26 (equivalent to Student’s T-Test ( $F=t^2$ )), which is significant at .075. In other words, there is good reason to suspect that the variance between those means results from a legitimate difference between the populations.

<sup>64</sup> Delaine (2005: 41-42).

been stored in relatively small areas. The architecture of those areas was not singular but was a simple courtyard. If *dolia* had not been preserved in them, more-or-less *in situ*, it is unlikely we to have divined their function. To put it another way, Ostia's urban grid offered numerous areas suitable for storage that were not architecturally distinct.

Second, these numbers demonstrate how misleading it is to group *horrea* together by type since both courtyard style *horrea* and corridor *horrea* have, at least as far as their spatial proportions, more in common with the city at large than they do with each other. In fact, the difference between the CR ratios of courtyard and corridor *horrea* are the only one we can state at a 95% confidence level did not come from two populations with the same mean. In other words, Staccioli's precedent of labeling these two building styles as two types of the same fundamental type was counterproductive.

Why then did these two architecturally distinct storage forms arise? Staccioli believed there had been an evolution from the corridor type to the courtyard type because two of the oldest extant *horrea* in Ostia are in the former style.<sup>65</sup> This suggestion is unconvincing. As Rickman pointed out, the *horrea Galbana* of Rome is of the courtyard type and predates any Ostian *horrea*.<sup>66</sup> Rickman tried to answer the question by determining whether Romans copied or adapted other, older Mediterranean powers' solutions to storage.<sup>67</sup> His approach is problematic because it tacitly assumes that a storage specific architectural form is required for effectively storing goods. The analysis above, however, shows that this is not so. An alternative hypothesis is to assume that both *horrea* forms were variations of the general urban grid, one which has become marginally

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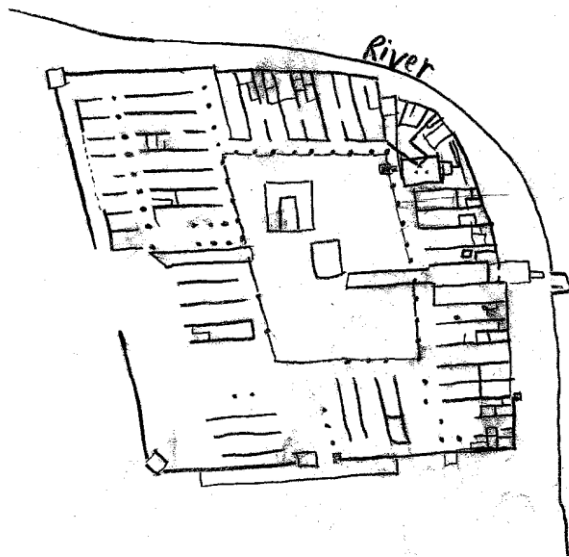
<sup>65</sup> Staccioli (1962: 1438).

<sup>66</sup> Rickman (1971: 148).

<sup>67</sup> *Ibid.* 148-155.

(but not significantly) more closed and the other marginally (but not significantly) more open than the city at large and ask why this variation from the mean occurred.

Rickman provided plans for storage complexes outside of Rome and Ostia from Portus, Lepcis Magna, Constanza on the Danube, Myra and Patara in Asia Minor, and Djemila in modern Algeria, but these are all fairly late (postdating the large complexes at Rome), and none of them remotely resembles a courtyard *horrea*.<sup>68</sup> An article from the late 2000s on early Roman *horrea* at Nauportus is instructive.<sup>69</sup> The *vicus* of Nauportus lay on the Ljubljana River and lay along trade routes between Northern Italy (Aquileia) and Danube regions to the north and east. The Roman settlement of Dolge Njive was situated on a river bend and was apparently an early Roman trading post dating to the early Augustan period.<sup>70</sup> Geophysical survey in 2003 and 2004 produced the following:<sup>71</sup>



**Figure 5.13: Horrea at Nauportus**

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<sup>68</sup> Rickman (1971: 123-47).

<sup>69</sup> Horvat (2008: 111-21).

<sup>70</sup> Horvat (2008: 113).

<sup>71</sup> After Horvat (2008: 115).

The basic ground plan is that of a central, slightly oblong market surrounded by storage cells and surrounded by a colonnade. At the southwest are eight rooms which have been identified as *tabernae*. The whole market area is surrounded by defensive walls with four towers, and, beyond the north gate, there were probably piers and wharf establishments. Horvat compares the rows of *horrea* here to corridor style *horrea*.<sup>72</sup> This is an odd comparison. Though it is true that the *horrea* themselves are in rows, the market, taken wholly, looks strikingly like a courtyard style *horrea*. This similarity raises the possibility that courtyard style *horrea* and this type of market arrangement were designed as solutions the same problem.

In Ostia, the largest imperial *horrea*, the *Grandi Horrea* and *Antoniniani*, were likely instrumental in the organization and movement of the *annona*: Many of Ostia's grain mills and bakeries congregated near the *Grandi Horrea*, and its open design must have facilitated local commerce as well.<sup>73</sup> The open spaces may have held auctions for goods stored within.<sup>74</sup> The famous *leges horreorum* from Rome both mentioned the leasor's ability to rent *intercolumnia*.<sup>75</sup>

This reference is somewhat mysterious: As Rickman points out, goods placed between a courtyard's central columns would be unsafe and get in the way.<sup>76</sup> Perhaps the columns are those of the portico and were rented separately because the area was partially sheltered from the elements. But we should not discount the possibility that the areas were not rented out for storage but for other commercial activities. After all, *armaria*

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<sup>72</sup> *Ibid.* 116.

<sup>73</sup> Bakker (2001: 179) argues that a portion of Ostia's residents likely received bread and grain like Romans and the *Grandi Horrea* may have been associated with that too.

<sup>74</sup> Delaine (2005: 41-2)

<sup>75</sup> *CIL* 6.33860, 6.33747, 6.37795.

<sup>76</sup> Rickman (1971: 197-98).

were rentable also, and these were generic storage cupboards but often associated with money.<sup>77</sup> It is not amiss to think of courtyard *horrea* as a dedicated-to-storage forum in which a range of accompanying commercial activities occurred.

### **Storage at Rome**

Ostia has demonstrated that storage should not be analyzed on the basis of overly schematic types but rather as an activity taking place throughout the city. Most characteristic types significantly differ from one another for reasons having less to do with the narrowly defined purpose of storage and more to do with the other commercial activities accompanying storage itself. We have also seen that wine storage, at least in *dolia defossa*, was of a different nature than goods kept in the various *horrea*. Here, I argue that wine in Rome was stored both in *horrea* and in *cellae vinariae* and that these *cellae* likely had fixed or semi-fixed *dolia*.

Two words are used for describing storage complexes at Rome: *horreum* and *cella*. The distinction between these two words has not drawn much attention. Almeida-Rodriguez suggests that, in literary contexts, *cella* refers generally to a private storeroom for a specific use but that, in epigraphic sources, *cella* is synonymous with a *horreum* for a specific good.<sup>78</sup> His first assertion appears correct: as early as Plautus, *domus* are equipped with *cellae* for storing wine.<sup>79</sup> In Cicero's *In Pisonem*, it is a calumny to lambaste Piso for having no *cella* and therefore needing to buy his bread and wine from a bar (*panis et vinum a propola atque de cupa*).<sup>80</sup> But this was not a hard distinction.

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<sup>77</sup> E.g., Cic. *Cael.* 52; *Cluent.* 179.

<sup>78</sup> Rodriguez-Almeida (1984: 36).

<sup>79</sup> E.g., *Mil. Glor.* 852/853; *Ibid.* 857: *Vos in cella vinaria Bacchanal facitis.*

<sup>80</sup> *Pis.* 67.6.

Horace, for example, refers to amphorae of old wine standing in the house's *horreum*.<sup>81</sup> It is true that the distinction between *horreum* and *cella* in an urban context depends on whether it was dedicated to a specific good, but only partly: there are several examples of product-specific *horrea*. In Rome, for example, were the *horrea Piperataria*, *Candelaria*, and *Chartaria*. *Dig.* 33.7.7 refers to a legated *horreum vinarium*. A recently published inscription from North Africa records that the proconsul Macedo had his factotum Marius Victorianus build an (*h*)*orreum oliarium adq(ue) frumentarium*.<sup>82</sup>

The combination of *horrea et cellae* was a formulaic phrase used to encompass all storage buildings. Cicero described Capua as the *cella atque horreum Campani*.<sup>83</sup> Manilius, describing how *spica* (an ear of grain) shelters its grains, claims that it furnishes (*praebere*) *cellas et horrea*. In the Theodosian Code, a fine of five pounds gold is to be levied upon anyone who vindicates for himself (*sibimet. . . ausi fuerint vindicare*) any supplies held by the bread-makers from the public or private storerooms (*ex his horreis cellulisque*).<sup>84</sup> Thus Staccioli and those following him did not give a robust account of Rome's areas for storage because they focused solely on *horrea* which conformed to a few basic architectural forms.

Not only have *cellae* been ignored almost entirely but the analysis of *horrea* on the basis of a schematic typology has skewed our interpretation. For example, Rome's Regionary Catalogues (the *Notitia* and *Curiosum*) list 290 *horrea* spread throughout the city of Rome. The Catalogues never use the word *cella*. But it is difficult to believe that

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<sup>81</sup> *Carm.* 2.14.25.

<sup>82</sup> *AE* 2002, 1670. The inscription is late (post 300), but I see no reason to believe that it is different from earlier word usage.

<sup>83</sup> *Leg. Agr.* 2.89.7. Cf. also *Paneg.* 8.13, *plena fuisse horrea, plenas cellas*.

<sup>84</sup> *CTh.* 14.15.4.1. *Cellulae* is synonymous with *cella*, as shown by *CTh.* 9.45.4.pr, which refers generically to temples' *cellulae* as opposed to *cellae*.



*Regio X*, for example, had 48 *horrea* all of which were multi-roomed complexes corresponding to one of Staccioli's types. It is more plausible to assume that the Catalogues' word *horrea* included *cellae* as well.

True, the *lex horreorum* of Q. Tinius Sacerdos did not list *cellae* as rentable units but listed *horrea*, *apothecae*, *compendiaria*, *armaria*, *intercolumnia*, and *loca armaris*.<sup>85</sup> But in *Dig.* 1.15.3.2 (Paul) states: "Break-ins generally occur in apartment complexes and storehouses, where people place the most precious part of their fortunes, when either the *cella* or cupboard or lockbox are broken..." (*Effracturae fiunt plerumque in insulis in horreisque, ubi homines pretiosissimam partem fortunarum suarum reponunt, cum vel cella effringitur vel armarium vel arca...*). Rickman suggests that *cella* here was equivalent to *apothecae*, and he may be correct,<sup>86</sup> but Paul was speaking not simply of *horrea* but both of *horrea* and *insulae*. He used the word *cellae* because of its generalness: *cellae* were small storerooms found throughout the city's landscape as opposed to *apothecae*, which seem to have been a more technical phrase if the inscription's usage was typical.<sup>87</sup> We need not push this evidence too far, but we can use it as the basis for the following hypothesis: the distinction between *horrea* and *cellae* did not depend on product specificity but on its architectural form and raises this question: were *cellae* stand-alone units or nestled within the general urban fabric?

We can answer this question best by using excavation reports and the extant portions of the Severan Marble Plan. In contrast to Ostia, excavation of storage complexes in Rome is of poor value. Of the Rome's large *horrea*, only the *Horrea*

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<sup>85</sup> *CIL* VI 33860=*ILS* 5913.

<sup>86</sup> Rickman (1971: 198).

<sup>87</sup> *Apothecae* do appear in the *Digest*, for example, 19.2.11 (Ulp) *qui vinum. . . in apothecam deposuisset* or 9.3.5.3 (Ulp) *Horrearius aut conductor apothecae*. In both cases, *apotheca* appears to have carried a more technical weight than *cella* in the passage adduced above.

*Agrippiana* courtyard was excavated and left open to the public.<sup>88</sup> The *Horrea Piperataria*, attributed to Domitian by the Chronographer of 354 and obliterated by the Basilica of Constantine,<sup>89</sup> was partly excavated by Lanciani in 1899<sup>90</sup> but was only briefly published by Barosso in 1940,<sup>91</sup> and its study has been “bedeviled by a misidentification in the early part of the century.”<sup>92</sup> This is the sum of our archaeological knowledge of *horrea* within Rome.

Scholars have turned to the Severan Marble Plan to make up for the deficiency in material remains.<sup>93</sup> The Marble Plan is, however, fraught with interpretative difficulties. The plan itself was commissioned by Septimius Severus in the third century, measured some 40 by 60 meters, was mounted on a wall of the *Templum Pacis* (currently the back wall of the church of SS. Cosmas and Damian in the *Forum Romanum*), and depicted a detailed (if not always accurate) visual depiction of the city in 1:240 scale.<sup>94</sup> Approximately 10% of the plan is still extant or known from Renaissance drawings, and about half of those fragments can be placed in their topographical context.<sup>95</sup>

Numerous *horrea* appear on the plan, though the *Horrea Lolliana* is the only storehouse labeled as such.<sup>96</sup> Both courtyard and corridor *horrea* are visible on the plan, but a third type, unknown at Ostia, is too.<sup>97</sup>

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<sup>88</sup> Rickman (1971: 87); Bauer and Pronti (1978: 132-46); Astolfi (1981: 33-48).

<sup>89</sup> *MGH* (1892: 146) *Multae operae publicae fabricatae sunt. . . horrea piperataria ubi modo est basilica. Constantiniana.*

<sup>90</sup> Lanciani (1900: 8-13).

<sup>91</sup> Barosso (1940: 58-62).

<sup>92</sup> Rickman (1971: 104).

<sup>93</sup> The most useful publications on the Marble Plan (*FUR*): Carettoni et al. (1960); Rodriguez-Almeida (1980); Reynolds (1996). The website <http://formaurbis.stanford.edu> is an invaluable resource.

<sup>94</sup> For a history of the plan, Carettoni et al. (1960: 25-31).

<sup>95</sup> Reynolds (1996: 15).

<sup>96</sup> E.g., fragments 24, 25, 33, 44, 92, 138, & 150. On the *Horrea Lolliana*, Carettoni et al. (1960, 83) and Rickman (1971, 109).

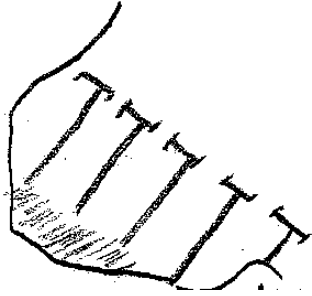


Figure 5.14: Roman Horrea Type

This new type was not organized either around a central corridor or courtyard; rather, it consisted of single, outward-facing rooms.<sup>98</sup> *Pace* Reynolds, there are no examples of this type from Ostia. In some cases, these types of rooms are found nearby other, larger storage complexes, for example, on fragment 421. And in the areas away from the wharves around the Tiber, they are the dominant type.<sup>99</sup> The rooms, except for their tendency toward elongation, are indistinguishable from *tabernae* and other unidentifiable buildings on the Marble Plan. In fact, not only are the rooms indistinguishable but they also often back onto open courtyards whose purpose is unclear. Surely storage of goods must have been common, as the example below shows:<sup>100</sup>

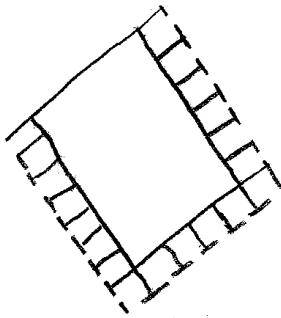


Figure 5.15: Roman non-Horrea storage facility

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<sup>97</sup> FUR #594 after *PM* (1960) Pl.

