INTRODUCTION

In the twenty-first century, it is easy to identify the many ways in which human society can prepare for, mitigate, and quickly rebuild after significant natural shocks. Natural events may create particular hazards for humans, but in many cases we have developed methods to respond, including better building codes for earthquakes, river management systems of dams and levees to control flooding, and better weather forecasts that allow more lead time for major hurricanes. The more resilience we build into our societies, the more resistant we are to such disasters. Despite the systems at our disposal, we are not fully resistant to natural shocks. Japan has one of the best earthquake preparedness systems in the world but still was unable to prevent the disaster at Fukushima; clear playbooks and epidemiological warnings about how global pandemics spread have not prevented the widespread chaos, serious economic consequences, and high mortality of COVID-19. But beyond overwhelming our defenses, crises like these strike different individuals within society in very different ways. Most of the disasters of the past few decades have fallen unequally hard on the most vulnerable within societies. Hurricane Katrina swamped the poorest neighborhoods of New Orleans, and preexisting poverty left the marginalized portions of the city's population least able to respond or rebuild. Even in the global coronavirus pandemic, where people often repeat some version of how we are all in this together, the response has varied widely by country, and deaths and suffering virtually always hit disadvantaged communities

most severely. Disasters occur when a natural shock exploits a vulnerability in human society and exposes preexisting weaknesses or divisions. Multicausal disasters—natural shocks that interact with structural weaknesses and social hierarchies—are often described as "complex human disasters." Of the many natural disasters, famine is one of the best examples of a complex human disaster. Our ability to produce and store food creates an array of different possible responses; natural shocks that influence the food supply run the gamut from floods to droughts, pathogens to wars. No famine has a single cause, and the resulting starvation and loss of life often mirror social hierarchies very closely.

The global food shortages of 2007 demonstrated many of the attendant complexities common to famine events. As the price of food rose steadily in the fall, commentators and politicians blamed a variety of factors, including low global food reserves, manipulative stock purchases by investment banks, growing demand for meat in Asia, drought in parts of the Ukraine, West Africa, Australia, and the United States, and a growing European and American subsidized demand for biofuels that took acreage away from global food staples.[1] News reports described bickering between countries attempting to lay blame for the situation.[2] While wealthier countries experienced rising food prices, poorer ones experienced real shortages. Food riots broke out in Egypt, Yemen, the Ivory Coast, Haiti, Bangladesh, and Cambodia. Local governments, fearing civil unrest, resorted to predictable measures to combat the food supply crisis: export bans, statutes against speculation and hoarding, and even price-fixing. These very measures exacerbated the problems in global exchange, causing markets to stagnate and inciting panic. Focus on the food crisis, particularly in developed countries, ended with the global banking meltdown in September 2008, which replaced the unresolved food issues with new, more dire economic concerns.[3] The events of 2007 included natural shocks, human economic and social decisions, market panic, and the filtering of suffering through global wealth inequality.

Medieval famines were similarly complex events, involving the same disparate array of environmental triggers, agriculture driven as much by societal choices as by survival tactics, and market failures. Patterns of suffering and starvation, then as now, ultimately followed the lines of social and economic inequality, striking vulnerable individuals considerably harder than elites. The central events of the major famine of 1374–75, which I describe in detail in chapter 5, resemble components of the 2007 crisis. Although the affected area was regional rather than global, 1374 witnessed diverse weather patterns across a wide area; frost, storms, drought, and hail ranging from Valencia

around the Mediterranean rim to southern Italy created shortages in multiple regions. The western Mediterranean functioned as a major trade network for foodstuffs, moving fruit, nuts, and grain between multiple areas. As soon as large importers like Barcelona and Florence began buying up supplies and restricting exports, many smaller locations followed suit, shutting down the market and freezing supplies in place, regardless of need. Panic spread like a contagion through the market and prices spiked. Within individual towns and cities, the wealthy complained about not being able to buy bread and having to make do with less desirable foods like chickpeas, while the poor actually starved. Further, restrictions on the socially marginalized increased as cities forcibly removed foreigners and beggars in an attempt to reduce the number of mouths to feed. As they do today, famines in the fourteenth century contained a mix of natural shocks, human responses, political maneuvering, and the structural inequalities of power and poverty.

