

Appendix A from Kroneberg and Wimmer, “Struggling over the Boundaries of Belonging: A Formal Model of Nation Building, Ethnic Closure, and Populism”

(AJS, vol. 118, no. 1, p. 176)

Historical Data on Resource Distributions in France and the Ottoman Empire

For the purpose of calibrating the model developed in the article, we need to have approximate values for the control over taxation, political decision-making power, public service provision, and military support. We were able to come up with reasonable estimates for three of the four resources. There were insurmountable difficulties, however, when trying to estimate the shares of control over political decision-making power; an overview of the entire political edifice and the amount of power vested in the different offices and positions would be necessary to arrive at a reasonably accurate estimation. Our estimations for the other three resources are explained and justified in this appendix.

The first step is to determine which periods correspond to a premodern, weakly centralized state and which ones to a centralized modern territorial state. For France, we propose to look at three points in time. The “premodern” situation corresponds to France in the 14th century, that is, after under Charles V a state with the capacity for direct taxation and with a standing army had emerged. The modern, territorial state in France arises with absolutism; that is, after the tax rebellions of the mid-17th century (the so-called “Fronde,” 1648–53) had been subdued, the collection of taxes had been centralized (see Kiser and Linton 2002), and after in the mid-16th century a military revolution had institutionalized and strengthened a standing army under the command of the king. The 17th-century absolutist state, however, was still based on tax farming, and most offices (including the army) were up for purchase. We thus take a third snapshot of the resource distribution in the late 19th century, that is, after the Franco-Prussian War. Now tax farming had been abolished and universal conscription introduced.

For the Ottoman Empire, any data point after the establishment of the standing army in 1360 and before the beginning of the Tanzimat reforms in the early 19th century is adequate for the premodern situation, whereas the late 19th century under Abulhamid serves as an example of the modern territorial state (including an army based on universal conscription, central taxation that does not rely on tax farmers, etc.).

Distribution of Control over Taxes (Postexchange Equilibrium)

In contrast to the distribution of control over military support and public welfare/infrastructure, we decided to empirically calibrate the postexchange distribution for taxes rather than the preexchange distribution of control. The main reason is that it is impossible to estimate the contributions by various actors to the overall tax income of the state and its various levels, whereas it is much easier to determine who receives how much of the overall tax revenues once it is collected and reapportioned.

France

Estimating the distribution of tax income for early modern France represents a steep challenge because of the complex set of seigniorial dues, local taxes, indirect taxes, and the even more complex system of exemptions, prerogatives, and tax-sharing agreements, all of which varied from locality to locality depending on the balance of power between the king, the nobles, and the cities and peasant communities.

14th/15th-Century France

For assessing the premodern situation, we are looking at the tax regime between 1360 and 1450 or, more precisely, before the reforms of Charles VII (reigned 1422–66), who abolished *tallages* (the seigniorial dues to feudal elites) and monopolized direct taxation for the king,³⁷ and after the reforms of King John (1360), who introduced indirect taxes (sales tax, wine tax, known together as *aides*, and a salt tax called *gabelles*, first established in 1341), and Charles V (reigned 1364–80), who established permanent taxes to the king, generalized the previous system that individuals would

³⁷ On the evolution of the French tax system, see Collins (1988); Wolfe (1972) describes the late medieval system as well. Henneman (1971) writes about the tax system before Charles V.

pay a cash sum instead of fulfilling their military obligations to the king, and levied a hearth tax (*fouage*, later called *tailles*, from which nobles were exempted) from 1363 onward on the inhabitants of Crown lands. There existed municipal taxes as well (*socquet* and *barrage*, sometimes *tailles*) used for financing public infrastructure projects, most important, fortification. On top of these regular taxes, the king from time to time imposed special taxes on his subjects (the *tailles générales*, e.g., to finance the marriage of the king's daughter or a crusade or a defensive war) or the clergy (the *décimes*). For the purpose of this analysis, however, we do not include one-time, special taxes such as the *tailles générales* and the *décimes*.

Besides these revenues that resemble taxes in the modern sense of the term, there were many seigniorial prerogatives, dues, tributes, and duties, both for the domains of the king himself (considered his own seigniorial property) and for those of other nobles. The most important of these seigniorial dues were the *cens* (an annual tax of vassals on leased land) and the *champart* (on average, one-eighth of the cereal harvest paid to the owner of the land), as well as the *banalités* for using the lord's mills, wine press, and so forth.

We consider the incomes derived both from seigniorial domains and from the aides as taxes. In order to calculate the share of the peripheral elite, we use information on the revenues that the royal domains produced and then assume that the other seigniorial domains outside of the control of the king produce revenues of a similar order. We know from Rey (1965, p. 45) that the royal domains contained roughly 33% of the territory of the kingdom during the reign of Charles VI (1388–1413).

To calculate royal domain income, we can again rely on Rey (1965, p. 96), who lists the income and expenses of five years from the royal treasury (based on the same source as Fawtier [1930]). The average annual income is 816,000 livres, of which on average (calculated on the basis of Rey [1965, p. 99]) 52% was income from the royal domains and an additional 9% was mostly domain income owed from previous years (under the title of *recepte communes*).³⁸ The average income from royal domains was therefore 500,000. We can thus assume that the feudal nobility received, on the two-thirds of the kingdom's lands that were not part of the royal lands, a total of 1 million (i.e., double the income of the king).

Rey (1965, p. 260) estimates the total income from the indirect taxes (the aides, a sales tax on all products, as well as the salt tax *gabelle*) to be 2 million francs. This includes more than one-third, or 700,000 francs, that went to nobles, magistrates, and cities that were allowed to appropriate parts or all of these taxes. These 700,000 were not entering the royal accounts. We suggest splitting them between peripheral elites (350,000) and the masses (125,000 each).

The remaining 1.3 million francs were used to subsidize the royal treasury, to pay off the salaries of staff, to maintain the royal and princely households, for pensions and gifts to noblemen, and to finance wars. Two expense accounts of how the income of aides was used (one from 1398 and one from 1411; see Rey 1965, p. 266) allow us to estimate the share of central and peripheral elites: Averaging over these two years and not taking "royal savings" into account, the king and his family received 271,000 livres while the nobility got 220,000. The treasurer of war received 365,000 on average, a sum that we attribute to the king since it helped to finance the war efforts that he commanded.

The municipalities were allowed to raise their own taxes, mostly in order to rebuild city walls and fortifications. It is difficult to know how much other taxes they were raising locally, but according to Rigaudière (1993, chap. 10), the fortifications were the major project for which the king allowed the towns to raise their own taxes. Using the estimates for fortification expenses that we derive below (see "public goods and infrastructure"), we attribute an additional 160,000 livres to central and peripheral masses.

Summary.—Central elite: 816,000 from royal domain, 636,000 from the aides; total of 1,452,000 (42%). Peripheral elite: 1,000,000 from feudal domains, 570,000 from aides; total of 1,570,000 (46%). Central mass: 125,000 from aides, 80,000 from special taxes; total of 205,000 (6%). Peripheral mass: 125,000 from aides, 80,000 from special taxes; total of 205,000 (6%). Total: 3,427,000.

Late 18th-Century France

By the late 18th century, the French state was collecting a wide variety of taxes, both direct and indirect. Among the former type were property taxes (*vingtième*), income taxes (*taille*), and a general per-person tax on all subjects ("poll tax"). The indirect taxes were basically sales taxes levied on a wide variety of goods. Some of these indirect taxes were collected directly by the state, while others were handled through tax farming (Matthews 1958, pp. 3–33). Goldsmith (1832, p. 85) provides a detailed budget from 1785. The central state's tax revenues totaled 535.9 million francs.

In order to determine the peripheral elite's share of tax revenues, it is necessary to take into account that there were

³⁸ Four percent was from coinage rights; 5% from *chancellerie* or in Latin *emulumentum* and *emende* (apparently a tax on royal seals on documents; Rey 1965, p. 155); 10% from *compositions et amendes* (*financie et composiciones*), which were mostly pawns and penalties from litigated contributions from domain administrators (but included the *fouage* of certain localities and, until the end of the century, 6,000 livres paid by the Jewish community as a tax on usury); and finally 18% for the various "subsides" paid to the king by his vassals but also transfers of income from the general sales tax to the royal treasury (see below).

two types of provinces under the Old Regime and that these two types were subject to distinct systems of tax regulation. The *pays d'élection* had no power to tax, while the *pays d'état* did have this power (Matthews 1958, pp. 23–24; Kwass 2000, p. 95). The *pays d'élection*, however, did receive a share of the taxes collected in the provinces. As explained by Matthews (1958, p. 29), this amount appears as “charges” on the “general receipts” from the *pays d'élection*. Because these monies do not go into the central treasury, they are not counted as receipts. Thus, they are not figured into the budget provided by Goldsmith (1832). However, Necker’s (1781) analysis of the 1780 budget fortunately provides this information. These “charges assigned on these taxes” were 19.6% of the taxes collected in the *pays d'élection* (calculated on the basis of Necker [1781, p. 107]). We make the assumption that this was also true in 1785. However, in order to apply this assumption, it is first necessary to discern the amount of direct taxes paid by the *pays d'élection* in 1785. Goldsmith (1832) does not provide this figure, but Necker (1781, p. 123) does. In 1780, 94.8% of direct taxes were paid by the *pays d'élection*. Assuming this was also true in 1785, 198.13 million of the 209 million in direct taxes collected came from the *pays d'élection*. Because 198.13 million is 80.4% of 246.43 million, we surmise that the peripheral elites in the *pays d'élection* controlled 48.30 million francs of tax revenue.

Data availability renders it more difficult to determine the tax revenue controlled by the peripheral elites in the *pays d'état*. We make use of data from two of these provinces, Burgundy and Languedoc, circa 1700. Swann (2003, pp. 179–84) provides information on Burgundy for 1689–91 and 1706–8. An average of 53.5% of expenditures went to the king, while 61% of the revenues used for expenditures came from taxes. Combining these figures, Burgundy retained 12.5% (i.e., $[61 - 53.5]/61$) of its tax revenues. Beik (1985, pp. 262–63) provides information on the 1677 distribution of taxes in Languedoc. Seventy-five percent of the taxes collected went to the Crown, meaning that 25% was retained by the peripheral elite. Averaging these figures from Burgundy and Languedoc, we estimate that peripheral elites in the *pays d'état* retained 18.7% of collected tax revenues. Assuming that this share was constant across the 18th century makes it possible to apply this figure to the 1785 budget found in Goldsmith (1832, p. 85). On the basis of our earlier calculation, 10.87 million of the direct taxes came from the *pays d'état*, which is 81.3% of 13.37 million. Thus, we estimate that peripheral elites in the *pays d'état* retained 2.5 million in tax revenues. Combining this with the estimate from the *pays d'élection* yields an overall share of the peripheral elite of 50.8 million francs.

As for the masses, an array of indirect taxes (mainly sales taxes and tariffs) collectively known as the *octroi* were the primary source of financing for municipal governments. Under a 1647 royal decree that remained in effect until the Revolution, municipalities were required to give one-half of the *octroi* revenues to the central state (Matthews 1958, p. 166). According to Goldsmith (1832), 27 million francs of the central state’s revenue in 1785 derived from the *octroi*. Thus, we estimate that the masses controlled 27 million francs in tax revenue.

Summary.—Central elites: 535.9 million (87.3%). Peripheral elites: 50.8 million (8.3%). Masses: 27 million (4.4%). Total: 613.7 million.