<sup>98</sup> Reynolds (1996: 183-84).

<sup>99</sup> Reynolds (1996: 238).

<sup>100</sup> FUR #137, 563 after *PM* (1060) pl., 37, 54.

These rooms seem, therefore, to be exactly the type of storage complexes whose existence we postulated on the basis of statistical analysis of Ostian warehouses and whose spatial relationships are indistinguishable from the urban fabric at large. A good example of the way any open urban space could be used for storage comes from *BGU* 2.606, which relates that a certain Aurelius Polion rented some urban space which included a courtyard for cows and two adjoining rooms for storing fodder.<sup>101</sup> I suspect that, in the phrase *horrea et cellae*, these single room for storage, scattered throughout the city, is what Romans had in mind with the latter word.

Although the largest *horrea* of Ostia did congregate near the river, it is misleading to conclude of that the city's *horrea* were all concentrated in a "storage district." This argument holds true for Rome as well. One way to test this is by examining the correlation between storage units and population density. If Rome had dedicated storage districts, we would hypothesize that they would tend to be away from its most densely populated areas.

The Regionary Catalogues give raw numbers of *horrea* for the city of Rome. Rickman used these numbers to conclude that *horrea* were scattered throughout Rome and that their "differing density of distribution makes sense when the character of the individual regions" are taken into account.<sup>102</sup> Reynolds pointed out that Rickman's conclusions, while unexceptional in their general claims, were skewed because Rickman's argument did not take into account Rome's regions' differing sizes. Reynolds therefore converts the Catalogues' raw numbers into densities, which we can use to test

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<sup>101</sup> βούλομαι μισθώσασθαι παρὰ σοῦ [τ]ὴν ὑπάρχουσάν σοι ἐν τῇ μη[τροπό]λει ἐπ' ἀμφόδου Φρεμει ἀύλην βοῶν, ἐν ἧ̄ κέλλαι δύο [πρὸς ἀ]πόθεσιν ἀχύρου καὶ χόρτου ἐπ[ὶ] χρόνον ἕτη [π]έντε ἀπὸ τοῦ Ὀ[ντο]ς μηνὸς Φαμενώθ (3-6).

<sup>102</sup> Rickman (1971: 323-25).

our hypothesis.<sup>103</sup> Here, I use densities of *insulae* and *domus* as proxies for population numbers. The next page presents a bar-graph of scaled densities (X-axis is Rome's 14 regions; Y is number of buildings).<sup>104</sup>

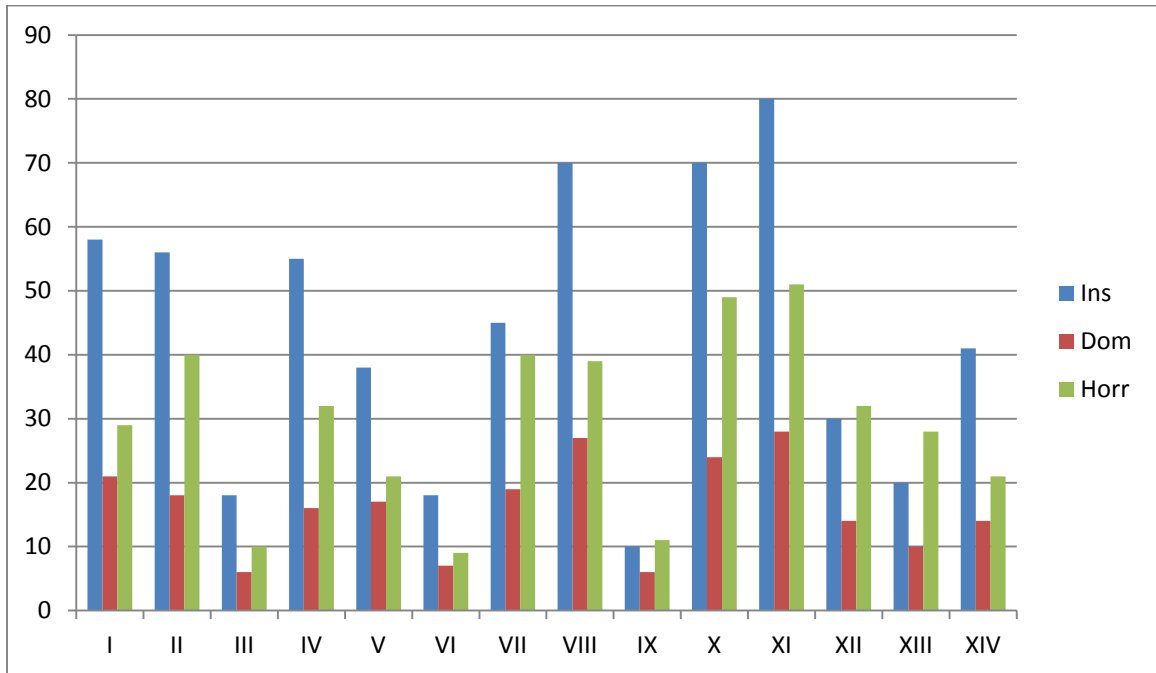


Figure 5.16: Insulae, Domus, and Horrea Densities at Rome

Visual inspection suggests that there is strong correlation between each region's building numbers. Regression of the densities of *Insulae* and *Domus* onto *Horrea* confirms that these two factors have good predictive value for the number of *horrea* ( $R^2=.78$ ).<sup>105</sup> We should not misinterpret this correlation to argue against the commonsense observation that a great deal of Rome's storage occurred along the Tiber. It did; the *Catalogues* do not distinguish *horrea* by size, and it stands to reason that the Aventine and the southern *trans Tiberim* possessed Rome's largest *horrea*. These met the organizational demands for Rome's grain storage and distribution and may have been the

<sup>103</sup> Reynolds (1996: 237-39); for density tables, 414-417.

<sup>104</sup> Densities of *Domus* and *Insulae* were simply multiplied by 10 to regularize the table's scale.

<sup>105</sup> Performed using Wessa, P. (2010), Free Statistics Software, Office for Research Development and Education, version 1.1.23-r6, URL <http://www.wessa.net>.

first stop for other goods prior to their distribution throughout the city. This correlation does, however, bolster the contention that storage facilities were spread throughout the city in a fairly regular fashion. These urban storage units must have included facilities for storing wine, analogous to those of Ostia. It remains to be seen, however, whether urban *cellae vinariae* had any special, defining features.

Varro wrote, in a fragment of unrecoverable context, “*Aliquot Romae sunt qui cellas vinarias fructuis causa fecerunt.*”—At Rome, there are many who built (or have built) *cellae vinariae* for profit.”<sup>106</sup> This is the only literary reference to urban wine cellars. There are, however, numerous references to rural wine cellars in Cato, Varro, Columella and Pliny. Operating on the assumption that Varro chose the phrase *cellae vinariae* deliberately, examining other uses of *cellae vinariae* should be instructive. This inspection reveals that *cellae vinariae* have a single, defining characteristic: permanent installations for storing wine.

In Varro’s agricultural writings, a *cella vinaria* was necessary for producing and storing wines. He praised villas which had, among other accoutrements, *cellae vinariae* of suitable size (*ad modum agri aptam*) and with a floor sloping into a vat (*lacus*) where new wine could ferment.<sup>107</sup> Cato also treated *cellae* as both a place for production and long-term storage. He advised that a well-built *villa* should have a wine-cellar, oil-cellar, and many *dolia*.<sup>108</sup> Likewise, the *cella* (here an oil-cellar)—which also includes a *lacus*<sup>109</sup>—should be near a press-room (*torcularium*).<sup>110</sup> Columella echoed those precepts

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<sup>106</sup> *Men. Frag.* 530.

<sup>107</sup> *Rust.* 1.13.6: *illic laudabatur uilla, si habebat culinam rusticam bonam, praesepi[i]s laxas, cellam uinariam et oleariam ad modum agri aptam et pauimento procliui in lacum, quod saepe, ubi conditum nouum uinum, orcae in Hispania[m] feruore musti ruptae neque non dolea in Italia.*

<sup>108</sup> *Agr.* 3.2.

<sup>109</sup> *Agr.* 67.2.

and added that these *cellae* should be dry and at a distance from baths, furnaces, and manure, all of which could cause the wine to spoil.<sup>110</sup> Likewise *D.32.93.4* (Scaev.), in a discussion on legacies, asked about *dolia* and *cuppae* which were fixed in the cellar (*vasa vinaria, id est cuppae et dolia, quae in cella defixa sunt*). Is there any evidence that Rome's urban *cellae vinariae* were labeled thus because they also possessed permanent or semi-permanent installations for storing wine?

Unfortunately, only five of Rome's *cellae vinariae* are known by name, one through excavation and four through epigraphy. The *Cella Civiciiana* is known only by a dedicatory inscription by its *vilicus* to *Silvanus*.<sup>111</sup> Its identification as a cellar for wine relies, so far as I can tell, solely on *Silvanus*' role as dedicatee. Likewise, the *Cella Groesiana* is known only from a dedication of a *M. Scanianus Zosa* to *Sol, Luna, and Silvanus*. The *Cella Nigriniana* is known from a fragmentary inscription and is assumed to have provided storage for wine because the inscription is flanked by pictures of two *dolia*.<sup>112</sup> Unlike the first two *cellae*, both of which were found near the river in Trastevere, this *cella* was apparently situated away from the river, on the Quirinal to the west of Trajan's markets.<sup>113</sup> Last is the *Cella Saeniana*, known only from an inscription on the base of a statue of *Liber Pater*.<sup>114</sup>

The single *cella vinaria* excavated is the *cellae vinariae Nova et Arruntiana*. The name is known from *CIL VI 8826*, which is a dedication to *Liber Pater* and *Mercury* by those who did business in the *cellae vinariae Novae et Arruntianae Caesaris*. During

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<sup>110</sup> *Agr.* 65.2, 66.1.

<sup>111</sup> *Rust.* 1.6.

<sup>112</sup> *AE 1937*, 61.

<sup>113</sup> *CIL VI* 31065.

<sup>114</sup> *LTUR* (1993) v.1 *ad loc.*

<sup>115</sup> *AE 1971*, 30.

excavations, begun in 1878 with the construction of new embankments along the Tiber, numerous fragments of *dolia* were found in general dispersion and rows of *dolia* were found in rows parallel to the columns of the portico.<sup>116</sup> Unfortunately for the excavators, Rome's water table had risen by the late 19<sup>th</sup> century from the Roman period, and these rooms were flooded up to their ceilings, and the water likely washed away more than it left behind.<sup>117</sup> The following is its plan.<sup>118</sup>

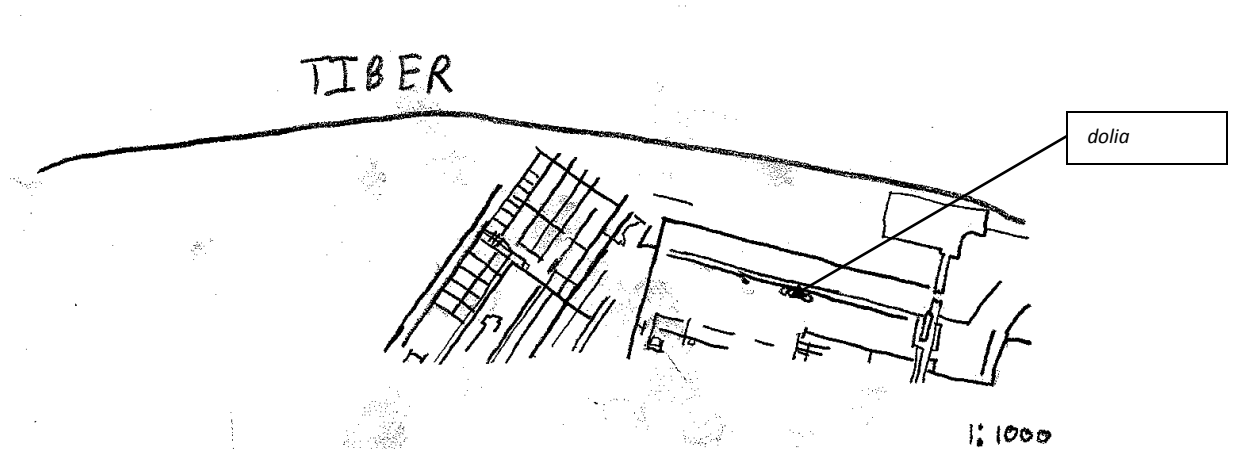


Figure 5.17: Cellae vinariae Nova et Arruntina

The complex consisted of two quite different parts. On the south was a two-story area with a courtyard and cells away from the river and, along the river, a group of double cells with a shared wall.<sup>119</sup> To the east, one sees a large open area with the remains of a long, double portico. It was along this portico that the remains of the *dolia* were found. On the one hand, we should be cautious in taking this one example as representative. In many ways, it was surely not. In the first place, by the time the inscription was written, the complex had become imperial property, and its activities

<sup>116</sup> *NSc* (1880: 140).

<sup>117</sup> Lanciani (1897: 31).

<sup>118</sup> After *NSc* (1880) Pl. 4.

<sup>119</sup> Richardson (1992: 80).



were sufficient to warrant its *negotiatores* to form a *collegium*. On the other hand, like the four examples from Ostia, this too apparently had more-or-less permanent features, that is, *dolia* installed under the portico (where the shade would help keep its contents cool).

Non-imperial *cella vinaria* were likely much the same, though presumably smaller. And there is at least some circumstantial evidence reinforcing my contention that it was in such semi-permanent installations that much of Rome's wine was stored. In 1596, Andrea Bacci, physician to Pope Sixtus V and scholar of ancient medicine and science, while discussing the Roman practice of burying *dolia* for storing wine when the ground was soft enough, added parenthetically, "such as even to this day we see unearthed here and there outside the city's walls—and of large capacity." (. . . *talia adhuc extra moenia urbis vidimus eruta aliqua, peramplo ventre.*)<sup>120</sup> Similarly, Lanciani tells of a number of excavations in which wine cellars were uncovered:

*Fresh excavations were opened in the same place along the northern slope in 1813 and they led to the discovery of other groups of amphorae set up against the walls of the caves in parallel lines Other amphorae came to light in 1868 together with the inscription of Tychicus near the gate of the Trinita de Monti This last find seems to indicate that wine cellars were established not only in a place naturally exposed to the tramontana and shaded from the sun but wherever the building of the substructures afforded an opportunity to create subterranean vaults under the terraces of the villa.*<sup>121</sup>

Lanciani tells of similar finds elsewhere, though caution must be taken about assuming that all amphorae found in neat rows were part of a wine cellar because the Romans often used amphorae in building walls. Though the example above was certainly from a residential wine cellar, his depiction reinforces our belief that wine storage

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<sup>120</sup> *De naturali vinorum historia*, 1.8.