Understanding Medieval Food Crises

Research into premodern famines is often conducted in the shadow of Ernest Labrousse's distinction between modern and premodern crises. Labrousse described modern events as largely economic in cause and consequence. He contrasted them with subsistence or "old type" crises, where natural forces caused harvest shortages that translated directly into food crises in a simpler economic system.[4] Conceiving of premodern famines as largely subsistence crises reduces humans to passive agents in a narrative of larger forces. This view precipitated a long debate about causation, which was further wrapped up in various debates about the "crisis of the fourteenth century" and the perceived touchstones of a shift toward modernity, however conceived. Scholars described famines as manifestations of various structural causes, including overpopulation, the economic struggles of late feudalism, and, more recently, global climatic shifts.[5] One of the more famous early theoretical discussions of medieval famines, known as the Brenner debate, exemplified this focus on deep structural forces.[6] The debate pitted neo-Malthusian ideas about overpopulation and its accompanying economic stagnation against Marxist interpretations of inflexible modes of production and feudal lack of interest in land improvements as competing explanations of what caused the fourteenth-century crisis. Both sides saw the crisis as upending the previous socioeconomic order (through the population loss caused by the Black Death and the social mobility it ushered in) and setting the stage for new modes of

production in the fifteenth century that made modern capital development possible.[7] The understanding of famines was secondary to the larger narrative, and the existence of significant disasters after the Black Death was largely ignored.

More recent debates, fitting our own contemporary concerns, have centered on the environmental backdrop to food supply. Again, the crisis of the fourteenth century fits neatly into a longer-term narrative in which the Medieval Warm Period slowly gave way to the Little Ice Age. The warm period provided optimal conditions for significant crop production and allowed for population expansion. The reversal of the climatic regime, which Bruce Campbell dubbed the "great transition," brought new restrictions and, ultimately, greater crop failures and crises.[8] In this model, the Black Death played a lesser role, but the decline in population still delivered some reprieve by blunting the impact of inevitable harvest shortfalls. In strong contrast to this model, Peregrine Horden and Nicholas Purcell adopted Amartya Sen's ideas about entitlement, which fit well into their own conception of diverse Mediterranean microclimates. In the 1980s, Sen had introduced the idea of famine "entitlements" as an analytical tool to describe how individuals fail or succeed at commanding access to food resources, particularly in times of scarcity. Horden and Purcell claimed that owing to high crop diversification and the pervasive connectivity of the sea, starvation was rare and resulted only from human failures.[9] It is certainly true that trade and exchange played a major role in medieval crises, as many of the examples in this book demonstrate. But Horden and Purcell described a climate with little long-term variation—its only persistent feature was its short-term variability. While Mediterranean models do not match northern Europe, significant climatic change in the fourteenth century did in fact influence the choices made by both individual and institutional crop producers.

The Great Famine of 1315–1317, one of the greatest food crises in European history, stands at a convenient junction in the early fourteenth century, a time when the multiple factors of climate, population, economic development, and feudal relations were all in flux.[10] Such a significant event makes a tempting foil in any number of historical arguments, but it can distract from the complexities of famine itself. While famines might be superficially connected to any one of those factors, as individual events they invariably weave together multiple causes and outcomes. Additionally, because of the narrative strength of the Great Famine and the crisis of the fourteenth century, research has mostly focused on crises prior to the Black Death. In the western Mediterranean, several famine events have competed to fill a historiographic

niche similar to the one occupied by the Great Famine: 1328 and 1346 in Italy and 1325 in southern France.[11] For the Crown of Aragon, 1333, referred to as the "first bad year," has most often occupied that position.[12]