Late 19th-Century France

To determine control over taxation in the late 19th century, we generally associate three scalar levels of government with the four actors: central state (central elite), departments (peripheral elites), and communes (central and peripheral masses). We do make one exception: We associate the central elite not only with the central state but also with the commune of Paris and the department (Seine) in which the capital city was located at this time.

The central state exercised considerable control over the late 19th-century taxation system.³⁹ The central state dictated the amount of taxes that each department owed. Each department in turn assigned its burden to its various communes. However, all of the monies collected were not destined for the central state. In addition to the money owed to the central state, an additional percentage (*centimes additionnels*)—which also was determined by the central state—was collected for the purpose of financing the departments and communes (Le Comte de Franqueville 1875, p. 299; Leacock 1906, p. 326). These centimes were the only source of tax financing for the departments (Scott 1871, p. 311). However, in addition to these direct taxes, communes were also allowed to collect a number of indirect taxes, such as tolls on roads and highways, as well as the *octroi*, a tax levied on various goods brought into the towns (Scott 1871, p. 311; Leacock 1906, p. 323). The central state also collected indirect taxes, indeed, a much wider range than the communes.

The central state budgets published in the Ministry of Public Instruction (1889) provide data on the apportionment of direct taxes to all actors as well as the indirect taxes collected by the central state, while Le Comte de Franqueville (1875) supplies data on the indirect taxes collected by the communes. Because the latter data are for 1871, that is the year adopted for all relevant data.

³⁹ The central state levied four direct types of taxes: *la contribution foncière* (a real estate tax), *la contribution des portes et fenêtres* (the “door and window tax”), *la contribution personnelle-mobilière* (personal tax), and *la contribution des patentes* (Scott 1871, p. 311; Le Comte de Franqueville 1875, p. 289; Ministry of Public Instruction 1889, pp. 6–7; Leacock 1906, p. 324). The fourth tax is variously described as a “tax on business” (Leacock 1906, p. 324) and as “a tax levied on all trades and professions” (Scott 1871, p. 311).

In 1871, the direct tax (i.e., centimes) share of departments and communes, respectively, was 193.9 million and 120.0 million (Ministry of Public Instruction 1889, p. 50). Given our adoption of the core-periphery model for identifying the different actors, it is necessary to deduce the 26.7%⁴⁰ share of these numbers that went to the commune of Paris and the department of Seine. This leaves us with 88 million. To this figure must be added all the *indirect taxes* collected by the communes. As mentioned, figures for 1871 are available from Le Comte de Franqueville (1875, pp. 306–7). The *octroi* is the most important of these (Scott 1871; Leacock 1906) and totaled 86.4 million. Adding tolls and duties (26.3 million) and the “dog tax” (4.7 million) yields 117.4 million. For the communes, which we associate with the masses, direct and indirect taxes together total 205.4 million.

A similar adjustment for the departmental centimes is necessary. At this time, Paris was located in the department of Seine. We make the same assumption as for the communes, that is, that this department enjoyed a 26.7% share of all departmental centimes. This means a reduction of 51.8 million, leaving 142.1 million for the peripheral elite. As mentioned, departments were not allowed to collect indirect taxes.

This total subtracted—for the commune of Paris and the department of Seine—goes to the central elite: 83.8 million. To this figure must be added the central state’s share of direct taxes, 323.2 million, yielding 407.0 million in direct taxes for the central elite in 1871. Indirect taxes constituted a far greater share of what the central elite controlled. Most receipts of the central state derived from indirect taxes (Ministry of Public Instruction 1889, pp. 8–19, 22–30). These totaled 2,776,900,000 francs. Adding these to the direct taxes previously calculated yields 3,183,900,000 francs in taxes controlled by the central elite.

There is one more indirect tax that must be attributed to the central elite. As mentioned, the sum of indirect taxes collected by communes was 117.4 million in 1871. Consistent with the discussion above, we estimate that Paris’s share of these taxes was 26.7% of the grand total for communes. However, this figure of 117.4 million is not the grand total because Le Comte de Franqueville (1875, p. 307) excluded communal data from Seine. Because 117.4 million is 73.3% of 160,163,711, the difference (160,163,711 – 117,400,000)—that is, 42,763,711—is the estimated share of Parisian indirect taxes, which must be added to the grand running total of taxes controlled by the central elite. Doing so brings the total to 3,226,663,711 francs.⁴¹

Summary.—Central elites: 3,226,663,711 (90.3%). Peripheral elites: 142,100,000 (4.0%). Masses: 205,400,000 (5.7%), or 2.85%/2.85%. Total: 3,574,163,711.

Ottoman Empire

16th-Century Ottoman Empire

The Ottoman Empire represents an easier case since it never developed a feudal system comparable to that in Western Europe. The power of taxation was more centralized and uniform, though very important regional variations existed as well (and many parts of the empire remained outside the effective taxing capacity of the Sublime Porte). Cosgel and Miceli (2005, p. 815) present a list that details, for the 16th century, the distribution of tax revenues between central government, provincial and district governments, fief holders, and others. They list this distribution for five different regions of the empire and for one to three different years between 1521 and 1596. The share of the central government ranges from 0.26 to 0.5, with an average of 36%; that of provincial and district governments from 0.04 to 0.29, averaging 13%; fief holders got 29%; and “others” (private landholders, pious foundations, and tribal chiefs) got between 0.09% and 39% of the overall taxes (21% on average). Translated into our scheme of actors, this means that central elites received 36% and peripheral elites 63%. We assume that tribal chiefs are part of the subordinate elite but that private landholders and pious foundations might be controlled by nonelite, if affluent, persons. We thus divide the 21% share of “others” into one-third for tribal leaders (thus adding 7% to the peripheral elite) and 14% to the masses.

Summary.—Central elites: 36%. Peripheral elites: 48%. Masses: 14%.

Late 19th-Century Ottoman Empire

How did this distribution of tax income change after the Tanzimat reforms were successfully completed? According to

⁴⁰ Thanks to Le Comte de Franqueville (1875, p. 307), we know the ratio of Paris expenditures to the expenditures of all other communes in 1871. Paris expenditures were about 200 million at this time, while all other communal expenditures were about 520 million. Thus, Paris expenditures were 26.7% of all communal expenditures. If we assume that Paris had a similar share of all communal centimes, then the communal figure identified above (i.e., 120 million) should be reduced by 26.7%, or 32.0 million, leaving 88.0 million.

⁴¹ To be sure, Paris was not the only commune in the Seine in the late 19th century. However, this city did account for practically the entire population: 2,226,023 out of a departmental population of 2,799,329 in the early 1880s (Ministry of Commerce and Industry [1886] 1968, pp. 31, 624, 627). While it would be possible, on the basis of this difference in population, to adjust further the share of indirect taxes controlled by the communes of the Seine, doing so would assume that the dramatically disproportionate share of expenditures dispensed by Paris was representative of the remaining communes in the Seine—an assumption that we do not make.

Stanford Shaw, all taxes and fees were collected directly by the central state treasury or specialized agencies by 1870, and tax farming had been entirely abolished by then (Shaw 1975). The only local revenues that were introduced are a small percentage of the taxes raised on property: “the municipalities which, as they finally were organized, were allowed to keep small shares for themselves” (p. 427). Thus, at the end of the Tanzimat reforms, the center controlled almost all of the tax revenues. We estimate that the “small shares” controlled by municipalities amount to 5% for each of the masses and that the rest (90%) was entirely controlled by the central state elites.

Summary.—Central elites: 90%. Peripheral elites: 0%. Masses: 10%.

Control over Military Support

In contrast to the tax distribution, we focus on the initial control of the four actors over military support rather than the postexchange distribution because, obviously, all control over the army in times of war was exercised by the central elites (except in case of mutiny). We can, however, look at the background of the fighting troops to determine which of the four actors provided how many troops to the overall military machine. We thus assume that “control” does not refer to the line of commands on the battlefield but rather to the process of providing armed men to the various fighting and defense units of a territory. Correspondingly, we also include militias and other fighting units not integrated into the military command structure but exclude police forces as well as soldiers that were recruited for particular campaigns or during general mobilization from the picture. Not surprisingly, this is the domain where data are most readily available.

France

The French military developed gradually. We suggest taking three points in time to calculate the share of armed men who were provided/controlled by the four actors. We focus on (a) the pre-centralized army of the High Middle Ages (under Philippe Auguste and his successors, before the 100 Years War), that is, after the establishment of a group of permanent warriors in the service of the king, but while the army was still recruited mostly on the principle of feudal loyalty; (b) the army under the absolutist king Louis XIV; and, finally, (c) the modern army as it had been reorganized after the Franco-Prussian War.

12th- and 13th-Century France

The fully mobilized army, such as engaged in the battles of 1285, 1327, 1329, and 1330, contained an average of 20,000 men. According to information found in Contamine (1992b), it was composed of the following parts:

a. Directly provided by the king:

- The “house of the king,” a small private army composed of the highest-ranking nobles most closely related to the king through family ties, the *chevaliers de l’hotel*, who are moving around with the king and formed a sort of royal guard. No figures for absolute size are available; we assume the same size as in the 15th century (see below): 200.
- Professional garrison soldiers, paid by the king: 1,250–1,450; average 1,350.
- *Arbatalières* (armbrusters), permanently employed: 70–150; average 110.
- Militias of those cities that belonged to the royal domain: 2,040.

Total: 3,700.

b. Controlled by the nobility:

- The feudal army, levied in times of war and based on the principle that fiefdom holders owed the king support in times of war. The term used to describe this army is *l’arrière-ban*. It comprised (1) high nobility chevaliers, mobilized through the principle of feudal loyalty: total of 550 (but usually not all were called to duty); (2) the noble warriors mobilized by the chevaliers (on average each commanding his own troop of 50): 27,500. Total: 28,050 (of which 13,600 were effectively mobilized).

c. Controlled by “the masses”:

- *Roturiers*, that is, peasant militias, nonarmored and nondisciplined: 300.
- *Sergeants a cheval*, mounted and fully armored warriors of lower noble or commoner origin: 2,400.

Total: 2,700

We assume that the difference between the theoretical strength of the army of 34,450 men, calculated on the basis of this information, and the average effective fighting strength in the various battles (20,000 men) arises because not all of *l’arrière-ban* was actually mobilized for war, but only 13,600 (instead of the theoretical figure of 28,050). If we take effective war figures as a basis of calculation, we arrive at an 18.5% share of the central elites, 68% of the peripheral elites, and 13.5% for the two masses.

Summary.—Central elite: 18.5%. Peripheral elite: 68%. Masses: 13.5%.

17th-Century France

According to Contamine (1992a, p. 435; based on Belhomme), the regular and irregular troops in 1690 (under Louis XIV) consisted of the following:

- a. 342,000 regular troops, of which
 - 277,000 infantry, including about 37,000 officers.⁴²
 - 65,000 mounted troops (including 10,000 members of the *maison militaire du roi*, which is now an elite troop, composed of high nobility and the royal families, but also around 3,000 Swiss guards and 4,000 nonnoble *gardes francaises*, as shown by Rowlands [1999]), including 7,333 officers.
 - Of these 342,000 regular troops, 74,000 were mercenaries⁴³ (including some Frenchmen from Alsace and Roussillon) and 270,000 *régnicoles* (subjects of the king born in France).
- b. 92,000 *miliciens* (of which 25,000 were royal militiamen, the rest local militias).
- c. *Arrière-ban*, though the feudal army was abolished in 1694 and seems not to have been used anymore.
- d. 3,500–4,000 *archers de la maréchaussée* (a military police force under the command of the army marshals; the positions were sold to local citizens under Louis XIV).
- e. 70,000 members of the navy, since Colbert based on obligatory conscription (the first in military history, according to Contamine [1992a, pp. 504–5]) and under direct command of royal navy officers at the time of Louis XIV, approximately 9,333 officers).
- f. 100,000 coastal guards, who were paid from the fifth day of duty onward by the king (see Hippeau 1863, p. 148).