<sup>121</sup> Lanciani (1896: 427).

occurred throughout the city and often had permanent or semi-permanent wine-specific features.

It is still unclear, however, how these *cellae vinariae* fit into the city's wine distribution network and why they remained so scattered. A late inscription—from the late 4<sup>th</sup> century—may help explain these *cellae*'s role in the storage and distribution of wine at Rome. The fragmentary inscription, *CIL VI 1785=31931* reads as follows:

*Austoribus in cupa una numm(i) xxx / tabulariis in singulis apocis  
numm(i) xx / exasciatori in cupa una numm(i) x / falancariis, qui de  
Ciconiis ad templum cupas / referre consuerunt numm(i) [---]. / custodibus  
cuparum [---] / df (sic) ampullis placuit ut post degustatio[nem] /  
possessori reddantur / professionariis de Ciconiis statim ut adveneret /  
vinum in una cupa numm(i) cxx.*

For the drainers 30 coins per barrel/For the bookkeepers 20 coins for each receipt/For the carpenters (?) 10 coins per barrel/For the “Falancarii”, who are accustomed to transport the barrels to the temple, [...] coins. To the guardians of the barrels[...] With regards to the flasks, it is decreed that they be returned to their possessor after the tasting. To all those who make a declaration that wine should arrive immediately from the *Ciconiae*, 120 coins per barrel.

The inscription was found in 1785 during some building on *S. Silvester in capite* and has been related to the management of the *vina fiscalia* which were first included as part of the *annona* during Aurelian's reign and probably hung prominently within the aforementioned porticos of the *templum Solis*.<sup>122</sup> Its immediate point was to enumerate the tariffs payable to various occupations connected with the transport and testing of fiscal wine. Interpretation is made difficult both by the vocabulary (*Austores*, *exasciator*, and *professionarii* are *hapax legomena*) and by the inscription's syntactic compression.

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<sup>122</sup> *H.A. Aurel.* 48.4 states that Aurelian, “. . . cogitasse quod in porticibus templi Solis fiscalia vina ponuntur, not gratuita populo eroganda sed pretio.”

Interpretations have differed,<sup>123</sup> but it seems to describe a process something like the following: wine came on ships down (or up?) the Tiber on *naves vinariae*<sup>124</sup> at which point the *austores*, an occupation likely connected etymologically with the verb *hausere*, drained and transferred the wine into new containers for transport. Wine was then transferred from the *Ciconiae*—likely on the Tiber in the north of the Campus Martius<sup>125</sup>—and thence to the temple for tasting and measurement after which the emptied vessels were returned to the *Ciconiae* for refilling.

Vera's interpretation differs from his predecessors' (except Pena in part) in his interpretation of how the wine was distributed from the temple. The prevailing opinion has been that wine was not only transported to the *templum Solis* but also sold there. Vera points out that neither this inscription nor the passage cited from the *Vita Aureliani* mentioned sale of wine. Moreover, Symmachus averred that Rome's *caupones* were held by the same public duties as its *pistores*.<sup>126</sup> Finally, we know that bread was distributed throughout the city in approximately 250 *gradus* and that, at Constantinople at least, oil in its 2300 *mensae oleariae*.<sup>127</sup> Based on these comparisons, Vera persuasively concludes that single individuals did not come to the temple to purchase wine but that Rome's *caupones* came there and that they sold the wine through the city's many *tabernae*.

It is unlikely that Aurelian and his advisors invented this process. Rather, the method of storing and counting the fiscal wines most likely developed as an appendage grafted onto the process in place prior to Aurelian's inclusion of wine in the *annona*

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<sup>123</sup> See Chastagnol (1960); Sirks (1991: 391); Pena (1999: 19); Vera (2006: 303-316).

<sup>124</sup> Cf. *Dig.* 47.2.21.5: *Quid deinde si nave vinaria (ut sunt multae, in quas vinum effunditur), quid dicemus de eo, qui vinum hausit?*

<sup>125</sup> *LTUR* (1993, v.1) s.v. *Ciconiae*.

<sup>126</sup> *Rel.* 14.3.

<sup>127</sup> Vera (2006: 304).

whereby most residents purchased wine through *cauponae*—remember Cicero’s censure of Piso for buying wine at bars. In fact, the temple’s porticoes, under which the fiscal wine was stored, seems nothing more than a centralized adaptation of the types of storage units for wine that preceded it.

Thus concludes this synoptic look at Roman storage. It might strike one that this organizational set-up was not terribly well thought-out. After all, storing wine in locations scattered throughout the city in between their arrival and their sale to retailers must have made aspects of storing, selling, and transporting wine less efficient than having a few central areas for storing and trading wine. The Romans were not, however, immune to these economic pressures. When Martial praised Domitian for cleaning up Rome, he specifically lauded his prohibition against wine-vessels chained to pillars on the street (*nulla catenatis pila est praecineta lagonis*).<sup>128</sup> Though this ban was not economically motivated, it paints a vivid picture of how haphazardly wine was stored at Rome in the 1<sup>st</sup> century. The next chapter uses the picture formed here as a basis for giving a more diachronic account of Roman wine storage and argues that there is of evidence of increased centralization between the 1<sup>st</sup> century BCE and 3<sup>rd</sup> CE.

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<sup>128</sup> *Epigramm.* 7.32.7.

## Chapter VI Dynamism in the Roman Wine Trade

### Cellae and Horrea: Why the Distinction?

In this dissertation's first two chapters, we saw how Rome's institutional environment influenced the operation of Rome's wine supply. The previous two chapters have illustrated offered new interpretations understanding the motivations and actions of producers on estates and distributors in the city. This final chapter attempts to bring these institutional and operational threads together. This chapter builds closely on the investigation of wine storage at Rome in chapter four. It argues that despite our paltry evidence, there are traces of a change in storage practice over the first two centuries CE which should be attributed to a combination of commercial practice, technological change, and legal change.

This chapter is somewhat discursive, so let me offer a brief overview. The chapter begins by suggesting that there is little evidence for storing wine within the city in *horrea* (as opposed to *cellae vinariae*) prior to the mid-1<sup>st</sup> century CE but that there is increasing evidence of wine storage in *horrea* thereafter. I then argue that this change was likely connected to two factors. First, the increased security of goods stored in *horrea* as the technology of locking devices improved. Second, keys became more suitable for daily commercial use along with the commercial benefits generated by using the new, "courtyard-style" *horrea*. I then offer a formal model for storing goods which suggests that the *ex ante* distribution of risk between the storage-unit owner and the owner of the stored goods is the crucial variable determining what rent the former charges and at what

point the latter stops storing his goods. I then show that the jurists were aware of the changes in commercial practice and also changed the law to make that practice more efficient.

There is comparatively little evidence for storing wine in large *horrea* prior to the first century. This partially stems from the randomness of textual preservation but cannot be attributed entirely to that. In Cicero's *De lege agraria* he described Capua as the *cella atque horrea Campani* (cellar and storehouse of Campania).<sup>1</sup> Campania, famous as Italy's breadbasket, produced wine and grain. Perhaps tellingly, Cicero felt obligated to include both words, *cella* and *horrea*, to remind his audience of Campania's two famous products: *horrea* alone would not do.<sup>2</sup> A fragment of Varro, from the mid-1<sup>st</sup> century BCE is suggestive. He stated, "*haec aduentoribus accedunt: cellae, claues, claustra, carnaria, dolia*" (These things pertain to travelers: cells, keys, locks, meat-racks, *dolia*).<sup>3</sup> Though an *adventor* should mean something like foreign visitor, it may also have overtones of travelling visitors dealing in money and commerce generally.<sup>4</sup> This fragment also links merchants to cellars and *dolia* but adds a new variable: security—locks and keys.

Varro's emphasis on the importance of security is unsurprising, especially when it comes to wine, a valuable commodity and attractive to thieves. Though the larger containers would have been too heavy to move in their entirety, it would have been relatively easy to pour off unguarded wine into smaller containers, and the *Digest*

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<sup>1</sup> 2.89.7.

<sup>2</sup> Similar is *D.* 30.47.1, which gives *frumentum ex illo horreo vel vinum ex apotheca* as alternatives.

<sup>3</sup> *Sat. Men.* 263.

<sup>4</sup> *TLL* s.v. *adventor*.

preserves several examples reflecting that concern. Paul, for example, raised concerns involving theft of wine from a *navis vinaria* and amphorae stolen from a storeroom.<sup>5</sup>

This was not merely legalistic hypothesizing, for similar concerns appear in papyri. For example, *P.Col.*10.255 records a contract between a land-owner and tenants written during the reign of Marcus Aurelius and explicitly enjoined that, after the vintage, the tenants would be responsible for moving and guarding the new wine until it could be locked up (οἶνον ἀπὸ γλεύκους νέον ἄδολον παρ]ἅ ληνὸν εἰς ὄν [π]αρέξει ὁ μεμισθωκῶς κενώματα μέτρῳ οἰνικῶ κοτυλῶν δεκαεννέα [ἄπερ λαβόντα τὸν οἶνον συνθήσουσι] μετακεινή[σουσι] καὶ παραφυλάξουσι ἄχρι ἐγκλεισμοῦ.) Thieves would be eager to take advantage of unguarded wine.

The jurists recognized this problem. But the remedies available for one whose wine was stolen were not sufficiently robust. First, it was incumbent on the wine owner to know exactly how much wine was stolen, not always feasible. Ulpian was the most explicit on this point, asserting that “if there is an action on theft of wine, it is necessary to be stated how many amphoras were taken away. If it was vessels taken away, the number must be stated” (*sed et si de vino furti agatur, necesse est dici, quot amphorae subreptae sint. Si vasa subrepta sint, numerus erit dicendus.*)<sup>6</sup> The seeming redundancy of *amphorae* and *vasa* suggests that Ulpian was using the word *amphora* as a generic measurement rather than a physical container whereas *vasa* referred to a vessel of non-standardized size.<sup>7</sup>

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<sup>5</sup> *D.* 47.2.21.5, 6. Cf. *D.* 47.2.52.25 (Ulpian).

<sup>6</sup> *D.* 47.2.52.25.

<sup>7</sup> Cf. *D.* 18.6.1.1 (Ulpian), stating that selling wine by the amphora or even by single *dolia* was an alternative to measuring out the wine for sale (*et ante mensuram periculo liberatur, si non ad mensuram vendidit, sed forte amphoras vel etiam singula dolia.*)

Ulpian likely included *amphorae* and *vasa* because wine was often stored in *dolia* or other large containers, only a portion of which would be stolen. This distinction also occurs in *D. 47.2.21.5-6* (Paul). Paul raised the following question: if a measure of wine (or grain or water) is stolen from a larger whole, for example, from a full *horreum* or from a vat of wine, should the thief be held by an action only for the amount stolen or for the entire stock.<sup>8</sup> Paul thought the former view better, and he criticized the opposing opinion as overly harsh (*durum est dicere totius furtum fieri.*). Paul went on to claim that, if individual containers were stolen, the action was definitely on them and not for the whole stock.<sup>9</sup>

The requirement that it was necessary to know how much had been stolen and that an action was limited to this amount was not to the wine-storer's advantage. First, a victim of theft would have to know how much was stolen. If the wine was kept in *dolia* or vats, this may not have been easy. Second, the value of the wine stolen (on which the action could be brought) may have been much less than the damage inflicted on the wine. For example, a thief's illegal removal of five amphorae of wine from a *dolium* could greatly reduce the wine's life expectancy by exposing it to air or introducing corrupting elements therein. In addition, the value of the stolen wine was based on the wine's market value rather than the expected (and often higher) value to the individual merchant.<sup>10</sup> These limiting factors may have rendered the substantial costs of litigation generally

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<sup>8</sup> *Sed si de navi onerata furto quis sextarium frumenti tulerit, utrum totius oneris an vero sextarii tantum furtum fecerit? Facilius hoc quaeritur in horreo pleno: et durum est dicere totius furtum fieri. Et quid si cisterna vini sit, quid dicet? Aut aquae cisterna? Quid deinde si nave vinaria (ut sunt multae, in quas vinum effunditur), quid dicemus de eo, qui vinum hausit? An totius oneris fur sit? Et magis est [et], ut et hic non totius dicamus.*

<sup>9</sup> *Certe si proponas in apotheca amphoras esse vini easque subtractas, singularum furtum fit, non totius apothecae.*

<sup>10</sup> Cf. *D. 12.1.22* (Julian).



unattractive to wine merchants. We would expect them to have placed considerable effort in *ex ante* protection of their wine rather than relying on *ex post* compensation through punitive damages. In short, perhaps the most important action a merchant could take to protect his wine was to limit the number of people who had access to it.

This was a chief factor making urban *cellae vinariae* more attractive for storage than *horrea*. The urban setting of *cellae* provided some protection. In contrast to the Ostian *horrea*, which, though guarded, also had entrances with easy street access, the courtyards with *dolia* had few entrance points and these were away from the street.<sup>11</sup> Anyone's entrance would have been noticed: at the *magazzino annonario*, entrance required walking through several anterooms. Storage courts at Rome had, as the pictures in the previous chapter showed, similarly limited access. In contrast, the level of security provided by *horrea* was, at least until the late 1<sup>st</sup> century, less than ideal for storing wine because of the lack of security.

It is true that warehouse operators had some degree of liability for the products stored within, but this was legally and practically insufficient for merchants storing valuable goods such as wine. The jurists gave some attention to how this notion of *custodia* applied to storehouses. *D. 19.2.60.9* (Labeo) gave the following: *Rerum custodiam, quam horrearius conductoribus praestare deberet, locatorem totorum horreorum horreario praestare non debere puto, nisi si in locando aliter convenerit*. ("I do not think that the lessor of a whole *horrea* needs to furnish custody, which a *horrearius* must furnish to renters, unless it was agreed differently in the rental in the

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<sup>11</sup> Noted by Delaine (2005: 42).

lease”).<sup>12</sup> The pertinent question here is: what was the nature of the *custodia quae horrearius conductoribus praestare deberet*?

From our perspective, there is a strangely subjective element in the Roman notion of *custodia*.<sup>13</sup> The word itself may simply mean care and “the borrower will only be liable if he fails in this.”<sup>14</sup> Even if that is correct, it is not immediately clear what counts as adequate care. The jurists make it plain that acts of *vis maior*—fire, flood, and armed robbery—do not count as failures to provide *custodia*.<sup>15</sup> Buckland argues that *custodia*, in classical law, encompassed liability for all but the aforesaid exceptions.<sup>16</sup> This is essentially the view taken by Zimmermann, who argues that *custodia* included much more than cases where there was *culpa* but was “the strictest conceivable standard of liability short of unmitigated no-fault liability.”<sup>17</sup>

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<sup>12</sup> There is debate over how many parties participated in *horrea* rental; this debate is tangential to the topic at hand. I accept the interpretation that, at least in larger storage complexes, there was a tripartite division between the *dominus horreorum*, the *horrearius*, and the *conductores* of individual rooms within the *horrea*. This view is now generally accepted. Alzon (1965) argued that the *horrearius* did not rent the building from their owner but was the building’s manager. Thomas (1959: 371-83) and Wacke (1980: 299-324) argued against this view, and they seem correct. Rickman (1971: 203) suggested that the legal texts may suggest some chronological development, viz., “under the early empire the *horrearius* (contractor) from whom the *conductor* (depositor) hired his space, need not be, and very often was not, the *dominus horreorum* (the owner). From the third century A.D., . . . the *horrearius* (contractor) probably need not be, but almost always was, the *dominus horreorum*.” This is certainly possible, but does not emerge clearly from the evidence.