Recently, scholars have reconsidered many assumptions about the early fourteenth century. Collaborative projects such as the articles collected in *Dynamiques du monde rural dans la conjoncture de 1300* have described greater dynamism in peasant economies, including economic specialization, access to credit, and rural market integration.[13] Recent research has shown that small towns boosted systems of exchange and economic opportunity, counter to the prevailing narrative of stagnation. *Les disettes dans la conjoncture de 1300*, the companion volume to *Dynamiques du monde rural*, demonstrated the importance of exchange networks, political tensions, and war in exacerbating food shortages.[14] Several recent conferences, spearheaded by Pere Benito i Monclús, have investigated specific characteristics of famine, such as the links between famine and war and political responses to food shortages.[15] Daniel Curtis has applied the concepts of vulnerability and resilience to questions of economic development, especially in Italy, while very recent work by Philip Slavin has reconsidered even the Great Famine in complex terms, taking more seriously the role of social factors like poverty and war.[16] New works on the premodern climate have also complicated the connections between famines as individual events and the influence of the natural world; one recent work memorably described shortages as "socionatural entanglements."[17] These works all treat famine as a significant event in itself, albeit one that changes character and severity depending on its interaction with numerous other factors, including climate, politics, war, and social attitudes.

Despite these more nuanced discussions of the causes of famine, scholars still generally assume that the significant population drop brought on by the Black Death reduced both the frequency and severity of famines.[18] However, the Crown of Aragon and much of the western Mediterranean continued to experience food shortages after the Plague. For much of the region, the worst famine of the century hit during the mid-1370s, a time when none of the Mediterranean populations had significantly recovered. Treating famines as complex and unique allows us to better understand the conditions that underlie a society's food supply and also the character and distribution of suffering during a crisis, regardless of the underlying climatic or population regimes. As I show in part 1 of this book, the study of food supply provides a window into methods of environmental adaptation, cultural influences on agricultural production, the strengths and weaknesses of markets and economic institutions, and the moral restrictions behind food entitlements. Part 2 brings

these observations to bear in understanding three famines of varying severity. For each event, considering the famine on its own terms involves multiple angles and cannot be easily subsumed into singular grand narratives.

While the fourteenth century saw a different constellation of overlapping causes than we see today in modern events, famines still involved a diverse set of factors, covering a wide geographic area. Long-term structural changes played a role, but no one factor proved decisive. Understanding medieval famines as complex disasters involves dissecting underlying vulnerability and resilience, but also considering the proximate set of causes that touched off individual events. The first part of this book dedicates a chapter to each of three fundamental aspects of society that helped shape how famines occurred and spread: agricultural production; trade and the economy; and systems of poverty and food access. In the fourteenth century, each of these areas had its own developments and shifts that changed the character of famines, determining who had better access to food, influencing the resilience of urban and rural people, and creating social filters that helped determine who, in the end, might actually starve.

Over the course of the fourteenth century, agricultural output fluctuated constantly in response to the weather. Scholars have debated crop yields and maximum caloric outputs for decades. However, other complexities of agricultural production influenced the outcome of shortages. Access to markets could encourage specialization at the local level, such as the increasing production of saffron in the counties northwest of Barcelona, or investment in vineyards, especially on land near large export markets. Responding to increasing demand and access to local markets, agricultural decision making was not primarily concerned with preventing famine at all costs. Producers balanced hedging against risk with strong cultural and market concerns. Even the heavy reliance on wheat responded as much to cultural tastes as to the goal of maximizing calories. In the Mediterranean, barley could provide more reliable yields and better resistance to drought than wheat. But the cultural supremacy of white bread meant that barley was planted only as a backup crop, consumed by the poor or even by domestic animals. In bad years, barley stored for animal consumption could be eaten by people in order to ward off starvation. Chroniclers regularly used the consumption of debased food—bread made of lentils, acorns, or even dirt or tree bark—as a measurement of suffering, because even in desperate times cultural food hierarchies remained in place. Agricultural output thus aimed to perpetuate cultural norms, not merely to maximize calories; preventing starvation was part of the goal, but not the entire goal.