Including these militias, the total of armed men was 678,000. The problem is to determine the percentage of the regular army that was controlled by the feudal elite. Following Blaufarb (2002), we can assume that the entire officer corps of the army and navy was composed of nobles (with the exception of roughly 200 nonnoble families who were ennobled through military service from 1750 onward). We exclude, however, the *arrière ban*. The nobility made up 53,666 officers, thus 8% of the total of armed men.

We can assume that the mercenaries as well as the royal guard (*la maison*) continued to be directly controlled by the king, with the exception of the 4,000 regiments of the *gardes francaises*, which were an elite infantry unit composed of commoners. The 74,000 mercenaries made up 11% of the total of armed men; the 3,000 members of the royal guard that were neither mercenaries (the Swiss) nor *gardes francaises* represent another 0.5%. Thus, the royal elite controlled 11.5% of the armed men. The remaining 80% can be attributed to the masses.

Summary.—Central elite: 11.5%. Peripheral elite: 8.5%. Masses: 80%.

Late 19th-Century France

In 1870, the French army consisted of a total of 367,850 men, and 16,869 of them were officers (Adriance 1987, p. 23). Thus, officers represented 4.6% of all men in uniform. Officers belonged to either the central or peripheral elite. Serman (1979) provides the geographical origin of officers around this time. Among all officers, 8.6% were from the department of Seine. Thus, we associate 0.4% of the military with the central elite and 4.2% with the peripheral elite. The remainder (95.4%) were split equally among the central and peripheral masses.

Summary.—Central elites: 0.4%. Peripheral elites: 4.2%. Masses: 95.4%.

Ottoman Empire

16th-Century Ottoman Empire

We again look at the 16th century as the premodern period according to our definitions. Following Inalcik (1994, p. 88; based on Barkan), the army consisted, in 1528, of the following groups.

- a. Regular troops under direct control of the sultan, that is, the salaried soldiers such as the Janissaries (legally “slaves” of the sultan, recruited mostly among Christians and other minorities of the empire), the fortress guards in the provinces, the cavalry (*sipahis*), the inner palace servants, and the navy: 50,000 men.
- b. Beneficiaries of *hass*, *ziamet*, and *timar* grants in the provinces (these were given the right to tax the local population against military support): 37,741 men.
- c. Auxiliary troops such as the *müsellems*, *canbaz*, *bazdars*, *yörüks*, and, most important, the *yayas*, who were groups of peasants who provided a number of fighters, rotating the duty to serve among family members; originally, the

⁴² The proportion of officers (*sergeants*, *captains*, *lieutnants*, *sous-lieutnants*) per *compagnie* (of 50 soldiers) was five. Since five *compagnies* made a regiment, which had eight officers, the number of soldiers per officer was roughly 7.5.

⁴³ Lynn (1997) estimates the percentage of foreign mercenaries to be 15%–25% during the reign of Louis XIV.

yaya were Turkoman tribal nomads fighting with the sultan and given lands in Central Anatolia after conquest. In political terms, these tribes and groups saw themselves and were perceived as part of the elite of the empire, having helped its foundation and defense. We thus count these among the peripheral elites. These auxiliary troops were abolished in 1582: 15,180.

d. Christian soldiers who were recruited into a paid militia: 3,000.

e. *Akincis*, that is, frontier raiders who received a salary if registered and who were recruited among the population around a garrison: 12,000.

In 1473, the army consisted of

f. Regular troops (Janissaries and cavalry of the Porte, *sipahis*): 19,500.

g. Beneficiaries of *timar* grants: 64,000.

h. *Azebs*, that is, general army levied among the entire population (roughly half of them recruited in Rumelia [Inalcik 1994, p. 93], thus Christians): 20,000.⁴⁴

We leave out *azebs* because these were recruited for specific campaigns and thus had no existence after the end of a war. Divided up by the four actors in our scheme, we arrive at the following figures.

Summary.—

	1528	%	1473	%	Average
Central elite (a; f)	50,000	42	19,500	23	32.5
Peripheral elite (b; c)	52,921	45	64,000	77	61
Central mass (e)	12,000	10	0	0	5
Peripheral mass (d)	3,000	3	0	0	1.5
Total	117,920		83,500		

Late 19th-Century Ottoman Empire

The army under the last sultan of the empire, Abdulhamid, looked quite different. Universal conscription was now realized (including *de iure* for Christian subjects), but actual service was decided by lot (as previously) and exemption through payment (obligatory for Christians before the reforms, now extended to everybody) was still possible, while substitution through another person had been abolished. The feudal elements of the army had been abolished as well, and a new professional officer corps was trained in the military academies founded during Abdulhamid’s reign (Akmese 2005, p. 23).

Zürcher (1998) describes the army composition after the reforms of 1843 and 1869, which introduced a Prussian-style system based on universal conscription: 210,000 regular troops (of which 60,000 were active reserves), 190,000 reserve troops called *redif* (the Turkish version of the *Landwehr*), as well as a 300,000 noncombat reserves (the Ottoman *Landsturm*). This puts the number of fighting troops at 400,000. The only armed group of men that were not based on this system of mass recruitment was the tribal regiments that Abdulhamid institutionalized in 1892 (inspired by the Cossack militias of imperial Russia). By the end of the century, these tribal militias under the command of Kurdish *aghas* numbered between 27,500 and 63,250 men (van Bruinessen 1999). Thus, the share of armed men under control of the peripheral elites (the tribal leaders) was somewhere between 6% and 14%, averaged to 10%, while the rest were under control of a professionally trained army based on mass conscription.

How many of the army officers and soldiers were members of the various elite branches? While no sources could be found to answer this question precisely, it is clear that all the rank and file seem to have been of Muslim peasant origin (Zürcher 1998). It is also clear that the new elementary and secondary schools established by and for the military in all the provinces of the empire provided a formidable machinery of upward mobility for provincial families that did not belong to the bureaucratic-military elites (Hale 1994, p. 24). On the basis of a detailed study of the career paths of the students of one of these elite schools (though not a military one),⁴⁵ we can guess that of the 4% officers of the army in

⁴⁴ Unfortunately, no figures for the recruits (*azebs*) are given for 1528. In 1389, 40,000 of them fought in Kosova against the Serbs. In 1473, there were 18,000 in the army. In 1492, 9,000 were recruited in Rumeli, and under Suleiman I, 20,000 were recruited in Rumeli, most likely for a specific campaign.

⁴⁵ The school in question (Mulkiye) was reformed by Abdulhamid to train civil servants. Szyliowicz (1971) has studied a sample of 475 students who went through the school. For comparative purposes, we are interested only in those students whom he classifies as “successful,” i.e., who later in their career reached the level of general director or higher (i.e., undersecretary, assistant undersecretary, ambassador, governor, etc.), which was the case for 26% of all students. Of those 109 successful students, 13 had an “elite” background, i.e., were sons of fathers who bore the title pasha, effendi, or bey and had a high-level position (p. 396). Elite students made up 9% of students; 63% of the students had an “official” background, i.e., belonged to the military-administrative caste; and 22% were not members of that group (p. 393). If we assume the same proportion for the “successful” non-central elite students, we can calculate that 67 successful students were members of the peripheral elite and 29 belonged to the central and peripheral masses. In percentage, thus, 12% of the successful students had a central elite background, 61% a peripheral elite background, and 27% a nonelite background.

peacetime (Erickson 2000, p. 7), around 1,920 (or 0.5% of the total number of fighters) were of central elite background and 9,600 (2.5%) came from families we could classify as members of the peripheral elite.

Summary.—Central elite: 0.5%. Peripheral elite: 12%. Masses: 87.5%.

Control over Public Goods

We define public goods as comprising welfare expenditures (including for soldiers and their families) such as pensions, unemployment benefits, and so forth that are not provided by families, the provision of public security (excluding defense, but including infrastructure such as city walls), non-religious education in generic skills such as writing and math, and the maintenance of public infrastructure (such as city walls, public roads, fountains, etc.). The question therefore is how many of these public services were provided by the central government elites, by peripheral elites who might be in charge of regional, substate entities, and how many of these services are under the control of municipalities, guilds, and so forth (the masses). To clarify what we mean by “control,” we assume that the highest institutional level through which money circulates used for public service provision “controls” these resources. For example, if taxes are collected by the central state and then handed down to municipal organizations or religious fraternities to take care of the poor, we assume that the central state is in control of these resources. We also assume that if a higher level of government mandates spending in certain areas and exercises appointive power in those areas, then that higher level of government controls the resources. Perhaps not surprisingly, estimating the division of control over public service provision was even more difficult than for taxes and military support. Extensive historical research was necessary to come up with meaningful and defensible estimates.

France

14th-Century France

In order to estimate the central elite’s contribution to public service expenditures in the first half of the 14th century, we make use of the royal accounts for 1322–25 and 1349 that are reprinted by Fawtier (1930, pp. LIX–LI, LXIV). These accounts do not represent budgets of income or expenses because both the costs of local administration and the costs of running the royal estates are not included. However, these accounts do provide a picture of what the king had at his disposal in terms of cash, as well as the uses to which he put this money.

There are two relevant line items, *opera*, which pertain to public works such as roads and bridges, and *elemosine*, which indicates the money dedicated to housing, feeding, and clothing the poor. On the basis of the five accounts examined, the king’s average annual expenditures on these concerns was 14,930 livres. This figure was out of total annual average expenditures of about 512,000 livres (a little less than 3%).

The best data available for the peripheral elites (and masses) come from the city of Avignon in the first half of the 14th century. We exploit these data and then generalize to all of France. Since at this time Avignon was the seat of the counter-pope, an extraordinary system of services for the poor developed, which we do not consider here because it was quite exceptional. We do consider, however, expenditures on other items. The papacy dispensed funds for various public construction projects such as bridges, granaries, and city gates (*opera*). Jean XXII’s total expenditures were about 4.2 million florins, of which 2.9% (121,800 florins) went to such projects. Benoît XII allocated 18% of 730,000 florins expended for these purposes (thus, 131,400 florins). And 12.2% (207,400 florins) of Clément VI’s 1.7 million florins of expenditure went to these projects (Le Blévec 2000, pp. 575, 579). This yields a total of 460,600 florins for these 38 years, or about 12,100 florins per year. We also consider the services provided by four crusaders’ orders in Avignon during the first half of the 14th century. One of these spent 38 livres on feeding the poor, housing pilgrims, and so on (Le Blévec 2000, p. 109). Assuming other crusaders’ orders made comparable expenditures, this yields 152 livres total, or 150 for purposes of estimation. Second, as explained below in more detail, the peripheral elite controlled 330 florins per year in hospital funds. Adding together all these figures yields a total peripheral elite expenditure of 12,580 livres. This figure can be generalized to France as a whole using Chevalier’s (1982, p. 207) figure on the number of towns in 14th-century France, that is, 226. Multiplying by this figure yields 2.73 million.