<sup>13</sup> On the problematic dichotomy between objective and subjective responsibility in Roman Law, see Robaye (1990: 345-59). He argues that the dominant thesis, of an evolution from objective responsibility in the early Roman Empire to subjective by Justinian’s time is wrong (350). He argues instead for a tripartite scheme, wherein responsibility includes psychology (e.g., intent), behavior (e.g., what action occurred), and the result (what damage ensued). See also Robaye (1987).

<sup>14</sup> Jolowicz and Nicholas (1972: 534).

<sup>15</sup> *D.* 13.6.18 pr; *D.* 44. 7.1. 4 (Gaius).

<sup>16</sup> Buckland (1939: 340-41).

<sup>17</sup> Zimmermann (1996: 397). Interestingly, *horrearii* were not apparently subject to the most stringent liability demands, which pertained at one time to sailors, innkeepers, and stable-keepers (*D.* 4.9.1.pr (Ulpian) *nautae caupones stabularii quod cuiusque salvum fore receperint nisi restituent, in eos iudicium dabo*, quoting the Praetor’s Edict). It is difficult to see why *horrearii* were not subject to the same liability requirements which fell upon professions which accepted goods on the condition that they would be safe (*salvum fore receperint*). In practical effects it did not much matter, since the jurists gradually weakened that absolute liability to the point that, by Gaius’ time, it became indistinguishable from general *custodia*. And it is fairly clear that this general *custodia* was required of *horrearii*. See Zimmermann (1996: 515) on

How this was actually applied is difficult to ascertain. The *lex horreorum Caesaris* is the only one of the *leges horreorum* to preserve mention of *custodia*, but it is badly damaged. It reads:<sup>18</sup>

*[in his h]orreis / . . . . . [C]aesaris Aug. loc / [horrea compendi]ar. armaria et loca / . . . . . rar. ex hac die et ex / [kal. Ianuaris]. Lex horreorum. / . . . . . [aliu]dve quid ante idus Dec. pensione solute renuntiet. Qui non / [renuntiaverit . . . . . pro i]nsequente anno non transegerit, tanti habebit, quanti eius gener. / [horreum armariumve eo anno ibi locari solebit, si modo ali locatum n]on erit. Quisquis in his horreis conductum habet, elocandi et / [substituendi ius non habebit . . . . . . . cu]stodia non praestabitur. Quae in his horreis invecta inlata / [erunt, pignori erunt horreario si quis pro pensionib]us satis ei [non fece]rit. Quisquis in his horreis conductum habet et sua / . . . . . . . fuer. venia. [Qui]squis in his horreis conduct. habet, pensione solute chiogr. / . . . . . [Quisquis habens conductu]m horreum su[a ibi] reliquer. et custodi non adsignaver., horrearius sine culpa erit.*

In these storerooms...of Caesar Augustus are leased rooms, safe-deposits, small storage areas...from this day and from the Kalends of January. The rules of the storehouse...Let him renew his lease after the rent is paid before the Ides of December. Anyone who has not renewed will have their lease renewed for the subsequent year for the same amount as before provided it has not been rented to someone else. Whoever has made a rental in these storerooms will not have the right of subletting...security (*custodia*) will not be furnished. Whatever will be brought into and stored in these storerooms will be security to the *horrearius* in case someone does not make enough rental payments. Whoever has made a rental in these storerooms and...permission. Whoever has made a rental in these storerooms will receive a receipt for paid rent...If someone has rented a storeroom and left his things there and has not assigned a guard to them, the *horrearius* will not be at fault.

The clause prior to the word *custodia* is unclear, but the most plausible reconstruction is that of Mitteis, followed by Rickman, of something like *auri*

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the gradual weakening of this absolute liability. *D. 4.9.5.pr* (Gaius): *Nauta et caupo et stabularius . . . custodiae nomine tenentur.*

<sup>18</sup> *ILS 5914=CIL 33743*

*argentive*.<sup>19</sup> This has a good parallel in *D. 19.2.60.6* (Labeo), which hypothesized a *horrearius* who refused to accept at his own risk (*suo periculo*) gold, silver, or pearls.<sup>20</sup> Mommsen's restoration of *invectorum in haec horrea* is implausible, both on the grounds of common sense and because the final clause gives a specific instance in which the *horrearius* will not be liable for damages. There would be no need to specify this if the regulations abnegated *custodia* for everything stored therein. For precious metals and jewelry, some *horrearii* must have believed that it would be impossible to extract enough additional rent to compensate for the high potential liability incurred.

It is therefore probable that *horrearii* had liability for exogenous harm done to goods stored within (with the standard exceptions for cases of *vis maior*). But wine, unlike precious metals, was also subject to endogenous depreciation, which could be severe enough to render the product worthless. The *horrearius* was almost certainly not responsible for loss arising from wine's propensity to acetify or turn musty—to change its nature *sua sponte*.

In sum, the ancient evidence indicates that wine was, for a time, largely stored in *cellae vinariae*, not *horrea*. But storing wine in self-contained, more secure units was not necessarily the most convenient system for facilitating commercial transactions in wine. For example, there is evidence of a link between Rome's supply of wine and auctions. There were considerable advantages to holding auctions in centralized places with ready access to the products offered for sale. The method of storing wine in *cellae* scattered

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<sup>19</sup> Rickman (1971: 200), citing Mitteis (1912: 259). This is contra Mommsen who read *invectorum in haec horrea*. But if the *horrearius* denied liability for all and sundry then the final clause, which eschewed *culpa* for items not assigned a guard, seems pointlessly redundant.

<sup>20</sup> *Locator horrei propositum habuit se aurum argentum margaritam non recipere suo periculo: deinde cum sciret has res inferri, passus est. Proinde eum futurum tibi obligatum dixi, ac si propositum fuit, remissum videtur.*

throughout the city was likely a sub-optimal storage system for the dominant method of selling wine.

Four inscriptions from Rome mention freedmen of a Caucilius family, several of whom are identified as *argentarii de foro vinario*.<sup>21</sup> *Argentarii* were, approximately translated, bankers; one of their main places of business was at auctions where they facilitated the purchase between buyer and seller by advancing the former a loan.<sup>22</sup> The Caucilius family was involved in the wine trade itself and was not simply operating out of the *forum vinarium*: In *CIL* 6.9181b, Publius Caucilius Eros is called a *coactor vinarius de foro vinario* (a wine-collector at the *forum vinarium*). Financial *coactores* were, as their name suggests, responsible for collecting the money from buyers and passing it on to sellers. Publius, *coactor*, was connected with the *argentarii* and thus represents an example of a fairly sophisticated and perhaps unusual hierarchy.<sup>23</sup>

That auctions were common in Roman commodity markets generally and the wine market in particular is not surprising. Unfortunately, auctions in the Roman world have been understudied generally and almost wholly ignored in economic histories.<sup>24</sup> Very briefly, auctions should be thought of as a mode of generating efficient resource

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<sup>21</sup> *CIL* 6. 9181abc, 9182.

<sup>22</sup> Andreau (1999: 39).

<sup>23</sup> Andreau (*ibid.*) believes that only a minority of *coactores* were part of an organizational hierarchy in which they were slaves, freedmen, or employed of *argentarii* (though Ps-Acron *ad Hor. Sat.* 1.6.86 stated that *coactores* were employed by *argentarii*). However common the set-up was, apparently it occurred here. One possibility is that these *argentarii vinarii* specialized in advancing loans to wine-merchants buying wine from traders bringing wine into the port or city. Our *coactor* could have been responsible for ensuring the proper transfer of wine from one party to another, but the inscriptions are simply too devoid of context to allow us to pick from any number of plausible reconstructions.

<sup>24</sup> Singular is Rauh (1989: 451-71) on auctioneers' importance to the Roman economy. De Ligt (1994), who has provided by far the best historical account of temporary markets in the Roman world has little to say on auctions (though see pp. 51, 114, 208). On their role in finance, see García Morcillo (2008: 257-75); Andreau (1987: 70, 163).

allocation in imperfect markets.<sup>25</sup> In many situations, it can be difficult to ascertain the competitive price of a good or service; in such cases, auction forms can serve as mechanisms for buyers to reveal prices to one another (though it is not always easy to determine how similar auction prices are to competitive prices<sup>26</sup>). In most models the number of bidders is a chief factor in determining the competitiveness of the auction.<sup>27</sup> The reliance on auctions in the city of Rome is unsurprising given the extremely imperfect informational markets. The execution of auctions in public centers increased their competitiveness by encouraging the greatest number of bidders possible.

The development of courtyard style *horrea* in the 1<sup>st</sup> century added a further benefit: it allowed commodity auctions to take place in close proximity to the products themselves. This allowed for more rapid and secure transfer of possession, decreased the risk for the buyer, who could presumably visually inspect the product beforehand, and therefore raised the overall sale-prices. Wine-sellers, however, were at a disadvantage by not generally storing their wine in these *horrea*, though with poor internal security there was little choice. But by the early third century we find the emperor Severus Alexander issuing a rescript, concerning *singulae amphorae vini...in horreis* (individual amphorae of wine in a *horrea*).<sup>28</sup> What changed?

### **A Simple Model of Storage**

Severus identified the transfer of keys (*claves traditae*) as the decisive factor in determining when the sale of wine was complete. In Varro's aforementioned fragment,

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<sup>25</sup> Vickrey (1961: 8-37) is the *locus classicus*. The bibliography on the economics of auctions is vast: see in particular Riley and Samuelson (1981: 381-92); Milgrom (1989: 3-22); Klemperer (2000). See Kagel (1995: 1-86) for a survey of the literature through the mid-90s.

<sup>26</sup> Milgrom and Weber (1982) 1090.

<sup>27</sup> Klemperer (2000) 171.

<sup>28</sup> *CJ* 4.48.2 (Severus Alexander).

portable locks were mentioned as defining possessions of a travelling merchant (*adventor*).<sup>29</sup> In Severus' rescript, we are clearly dealing with permanent locks to *horrea* storerooms with transferrable keys. This change points us in a new direction. Understanding why security in the form of locks apparently shifted from merchant to warehouse operator requires us to introduce a model for understanding storage more generally.

Consider a perfect-knowledge economy in which there are merchants who store goods and warehouse operators who lease space within the storage area. Assume that a merchant can choose to store or sell his good and an operator can choose whether to lease his storage unit. Let  $V$  be the time dependent value of the good being stored such that  $V_0$  is its initial value and  $V_t$  is its value at time  $t$ . Let  $V^*$  be the value of the item at the time when the merchant prefers sale instead of storage. Let  $r$  be the good's total depreciation rate (i.e., it includes both endogenous and exogenous rates). Let  $\delta$  be the good's appreciation rate. Let  $C_s$  be the cost of storing the good, equal to the cost of guarding it,  $C_o$ , plus a constant  $\alpha$ , which is the additional charge by which the operator achieves a profit.  $V_t$  will then be given by:  $V_t = V_{t-1}(1 + \delta - r) - C_{s,t}$ .<sup>30</sup>

The game's shape will vary depending on what *ex ante* conditions hold. If  $\delta < 0$  or  $\delta \leq r$  then  $V_0 = V^*$  and the merchant will not store his good. If  $\delta > 0$ ,  $r = 0$ , then  $\lim_{t \rightarrow \infty} V_t = \infty$ , and the merchant can always achieve greater expected profit by continuing to store his good. The latter case is, in the real world, impossible; therefore storage will occur when  $\delta > 0$  and  $\delta > r$ . Both variables are positive. Further: while  $\delta$  is linearly positive over the

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<sup>29</sup> *Sat. Men.* 263.

<sup>30</sup> Proof (by induction):  $V_1 = V_0 + V_0\delta\Delta t - V_0r\Delta t - C_s \Delta t = 1$  and  $V_1 = V_0(1 + \delta - r) - C_{s,t}$ .

range of  $t$ , the endogenous rate of depreciation dictates that  $r$  increases exponentially.<sup>31</sup>

Therefore, there is a finite range  $t_m \dots t_n$  over which  $\delta > r$  and that  $\exists t^* \in$

$\{t_m \dots t_n\}, f(t^*) = \delta^* = r^*$ . In graphical form ( $r^*$  is  $|r^*|$ ). *Ceteris paribus*, a merchant will stop storing a good at the equilibrium point between its appreciation and depreciation rates.<sup>32</sup>

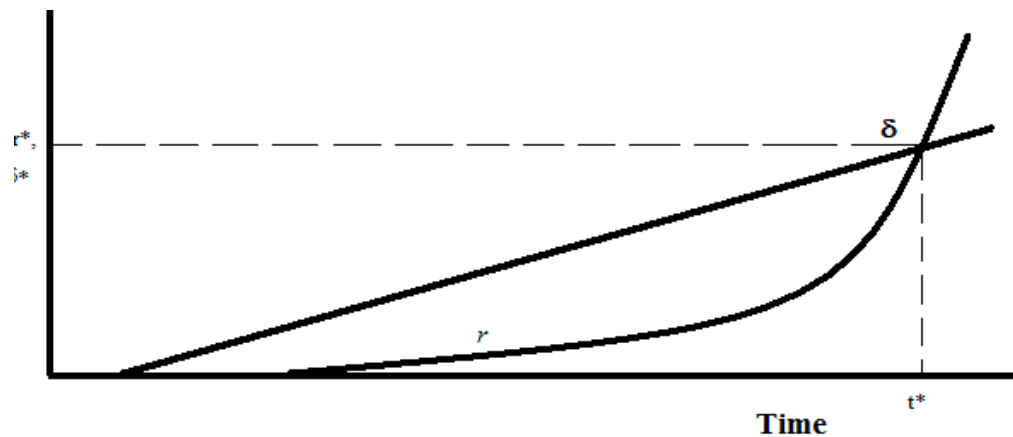


Figure 6.1: Appreciation-Depreciation Equilibrium

Let us turn now to the other variable in our formula,  $C_s$ : the cost of storage.

Because operators were to some degree liable for damages to the goods stored in their warehouses,  $C_s$  will depend on the relative rates of both  $\delta$  and  $r$  (see note above for explanation), and  $C_s$  will therefore be monotonically related to  $V$ .<sup>33</sup> Therefore, let us name a variable  $R$ , which is the rent charged by the operator at time  $t$  and which can be described by the function,  $f(C_s)=R$ , which is monotonically increasing with  $C_s$ .

<sup>31</sup> We can appeal to observation here: an opened bottle of wine has little chance of spoiling the 1<sup>st</sup> day, more the 2<sup>nd</sup> and 3<sup>rd</sup>, and by the end of a week a nearly 100% chance of having gone bad. This flatness of the curve varies from product to product, but all are exponential. In addition, during the time over which the good's value is increasing in accordance with  $\delta$ , there is increasing incentive for theft (exogenous risk) which adds to the exponential shape of  $r$ .

<sup>32</sup> Note that this model does assume merchants are risk neutral and have perfect knowledge of the respective rates.