If agricultural practices did not always seek to prevent famine, systems of economic exchange and trade could both reduce and exacerbate shortages. Contemporary scholarship has increasingly described the late medieval economy in dynamic and complex terms.[19] Over the course of the fourteenth century, western Mediterranean cities increased their direct legal and economic control over their grain supplies. Barcelona and Valencia, like major Italian cities, experimented with legal and economic measures, including monopolies, tax breaks, import subsidies, and direct purchases. These new initiatives often relied on support from the royal authorities, especially when granting trade licenses or acquiring new privileges was involved. This suite of options resulted in inconsistent outcomes. Some tactics, such as licenses and waiving fees, worked well in addressing local shortages but proved less effective in systemic crises. Violent coercion and export bans tended to shut down trade networks and channel grain away from areas with less clout toward politically powerful centers. Over the course of the century, urban governments, especially, learned which methods proved more effective and which only exacerbated the problem, and they leaned on methods with a better track record, although every response had its drawbacks.[20]

An important consequence of increasing market integration and control was a change in the geography of famines. As the western Mediterranean market became more efficient, local shortages became easier to cope with. But market breakdowns caused by shortages in multiple locations could heighten market panics throughout the region, increasing the severity of the crisis. Part of the complexity of famines during the second half of the fourteenth century arose from the occurrence of food shortages in multiple connected regions. If one region lost a harvest because of drought, while a second region experienced war or siege, it was the combination of these events that precipitated a famine. Hence the geographic breadth of the event contributed directly to its severity, an effect seen clearly in all of the shortages detailed in part 2 of this book.

Finally, individual access to food resources is not equally distributed throughout society. Amartya Sen, with his concept of "entitlements," codified the argument that inequality was more important than levels of production. Subsequent scholars have often distinguished between famines caused by bad entitlements (often caused by market failure or poverty) and those caused by an overall decline in food availability.[21] However, most modern famine scholars do not see these as mutually exclusive factors.[22] Crop failures caused by weather could reduce overall food availability, but not every individual starved. Measuring the entitlements of different groups during a famine helps identify

those who are most likely to starve along with those who might even have profited from the shortage.[23] The particular character of suffering in a famine still depended on individual food access, rather than on a facile comparison between the amount of food produced and the number of mouths to feed. In the fourteenth century, the general treatment of the poor shifted in response to coalescing theological categories of poverty. Wealthy urban patrons donated increasing amounts of money to hospitals and other institutions that gave aid to the poor.[24] But most such donations were predicated on the spiritual rewards gained by the donor as much as on concern for the physical well-being of the needy. In order to ensure the salvific character of those who gave alms, churches, hospitals, and governments increasingly used theological categories of deserving and undeserving poor to criminalize economic marginality. Those criminalized often included the local poor, along with migrants or temporary residents.[25] During periods of food shortage, these laws took increasingly harsh effect, systematically denying food entitlements to large categories of people in an effort to preserve supplies for those deemed worthy. At worst, foreigners and the poor were both scapegoated, when in fact market forces were responsible for exacerbating an initial shortfall of food supplies.

Thus famine was not only a question of agricultural or market failures but always involved at least a partial breakdown in the general social order. In the most serious events, riots and unrest manifested the general feeling that the social contract had been violated (an idea discussed in scholarship on the "moral economy").[26] Even during minor shortages, though, suffering was filtered through individual vulnerability. When individuals in power aided the needy, they did so on their own terms and often for their own benefit. One of the better markers of famine severity is thus the level of social disjunction. Shortages encouraged governments and individuals alike to find methods of diverting suffering away from those who might cause direct unrest to those with less social standing. The cruel mechanisms of society determined who could suffer or die with the fewest overall social consequences.