To estimate the expenditures on public services provided by the masses, we use data concerning expenditures on hospitals, policing, and fortifications. Hospitals were a central institution of French society across the time periods we analyze. French hospitals had broader functions than usually associated with them in the current era. Hospitals cared for a broad range of those most unfortunate: not only the infirm (both physically and mentally) but also orphans and the poor. In some cases (especially the 18th century) “caring” for the poor amounted to confining them (McCloy 1946; Fairchild 1976; Jones 1982; McHugh 2007). Hospitals were important enough that the Crown sought for three centuries (16th–

18th) to centralize control over them (Hickey 1997), and, following the Revolution, the revolutionary convention alienated all hospital endowments (although the directory later reversed course; Ramsey 1988, p. 91).

To estimate the towns' contributions to hospital expenditures, we again make use of data from Avignon in the first half of the 14th century (Le Blévec 2000). By 1350 there were 22 hospitals in Avignon (p. 603). At this time, 20 florins were legally necessary to run a hospital (p. 683). Assuming that the average one had 30 florins in annual expenses, 660 florins per year went to hospitals in Avignon. Of all the hospitals for which there are records, 48% were run by aristocrats or clergy; 52% were under the charge of municipalities or lay brotherhoods, or commoners had founded them. Thus, one-half of this money, or 330 florins, was controlled by the masses. Following the estimation method described above, we multiply this figure by the number of towns in 14th-century France (i.e., 226), yielding 74,580 florins.

To estimate the contributions that towns, which started to emancipate themselves from seigniorial rule during that time, made to the provision of public safety and security, we take into account the *sergents*, which became part of the municipal government. The entire government structure became more differentiated as a result of the efforts to rebuild city walls for protection against enemies, which was a major effort consuming large shares of municipal resources from the 1340s onward (i.e., until the city walls lost their military function sometimes in the 15th or 16th century). The collection of local taxes, administration of municipal bonds, and oversight of these works were the main tasks of the new administration. The *sergents* were, among other things, also charged with policing the city at night, bringing criminals to court or prison, and so forth. We therefore consider their salaries to be an investment by local communities in public safety. The best estimates come from Bernard Chevalier's (1982) book. He mentions that in small cities such as Tours, four *sergents* were employed, while there were 24 in Bordeaux (p. 207). They represented roughly 50% of all administrative personnel of the cities. The city of Privins, a small town, spent 8% of its 545 livres budget in 1451 on salaries for its officers (p. 213). We can thus assume that half of this, or 22 livres, was necessary to support its *sergents*.

How do we get at a national figure from these estimates? We know from the same source (Chevalier 1982, p. 41) that there were 226 towns in 1330. Of these, 21 were of comparable size to Bordeaux (i.e., having four convents of the mendicant orders), while 13 were of medium and 192 of small size (one or two convents). If we assume that Privins is representative of these small towns, we can also assume that they each spent 22 livres on *sergents* (or 4,224 in total), while the big towns spent six times more, that is, 132 livres each (or 2,727 in total). The medium-sized towns spent 77 each (or 1,001 in total). We thus arrive at 7,952 livres.

Rigaudière (1993, pp. 488–96) provides detailed municipal budgets and lists how much the municipalities spent on fortifications. The most relevant research is that which samples a series of municipal budgets from this period (instead of just listing the ones with high expenditures on fortifications). For Marseille, 15 budgets between 1361 and 1411 show an average expenditure for fortifications of about 728 livres. For Saint-Flour, a small city in the Loire Valley, 43 budgets between 1378 and 1467 produce an average of 280 livres per year, while the 25 budgets between 1355 and 1380 of Dijon list 880 livres on average. Averaging the information on Lisieux (11 budgets are listed in Rigaudière [1993]) gives us an estimate of 945. These figures are surprisingly consistent. Since it seems that small cities could invest as much in their city walls and towers as large ones, it is perhaps best to simply average over all these figures, thus arriving at 708 on average and thus 160,000 for all cities of 14th-century France. Summing expenditures for poor relief, public safety, and fortifications results in a total estimate of roughly 242,530 florins.

Summary.—Central elite: 14,930 (0.5%). Peripheral elite: 2,730,000 (91.4%). Masses: 242,530 (8.1%).

18th-Century France

Goldsmith (1832, p. 85) provides a detailed central budget for 1785, which gives us insight into how much the central elite invested in public service provision during the 18th century. Among such expenditures were funds for police, postal services, construction and repair projects, and education. These expenditures totaled 90.3 million livres.

Included among these central state expenditures were 26 million livres for hospitals (Goldsmith 1832). The implication is that the dominance of peripheral elites and masses in this area of public service provision had diminished significantly by the late 18th century. A government report in 1791 estimated total hospital receipts on the eve of the Revolution as totaling 29 million livres (McCloy 1946, p. 189). Thus, only 3 million of these funds are attributable to the peripheral elites and the masses. Carrying over the premodern estimate of proportional share, we thus estimate that the peripheral elites and the masses each controlled 1.5 million of these funds.

In order to estimate additional peripheral elite control over public service expenditures, we make use of the budgetary data from two provinces in the late 17th century: Burgundy (Swann 2003) and Languedoc (Beik 1985). At this time, Burgundy spent 2.8% of its budget on public welfare (Swann 2003, pp. 179–80), while Languedoc spent 1.4% (Beik 1985, pp. 262–63), yielding an average of 2.1%. We generalize this to all provinces that were *pays d'état* (the *pays d'élection* are inappropriate for generalization because they had no independent financing powers and, thus, received all funds for public service expenditures from the central state) by making an empirically based assumption about the

relationship between the Crown's income from these provinces and total expenditures. The late 17th-century Burgundy budgets indicate that an average of 58.5% of all expenditures were monies sent to the Crown. Assuming this was true in the 18th century, one can derive total provincial expenditures. According to earlier calculations (see "taxation") based on Necker (1781) and Goldsmith (1832), the *pays d'état* in 1785 sent 10.87 million livres to the Crown, which is 58.5% of 18.6 million livres—which is therefore our estimate for total provincial expenditures in the *pays d'état* in 1785. On the basis of this information and the assumption that these provinces spent 2.1% of all expenditures on public welfare, we estimate that the peripheral elite controlled about 400,000 of the livres that were devoted to government-provided public services. Combining this figure with the hospital funds yields a total of 1.9 million livres attributable to the peripheral elites.

In order to calculate additional mass control of public service expenditure, we use communal budget data. Pouchenot (1910, pp. 55–93) provides detailed budgets from 1690, 1705, and 1710 for the commune of Besançon. This village of 11,500 (in 1708) spent money on road maintenance, water provision, aid to the poor, and other public services. On average, this spending accounted for 6.7% of total outlays, which is comparable to the village of Angers in the middle two quarters of the 18th century.⁴⁶ As an average of the three budgets, Besançon spent 6,867 livres per year for its 11,500 inhabitants. This amounts to a little less than 0.6 livres per person.⁴⁷ In order to generalize this figure across France, we make the assumption that such public service provision generally was not available to the masses of people who lived in rural areas. At the beginning of the 18th century, only 20% of France's population lived in towns of 2,000 or more.⁴⁸ Thus, we apply this per-person expenditure of 0.6 livres to one-fifth of France's 1700 population of 19.3 million (Babuscio and Minta Dunn 1984, p. 335), that is, 3.86 million people, which yields a total public service expenditure of 2.316 million livres. However, this is an estimate for circa 1700, whereas other data cover the latter portion of the 18th century. Thus, an adjustment to this figure is appropriate. We assume proportionality between the growth in central state receipts and the growth in communal public service expenditures. When 1695 is compared to 1785, central state receipts were about 4.6 times more in the later year.⁴⁹ Applying this factor to communal public service expenditures, we estimate that communes spent about 10.7 million livres on public service expenditures in the latter portion of the 18th century. Combining this with the estimate for hospital funding yields 12.2 million livres.

Summary.—Central elite: 90.3 million (86.5%). Peripheral elite: 1.9 million (1.8%). Masses: 12.2 million (11.7%). Total: 104.4 million.

Late 19th-Century France

To determine the distribution of control over public service expenditures, we follow the same principle of identifying actors as in the "control over taxation" section for late 19th-century France, generally associating the major actors with different levels of government (central = central elite; departmental = peripheral elite; communal = central and peripheral masses). As with control of taxation, we associate the commune of Paris and department of Seine in which it was located at this time with the central elite. While most data are from the early 1870s, this is purely due to the fact that these are the years for which details on central, provincial, and communal spending are available. We use these data but apply the "rules of the game" (concerning spending mandates, appointive power, etc.) for the 1890s.

Le Comte de Franqueville (1875, pp. 298, 307) provides comprehensive data on the public service expenditures of nearly all communes (those in the department of Seine are not included) in 1871 and all departments in 1869. Such expenditures in the communes included outlays for police, public worship, elementary education, streets and highways, and poor relief. These expenditures totaled 225.685 million francs. However, in line with our definition of control, most of these monies cannot be attributed to the masses. First, a significant share of these expenditures first passed through the central state and then were redistributed. In 1871, centimes (see above) constituted 119.99 million francs of the financing available in the communes (Ministry of Public Instruction 1889, p. 50). Because we treat communes in the department of Seine differently, it is necessary to remove their estimated share of 26.7% (see discussion above) from this figure, which leaves 87.95 million francs. Communal expenditures (excluding the department of Seine) totaled 520.5 million francs in 1871, but because 123.81 million came directly from the central state for war expenses, the more appropriate figure for total expenditures is 401.38 million (Le Comte de Franqueville 1875, p. 307). As the proportion of centimes (87.95 million) to total expenditures (396.69 million) is 22.2%, it is appropriate to subtract this proportion (a total of 50.768 million) from the total communal expenditures on public services, which leaves 174.917 million francs. It is also necessary to attribute this subtracted figure to the central state, which is the ultimate source of this funding. Thus, some

⁴⁶ In 1720, 1760, and 1780, respectively, public service expenditures accounted for 5.5%, 2.5%, and 9.2% (average of 5.7%) of all spending in Angers (Maillard 2000, p. 175). Such variation was also evident in the Besançon budgets (9.5% in 1690, 3.4% in 1705, and 5.9% in 1710).

⁴⁷ It should be noted that the 1690 budget entries are in *francs* rather than *livres* (Pouchenot 1910, pp. 55–78). However, it is quite likely that these were actually livres, for, while francs went out of circulation in the 17th century, the term itself was typically a synonym for livres. See <http://www.britannica.com/EBchecked/topic/215751/franc>.

⁴⁸ This figure is available at <http://chnm.gmu.edu/revolution/chap1a.html>. A book version of the website's contents is available through Penn State University Press.

⁴⁹ The 1785 receipts are available in Goldsmith (1832). The 1695 central state income comes from European State Finance Database (n.d.).

of the communal spending was under the control of the central elite because the expended monies first passed through the central level of the state.

In terms of our definition of control, other communal expenditures were under control of the central elite because the central state mandated these expenditures and exercised appointive powers in these areas. This is true for the following areas: police, highways, education, and hospitals/poor relief (Le Comte de Franqueville 1875, p. 305; Chapman 1955, p. 46; Imbert et al. 1982, pp. 301, 313). These expenditures totaled 162.38 million francs (after applying the 22.2% adjustment explained previously), which must be subtracted from the above total and applied to the central elite. This leaves 12.537 million francs under the control of the masses.