<sup>33</sup> In the real world, the costs of determining  $V$  at all points over  $t$  are prohibitively costly. This takes us into the realm of imperfect knowledge games. These are much more complicated to model; as this chapter will show, assumption of perfect knowledge still yields a model robust enough to have predictive value.



We further note that both  $\delta$  and  $r$  will cause  $C_s$  to increase when the operator is liable for both exogenous product value loss (theft for example) and endogenous depreciation (say, spoilage). If the operator is liable for endogenous depreciation, the  $C_s$  curve will also be exponential and shifted to the left of the  $r$  curve. If the operator is liable for exogenous damage, the curve will be roughly linear and shifted downward from  $r$ .<sup>34</sup> In the latter case, only  $\delta$  will cause  $C_s$  to rise. In other words, operators' *ex ante* liability for stored products is an important consideration because it results in two, differently shaped cost curves. Shown graphically:

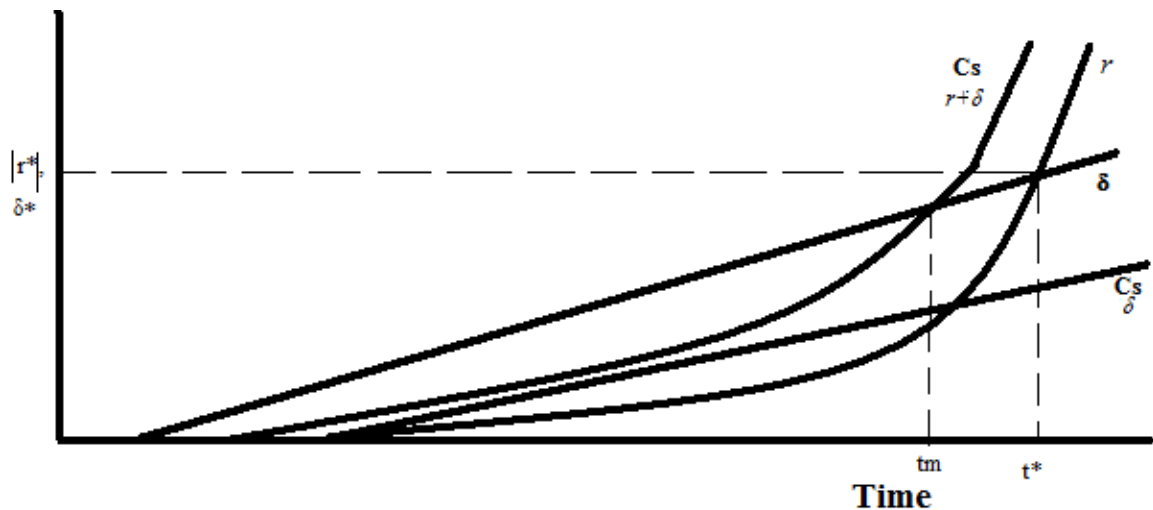


Figure 6.2: Risk allocation curve for storage

Consider the point where  $C_{s(r+\delta)}$  intersects  $\delta$ . After this point, the marginal cost of rent to the merchant exceeds the marginal increase of the good and he will sell. Note, however, that  $t_m < t^*$ . Therefore,  $V_{t,m} < V^*$ , and the merchant sells his goods at a sub-optimum level. Now consider the value of  $R$  of  $C_{s(\delta)}$  at  $t^*$ . As figure 15 illustrates,  $R(C_{s\delta}) < R(C_{s(r+\delta)})$ ; in other words, the operator could charge higher rent at this point by

<sup>34</sup> The operator must discount  $\delta$  in calculating storage rent because the merchant is still paying  $r$  and would obviously not pay rent greater than  $V_{t-1}(1 + \delta r)$ .

accepting a portion of  $r$ . This distinction shows how crucial the *ex ante* risk allocation between merchant and operator is. If the operator accepts all the endogenous risk, the buyer must sell at a  $V < V^*$  but if the merchant accepts all the endogenous risk then the operator will accept a rent  $R < R^*$ .

The allocation of  $r$  will be the primary issue at stake in contractual arrangements for storage. But this true if and only if  $\exists r', t': (R_{r'} - R_{\delta'}) > (C_{\delta+r} - C_{\delta})$  and  $(V_t' - V_{tm}) > (C_{r'} - C_{\delta+r})$ . In other words, we should expect both operators and sellers to be residual claimants of  $r$  only when the additional rent an operator gains by accepting partial ownership of  $r$  exceeds the additional costs he incurs and where the additional value gained by merchant by accepting partial ownership of  $r$  exceeds the lower risk-costs he incurs by selling at a point where the operator accepts full liability. Between the time of Varro and the rescript of Severus Alexander, it is my belief that the technological development of locking devices along with the evolution of juristic thought changed the value of  $r$ , such that it became profitable for *horrea* owners to become partial residual claimants on  $r$  by supplying the locks and for merchants to forgo some degree of security in order to benefit from the more commercially convenient, centralized *horrea*.

### **Locking Devices: Technological Development**

Locking devices are so ubiquitous today that it is easy to take them and the technology upon which they rely for granted. Yet in the Greek and Early Roman period, locks were mysterious enough that they were symbols of divinity.<sup>35</sup> Temples and city gates were some of the earliest structures to be fitted with locks, and the keys themselves could be of great symbolic (and literal) weight: A 5<sup>th</sup> century BCE key from the temple of

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<sup>35</sup> For example, the three-bodied Hecate in the Capitoline museum. Ovid (*Fast.* 1.99) depicted Janus as holding a rod in one hand and a key in the other.

*Artemis Hemera* in Arcadia was over forty cm long and was made to look like a snake, a design having nothing to do with utility.<sup>36</sup> The religious importance of keys lasted through the Roman period and is still the sign of the Papacy.

There is little evidence of keys used in non-domestic or religious settings prior to the 1<sup>st</sup> century BCE, and there is no evidence until the late 1<sup>st</sup> /early 2<sup>nd</sup> CE of *horrea* with locks for individual rooms (as opposed to the building as a whole). This is unsurprising: to be effective security for commercial purposes, locking devices had to be sufficiently difficult to break and their keys had to be unique and reasonably portable. There is no evidence that these conditions existed at Rome until the 1<sup>st</sup> century BCE. By examining this development, we can see that conditions gradually changed in a way that provided a necessary though not sufficient condition for allowing merchants to store wine in *horrea*.

At least as early as 200 BCE keys were used in a variety of domestic settings. Pliny gave the following example as evidence of old Roman morality: “Fabius Pictor wrote in his *Annals* that a matron was starved to death by her own family because she had unsealed the receptacle in which were the keys to the wine cellar.”<sup>37</sup> A mid-second century BCE fragment of the comic author Titinius makes reference to an *arca sine clavi*, implying that chests with locking devices were reasonably well known by that time.<sup>38</sup> More or less contemporaneously, Cato advised his readers that a villa’s oil cellar should be fitted with two sets of locks.<sup>39</sup>

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<sup>36</sup> For a photograph see Guaitoli (1996: 22).

<sup>37</sup> *NH.* 14.89: “*Fabius Pictor in annalibus suis scripsit matronam, quod loculos in quibus erant claves cellae vinariae resignavisset, a suis inedia mori coactam.*”

<sup>38</sup> *Com.* 178: *quid habes nisi unam arcam sine clavi.*

<sup>39</sup> *Agr.* 13.2

There is evidence that by the 1<sup>st</sup> century BCE, storage buildings themselves could be locked. Cicero lambasted the policy which had given Clodius “all private and public grain, all the grain-producing provinces, all contractors, and all the keys to the *horrea*.”<sup>40</sup> There are two Ostian *horrea* that preserve evidence of locking devices: the *Horrea Epagathiana* and the corridor-*horrea* of Reg. III.II.6. In the former, the main entrance, the side entrance on the north, and the interior staircase all had locking devices—probably (in essence) crossbars anchored in the wall and secured by padlocks.<sup>41</sup> The interior rooms apparently had a similar locking system as well. The latter *horrea*, though smaller, evidently had the same sort of locking system on its main doors.<sup>42</sup>

Ostia provides limited evidence that this was the general rule. The small *horrea* of Reg. IV.V.12 consisted of six small cells, four of whose thresholds remain today. All four were originally of the same type and included two pivot holes, a central bolt hole, and a check for restraining the doors’ motion. The far northwest room’s threshold, however, was changed at a later date when a groove was cut at its front for placing shutters, commonly used for securing retail establishments.<sup>43</sup> It is unclear why this was done. Perhaps the warehouse’s function changed, though this room does not seem convenient for retail trade. Regardless, this threshold’s transformation provides evidence that the rooms’ original doors were not secure enough to meet later needs so that shutters later had to be installed.

The remains of the *grandi horrea* also indicate that, at least in its early (pre-2<sup>nd</sup> century) phases, the individual rooms did not have permanent locking devices and that

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<sup>40</sup> *Dom. 25*: “...*omne frumentum privatum et publicum, omnis provincias frumentarias, omnis mancipis, omnis horreorum clavis lege tua tradidisti.*”

<sup>41</sup> See Rickman (1971: 33-35) for a description of these locks and their operation.

<sup>42</sup> Rickman (1971: 55).

<sup>43</sup> Rickman (1971: 60-61); for shutters, Carcopino and Rowell (1992).

their general security may have been poor. Our understanding of this building is, as discussed above, tempered by its complicated building phases and our admittedly imperfect knowledge of them. However, the south rooms' preserved thresholds are peculiar because the block on which the thresholds rest is wider than the opening for the doors.<sup>44</sup> Calza argued that this shows that the doorways were narrowed in a later building phase.<sup>45</sup> Rickman was skeptical because, “. . . for this to be true we should have to imagine that the rooms previously had had no doors at all, since there is only one set of pivot holes and bolt hole in each case, namely that for the narrow doorway.”<sup>46</sup> He gives no alternative explanation for this peculiarity. It is not clear to me that we can dismiss Calza's interpretation out of hand. The contemporaneous and better preserved *horrea Epagathiana*, which was probably of the specialized safe-deposit type mentioned in the *Digest*,<sup>47</sup> did have individual rooms with locks. But it may be risky to generalize from this building, since it is “distinct from anything else yet found in Ostia” and likely served a considerably different purpose than *horrea* used for storing commodities.<sup>48</sup> These developments certainly made *horrea* more secure, but not enough for storing wine for the reason given above: too many people had potential access to the individual storerooms.

This degree of security, in which the buildings themselves had locks but not the individual units, would have suited *cellae vinariae* reasonably well. These urban *cellae* would have needed only one set of lock(s)—that on a door or gate blocking access to the interior room, courtyard, or staircase. The number of locking devices and their complexity was commensurate with the number of people with access to the area. For

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<sup>44</sup> Rickman (1971: 48).

<sup>45</sup> Calza (1921: 376).

<sup>46</sup> Rickman (1971: 48).

<sup>47</sup> *D.* 1.15.3.2.

<sup>48</sup> Rickman (1971: 37).

example, P.Princ. 3.153 preserves the instructions of an unnamed party who was “to take the key to a gate-house in which were stored 27 jars of wine of various sizes.”<sup>49</sup> This gate-house was not part of a larger storage unit, and one lock controlled by those who controlled the wine within was clearly sufficient.

Though we are wholly ignorant of the details of this practice, the plausible broad contours are fairly easy to infer. Presumably the unit’s owner supplied the locking device but (naturally) the person to whom the wine belonged, presuming he was a different person, would have kept the key. Such an arrangement would serve both parties’ interests. First, it was clearly in the wine-owner’s interest to have ready access to his product, and this required possessing the key. Second, handing over the key to the wine owner may have relieved the storage unit’s owner from some custodial responsibility: Papinian, for example, told of a dying father who gave his daughter keys and a ring *custodiae causa*.<sup>50</sup> And the fragment of Varro cited above, which linked *cellae* and *claustra*, is surely relevant (*Sat. Men.* 263).

By the early 1<sup>st</sup> century CE, *horrea* were commonly equipped with exterior locks, but there is little evidence that their interior rooms were similarly secure. But by the reign of Severus, we have an example of wine stored under lock and key in a *horrea*. We should not treat this example as aberrant: *D.* 1.15.3.2 (Paul) states, “Break-ins are common in *insulae* and *horrea*, where people store the most valuable part of their fortunes, when a room, a locker, or a chest is broken into.” (*Effracturae fiunt plerumque*

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<sup>49</sup> ἀνοιξάτωσαν τὸ σκρίνιον καὶ δότωσάν σοι τὸ παρακλείδιον τοῦ πυλῶνος 5κ’ ἔσται ἐν τῷ πυλῶνι οἴνου (τετρά)χ(οα) ιθ (δί)χ(οα) η ἐν τῷ πρώτῳ ἀγωγίῳ ἠνέχθη σοι (τετρά)χ(οα) σπη χ(αίρειν). In this case, a gatehouse was functionally equivalent to a *cella*.

<sup>50</sup> *D.* 31.77.21 : *Pater pluribus filiis heredibus institutis moriens claves et anulum custodiae causa maiori natu filiae tradidit et libertum eidem filiae, qui praesens erat, res quas sub cura sua habuit adsignare iussit. Commune filiorum negotium gestum intellegebatur nec ob eam rem apud arbitrum divisionis praecipuam causam filiae fore.*

*in insulis in horreisque, ubi homines pretiosissimam partem fortunarum suarum reponunt, cum vel cella effringitur vel armarium vel arca*). The linking of the *cella* with *armarium* and *arca* clearly indicates that the *cella* is locked. Moreover, it is difficult to believe anyone was so stupid as to store *pretiosissimam partem fortunarum* in an unlocked *cella*.

To trace this development requires a brief excursus on the development of keys. This will demonstrate how lock-technology became increasingly suitable for mercantile use. Keys were an ancient technology which developed significantly during the Roman period.<sup>51</sup> They changed in two ways: new technology developed, in particular the rotary lock, and existing technologies became more sophisticated, more widely disseminated, and, by extension, almost certainly cheaper.

Two common and ancient lock types would not have been suitable at all. The first and simplest was the latch lifter. They were usually long (ca. 35 cm) and had a gentle curve at their ends. The curved end passed through a hole in the door, and the key's tip would catch a bolt, after which the person outside the door would pull a rope to remove the bolt within. Simple and often wooden, they were common throughout the Roman period.<sup>52</sup> The simple tumbler lock was the other type. Keys for this device were either T- or L-shaped and came in various sizes. The key lifted the lock's tumblers, but (as in the latch lifting type) the bolt probably had to be removed manually with a cord by the person standing without.<sup>53</sup> It is unlikely that these two types were sophisticated enough to provide sufficient security for use in an urban, commercial setting.

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<sup>51</sup> Greene (2008: 813).

<sup>52</sup> Manning (1988: 88).

<sup>53</sup> *Ibid.*

Three types of locking mechanisms were, one would suspect, of value for commercial security. The first is also a tumbler lock but, as opposed to the one above, the key itself removed the bolt. The lock had tumblers arranged in patterns (Z-shaped, L-shaped, and curved are common), and the key had teeth arranged in the same pattern, which allowed it to catch the tumblers and remove the bolt (and were called in Latin a *clavis Laconica*).<sup>54</sup> These certainly provided more security than those above because of the often high number of tumblers but presented some drawbacks. A bolt of suitable length and weight to secure a door required a fairly large key: keys of this type are commonly between 15 and 25 cm,<sup>55</sup> and two hands may have been required to operate it.<sup>56</sup> This type was cumbersome but potentially effective.