While these patterns appear in other famine crises across Europe, the Crown of Aragon provides a particularly useful combination of factors for understanding medieval food shortages. The Crown combined several powerful trading cities—Barcelona, Valencia, and Palma de Mallorca, most notably—with a complex agricultural system. Inland areas of Aragon, along with large portions of Catalonia, like the Urgell, produced grain both for urban centers and for export into the wider Mediterranean market. Valencian irrigation systems shifted production toward crop intensification and required significant governmental oversight to function well. Records from

the Crown of Aragon illustrate complex systems of production and the diversity of agricultural methods available in the fourteenth century. The urban centers participated in long-distance and local trade, providing evidence of the influence of market integration on the changing character of shortages. Additionally, the Crown of Aragon had an extensive system of hospitals with large record collections, enabling a close look at the treatment of the poor and the social structures produced by a changing theological view of poverty. The Crown of Aragon combines a rich documentary tradition with a diversity of institutions and practices that constitute an excellent laboratory for understanding the complexity of late medieval famines.

As noted above, medieval famines share many features with modern events. In 2007, the relative wealth and power of individual actors and political power centers determined the most likely destination for available grain. Such a global crisis necessarily involved a combination of long-term and short-term causes. Political leaders responded to fears of civil unrest with an array of increasingly desperate responses (hoarding, export bans, criminalization of individuals at the social periphery). In the end, the economic elites did not seriously expect to starve either in 1374 or in 2007. Both poor relief and international aid favored specific groups of people and excluded others, leaving the excluded even more vulnerable than they had been before the crisis. Modern and medieval shortages have these features in common, making the underlying structures of many famines ultimately legible and comparable.[27]

Sources

Famines are difficult to study because the shortage of food influences so many facets of social life. Documents that refer to the famine and provide insight into the responses of fourteenth-century society appear in royal, urban, baronial, and religious administrative collections. I have tried to be omnivorous in the inclusion of diverse types of sources from as many regions as possible, but the realities of archival work inevitably make certain collections more fruitful for research—notably, in this case, the urban administrative records of Barcelona and Valencia and the administrative documents from the poorhouse of the Barcelona Cathedral, the Pia Almoina.

The municipal archives in Barcelona and Valencia are well known and widely used. Both contain council deliberations, exchequer records, and letter collections (among other documents) starting in the early fourteenth century. Earlier research on urban food supply has often made use of these archival

sources.[28] The financial records from Valencia in particular made possible a detailed study of import subsidies and the financial ramifications of urban interventions in the grain market. Such analyses form the basis of the first case study in chapter 4 and a significant portion of the argument in chapter 2. Similar documentation exists in other urban centers, and I have used additional resources from Manresa, Villarreal, and Tarragona, and have supplemented this information with published studies that draw on similar data from Cervera, Tortosa, Tarragona, and other locations.[29]

I have also relied heavily on poorhouse records for their extensive administrative documents, which often illuminate agricultural practices and the conditions of the grain market in addition to practical decisions on the treatment of the poor. For this study, the most important hospital records include the archive of Pere Desvilar in Barcelona, other hospitals of the Barcelona Cathedral (especially the hospital "d'en Colom" and the hospital "dels malalts" [of the sick]), the Hospital of en Clapers in Valencia, and the episcopal poorhouse in Vic.[30] Not only did poorhouses record the levels of aid available to the poor, but their donation documents often illustrate the restrictions placed on the poor when they received aid, the types of people singled out for assistance, and those denied public help. The poorhouse in Vic and the cathedral's hospital records also include food prices and land-use records that provide points of comparison for the study of agricultural production in chapter 1.

The most notable source for this work is the impressive collection of documents at the Pia Almoina, the almshouse of the Barcelona Cathedral. As a poorhouse, the Almoina served an increasing urban population and received large bequests and donations from wealthy Barcelonans. The managers of the house parlayed these donations into an extensive urban and rural patrimony that in turn produced copious managerial documentation. The details in the archive allow us to reconstruct every facet of the food supply system, from agricultural practice in demesne lands, to involvement in the powerful international grain market in Barcelona, to fourteenth-century conceptions of poverty and poor relief. Because of this variety, the records of the Almoina are cited regularly throughout this book.