As for the departments, public service expenditures were directed at roads and highways, the relief of the poor and lunatics, public worship, public education, and railways of local interest. These expenditures totaled 96.207 million francs. However, departments by this time had no independent powers of taxation. Thus, all of these monies came from the central state and are attributable to the central elite.

To determine the central elite's public service expenditure, it is first useful to tally what has already been attributed to them, that is, 50.768 million in centimes to the communes, 162.380 million on mandated services in the communes where the central state had appointive powers in the agencies responsible for delivering these services, and all spending (96.207 million) on public services in the departments, for a total of 309.355 million. Next, we need to estimate public service expenditures in the commune of Paris, as these were not included in Le Comte de Franqueville (1875). We continue to follow our empirically derived assumption (see above) that Paris accounts for 26.7% of all departmental monies in various areas, including public service expenditures. Given that 225.685 million (the total communal public service expenditures) is 73.3% of 307.893 million, we know that the difference between these two figures—that is, 82.208 million—is the 26.7% of all communal public service expenditures attributable to the commune of Paris and, thus, the central elite.⁵⁰

Finally, a very large portion of public service expenditures was controlled by the central elite by virtue of direct management by the central state. To maintain consistency with the data for the departments and communes, we make use of the central state budget data from 1870 that are available from the Ministry of Public Instruction (1889, pp. 32–52). The central state expended large sums of money on a variety of public services including pensions for civil and military employees, post and telegraph service, public worship, education, police, poor and emergency relief, roads and bridges, and subsidies to Paris. These expenditures totaled 301 million francs in 1870.

Summary.—Central elite: 50.768 + 162.380 + 96.207 + 82.208 + 301 = 692.563 million (98.2%). Peripheral elite: 0 (0%). Central and peripheral masses: 12.537 million francs (1.8%). Total: 705.10 million.

Ottoman Empire

17th-Century Ottoman Empire

Faroqhi (1997, p. 541) provides detailed information on the 1669–70 central government budget.⁵¹ He writes that the sultan spent 189.2 million akçe on the upkeep of his palace, which was 29.5% of overall expenditures. From this we can infer that total expenditures were 641,355,932 akçe. Besides the roughly 30% that went to the palace, nearly two-thirds of the expenditures went to military activities, leaving very little for other endeavors. Construction projects were 2% of expenditures, while another 0.5% went to the *hajj* and the inhabitants of medina. Thus, public service expenditures were 2.5% of all expenditures, for a total of 16,033,898 akçe. To this figure one must add (as explained below) the central elites' share of *waqf* public service expenditures—4,629 akçe—for a total of 16 million.

Sufficiently detailed provincial government data are generally nonexistent for this time period, which makes an estimation of the contributions of the peripheral elite rather difficult. However, thanks to the herculean work of Stanford Shaw (1958), we have specific information on expenditures in Egypt, which was under Ottoman control at the time. The Ottoman financial year of 1080 is the focus because it ran from September 1669 to September 1670, allowing an almost perfect match with the central budget data (Shaw 1958, p. xxviii). Because Shaw provides both total expenditures (p. 399) and public service expenditures (pp. 225–68) for decades before and after 1669–70, this allows us to average these figures in order to increase the reliability of the measure of this province's contribution to public service provision. Specifically, we derived an average based on the 40 years that straddle 1669–70.⁵² For most public service expenditures,

⁵⁰ It is important to offer a caveat similar to one made in the context of estimating Paris's share of communal indirect taxes: To be sure, Paris was not the only commune in the Seine in the late 19th century. However, this city did account for practically the entire population: 2,226,023 out of a departmental population of 2,799,329 in the early 1880s (Ministry of Commerce and Industry [1886] 1968, pp. 31, 624, 627). While it would be possible, on the basis of this difference in population, to adjust further the share of public service expenditures controlled by the communes of the Seine, doing so would assume that the dramatically disproportionate share of expenditures dispensed by Paris was representative of the remaining communes in the Seine—an assumption that we do not make.

⁵¹ Because of the accounting methods used by the Ottoman central government during this period, the only central budgets that contain unambiguous information on income and expenditures are those for 1527–28, 1660–61, and 1669–70. However, none of these three budgets includes *timars* (Sahillioğlu 1999, p. 67n3).

⁵² Most of Shaw's (1958) tables report many more years before and after 1669–70 (Ottoman year 1080) and without distinguishing the time period we examine. For

the annual data are available for all 40 years. The average total expenditures—72,200,000 paras—are based on the three years for which data are available during this 40-year period.⁵³ The average annual expenditures related to public service provision (e.g., food and clothing for the poor, canal and mosque maintenance, water storage, pilgrimage, maintenance of holy cities) were 9,971,340 paras, or 13.8% of the total expenditures.⁵⁴

Assuming that Egypt was representative of Ottoman provinces at the time, we can calculate public service provision expenditures controlled by the peripheral elite using the total expenditures for all provinces. Because this total expenditure figure is not available, it must be estimated. We do so by exploiting information on the relationship between provincial expenditures and total central income in 1527–28. Provincial expenditures were about 75% of central state income at that time (403.37 million out of 537.90 million; Inalcik 1994, pp. 82–83). Assuming that the same was true in 1669–70, when central state income was 596,655,932 akçe, then total provincial expenditures in that year were 447,491,949 akçe.⁵⁵ Generalizing the Egyptian figure of 13.8% dedicated to public service provision, the peripheral elite across the Ottoman Empire in the late 17th century contributed 61,753,889 akçe to public service provision.

The peripheral elite's control over public service expenditures was not confined to the institutions and resources of provincial governments. Peripheral elites also exercised substantial control over *waqfs*, which for centuries have been important charitable institutions in Islamic society. Founders of *waqfs* set aside some revenue-producing resources (usually buildings or land) for specific purposes, which quite frequently were and are religious or charitable in character. Once a *waqf* is formed, it exists in perpetuity (it cannot be sold or alienated in any fashion), and its net revenues are distributed to "the object of endowment" (Barnes 1987, p. 1), for example, the charitable purpose. At the same time, the founder "determined its purpose, conditions and forms of management, and appointed its ... chief trustee" (Inalcik 1973, p. 142). Over the centuries, *waqfs* have funded a variety of public services, including aid to the poor, public infrastructure projects, hospitals, and education (Barnes 1987; Hoexter 1998; Yüksel 1998; Leeuwen 1999).

Studies of more than 300 *waqfs* in the 17th century (Yüksel 1998, p. 220) and 6,000 in the 18th century (Yediyıldız 1975; cited in Barnes 1987, p. 43) confirm that actors we associate with the peripheral elite (e.g., the military class, state officials in the provinces, the religious class of *ulema*) controlled the vast majority of these endowments (Yüksel estimates 89% and Yediyıldız 90%), while Gerber (1983, p. 29) estimates that 2% of *waqfs* were set up by the sultan and his family. On the basis of these sources, *waqf* public service expenditures can be distributed in the following fashion: central elite, 2%; peripheral elite, 89.5%; and masses, 8.5%.⁵⁶

To determine the portion of *waqf* public service expenditure money for the premodern period, we use Yüksel's (1998) major study of *waqf* expenditures between 1585 and 1683 (993–1095 on the Muslim calendar). Across this century-long period, total *waqf* expenditures were 18,936,073 akçe, or about 186,000 per year (p. 266). However, these figures come from the geographic expanse of modern-day Turkey, whereas the Ottoman Empire was much larger. According to population figures for the year 1867 provided by Karpas (1985, p. 25), the region that is now Turkey contained about one-half of the empire's population. Assuming equal expenditures per person inside and outside geographic Turkey, we therefore double the per-year expenditure to 372,000 akçe. A substantial portion of total expenditures, 63.5%, went to the provision of public services such as education, feeding and housing the poor, and maintaining an infrastructure for religious services (Yüksel 1998, p. 266). Thus, we estimate that in 1670, *waqf* expenditures devoted to public services totaled about 231,496 akçe. Adding the peripheral elite's share of this—207,189—to the figure calculated above yields a total of 61.961 million.

The masses' share of *waqf* public service expenditures totaled 19,677 akçe. Police protection was another public service controlled by the masses (fortification, however, never reached the importance of late medieval Europe, and we thus do not include such expenses in our calculations for the Ottoman Empire). Emecen (1989, p. 339) provides detailed data on expenditures for guards and night watchmen for the city of Manisa in 1572–73, which was an average-sized city at this time (Erder and Faroqhi 1980, p. 273; Emecen 1989, p. 54n270). Each guard was responsible for collecting his salary directly from town citizens. As of 1575, the city had a population of 8,245 (Emecen 1989, p. 55). The guards collected 55,608 akçe in salaries from the local citizens, yielding an average of 6.74 akçe per resident. How can this be generalized to the empire as a whole? The population of the Ottoman Empire was about 15 million in the late 16th century (Kinross 1977, p. 206). However, we assume that this service was specific to the urban population of the

example, many tables contain entries for 1020–82 (i.e., 1611–71; see pp. xxvii–xxviii). However, because annual expenditures are constant across these time periods, it is possible to determine the average for the 20-year period with which we are concerned. That these entries relate to annual expenditures is not manifestly evident from examining the table, but Shaw indicates as much in a number of discussions in the text (pp. 90–91).

⁵³ During this time, 1 para = 1.2 akçe (Inalcik 1994, p. 87), on average. However, this conversion is unnecessary, as we make use of the percentage of expenditures devoted to public service provision and generalize this to the empire as a whole.

⁵⁴ These were the input figures. All come from pp. 225–38, save for the last, which relates to spending on the pilgrimage and holy cities and comes from p. 268: 22,800 + 45,600 + 57,000 + 11,300 + 9,000 + 4,200 + 840,000 + 16,400 + 6,200 + 1,230 + 21,000 + 1,040 + 35,320 + 250 + 8,900,000 = 9,971,340.

⁵⁵ The central state income figure comes from subtracting the 44.7 million akçe in deficit expenditures noted by Faroqui (1997, p. 541) from the central state expenditure figure.

⁵⁶ This estimation of the masses' share is obviously residual, but it is also consistent with Yediyıldız (1975) (10% founded by the *reaya*, i.e., peasantry, artisan, and merchant classes). Yüksel (1998) attributes only 1% to the *reaya*, but 10% of his sample are classified as "unknown."

Ottoman Empire. According to Quætaert (2001, p. 94), “from its inception until its demise [the Ottoman Empire] was an agrarian empire and economy [in which] three quarters of the inhabitants lived in the countryside and drew their livings from the soil and agriculturally related activities.” Thus, we estimate the late 16th-century urban population at 3.75 million. By assuming uniformity in payment per person for city and town protection, we estimate that the masses spent 27,275,000 akçe. Combining this figure with the *waqf* estimate yields 27.295 million.

Summary.—Central elites: 16.039 million akçe (15.2%). Peripheral elites: 61.961 million akçe (58.8%). Masses: 27.295 million akçe (26%). Total: 105.295 million akçe.