Rotary locks were an invention of the Roman period and are similar to modern locks. As opposed to the tumbler locks above, whose security is provided by increasing numbers of tumblers in complicated patterns, rotary locks could have only one tumbler held down by a spring; wards in the lock block access except to a key cut with aligning grooves. The key rotates in the lock, and, as it does so, raises the tumbler and releases the bolt, which the key then moves to the side.<sup>57</sup> First used for chests and jewelry boxes, they were widespread by the 2<sup>nd</sup> century CE,<sup>58</sup> and they were used on doors.<sup>59</sup> Both tumbler and rotary locks existed simultaneously by the 1<sup>st</sup> century CE, and both could have secured doors reasonably well.

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<sup>54</sup> Ciurletti (1996: 76).

<sup>55</sup> E.g., Manning catalogue (1985: 92-94); Bassi (1996: 87. Figs. 24.2, .3, 25.1).

<sup>56</sup> Cavada (1996: 96).

<sup>57</sup> Manning (1985: 94).

<sup>58</sup> Ciurletti (1996: 76).

<sup>59</sup> As shown by the size of several rotary keys in the British Museum; Manning (1985: 94, pl. 41).



The final type of locking device which may have been commercially important was the padlock. The Romans' most common variety was a barb-spring padlock.<sup>60</sup> The lock is fairly simple: it consists of a padlock case and a bolt. The bolt has springs which project from its tip. When it is pushed into the padlock, the springs compress (allowing it to slide in). Once it is inserted, however, the springs release. This makes withdrawing it impossible. The bolt could be attached to a chain, much like a bicycle lock, for securing objects or doors if they were provided with anchors for the chains.

The opening for the key is at the padlock's other end. An L-shaped key is inserted, which has a square opening at its end. This allows it to slip over the springs, compressing them, and makes bolt removal possible.<sup>61</sup> The barb-spring lock's security was compromised by the fact that the keys were fairly modular, though there was variation in their length and in how many springs their bits were fitted for. Romans in need of more secure portable locks had recourse to rotary-locked padlocks. Though these were apparently less common than the barb-spring type, "the finest and most elaborate forms... [of rotary locks]...are seen in a series of padlocks such as those from Caerleon and Fishbourne."<sup>62</sup> These locking mechanisms existed simultaneously by the 1<sup>st</sup> century CE and lasted throughout the Roman period. These types did not supersede one another in an evolutionary fashion but show the availability of locks of increasingly secure design.

We can, however, use key-length as proxy data for their utilitarian use and suitability for commercial activity. My premises are, I hope, unexceptionable: shorter-key length is more suitable for daily use than longer and increasing uniformity in key size

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<sup>60</sup> Manning (1985: 95-97); Ciurletti (1996: 80-81).

<sup>61</sup> Manning (1985: 95).

<sup>62</sup> Manning (1985: 94).

suggests increasing standardization likely stemming from increased use. I tested this hypothesis by using the 61 keys at the British Museum.<sup>63</sup> Keys are presented in the table from simplest (and oldest forms) to complex:

Type	Average (cm)	$\sigma$
Latch-Lifter	22.9	6.5
Simple-Tumbler	13.5	4
Slide-Tumbler	8.9	3
Rotary	9.7	3.5

**Figure 6.3: Average Key Lengths**

Visual inspection of these numbers shows that keys' average size generally decreased and perhaps more importantly that the standard deviation in size decreased too. Further, we can test whether the mean lengths for latch-lifter tumbler lock, which I doubt was suitable for secure, urban storage, and for the slide-tumbler lock, which probably was, could have come from two populations with the same mean. Testing the null hypothesis (Mann-Whitney rank-sum test) shows the difference is highly significant. In other words, the type of keys suitable for commercial storage are of significantly different size than the others, and this size helped make them practical to use commercially. This bolsters the contention that keys became increasingly appropriate for commercial storage over time.

Nevertheless, the existence of a technology does not ensure or necessarily make more likely its widespread use.<sup>64</sup> The discovery, acceptance, and dissemination of

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<sup>63</sup> Catalogue is Manning (1986: 88-94); scale pictures are to be found in plates 37-43.

technologies is contingent on psychology, economic and structural conditions, and random chance.<sup>65</sup> In the case of locks, we are dealing with the improvement of an already existing technology. When Finley, who was generally skeptical of narratives tracing large-scale changes in ancient technology, conceded that “there was more [technical development], provided we avoid the mistake of hunting solely for great radical inventions and we also look at developments within the limits of the traditional techniques,” this change in locking devices was the type of development he had in mind.<sup>66</sup>

But changed technologies are not adopted *ex vacuo*. Motivating factors are necessary. The growing importance of *horrea*, not for their storage facilities per se but for the concomitant commercial activities occurring therein, provided such a factor. Growing urbanization, long-distance trade in valuable goods, and the development of increasingly sophisticated mercantilism generally applied pressure toward centralized commercial venues. At the beginning, wine—a comparatively valuable product subject to theft and spoilage—could not take advantage of this new commercial possibility. With the improvement of locking devices, *horrea* storage became more attractive. Though improved technology was a necessary condition for bringing about this change, it was not a sufficient condition.

### **Locking Devices: Legal Developments**

Improved locks would have made storing wine in *horrea* a more feasible option for merchants, but the development itself was not a sufficient condition for its adoption. In order to explain why merchants implemented this technology, another explanatory

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<sup>64</sup> Morley (2000: 197-210).

<sup>65</sup> See, classically, Bloch (1967: 124-35).

<sup>66</sup> Finley (1965: 29). The description of Finley’s article is from Greene (2000: 29).

factor is necessary. In this case, the development of juristic rulings concomitant with that technological development provided one. There are three relevant texts:

1) *Si iusserim venditorem procuratori rem tradere, cum ea in praesentia sit, videri mihi traditam Priscus ait, idemque esse, si nummos debitorem iusserim alii dare. Non est enim corpore et tactu necesse adprehendere possessionem, sed etiam oculis et affectu argumento esse eas res, quae propter magnitudinem ponderis moveri non possunt, ut columnas, nam pro traditis eas haberi, si in re praesenti consenserint: et vina tradita videri, cum claves cellae vinariae emptori traditae fuerint.*

If I order a seller to hand over an object to a procurator when it is present, Priscus says it is obviously handed over to me and that the same thing holds if I order a debtor to give money to another. For it is not necessary to take possession physically, but it can also be done by sight and inclination and that the following things, which are unable to be moved because of their great weight, are proof. For example, columns are considered delivered if the parties make agreement in sight of the thing. And wine is obviously delivered when keys to the wine cellar are handed over to the buyer.<sup>67</sup>

This first passage is Paul's and quotes the jurist Priscus (*Priscus ait...*). Priscus could be one of two jurists: Neratius Priscus, who flourished under the reign of Trajan and (with Celsus) was the last head of the Proculian school, or Iavolenus Priscus, a Sabinian who was a contemporary to Neratius.<sup>68</sup> Though the jurist's identity is not crucial, we may agree with Lenel that Priscus here is more likely to be the former.<sup>69</sup> Either way, the text should date to the early 2<sup>nd</sup> century CE, about 50-75 years after our earliest evidence for interior locking devices in warehouses at Ostia.

This text is doubly refracted both by the Paul's excerption and by the compilers themselves, and has doubtless considerably compressed the logic of the argument here.

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<sup>67</sup> *D. 41.2.1.21.*

<sup>68</sup> On Neratius, Syme (1957: 480-93); Camodeca (2007: 291-311).

<sup>69</sup> Lenel and Sierl (1960: 778): "*Prisci nomen non addito nomine gentilicio laudatur in quinque fragmentis, quae, quamvis non constet Neratium in his omnibus esse intellegendum, in hunc iudicem recepi; in uno fragmento Prisci nomen ad Neratium spectare maxime verisimile est: cf. (41.2.1.21) cum (41.1.13), (41.3.47).*"

Nevertheless, the text seems fairly sound. Of suggested emendations, only the deletion of *non est . . . affectu* merits consideration: the switch from *oratio obliqua* to the direct *neesse est* construction and then back to indirect speech is awkward and not strictly grammatical; it gives the impression of being a parenthetical addition to Priscus' original quote.<sup>70</sup> But there is nothing to make us doubt the text in general.

The passage's most interesting feature comes in the final lines: why does Priscus use columns and wine as his two examples? A column could weigh up to several tons and was extremely difficult to move. It makes sense that jurists may have been willing to begin extending the range of accepted *traditiones* for such immovable objects. Though an amphora of wine would certainly have been heavy, upwards of a hundred pounds in many cases, they were transportable as numerous funerary reliefs testify.<sup>71</sup> It would be incredible if Neratius seriously believed those two items to be comparable. And surely he did not. As argued, now perhaps *ad taedium*, the defining feature of a *cella vinaria*, both in rural and urban contexts, was its permanent installations, above all, *dolia*, often buried. And a filled and buried *dolium* was, if anything, more immobile than a column.

As argued above, keys to *cellae vinariae* were common by the time Priscus wrote, and this is likely an example of a jurist reacting to real-world practice. Beside whatever general familiarity a resident of Rome might have with contemporary practice, Priscus himself, if this is Neratius Priscus as is likely, displayed some knowledge of wine elsewhere. In his fourth book of rules he claimed that rural servitudes can be created both for storing fruits in a neighboring villa and stakes for the vines (*pedamenta ad vineam*), a

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<sup>70</sup> *Index Interp.* (1929 v.3) *ad loc.*

<sup>71</sup> See the pictures in Zimmer (1982).

relatively specific example.<sup>72</sup> It is all the more interesting that Neratius was the first jurist to consider the issue because there is good evidence that he was generally knowledgeable about wine manufacture and also considered problems relating the technological development of presses.<sup>73</sup>

Egyptian papyri mention keys in commercial or quasi-commercial storage contexts fairly frequently and demonstrate that keys were used for commercial purposes both during and before the jurists were writing. They also suggest why the use of keys piqued Priscus' interest: their mobility was used to simplify commercial transactions. As early as 190 BCE and long predating any juristic text, we have a pithy letter from a certain Apollonios to Dikaios, which concerns both a key and a warehouse:

Ἀπολλώνιος Δικαίωι χαίρειν. ἀγνώμων γεγονός μὴ οὐκ ἀποστείλας Σαραπίωνα τὸν παρὰ σοῦ κομίζοντα τὴν κλεῖδα τοῦ Πετσαρμώτιος ταμείου, καθότι ἐτάξω. οὐ μὴν ἀλλὰ ἔτι καὶ νῦν ἐξαπόστειλον αὐτὸν πρὸς ἡμᾶς. ἔρρωσο.

Apollonios to Dikaios, greetings. You were senseless not to send Sarapion the key to the "Petearmotis" warehouse as I directed. Naturally please send it now.<sup>74</sup>

From 103 CE, roughly contemporaneous with Priscus' opinion, we have a letter from a Lucius Bellenus Gemellus, who wrote to his son complaining of having bought a rotten bale of hay—"no better than dung" (λελυμένον ὡς σκύβαλον). In preparation for settling accounts with the seller, he enjoined his son to inform him where he put the notice of payment for the hay and contract for a loan and then to send him the key for their storage location.<sup>75</sup> Another and somewhat later papyri (late 2<sup>nd</sup>/early 3<sup>rd</sup> century) contains the instructions to a woman, Didyma, from her brother to get the key to a largish

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<sup>72</sup> D. 8.3.3 pr.-2.

<sup>73</sup> Frier (1979: 204-28).

<sup>74</sup> P.Yale.1.39.

<sup>75</sup> P.Fay.119.

*panarium* from a slave (...καὶ παρὰ Κάρπου τοῦ δροῦλον Κλέωνος κόμισαι τὸ τοῦ παναρίου κλειδίον.)<sup>76</sup>

There is no particular reason why keys' mobility should have caught Priscus' eye unless their mobility raised an interesting or problematic legal point. The passage gives the answer: the jurist wanted to know whether *traditio* of wine in a cellar could be effected by transfer of the key to the cellar rather than by the wine itself. Likely, the practice I posited above of selling wine to a retailer through handing over the key to the *cella* raised the issue. We need not be unhealthily suspicious of this claim. Even Watson, the supreme skeptic of jurists' reaction to real issues, conceded that they showed an "astonishing concentration on conditions at Rome."<sup>77</sup>

Priscus' response allowed a symbolic, metonymous transfer (the key for the good), which Buckland characterizes as a subset of a type of *traditio brevi manu*. This decision makes sense and is the first legal sanctification of this type of delivery. This development on its own would not have changed anything about wine storage and sale at Rome; remember, our model predicts that additional value to storage would have to accrue to offset the product's endogenous risk. But the precedent solidified the legal standing of a commercial practice and changed the rules of the game in a way that shifted the calculus of how to store wine.

The next two texts, *D.* 18.1.74 (Papinian) and *D.* 41.1.9.6 (Gaius), postdate Priscus' ruling by approximately half a century and suggest that changes were occurring in the physical structure of *horrea* as well as in methods of commercial transactions:

2) *Clavibus traditis ita mercium in horreis conditarum possessio tradita videtur, si claves apud horrea traditae sint: quo facto confestim emptor*

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<sup>76</sup> P.Oxy. 10.1294.

<sup>77</sup> Watson (1987: 167).

*dominium et possessionem adipiscitur, etsi non aperuerit horrea: quod si venditoris merces non fuerunt, usucapio confestim inchoabitur.* (D. 18.1.74, Papinian)

When keys are handed over, possession of the merchandise laid up in the *horrea* seems handed over, if the keys are handed over at the *horrea*. When this is done, the buyer immediately gains ownership and possession, even if he does not open the *horrea*. But if the goods were not the vendor's, usucaption begins immediately.

3) *Item si quis merces in horreo repositas vendiderit, simul atque claves horrei tradiderit emptori, transfert proprietatem mercium ad emptorem.* (D. 41.1.9.6 Gaius)

Likewise if someone sells merchandise deposited in a *horreum*, as soon as he hands over the keys of the *horreum* to the buyer, he transfers ownership of the merchandise to the buyer.

Both these texts resemble Paul/Priscus: both take up the question of the status of goods delivered by transferring a key. Both texts deal with *horrea*, and—surely in connection—extend the question from wine in a *cella vinaria* to any good (*merces*). There is one noticeable difference: Papinian stipulates that the *traditio* must take place at the *horrea* itself. Gaius makes no such restriction. We can offer solutions to why both have extended Priscus' judgment and whence that difference arose by trying to reconstruct the conditions behind these judgments.

First, it is more likely than not that these texts were also reacting to contemporary practice, at least in general. Papinian's opinion on goods which did not belong to the seller is suggestive: the *lex horreorum Caesaris* stipulated that one's lease would renew automatically annually unless the storeroom had already been assigned to someone else. If, however, the storeroom *had* been rented out to another it is quite likely that the previous occupant's goods were still there, and their legal status was problematic.<sup>78</sup>

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<sup>78</sup> Cf. D. 41.7.6 on *usucapio pro derelict* which states that *causa* for transfer of possession demanded actual, not putative abandonment of an object.