Until very recently, the records of the Pia Almoina were poorly cataloged and relatively difficult to access. The Almoina's archivist, Josep Baucells i Reig, made a heroic effort to better systematize and describe the archive's rich resources, and oversaw the publication of several important catalogs of the institution's parchment charters and documents.[31] Apart from the studies written by Baucells i Reig himself, the only works to make extensive use of the Pia Almoina documents are those of Tomás López Pizcueta, particularly

his book-length study of the Almoina's patrimonial holdings in the thirteenth and early fourteenth centuries.[32] Under the direction of Pere Benito i Monclús, new scholars have also begun to mine the resources of the Pia Almoina for studies on agricultural practice, poor relief, food supply, and famine.[33]

The Pia Almoina was overseen by a general manager, the *majordom*, who was supervised by a pair of canons from the cathedral. The *majordoms* kept a compilation of all financial transactions of the institution, now housed in the archive as the Majordomia and the first series of the "general administration." The first of these books has been edited and published by María Echániz i Sans.[34] The Pia Almoina doubled in size between the mid-thirteenth century and the beginning of the fourteenth, increasing the number and size of the registers. In the middle of the century, the *majordoms* consolidated diverse records into a single, large-format volume that contained a summary of all major income and expenses over a two-year period.[35] Each volume contains a section recording the income and expenses for each of two years. The payment sections provide perhaps the greatest new source of information: food costs. The books record all food purchased and served to the poor by the institution, including their bread, meat, wine, and accompaniments. Previous writers on the Catalan economy have either guessed at prices or provided only partial price series.[36] The Almoina frequently purchased its grain through privileged channels; thus the prices are probably slightly lower than those paid by an average consumer. However, the general fluctuations and the notes about the origins of the grain available in the Barcelona market provide a more complete picture of the city's economic tides than previously available.

Along with these centralized account books, several other series hold valuable information for the history of the Catalan food supply. The two main examples of agricultural land practices used in the first chapter, Sitges and Mogoda, both maintained local records that were compiled and summarized in the Majordomia. While many of the Mogoda books are now lost, Sitges retains several dozen that run from 1354, when the cathedral purchased the rights to the castle, to 1410. These volumes contain rents and expenditures, including extensive food and labor costs. Most important for this study, the records describe the work done on the demesne land of the castle, called the *llauró*, which allows for the calculation of crop yields and the description of labor practices. Apart from the wealth of English manorial accounts, European crop yield data are relatively rare until the fifteenth or even sixteenth century. Pere Benito i Monclús and I have each written an article investigating yields and harvest practices in Sitges based on these records.[37] Beyond these studies, there are no other comparable crop yield data known

from anywhere in Catalonia or Valencia during the fourteenth century, so the importance of these books is hard to overstate.

In addition to using the Majordomia, I have added food prices from the financial records of the abbess of the monastery of Sant Pere de les Puel·les. Starting in the mid-fourteenth century, the abbess kept annual accounts of income and expenses similar in structure to the Almoina records (and possibly compiled under the supervision of members of the Barcelona Cathedral administration). The series is not as complete as the Almoina, but it provides additional evidence for labor practices and food prices. Sant Pere had different relationships to regional markets and to Barcelona itself, making it an excellent comparison to the data from the Almoina. Records of city administrations, including Perpignan, Manresa, Tarragona, Tortosa, and others, supplement the main observations from the archives in Barcelona and Valencia. Taken together, these sources cover a wide geographic area and take into consideration several different types of evidence. However, they are still only a fraction of the overall primary source base for a major famine event that left its mark in documents from Valencia north to Toulouse, and across many of the cities of the Italian Peninsula.

A Note on Weights, Measures, and Prices

One of the challenges of studying medieval economic history is the constantly shifting standards for both the weights of goods and the underlying values of coinage.[38] In Catalonia, even the most official weights and measures changed periodically. In 1381, King Pere the Ceremonious (r. 1336–87) adjusted one of the standard measures of wheat (the quarter, or *quartera*) in an attempt to normalize the measure for northern Catalonia so that it would match the same unit for barley. Prior to the adjustment, a quarter of barley held 20 percent more grain; this meant that the subdivision of twelve *quartans* to the *quartera* could be calculated as ten *quartans* of barley to twelve (or one *quartera*) of wheat. The adjustment brought the two *quarteras* into alignment, increasing the *quartera* of wheat by 20 percent. For several years afterward, numerous documents listed purchases in both the new and the old *quartera*. Because most of the events described in this work occurred under the old *quartera* system, I have converted all references to the Barcelona *quartera* to this older measure (just shy of seventy liters, as noted in the table below).