19th-Century Ottoman Empire

We determined the central elite contribution to public service expenditures by averaging from the central state budget expenditures between 1874 and 1898 published by Shaw (1978). Compared to its premodern counterpart, the modern state during this time had vastly wider concerns in the area of public service provision. The central state was involved in public works, education, the administration of justice in both Muslim and non-Muslim areas (respectively, the Ilmiye Office and Ministry of Justice and Sects), policing, pensions for former government workers, postal and telegraph services, and funding of the holy cities and pilgrimages. Reported below is an average expenditure figure for each of these public service provisions (all figures are in *kurus*, rounded to the nearer hundred thousand):

- Holy cities and pilgrimage:⁵⁷ 36.5 million
- Pensions:⁵⁸ 61.7 million
- Post Office and Telegraph Service:⁵⁹ 39.1 million
- Ministry of Police and Gendarmerie:⁶⁰ 120.2 million
- Ministry of Justice and Sects:⁶¹ 40.1 million
- Ilmiye Office:⁶² 21.4 million
- Education:⁶³ 13.2 million
- Public Works:⁶⁴ 6.4 million

Total public service expenditures controlled by the central elite in an average year between 1874 and 1898 thus amounted to 338.6 million kurus. Adding to this figure the central elite’s share of *waqf* public service expenditures—659,220 kurus—yields 339.259 million kurus.

Given our conception of control, it is necessary also to incorporate spending at the provincial level: By virtue of the 19th-century Tanzimat reforms, all tax money was collected in the name of the central state, went to the State Treasury, and returned to the local level on the basis of budgets approved by the central state (O’Meara 1894, p. 291; Shaw 1975). In order to determine how much of this spending at the local level could be attributed to the central state, we were able to obtain provincial expenditures from five provincial budgets between 1874 and 1898. The following is a list of these provinces followed by the year of the budget: Sivas (1898), Hüdavendigâr (1895), Ankara (1882), Syria (1878), and Halep (1874). Budgets for the first three provinces are from Kilia (2000), while the Halep provincial budget is from Akkuş (2008) and Syria is from Saliba (1978, p. 311). According to these budgets, provincial governments provided hospitals, police, education, courts, mail service, and infrastructure projects. These expenditures totaled 28.8 million kurus. According to Karpat (1985, pp. 160–61), these provinces together accounted for 25% of the empire’s population in 1897. Assuming equal per-person spending across the empire (i.e., multiplying by 4), provincial government public service expenditure totaled 115.2 million kurus on an average year between 1874 and 1898. Because the central state provided this money, we attribute this to the central elite.

Most of the *waqf* money, on the other hand, can be attributed to the peripheral elites. Demirel (2000) provides total *waqf* expenditures for the province of Sivas in 1835. The portion going to such public services as education, libraries, mosque maintenance, and public fountains is 480,000 kurus. According to Karpat (1985, pp. 160–61), Sivas accounted for about 5% of the empire’s total population in the 19th century. Assuming equal expenditure per person across the empire (multiplying by 20), *waqf* public service expenditures totaled 9.6 million kurus.

A second data source allows us to mitigate the hazards of generalizing to the empire from a single province in the 1830s. Öztürk (1995, pp. 49–56) provides data on 60 *waqfs* across the 19th century (more precisely, 1802–1911), 38 of

⁵⁷ Starting in 1868, this item was moved to the Treasury of the sultan. Thus, the 1874–98 figure is based on an average of the years during which it appeared separately: 1860–67.

⁵⁸ Because this item was moved into the Ministry of Finance after 1881 and became indistinguishable, the figure reported is an average of 1874–81.

⁵⁹ This average is based on the following available years: 1874–75, 1877–78, and 1887–98.

⁶⁰ This average is based on 1887–98, as prior to this time most of the police funds were indistinguishable from the Ministry of Interior budget.

⁶¹ This average is based on 1874–75, 1877–81, and 1887–98.

⁶² This averaged is based on 1887–98.

⁶³ This ceased to be a separate item after 1878 when it was moved into the Ministry of Interior. Thus, this average is based on two years, 1874–75 and 1877–78.

⁶⁴ This ceased to be a separate item after 1878 when it was moved into the Ministry of Interior. This average is based on the available data from 1868–78.

these from 1868 or later (p. 49). All of these *waqfs* were located in Anatolia. Average spending on the range of relevant services (religious, educational, and social, the latter of which included municipal services and welfare) totaled 8,046 kurus per month for all 60 *vakifs*, or 96,552 kurus per year. This yields 1,609.2 kurus per *vakif* per year. This can be generalized to the empire because Öztürk (p. 56) provides the total number of *waqfs* in the empire: 35,000. Assuming all 35,000 *vakifs* had average annual public service expenditures consistent with the 60 *vakifs* in Öztürk's sample, *vakif* expenditures on public services during a typical year in the 19th century totaled 56,322,000 kurus. Given that the two different data sources and estimation methods yield different estimates, we average the two, which produces about 32.961 million kurus. Assigning 89.5% of this to the peripheral elite—29,500,092—pushes the peripheral elite total to 144.7 million kurus. The masses controlled 8.5% of total *waqf* expenditures, that is, 2.802 million kurus.

Summary.—Central elite: 454.459 million (93.4%). Peripheral elite: 29.5 million (6.0%). Masses: 2.802 million (0.6%). Total: 486.761 million. Table A1 gives an overview over the results of these various estimations.

Table A1. Summary of Empirically Measured Shares of Control

	TAXES (Postexchange)			MILITARY SUPPORT (Preexchange)			PUBLIC SERVICE PROVISION (Preexchange)							
	France, 1360-80	Ottoman Empire, 1521-96	France, 1780s	France, 1870-1908	Ottoman Empire, 1870-1908	France, 1870-1900	France, 1870-1908	Ottoman Empire, 1870-1908	France, 1870-1908	Ottoman Empire, 1870-1908				
cE	42	36	87.3	90	18.5	32.5	12	.5	.4	.5	15.2	86.5	93.4	98.2
pE	46	49	8.3	4	68	61	8	12	4.2	91.5	58.8	1.8	6.0	0
eM	6	7	2.2	3	6.5	5	40	44	47.7	4	13	5.85	.3	.9
pM	6	7	2.2	3	6.5	1.5	40	43.5	47.7	4	13	5.85	.3	.9

References (Appendix A)

- Adriance, Thomas J. 1987. *The Last Gaiter Button: A Study of the Mobilization and Concentration of the French Army in the War of 1870*. New York: Greenwood.
- Akkuş, Yakup. 2008. "Vilayet Bütçeleri Çerçevesinde Tanzimat Sonrası Osmanlı Taşra Maliyesi (1860–1913)." Ph.D. thesis. Istanbul University.
- Akmese, Handan Nezir. 2005. *The Birth of Modern Turkey: The Ottoman Military and the March to World War I*. London: Tauris.
- Babuscio, Jack, and Richard Minta Dunn. 1984. *European Political Facts, 1648–1789*. New York: Facts on File Publications.
- Barnes, John Robert. 1987. *An Introduction to Religious Foundations in the Ottoman Empire*. Leiden and New York: Brill.
- Beik, William. 1985. *Absolutism and Society in Seventeenth-Century France: State Power and Provincial Aristocracy in Languedoc*. Cambridge: Cambridge University Press.
- Blaufarb, Rafe. 2002. *The French Army, 1750–1820: Careers, Talent, Merit*. Manchester: Manchester University Press.
- Chapman, Brian. 1955. *The Prefects and Provincial France*. London: Allen & Unwin.
- Chevalier, Bernard. 1982. *Les bonnes villes de France du X^{IV}e au X^{VI}e siècle*. Paris: Aubier Montaigne.
- Collins, James B. 1988. *Fiscal Limits of Absolutism: Direct Taxation in Early Seventeenth-Century France*. Berkeley and Los Angeles: University of California Press.
- Contamine, Philippe. 1992a. *Histoire militaire de la France*, vol. 1, *Des origines à 1715*. Paris: PUF.
- . 1992b. "La première modernité: Louis XI, tensions et innovations." Pp. 209–32 in *Histoire militaire de la France*, vol. 1, *Des origines à 1715*. Edited by Philippe Contamine. Paris: PUF.
- Cosgel, Metin M., and Thomas J. Miceli. 2005. "Risk, Transaction Costs, and Tax Assignment: Government Finance in the Ottoman Empire." *Journal of Economic History* 65:806–21.
- Demirel, Ömer. 2000. *Osmanlı Vakıf-Şehir İlişkisine Bir Örnek: Sivas Şehir Hayatında Vakıfların Rolü*. Ankara: Türk Tarih Kurumu Basımevi.
- Emecen, Feridun. 1989. *XVI: Asırda Manisa Kazâsi*. Ankara: Türk Tarih Kurumu Basımevi.
- Erder, Leila T., and Suraiya Faroqhi. 1980. "The Development of the Anatolian Urban Network during the Sixteenth Century." *Journal of the Economic and Social History of the Orient* 23 (3): 265–303.
- Erickson, Edward. 2000. *Ordered to Die: A History of the Ottoman Army in the First World War*. Westport, Conn.: Greenwood.
- European State Finance Database. n.d. "Seventeenth-Century French Revenues and Expenditures." Figure 82. <http://www.le.ac.uk/hi/bon/ESFDB/images/fmalb051.gif>.
- Fairchild, Cissie C. 1976. *Poverty and Charity in Aix-en-Provence, 1640–1789*. Baltimore and London: Johns Hopkins University Press.
- Faroqhi, Suraiya. 1997. "Part II Crisis and Change, 1590–1699." Pp. 411–636 in *An Economic and Social History of the Ottoman Empire*, vol. 2: *1600–1914*. Edited by Halil İnalcık with Donald Quataert. Cambridge: Cambridge University Press.
- Fawtier, Robert, ed. 1930. *Comptes du Trésor (1296, 1316, 1384, 1477)*. Paris: Imprimerie Nationale.
- Gerber, Haim. 1983. "The Waqf Institution in Early Ottoman Erdine." *Asian and African Studies* 17:29–45.
- Goldsmith, Lewis. 1832. *Statistics of France*. Hatchard: London, 1832.
- Hale, William M. 1994. *Turkish Politics and the Military*. London: Routledge.
- Henneman, John Bell. 1971. *Royal Taxation in Fourteenth Century France: The Development of War Financing, 1322–1356*. Princeton, N.J.: Princeton University Press.
- Hickey, Daniel. 1997. *Local Hospitals in Ancien Régime France: Rationalization, Resistance, Renewal, 1530–1789*. Montreal and Kingston: McGill–Queen's University Press.
- Hippeau, M. C. 1863. *Le gouvernement de Normandie au X^{VII}e et au X^{VIII}e siècle*. Caen: Goussiaume de la Porte.
- Hoexter, Miriam. 1998. *Endowments, Rulers and Community: Waqf al-Haramayn in Ottoman Algiers*. Leiden and Boston: Brill.
- Imbert, Jean, et al. 1982. *Histoire des hôpitaux en France*. Toulouse: Privat.
- İnalcık, Halil. 1973. *The Ottoman Empire: The Classical Age, 1300–1600*. London: Weidenfeld & Nicolson.
- . 1994. *An Economic and Social History of the Ottoman Empire, 1300–1914*. Cambridge: Cambridge University Press.
- Jones, Colin. 1982. *Charity and Bienfaisance: The Treatment of the Poor in the Montpellier Region, 1740–1815*. Cambridge: Cambridge University Press.