Papinian's ruling, we might note, offered much greater flexibility to the warehouse owner/manager than to the individual renters.<sup>79</sup> In any event, Papinian's concern with this question suggests that he had reasonably good knowledge of the problems arising from normal warehouse management.

Basic knowledge of storage operation generated Papinian's concern with *merces non venditoris* and increases the likelihood that his entire discussion originated from familiarity with contemporary practice. Moreover, the question of *merces non venditoris* applied to goods stored in individual storage rooms and removes the admittedly remote possibility that Papinian was considering the *traditio* of the entire building rather than of property within individual units. The question remains though, what caused this situation?

Inward-looking legal debate is not a satisfactory explanation. In the first place, it is difficult to see why the problem presented by Papinian and Gaius, different only in the generalization of the merchandise and the specification of *horrea* rather than *cella*, should have been fundamentally different or more interesting than the situation considered by Priscus.

The jurists had a marked preference for physical transfer of property, and it was not until Justinian that delivery of documents of title, for example, was treated as a valid *traditio*.<sup>80</sup> Priscus' precedent, which recognized a symbolic yet corporeal transfer of

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<sup>79</sup> In contrast, we might mention Britain's Torts (Interference with Goods) Act 1977 which offers much more protection to the goods' owners than does Papinian's. Under these rules, the landlord must inform the tenant (or make a good faith effort to find him) of the goods' identities, location, and date after which they will be sold. Once sold, the sale proceeds, minus cost of sale and any delinquent rent payments, belong to the tenant.

<sup>80</sup> Buckland (1939: 136).

property, made the commercial activities, for which many *horrea* were explicitly designed, more efficient.

Lest anyone begin to think that this process, by which items would be stored in a *horrea*, sold at the *horrea*, and the key transferred thereby effecting instantaneous delivery, is too elaborate, I offer the following example as evidence of the maneuvers Romans apparently undertook in commercial transactions. We have three documents relating to a cast of characters from mid-summer of 37 CE at Puteoli. These documents are part of the *Tabulae Sulpiciorum*, a group of wax tablets recording some of the business operations of the *Sulpicii*, a family from Puteoli. Somewhat later they were re-copied for mysterious reasons at Pompeii, and fortuitously preserved more or less legibly by the eruption of Vesuvius.<sup>81</sup>

This short story has a confusion of characters, so bear with me. A *horrearius* named Gaius Novius Cypaerus had a freedman, Gaius Novius Eunus who was a grain merchant (a “*mercator frumentarius*”) and a slave Diognetus, who was involved in running the *horrea*.<sup>82</sup> On the 18<sup>th</sup> on June, Eunus borrowed (*mutuum*) 10,000 HS from Evenus Primianus, a freedman of the former emperor Tiberius. Primianus, however, was out of town and his slave Hesychus executed the loan, guaranteed by the 7,000 *modii* (around 47 tons) of Alexandrian grain and about 26 tons of other assorted grains and legumes, which Eunus was storing in the *horreis Bassianis*. Later that same day, Hesychus and Eunus made went to the *horrea* where Eunus’ goods were stored. There,

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<sup>81</sup> See Camodeca (1999). The three relevant documents are TPSulp. 45, 51, 52.

<sup>82</sup> Though, contra Serrao (1984: 3605-18) not a slave-manager.

Hesychus leased *cella* number twelve in which was stored the pledged Alexandrian grain to Eunus at a nominal 1 HS per month.<sup>83</sup>

Such detailed information about day-to-day business practice anywhere in the Roman world is vanishingly rare. The relationship between the characters and the method by which an essentially fictional (though legally important) transfer of *cella* 12's lease was used as a method of guaranteeing a loan shows how creatively Romans used and combined relatively straightforward processes to engage in complicated commercial transactions. I cannot refrain from noting that there is no hint in any of these documents that the *horrea* rooms had keys, nor from pointing out how much easier this whole transaction would have been if Eunus simply could have transferred possession of the grain by giving him a key to cell 12 rather than by having to draw up an entirely new rental contract at the warehouse.

The failure to explain what conditions led the jurists to offer these decisions has led to some confusion over the main substantive difference between Gaius' and Papinian's decisions: the latter specified that the transfer of keys must take place at the *horrea* (*apud horrea*) whereas the former averred that possession changed hands whenever the keys did (*simul atque...emptorem*). This difference was significant enough to tempt Riccobono to add the words *apud horrea* after *emptori* to Gaius' text to make it

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<sup>83</sup> Camodeca (1999: 123) points out that Cypaeus, who appears as a *signator* to the initial loan, doubtless had a vested interest as Eunus' patron to his client's success. The token rent should, however, be explained by a view toward Hesychus' interest, which would decidedly not include paying rent for the privilege of securing a loan. There may be some significance to fact that, although Hesychus accepted the merchandise as security either on the 18<sup>th</sup> or 28<sup>th</sup> of June, the parties waited until July 2<sup>nd</sup> to take out a lease—one day after the start of the Roman rental year. Cf. Frier (1980: 34-36) on the importance of July 1.

cohere with Papinian's, thereby suggesting that the best solution to a problem is simply to write it out of existence.<sup>84</sup>

Rickman at least considered the problem more broadly, but his failure to recognize that *horrea* design depended a great deal on the commercial transactions taking place therein led him to become confused in trying to explain Papinian's restriction:

*The insoluble question is therefore whether the horrearius kept the only keys to the cellae in his office, to which the depositors came when they wanted entry, or whether the horrearius simply kept duplicate keys or some master key which would allow him entrance, while the depositors held their own keys to locked cellae. I think the latter is more likely, but the former would give a practical, as well as a legal, reason why the handing over of the keys had originally to be carried out at the warehouse itself.<sup>85</sup>*

We can immediately rule out the suggestion that the *horrearius* had "some master key."

A skeleton key is designed to bypass the wards on a warded lock, usually by filing away the key's bits, and thus rotate the latch. It is doubtful that the Romans knew how to do this (I know of no example of any discovery or mention of such a key), and the remains of the interior locks found at Ostian storehouses are lever-locks. Because lever locks depend on a key with a unique pattern of male/female bits and holes, a master key is impossible to make.<sup>86</sup>

It is, however, likely that the warehouse operator kept duplicate keys, which are easy to make from the original by using wax and wood. Besides being intuitively probable, Egyptian rental agreements commonly stipulated that the renter was not to change the existing doors or keys, as in Chr.Wilck.192, in which the renter agrees "to

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<sup>84</sup> Riccobono (1913: 199).

<sup>85</sup> Rickman (1971: 209).

<sup>86</sup> It cannot, I suppose, be ruled out that the individual cells all had the *same* lock, in which case, the *horrearius* could have a key to open any room. But insofar as one of the main points of these locks was to protect the property of depositors against other depositors, this possibility must be taken as highly improbable.

return the vault in clean condition with its existing doors and locks” (παραδόσθαι τὸν θ[η]σαυρὸν ἀ[π]ὸ πάσ[ης] ἀκ[α]θαρσίας σὺν ταῖς ἐφεστώσαις θύραισι καὶ κλ[ει]σί).<sup>87</sup>

Similarly, the fragmentary *lex* for the *horrea Ummidiana* at Rome preserves, in its second clause, the words *aedificaverit* and *ei refigendi* and therefore probably banned changes to the storage units, a fact strongly suggesting that merchants did not supply the locking devices on warehouses’ interior doors.<sup>88</sup>

The lessor and lessee’s dual possession of interior keys confounds Rickman because he could not conceive of any reason why there was a legal stipulation that the transfer of keys had to occur at the warehouse under those conditions and is forced to adopt a conclusion which he himself states was not “practical.” To solve this problem, he claimed that, “in classical Roman law it appears that delivery of keys away from the warehouse did not satisfy this requirement [i.e., for a proper *traditio*]. Later ‘symbolic *traditio*’ seems to have allowed the transfer of the keys at any place, not necessarily the warehouse itself.”<sup>89</sup> This alleged chronological development between Papinian and Gaius is fanciful: the two were only a generation apart, and it is bizarre to use one as embodying “classical Roman law” in contrast to the other, especially since Rickman used Papinian, who marginally postdated Gaius, as his classical example.

If we hold in mind the broader commercial context that necessitated this ruling then Papinian’s stipulation makes sense both for legal and pragmatic reasons. Legally, any *traditio* needed a proper reason (*iusta causa*), such as a sale, gift, legacy, etc. There has to be agreement both on the object delivered and the intent to deliver it.<sup>90</sup> In some

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<sup>87</sup> Examples are numerous. Cf. CPR 8.9, p.Harr. 2.255, p.Lips. 1.16.

<sup>88</sup> *CIL* 6 37795. Cf. Rickman (1971: 200-1).

<sup>89</sup> *Ibid.* 208

<sup>90</sup> Buckland (1939: 129-30, 135).

sense this was true of symbolic delivery too: there had to be a reason why it occurred by “eyes and inclination” rather than corporally, and Priscus stated that items of great weight constituted such a case (*propter magnitudinem ponderis*; *D. 41.2.1.21*).

Papinian’s ruling extended the reason but not significantly. The logic underpinning his decision seems to be on the basis of convenience: a sale occurred at the warehouse for merchandise which would be readily identifiable. To have allowed a key’s delivery to stand in for a more elaborate process that would have achieved the same result seconded Priscus’ judgment and extended it only by allowing that symbolic transfer was acceptable not only for items impossible to move but for items inconvenient to transfer where the context for transfer made confusion about identifying the objects unlikely.<sup>91</sup>

The logic underlying this opinion is similar to that found in *D. 41.2.51*

(Iavolenus):

*Quarundam rerum animo possessionem apisci nos ait Labeo: veluti si acervum lignorum emero et eum venditor tollere me iusserit, simul atque custodiam posuissem, traditus mihi videtur. Idem iuris esse vino vendito, cum universae amphorae vini simul essent. Sed videamus, inquit, ne haec ipsa corporis traditio sit, quia nihil interest, utrum mihi an et cuilibet iusserim custodia tradatur. In eo puto hanc quaestionem consistere, an, etiamsi corpore acervus aut amphorae adprehensae non sunt, nihilo minus traditae videantur: nihil video interesse, utrum ipse acervum an mandato meo aliquis custodiat: utrobique animi quodam genere possessio erit aestimanda.*

Labeo says that we achieve possession of some things by inclination. For example, if I buy a cord of wood and the vendor bids me to take it away then as soon as I place guardianship on it we can regard delivery as having occurred. Likewise when wine is sold, when all the jars are together at the same time. But let us see, he says, whether this is not a physical delivery because there it does not matter whether guardianship is given to me or even to someone else. It is here that a question exists: although the cord or amphorae are not physically apprehended, are they nevertheless to be taken as delivered? I see no difference whether I myself guard the wood or

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<sup>91</sup> *D. 45.1.75.5* for example states that a stipulation for wine, oil, or grain which is in a *horreum* is a stipulation for a definite thing (*certum*).

someone at my bidding: in both cases possession will have to be judged by some sort of intention.

This discussion makes no mention of keys specifically but clearly keys, as a form of *custodia*, should fall under the scope of this opinion. Nor is the judgment at odds with those relating to keys narrowly: Javolenus agreed that establishing *custodia*, which one could certainly do with a lock, was sufficient for transferring possession. In fact, it could have been some such logic that led to Gaius' opinion which offered a significantly more expansive range of possibilities for transfer of possession by key.

Allowing the transfer of keys to take place anywhere made possible new methods of transferring property but also would have raised new problems. For example, imagine the following scenario: Stichus has grain in a warehouse at Rome which he sells to Sextus in Pompeii. If Gaius' opinion had force, then Stichus would have been able to deliver his goods on the spot by handing over the key. It is easy to think of possible problems: what if Sextus came to Rome a month later and found the grain had spoiled? It would have been impossible to determine whether the spoilage had occurred before or after the *traditio*. Either way, Papinian's and Gaius' texts reflect an actual distinction in juristic opinion and do not result from textual corruption, but it is unclear which prevailed (though my hunch is the former).

To review: from the 1<sup>st</sup> century BCE through the first two centuries CE, locks became cheaper, more secure, and therefore more suitable for use in warehouses. *Horrearii* saw them as an inexpensive method to increase the security they offered while decreasing their reliance on human guards. Over the same time, the law developed so as to allow commercial transactions within these warehouses to become more convenient. It

is this concurrent technological and legal development which allows us to explain why, by the time of Severus Alexander's rescript in the 223, we find wine in a *horreum*.

The open spaces at *horrea* may have been long used as a place for buying and selling wine, but I seriously doubt whether most merchants would store their wine there before locks became common on the interior cells. As locks became common, however, merchants' calculus would have changed: the additional value obtained by the convenience of storing the product where sale occurred and transferring it on the spot must have made amphorae of wine an increasingly common sight at Rome's large warehouses.

Thus in 223, the emperor, Severus Alexander, responded to a petition concerning such wine:

*Imperator Alexander Severus. Cum convenit, ut singulae amphorae vini certo pretio veneant, antequam tradantur, imperfecta etiam tunc venditione periculum vini mutati emptoris, qui moram mensurae faciendae non interposuit, non fuit.*

*1 . Cum autem universum quod in horreis erat postea venisse sine mensura et claves emptoribus traditas adlegas, perfecta venditione quod vino mutato damnum accidit, ad emptorem pertinet.*

*2 . Haec omnia locum habent non solum si vinum, sed etiam si oleum vel frumentum vel his similia venierint et ea aut deteriora aut penitus corrupta fuerint. \* ALEX. A. GARGILIO IULIANO. A 223 PP. V K. APRIL. MAXIMO II ET AELIANO CONSS. (CJ 4.48.2)*

Since there is agreement that individual amphorae of wine are sold at a definite price, before they are handed over, since even then the sale is imperfect, the risk for changed wine was not the buyer's, who did not interpose a delay in making measurement. (1) But since you allege that the entirety of what was in the storehouses was afterward sold without measure and that the keys were handed over to the buyers, since the sale is perfect, whatever loss occurs because of changed wine accrues to the buyer. (2) All this has a place not only if wine is sold but also oil or grain or things similar to these and they deteriorated or spoiled inside.



As usual, we have here a tiny sliver of the situation, devoid not only of background context and details but also of crucial aspects of the petition, for example, whether the buyers or sellers brought the suit. In broad outline, some amphorae were sold at a set price per amphora (this is the only reasonable interpretation of *singulae amphorae*). Sometime thereafter the wine went bad, and a dispute arose whether the loss belonged to the buyer or seller: the buyer apparently argued that the wine's spoilage nullified the deal. Severus ruled in favor of the seller for two reasons: the wine was sold in its entirety (*universum*) without measure and keys were given to the buyer. In its most basic elements, this decision reaffirmed those of the antecedent juristic consensus that *traditio* had occurred when keys were handed over.<sup>92</sup> But this rescript has some puzzling details which we can use to better reconstruct the situation underlying this case.