Beyond changes over time, measurements, especially for foodstuffs, sometimes varied from town to town. Thus, while Barcelona, Lleida, and Palma de

	Barcelona "old" *quartera*	Tarragona *quartera*	Tortosa *quartera*	Lleida *quartera*	Palma *quartera*	Girona *quartera*	Alicante *cafís*	Zaragoza *cafís*	Valencia *cafís*
Liters	69.5	70.8	70.3	73.4	70.3	72.3	249.3	179.4	201
Barcelona "old" *quartera*	1	0.98	0.99	0.94	0.99	0.96	0.28	0.39	0.35
Tarragona *quartera*	1.02	1	0.99	0.96	0.99	0.98	0.28	0.39	0.35
Tortosa *quartera*	1.01	1.01	1	0.96	1	0.97	0.28	0.39	0.35
Lleida *quartera*	1.05	1.04	1.04	1	1.04	1.02	0.29	0.41	0.37
Palma *quartera*	1.01	1.01	1	0.96	1	0.97	0.28	0.39	0.35
Girona *quartera*	1.04	1.02	1.03	0.98	1.03	1	0.29	0.4	0.36
Alicante *cafís*	3.58	3.52	3.55	3.4	3.55	3.45	1	1.39	1.24
Zaragoza *cafís*	2.58	2.53	2.55	2.44	2.55	2.48	0.72	1	0.89
Valencia *cafís*	2.89	2.84	2.86	2.74	2.86	2.78	0.81	1.12	1

TABLE 1. WEIGHTS AND MEASURES. These numbers follow Llensa i de Gelcen 1951 and Alsina i Català, Feliu i Montfort, and Marquet i Ferigle 1990; see also Gual Camarena and Druguer 1981.

Mallorca all used similar *quarteras*, each city's measure held a slightly different amount of grain (see table 1).[39] In this case, the differences are relatively small, fluctuating by less than 10 percent. In Valencia and parts of Aragon, a *cafís* was nearly three times the size of a *quartera*, but the variations could be larger. Valencia's *cafís* equated to around 201 liters of wheat, while Zaragoza's measured only about 180, with Alicante's measure yielding almost 250 liters, a difference of more than 20 percent. Moreover, Zaragoza broke its *cafís* into eight *fanegas*, while Valencia subdivided it into six, meaning that the size of the smaller unit diverged even further (22 liters versus 33).[40] This does not include the staggering variety opened up when we look at the whole of the western Mediterranean with multiple Italian measures, frequent use of the Sicilian *salma* for imports, and other, less common measures. When comparing grain measures and prices across markets, I have tried to include a conversion to a baseline of either Barcelona *quarteras* or liters, especially when estimating caloric yields and the overall grain needs of a population.

Fortunately, the monetary system was, relatively speaking, more stable. While the weight and value of coins varied, the general system remained

consistent over the entire time period. Overall, as with much medieval coinage, the system mirrored the Roman monetary system. The basic silver coin was the solidus or *sou* (in Latin and Catalan, respectively). In earlier documents, this unit is sometimes called a *croat*, but the term is rare in late fourteenth-century records. Each solidus was worth 12 denarii or *diners* (the copper penny, again in Latin and Catalan), and the gold florin was generally worth 11 solidi. However, multiple mints in the western Mediterranean struck their own gold florin (most obviously its namesake, Florence), and the weights of those competing florins could sometimes be worth differing amounts of silver. The pound, or *lliure* in Catalan, worth 20 solidi, was not actually a coin and only appears in account books as a unit of measure for especially large payments or costs. In this book, I have tended to convert all costs to solidi whenever possible, as the solidus was the most commonly used currency for the purchase of grain.