- Karpat, Kemal H. 1985. *Ottoman Population, 1830–1914: Demographic and Social Characteristics*. Madison: University of Wisconsin Press.
- Kilia, S. 2000. “Tanzimat Sonrası Osmanlı Vilayet Bütçeleri.” *Tarih Araştırmaları Dergisi* 20 (3): 196–206.
- Kinross, Patrick Balfour. 1977. *The Ottoman Centuries: The Rise and Fall of the Turkish Empire*. New York: Morrow.
- Kiser, Edgar, and April Linton. 2002. “The Hinges of History: State-Making and Revolt in Early Modern France.” *American Sociological Review* 67:889–910.
- Kwass, Michael. 2000. *Privilege and the Politics of Taxation in Eighteenth-Century France*. Cambridge: Cambridge University Press.
- Leacock, Stephen. 1906. *Elements of Political Science*. New York: Houghton Mifflin.
- Le Blévec, Daniel. 2000. *La part du pauvre: L’assistance dans les pays du bas-Rhône du XIIIe siècle*, vols. 1 and 2. Rome: École Française de Rome.
- Le Comte de Franqueville, M. 1875. “Local Government in France.” Pp. 283–308 in *Local Government and Taxation*, edited by J. W. Probyn. New York and London: Cassell, Petter & Galpin.
- Leeuwen, Richard van. 1999. *Waqfs and Urban Structures: The Case of Ottoman Damascus*. Leiden and Boston: Brill.
- Lynn, John Albert. 1997. *Giant of the Grand Siècle: The French Army, 1610–1715*. Cambridge: Cambridge University Press.
- Maillard, Jacques. 2000. “Les ressources de la ville d’Angers au XVIIIe siècle.” Pp. 167–77 in *Les finances en province sous l’Ancien Régime: Journée d’études tenue à Bercy le 3 décembre 1998*, edited by Françoise Bayard. Paris: Ministère de l’Économie, des Finances et de l’Industrie, Comité pour l’Histoire Économique et Financière de la France.
- Matthews, George T. 1958. *The Royal General Farms in Eighteenth-Century France*. New York: Columbia University Press.
- McCloy, Shelby T. 1946. *Government Assistance in Eighteenth-Century France*. Durham, N.C.: Duke University Press.
- McHugh, Tim. 2007. *Hospital Politics in Seventeenth-Century France: The Crown, Urban Elites, and the Poor*. Aldershot: Ashgate.
- Ministry of Commerce and Industry. (1886) 1968. *Annuaire statistique de La France: Neuvième année, 1886*. Nendeln, Liechtenstein: Kraus Reprint Ltd. (originally published in Paris by Imprimerie Nationale).
- Ministry of Public Instruction. 1889. *Les recettes et les dépenses de la République Française de 1870 à 1889*. Facsimile no. 96. Paris: Imprimerie Alcide Picard et Kaan.
- Necker, Mr. 1781. *State of the Finances of France, Laid before the King, by Mr. Necker, Director-General of the Finances, in the Month of January, 1781*. London: printed for G. Kearsley, T. Becket, J. Walter, et al.
- O’Meara, John J. 1894. *Municipal Taxation at Home and Abroad: Local Government—Indebtedness and Valuation*. London, Paris, and Melbourne: Cassell.
- Öztürk, Nazif. 1995. *Türk yenileşme tarihi çerçevesinde vakıf müessesesi*. Ankara: Türkiye Diyanet Vakfı.
- Pouchenot, Marius. 1910. *Le budget communal de Besançon au début du XVIIIe siècle*. Paris: Librairie Honoré Champion.
- Quaetaert, Donald. 2001. “Labor History in the Ottoman Middle East, 1700–1922.” *International Labor and Working-Class History* 60:93–109.
- Ramsey, Matthew. 1988. *Professional and Popular Medicine in France, 1770–1830: The Social World of Medical Practice*. Cambridge and New York: Cambridge University Press.
- Rey, Maurice. 1965. *Le domaine du roi et les finances extraordinaires sous Charles VI, 1388–1413*. Paris: S.E.V.P.E.N.
- Rigaudière, Albert. 1993. *Gouverner la ville au Moyen Age*. Paris: Anthropos.
- Rowlands, Guy. 1999. “Louis XIV, Aristocratic Power and the Elite Units of the French Army.” *French History* 13 (3): 303–31.
- Sahillioğlu, Halil. 1999. *Studies on Ottoman Economic and Social History*. Istanbul: Research Centre for Islamic History, Art and Culture.
- Saliba, Najib E. 1978. “The Achievements of Midhat Pasha as Governor of the Province of Syria, 1878–1880.” *International Journal of Middle East Studies* 9 (3): 307–23.
- Scott, John. 1871. “On Local Taxation.” *Journal of the Statistical Society of London* 34 (3): 281–333.
- Serman, William. 1979. *Les origines des officiers français, 1848–1870*. Paris: Publications de la Sorbonne.
- Shaw, Stanford J. 1958. *The Financial and Administrative Organization and Development of Ottoman Egypt, 1517–1798*. Princeton, N.J.: Princeton University Press.
- . 1975. “The Nineteenth-Century Ottoman Tax Reforms and Revenue Systems.” *International Journal of Middle East Studies* 6:421–59.
- . 1978. “Notes and Communications: Ottoman Expenditures and Budgets in the Late Nineteenth and Early Twentieth Centuries.” *International Journal of Middle East Studies* 9:373–78.

- Swann, Julian. 2003. *Provincial Power and Absolute Monarchy: The Estates General of Burgundy, 1661–1790*. Cambridge: Cambridge University Press.
- Szylowicz, Joseph S. 1971. "Elite Recruitment in Turkey: The Role of the Mulkiye." *World Politics* 23:371–98.
- van Bruinessen, Martin. 1999. "Kurds, States, and Tribes." Paper presented at the Tribes and Powers in the Middle East conference, London, January 23–24.
- Wolfe, Martin. 1972. *The Fiscal System of Renaissance France*. New Haven, Conn.: Yale University Press.
- Yediyıldız, B. 1975. "L'institution du waqf au XVIIIe siècle en Turquie: Étude socio-historique." Ph.D. dissertation. Sorbonne, University of Paris.
- Yüksel, Hasan. 1998. *Osmanlı Sosyal Ve Ekonomik Hayatında Vakıfların Rolü (1585–1683)*. Sivas: Dilek Matbaası.
- Zürcher, Eric-Jan. 1998. "The Ottoman Conscription System in Theory and Practice, 1844–1918." *International Review of Social History* 43:437–49.

Appendix B from Kroneberg and Wimmer, “Struggling over the Boundaries of Belonging: A Formal Model of Nation Building, Ethnic Closure, and Populism”

(AJS, vol. 118, no. 1, p. 176)

Alliances and Exchanges in Empires

Understanding why social boundaries follow the estate order in imperial society provides the necessary background to our analysis of various paths of political modernization. Table B1 summarizes our model assumptions and lists again the empirical data on the resource distribution in empires, based on the historical research documented in appendix A. As can be seen, we model the “empire scenario” closer to the French data since the Ottoman Empire in the 17th century was more advanced in terms of the center’s taxing capabilities as well as its relative military power (Barkey 1991, p. 704).

The historical data show, consistent with the historical sociology of empires (Eisenstadt 1963; Hechter 2000; Howe 2002; Barkey 2008), that the central elites of both societies relied on a system of indirect rule and taxation. They were able to raise only 10% of the taxes directly, while more than three-quarters of the overall tax volume (including income from seigniorial domains in France) was controlled by peripheral elites. The majority of public goods were also provided by peripheral elites (initial control of 0.85), such as through the hospitals founded and funded by the nobility or crusading orders in France or the religious foundations in the Ottoman Empire or the expenditures of Ottoman provincial governors to feed and clothe the poor, maintain canals and roads, public fountains, and the like. The remaining shares were controlled by the central elites on the one hand, who provided alimonies for the poor (in France), infrastructure and food for the pilgrims in Mecca (the Ottoman Empire), and funded maintenance/construction of major roads. On the other hand, the masses offered public goods through the hospitals and religious foundations founded by townspeople, the police patrols paid for by local communities, or the town fortifications, in which massive investments were made in Renaissance France.

Since in both empires the masses were excluded from supralocal political processes, they had no control over political decision making. Most of the control over this resource lay with the central elites at the political center (0.6). However, being relatively autonomous at the local or regional level, the peripheral elites also held significant shares of control (0.4) (on the political sociology of empires, see again Eisenstadt [1963]; Hechter [2000]; Howe [2002]; Barkey [2008]).

Military support was controlled predominantly by the peripheral elites (0.70), on whose troops the center depended to conduct large-scale war. In France, the king’s army (the *arrière ban*) was mobilized through the principle of feudal fealty, while in the Ottoman Empire the beneficiaries of the right to tax the local population owed the sultan military support. The center’s own army was still very small in Renaissance France (consisting of the royal family and the chevaliers of the high nobility, professional garrison soldiers, and royal militias), just enough to guarantee the king’s security (0.20). It was considerably larger in the case of the Ottoman Empire, where the famous *sipahi* cavalry and the palace guards formed a formidable fighting force. Before the advent of universal conscription, the masses played a lesser role and provided only small, undisciplined militias or small contingents of mounted warriors in France or the frontier raiders around garrison towns in the Ottoman Empire (0.05 each).

We now turn to the interest distribution, for which we depend on plausibility arguments, as discussed in the main text of the article, because it is not possible to estimate them on the basis of quantitative empirical data. Since the masses were not organized to a degree that would have enabled them to formulate political demands relevant for the entire polity (cf. the “lateral insulation” in Gellner [1983, pp. 9–11]; Mann [1993, chap. 4]), they were not interested in political decision making at this level. Given that warfare at this point in history was still very much an elite (and mercenary) affair that did not mobilize or involve or concern the masses (Rogers 1995; more specifically regarding France, see Lynn [1997]), they were also not interested in exercising control over military support. Rather, their main interest was in control over taxation (0.85), that is, to retain as much of their economic revenue as possible to maintain what is considered an acceptable and morally justified subsistence-level existence (Scott 1976), as is evidenced by the prevalence of tax rebellions in premodern and early modern polities (Mousnier 1970; Kiser and Linton 2002). Moreover, it is reasonable to assume that they were interested in public service provision, but to a much lower degree (0.15), since they relied on family, guild, village, or the local lord to provide for basic forms of social security, policing, and education (on rural life in medieval Europe, see Duby [(1961) 1998]; on guilds in the Arab world, see Lewis [1937]).

In systems of indirect rule, by far the greatest concern of the central elite was to acquire control over taxation (0.59) in

order to finance their war enterprises, as a long line of research in comparative historical sociology has shown (from Tilly [1975] to Kiser and Linton [2001]). Besides this, we assume that they were interested in control over political decision making and military support (0.20 each) as two important sources for expanding their domain and power. Since the center fought larger wars than did the peripheral elite, it was more interested than the peripheral elite (0.15) in military support by allies. We assume that the latter was mostly interested in their control over taxation (0.30) and access to political decision making (0.45). This is again plausible in view of the constant political rivalries and wars between the French king and various factions of nobles from the provinces over taxation rights and access to political offices (Lachmann 1989), as well as the intense tug-of-war between the sultan and regional governors and military entrepreneurs (Inalcik 1980) or between the Ottoman center and various victims of its centralization policies that gathered under the mantle of Sufi orders and the call for religious renewal (Barkey 2008, chap. 5). Exercising control over public service provision was also of some interest to the peripheral elites (0.10) since the legitimacy of their rule in the eyes of the masses largely depended on their “good deeds” and the maintenance of functioning patron-client relations with their dependents (in general, for peasant societies, see Scott [1976]; for France, see the case study by Le Blévec [2000]; on the *waqfs* in the Ottoman world, see Barnes [1987]).