First, the sale had two distinct phases—I see no other way to interpret *postea* except as marking section one as temporally later than the *principium*. Initially the seller was going to sell wine per amphora, but at some point later all the stored wine was sold at once. The price per amphora was set, but the number to be sold was not. There is a difficulty here: if individual amphorae of wine were being sold, there should have been no need of measuring the wine, yet this feature receives a great deal of attention. True, Ulpian stated that prior to measuring wine, the sale was incomplete and any risk of damage was the seller's (*priusquam enim admetiatur vinum proper quasi nondum venit*) but adds an exception: the seller does not incur that risk if the transaction was for single amphorae or dolia (...*sed forte <vendidit> amphoras vel etiam singular dolia*).<sup>93</sup> He did

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<sup>92</sup> It is *just* possible that Severus' disregard for the place where the keys were handed over marks a preference for Gaius' broad ruling, but it seems more likely that the specification of *universum...in horreis* was taken to imply that the keys were handed at the *horrea*.

<sup>93</sup> D. 18.6.1.1.

not give his reason for this opinion explicitly (or it has not come down to us), but the reason is clear enough: these containers came in a range of sizes of fairly consistent volume so that both buyer and seller had a fairly good idea how much wine was contained within them.

Gaius gave a fuller description of sale by amphora:

*Quod si vinum ita venierit, ut in singulas amphoras...certum pretium diceretur, quaeritur, quando videatur emptio perfici...Sabinus et Cassius tunc perfici emptionem existimant, cum adnumerata...sint, quia venditio quasi sub hac condicione videtur fieri.*

But if wine is sold by a definite price for individual amphorae...it is asked when the purchase is completed...Sabinus and Cassius judged the purchase complete when they are counted out because the sale is made as if on this condition.<sup>94</sup>

The relationship between *singulae amphorae*, *universum*, and *sine mensura* is problematic because it implies the seller did not know how many amphorae he had. That is, if the seller had, say, 50 amphorae of wine, selling the wine *universum* would simply mean selling all 50 jars and the added information that the sale was *sine mensura* would make no sense. There is a problem of language too: if the amphorae were to be counted, the Latin should read *mora numerandae faciendae*, not *mensurae faciendae*. The solution becomes fairly easy, however, if measuring by amphora referred to measurement by a standard volume rather than to sale of corporeal amphoras.

We can find supporting evidence bolstering this solution's plausibility elsewhere in the *Digest*. Proculus, at *D. 33.6.15* on the status of legacies of wines and their containers, points us to the solution. He says, "For we pour wine into amphoras and jars with the intention that it remain there until it is poured out to use and we certainly sell it with the amphoras as jars. But we place it in *dolia* for another reason, clearly so that we

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<sup>94</sup> *D. 18.1.35.5.*

may later draw it off into amphorae or jars or that it may be sold without the *dolia* themselves.”<sup>95</sup> I suspect that Severus’ seller was never storing his wine in actual amphorae but was keeping it in bulk—in *dolia* or a *cisterna vini* (whose existence is attested only by Paul),<sup>96</sup> waiting for it to be sold and drawn off in amphorae as Proculus described. He agreed to sell wine from this bulk at a set price per amphora (likely within the *horrea* itself), but measurement never occurred. Afterwards (*postea*), however, the deal was changed; the entire stock was sold at one fell swoop without measuring by amphora (*sine mensura*).<sup>97</sup> The key for the area the wine was stored was handed over and the sale was deemed complete even though the buyer, like Papinian’s, did not apparently first open the *horrea* and make sure the wine was acceptable.

### “Keys to the Kingdom of God...”

We can see, therefore, the influence of law and technology on the storage of wine at Rome. The situation behind Severus’ rescript suggests a *horreum*, which, like a *cella vinaria*, had permanent installations for storing wine—one is immediately reminded of the single mention of a *horreum vinarium* with wine, casks, equipment, and managers of *D. 33.7.7*.<sup>98</sup> This *horreum* had apparently taken over not only the locking mechanisms, which had become increasingly common over the prior century and a half, but also the business practices of sale and *traditio* by key which the legal decisions stemming from that development allowed.

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<sup>95</sup> *Vinum enim in amphoras et cados hac mente diffundimus, ut in his sit, donec usus causa probetur, et scilicet id vendimus cum his amphoris et cadis: in dolia autem alia mente coicimus, scilicet ut ex his postea vel in amphoras et cados diffundamus vel sine ipsis doliis veneat.*

<sup>96</sup> *D. 47.2.21.5.*

<sup>97</sup> In other words, the sale was changed to one *cum aversione*, a bulk sale (Jakab 2005: 87-110).

<sup>98</sup> *Horreum vinarium cum vino et vasis et instrumento et institoribus.*

It is doubtful that these developments affected the wine industry except at Rome or perhaps one or two other very large cities. After all, most cities imported much less wine over much less distance. Moreover, a great deal of Roman wine, starting in the mid 1<sup>st</sup> century and then especially after Trajan, came through *portus*; the development of warehouses making possible onsite delivery would have been especially attractive—wines, like “Titius’ and held both in the city and at Portus” must have been common indeed.<sup>99</sup>

Over the last two chapters, we have argued that Romans employed a range of storage facilities, and their use was predicated on the relationship between rents and appreciation/depreciation rates. From the 1<sup>st</sup> century BCE to the 3<sup>rd</sup> CE, law and technology developed in tandem so as to alter the calculus of wine merchants looking to store wine, and these developments almost certainly made the storage and distribution of wine to retailers in the city of Rome more efficient by streamlining the process of sale and transfer.

It is of course impossible to say just how common this method of using key-transfer to complete sales of stored goods became but image and even the legal language found its way into a work of a very different context. In his defense of fasting, Tertullian said:

*Et si claves macelli tibi tradidit permittens esui omnia ad constituendam idolothorum exceptionem, non tamen in macello regnum dei inclusit. Nec enim, inquit, esus aut potus est dei regnum...*

And if he delivered to you the keys of a meat-market, thereby allowing everything to be eaten for establishing the defense of idols, still he did not include the kingdom of god in the meat-market, for, he said, food and drink is not the kingdom of heaven...<sup>100</sup>

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<sup>99</sup> D. 34.2.30.

<sup>100</sup> *De leiunio adversus psychicos* 15.5.

At the end, there were more things on heaven and earth than were dreamed of even in juristic philosophy.

## **Chapter VII**

### **Conclusions**

The city of Rome was, by any measure, a phenomenal consumer of wine: we can reasonably estimate the city's annual consumption of being on the order of 2-2.5 million Hl, enough wine to fill eighty to a hundred Olympic sized pools. Yet until the reign of Aurelian, Rome's emperors made no effort to guide or manipulate the city's wine market as they did for grain and olive oil, the other two staples forming the Mediterranean triad. For all intents and purposes, Rome's wine supply was market driven, but, as with all ancient economic markets, there were severe distortions which raised the cost of using the market itself. Among these we can list, for example, asymmetrical information costs and availability, highly variable and often expensive transportation rates, Rome's unique body of organization law, and problems inherent to the chemistry of wine itself.

Surprisingly, there has been no major study of how, given those constraints, Rome's wine market operated so successfully. Rather, most prior histories of the Roman wine trade have used the wine-trade as a proxy for engaging in broader arguments and polemic about the nature of the Roman economy generally. I have deliberately steered away from these debates, preferring rather to write about wine-commerce as a subject deserving its own study and not merely as a handmaiden to such broader, theoretical debates.

My approach is modern in technique, though this methodological modernism does not generally lead to conclusions showing similarities between Rome's wine trade and

that of later periods. This feature is unusual for a work of Roman economic history where, quite often, the historians most inclined to use modern theory are also those most inclined to search for similarities between ancient and modern economies. My studies show how economic theory is an equally powerful tool for explaining unique characteristics of Roman economic activity generally and the wine-trade in particular.

Chapter two surveys previous histories of Rome's wine trade; evaluates the sources available for its study; and argues that the traditional debate among Roman economic historians over the degree to which ancient economic activity was market driven or was "embedded" in non-market behavior is a false dichotomy. True, the direct and indirect involvement of Rome's upper classes in the wine market was likely responsible for 5-20% of Rome's annual imports of wine. An unknowable amount of this wine would have been produced on that class's own estates and, in some sense, never entered a general wine market. *Prima facie*, this could lead one to believe that much of Rome's wine supply depended on a non-market system.

But, on closer consideration, it is apparent that even internal supply still affected the general market for wine. One who produces wine for his own consumption is choosing *not* to buy wine on the open market thereby affecting the market's total supply and wine's corresponding market price. Moreover, the shape of Rome's upper class's demand for wine surely differed considerably from the general populace's, whose disposable income available for purchase would have fluctuated considerably more. The presence at Rome of this wealthy class may have made Rome a more attractive market for wine merchants than even other large, Mediterranean cities like Antioch, Carthage, or Alexandria.

Therefore, to found a study of wine commerce either as purely market driven or purely embedded in non-economic activity is counterproductive. Rather, I adopt the premises of New Institutional Economics (NIE), the now typical body of theory for analyzing the relationship between economic activity and the institutions in which they occur. NIE posits that using the market incurs transactions costs and, at times, these costs can become prohibitive and may lead economic actors to seek alternative organizational/governance regimes (such as firms). This approach adopts most of the premises of neoclassical economics but relaxes some in an effort to understand why the firm, the black-box of neoclassical economics, exists, its limits, and its operation. For example, neoclassical utility theory is still necessary for analyzing individual preference and decision making, but actors' decisions and available actions are circumscribed or even constrained by their institutional setting, which sets the rules of game. These rules may differ considerably over time and place. Therefore, analyzing institutions can help us understand how economic activity occurred and how it differed from comparable activity in other places and times.

More specifically, legal rules, both formal and informal, are crucial factors in setting the rules of the game. Increasing attention, both among historical and development economists, has been given in the last twenty years to studying how differing legal frameworks give rise to radically different modes of economic behavior and development. For this reason, the rules laid out in Justinian's *Digest*, particularly those dealing with wine, are the linchpin of my study. In addition to its narrow focus on wine, this dissertation should be seen also as a test case, showing that transaction cost



economics reveals hidden patterns in economic activities from all time periods, including from ancient Rome.

Chapter three begins by observing that although contemporary and historical wine industries show a marked tendency toward vertical integration, there is little evidence of significantly integrated Roman wine firms. To explain this peculiarity, I argue that Rome's (*de facto*) body of organizational law lacked certain features crucial for the historical development of large integrated firms with multiple owners in later periods, namely, entity shielding/affirmative asset partitioning. Attempting to contract for this feature without organization law generates considerable problems of moral hazard and therefore incurs prohibitively high transaction costs. This important feature of modern businesses requires the existence of codified law which the Romans lacked. For this reason, Roman wine commerce was not well integrated between different sectors—the firm which grew grapes in Spain was unlikely to also manage distribution of wine at Rome.

Therefore, the Roman wine trade was dependent on contractual relationships to a remarkably high degree. Moreover, the jurists were willing to engage with problems particular to the wine industry's standards of trade. In particular, I argue that the contractual default rule for *degustatio*, which, of all the elements relating the sale of wine, received far and away the most juristic attention, belongs to a class of penalty-default rules which can be more efficient than market mimicking default rules when significant transaction costs arise from incomplete contracting and high court costs. At the same time, the jurists were minimalists: there is no evidence, for example, that they dealt with the crafting of warranties, a feature which can operate efficiently through

private-ordered arrangements. Thus, while Roman law did not develop in a way favorable for large wine firms to develop, the jurists consistently and consciously tried lower the transaction costs associated with wine-sale.

Chapter four examines wine production in light of the previous two chapters' findings. I argue that distinction between growing wines of quality versus wines in quantity was not the fundamental decision facing the Roman wine producer as it was in early modern France. In contrast, Roman growers always attempted to produce the most wine possible. For this reason, Roman wine production never really became a sector separated from agricultural production generally. The uniformity of Roman wine production owed something to the comparative uniformity of trade regulations and customs dues, as opposed to the medieval Mediterranean. I then use the Heckscher-Ohlin model of international trade to suggest that the changing provenance of wine consumed at Rome largely stemmed from the changing distribution of capital in the Roman world. I conclude that wine chased capital but not vice versa, quite the opposite of how the modern wine sector developed.

Chapter five examines wine storage and distribution within the city of Rome. We are very poorly informed about storage and distribution within the city of Rome, and much of our data relies on architectural remains from Ostia, Rome's Marble Plan, and plausible conjecture. I argue that studies of storage units overly rely on Staccioli's typology of *horrea*, which proves fairly inutile for determining where and how wine was stored. There is good circumstantial evidence that much wine was not stored in either of Staccioli's two *horrea* types but rather in non-architecturally distinct, scattered urban spaces in which were buried voluminous storage vessels (*dolia*). Finally, I argue that

these storage units were likely associated with retail shops like taverns and that Rome's general population acquired most of its wine through such retailers. I agree with Vera that when Aurelian added wine to the *annona* in the late 3<sup>rd</sup> century, the wines were purchased at the *templum Solis* by retailers (not private consumers). Further, this was not a new development but simply adapted the already existing method of distribution.

Chapter six shows that the operation of Rome's wine commerce was not static but evolved and that wine merchants and institutions reciprocally affected one another. This chapter observes that there seemed to be some tendency over the first two centuries CE for Romans to begin storing wine in *horrea* in addition to the venues described in chapter four. I argue that two related developments led to this change: security within these *horrea* became better as interior locking devices and keys became more suitable to daily commerce, and the jurists became increasingly willing to extend their notion of a valid *traditio* to include handing over the key to a locked storeroom rather than handing over the sold goods themselves. I argue that we have here a rare example of commercial practice, law, and technological change operating in tandem and influencing each other so as to make the storage and distribution of wine in Rome more efficient.

The chain of supply that could transform a grape on a vine in Spain into wine sold at a tavern in Rome was one of considerable dynamism and energy. By linking vintners, potters, merchants, shippers, tavern keepers, and, ultimately, wine-drinkers, the commercial network existing to slake Rome's thirst for wine spanned the Mediterranean and, for several centuries, worked well enough to meet the demands of a city of a million people without direct governmental intervention.

As this commercial network grew to such an extent, it became increasingly reliant on the institutional settings in which it operated. Among the most important of these was the formal legal setting. This was particularly important because the Rome's lack of a general body of organizational law favorable to the creation of vertically integrated, multi-owned corporate forms largely constrained the different sectors of the Roman wine trade for a significant degree of integration. In contrast, it apparently relied to a remarkably high extent on contractual relationships. Rome's jurists showed remarkable sensitivity to the contours and needs of Rome's wine trade and deliberately tried to tailor rules enhancing its efficient operation.

But the importance of face-to-face, contractual relationships between different sectors means that a good deal of detail about the day-to-day operation of the actors who participated in the wine-trade remains difficult to ascertain and often invisible. Moreover, for reasons both theoretic and pragmatic, this study has emphasized the importance of *formal* contractual and enforcement mechanisms but we can be sure that privately-ordered agreements and penalty mechanisms would have been critically important too.<sup>1</sup> There are therefore myriad questions and problems left to be explored in refining, expanding, and perhaps challenging the image I have drawn here of Rome's wine-trade. But I am comforted that, in the end, "dissertations, however inconclusive, may amuse individuals of fortune not unprofitably who have leisure to bestow upon speculations of a similar nature."<sup>2</sup>

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<sup>1</sup> Greif, Milgrom, and Weingast (1994: 745-776) on the importance of private enforcement of contracts among medieval merchant guilds; see also Bernstein (1992: 115-57) and (2001: 1724-90).

<sup>2</sup> Redding (1851: 19).

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