Given this specification of interests and control and assuming at this moment that actors do not care about cultural traits or markers when forming alliances, the estate order constitutes the equilibrium outcome. To make this result understandable, we describe why actors either have no incentive or are not able to unilaterally deviate from the equilibrium. In particular, we consider why the central and the peripheral elites do not also exchange with the masses. First note that the peripheral elite would do best if the exchange took place among all actors. The reason is that their control over taxation (a consequence of indirect rule) is highly demanded by all other actors. If classified together with the peripheral elites, the masses would want them to rescind some of their coercive control over taxation. The central elite likewise demands control over taxation from the peripheral elite.

For this reason, the central elites do much better if they do not have to compete with the masses in their demand for control over taxation. The central elite therefore use their first-mover advantage to propose the estate order. The peripheral elite accept this proposal (rather than trying to align with the masses) because they depend on the exchange with the central elite. It is only through this exchange that they can gain further control over political decision making and thus maintain their political autonomy. More concretely, the central elite transfer certain positions and rights to the peripheral elite and in return receive military support and taxation from the peripheral elite. Faced with the proposal of the central elite to form a group without the masses, the peripheral elite cannot but agree to this proposal if they want to end up in an alliance system with them. Given this situation and their interest in an exchange among elites, the peripheral elite do not formulate a counterproposal, and the estate order emerges as a stable status quo.

Again, the uncertainty behind our model assumptions makes it necessary to investigate the robustness of this result. Similar to figure 3 in the main text, figure B1 depicts the equilibria of various “empire scenarios” that result under different assumptions regarding state centralization, mass mobilization, and cultural differentiation across different actors. The equilibrium of the empire scenario as described above is depicted in the middle of the left-hand-side graph.

The graphs were constructed by starting from an extreme version of the empire scenario in the lower-left corner and incrementing indicators of state centralization (*y*-axis) and mass mobilization (*x*-axis) from there on. On the *x*-axis, control over military support by the masses varies from 0.02 to 0.08. The second indicator of mass mobilization—their interest in political participation—is held constant since it takes on a value of zero in the empire scenario. On the *y*-axis, the asymmetry in control between the central and peripheral elite varies starting from the scenario of an extremely weak center in the lower-left corner. In this extreme empire scenario, the peripheral elite’s control over political decision making equals 0.53, over public goods provision 0.88, over military support 0.83, and over taxation 0.86. Moreover, the peripheral elite are less interested in control over public goods provision (0.07), as are the masses (0.12). With increasing state centralization, the central elite’s control relative to that of the peripheral elite increases, as does the other actors’ interest in control over public good provision.

The left-hand-side graph shows the equilibrium alliance systems that result if there is no cultural differentiation (or if it is of no interest to the actors). The middle graph represents the outcome when cultural differentiation proceeds along status lines. The right-hand-side graph depicts the equilibria for an ethnic trait distribution. As can be seen, the estate order always constitutes an equilibrium, independent of the landscape of cultural difference. When it is backed by a class-cultural differentiation, it constitutes the only equilibrium under all 25 model runs. Under an ethnocultural differentiation, six of the model runs lead to an enlarged estate order as an additional second equilibrium. Rather than representing an entirely different kind of outcome, this alliance system can be regarded as a variant of the estate order where preferential treatment allows one of the masses to enter into an exchange relationship with the elites (think of the constitutional monarchy in Great Britain in the early modern period or of France under Louis Philippe, when the royal house and the aristocratic elites granted limited voting rights to the bourgeois middle classes).

If cultural difference is irrelevant, three of these will feature nationhood as a third equilibrium. Note, however, that

these nationalist equilibria are relatively far removed from the middle of the graph that corresponds to our actual (and empirically calibrated) assumptions for the empire scenario. In any case, the empirical data that we have collected for Renaissance France and the Ottoman Empire of the Classical Age put these two societies very squarely at the center of zones for which our model predicts the estate order as the outcome. For historically plausible reasons, discussed in the main text, we assume that a class-cultural differentiation was prevalent in Renaissance France, while the Ottoman “empire of difference” (Barkey 2008) was marked by institutionally supported cultural differences between ethnoreligious communities. Figure B1 suggests that in these two societies, the elite coalition and the exclusion of the masses were a rather stable outcome that would survive considerable variation in the degree of state centralization (such as that brought about by external wars) or the military mobilization of the population.

Table B1. Control and Interest in an Empire: Model Assumptions and Empirical Data

	CONTROL OVER					INTEREST IN			
	Political Decision Making	Public Goods Provision	Military Support	Taxation		cE	pE	cM	pM
	Model Assumptions								
cE	.6	.05	.20	.1	Political decision making	.20	.45	0	0
pE	.4	.85	.70	.8	Public goods provision	.01	.10	.15	.15
cM	0	.05	.05	.05	Military support	.20	.15	0	0
pM	0	.05	.05	.05	Taxation	.59	.30	.85	.85
	Empirical Data								
France 1280–1350:									
cE	NA	.005	.185	.42					
pE	NA	.915	.68	.46					
cM	NA	.04	.065	.06					
pM	NA	.04	.065	.06					
Ottoman Empire 1470–1670:									
cE	NA	.152	.325	.36					
pE	NA	.588	.61	.49					
cM	NA	.13	.05	.07					
pM	NA	.13	.015	.07					

NOTE.—The control matrix gives the preexchange distribution of control for each resource (i.e., the relative shares of control exercised by the actors). The interest matrix gives the distributions of interest for each actor (i.e., her relative interest in the resources). Empirical data on control over taxation, however, represent postexchange values because preexchange controls cannot be measured empirically. The comparable postexchange values generated by our model in equilibrium are (.42, .48, .05, .05).

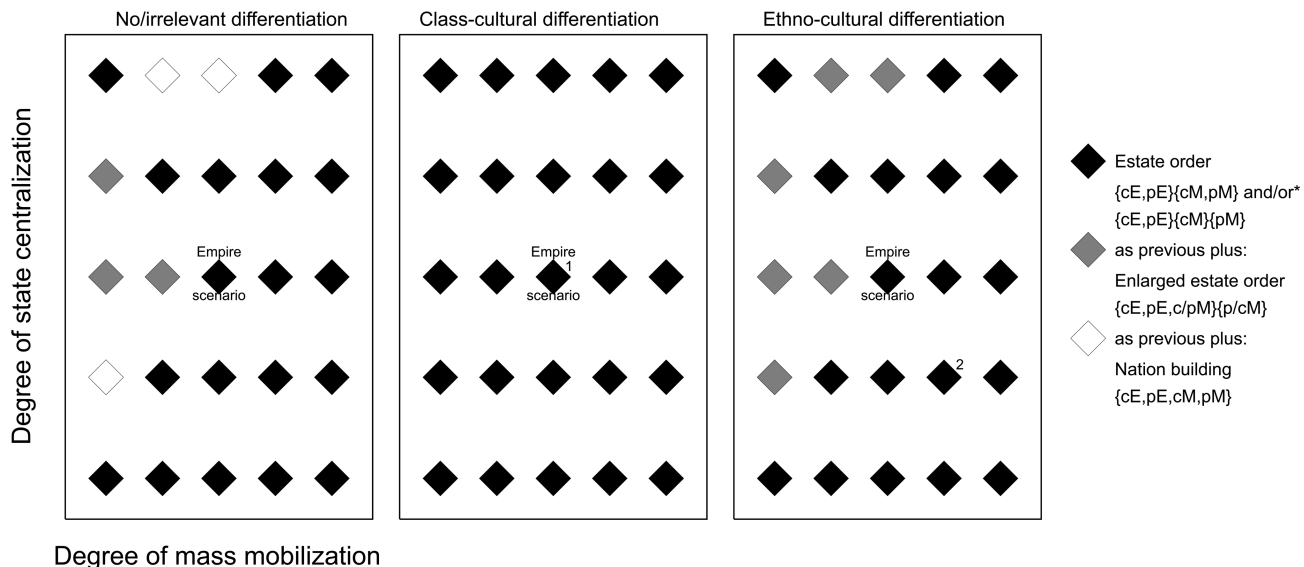


FIG. B1.—Equilibria in the “empire scenario” under no differentiation, a class-cultural, and an ethnocultural differentiation. cE = central elites, pE = peripheral elites, cM = central masses, and pM = peripheral masses. Numbers indicate simulations that correspond most closely to empirical measures: 1 = France 1180–1380, 2 = Ottoman Empire 1470–1670. *Both under irrelevant differentiation, only {cE, pE}{cM, pM} under class-cultural differentiation, only {cE, pE}{cM}{pM} under ethnocultural differentiation

Appendix C from Kroneberg and Wimmer, “Struggling over the Boundaries of Belonging: A Formal Model of Nation Building, Ethnic Closure, and Populism”

(AJS, vol. 118, no. 1, p. 176)

Sensitivity Analysis

In this appendix, we describe the setup and results of a sensitivity analysis that ensures that our inferences do not depend on fragile assumptions (Saltelli et al. 2008, p. 34). We concentrate on our main result, namely, that a greater level of state centralization leads to the emergence of nationhood, while acting against ethnic closure and populism. This result was derived under specific assumptions regarding the distributions of interests and control. Where available, we used historical sources of quantitative data to empirically ground our assumptions about resource distributions (see app. A). However, these estimations necessarily entail some degree of uncertainty. This also holds true with regard to actors’ interests, since our assumptions are based on historical plausibility assumptions alone.

The sensitivity analysis randomly varies the exact specification of the control and interest matrices that define the transition from weak to strong state centralization (as represented by the y -axes of fig. 3 in the main text). We then record whether the corresponding shift in alliance systems is in line with our main conclusion or contradicts it.⁶⁵ A contradiction occurs whenever greater state centralization leads away from nation building or toward ethnic closure or populism. These changes constitute the dependent variable of the sensitivity analysis. Throughout the analysis, we assume a strong civil society ($U^{\text{meaning}} = 0$) since the impact of this one-dimensional factor is already well understood. We also assume mass mobilization to be medium or strong (varying the exact values randomly). On the basis of the results reported in the main text, we expect that this factor influences the equilibria only at the margin.

The independent variables of the sensitivity analysis are the parameters that define weak and strong state centralization. For each of these parameters in the control and interest matrices, we define an *interval* Δ of reasonable values (which includes our empirically estimated or assumed values). These intervals span a multidimensional distribution of input parameters. Since the number of parameters is high, it is impossible to derive the complete multidimensional “response surface,” that is, how the dependent variable changes as a function of the input parameters (Oliver 1993; Oliver and Myers 2002). The most widely used strategies are therefore local derivatives or simple one-factor-at-a-time approaches (Saltelli et al. 2006). However, such approaches are clearly insufficient as they cannot account for nonlinear effects and interactions (Oliver 1993; Oliver and Myers 2002). For our purposes, we need a method that can not only deal with such effects and interactions but also handle a large number of input factors and is computationally efficient by requiring a relatively small number of model evaluations. We use the elementary effect test developed by Morris (1991) and extended by Campolongo, Cariboni, and Saltelli (2007), which is best suited to deal with this kind of situation (Saltelli et al. 2008).

In the elementary effect method, each of k independent input factors X_i ($i = 1, \dots, k$) is allowed to vary across p selected levels. For a given vector $\mathbf{X} = (X_1, X_2, \dots, X_k)$, the elementary effect of the i th input factor is defined as

$$EE_i(\mathbf{X}) = \frac{[Y(X_1, X_2, \dots, X_{i-1}, X_i + \Delta, \dots, X_k) - Y(\mathbf{X})]}{\Delta},$$

where Δ is the size of the sampling step in the scale $[0, 1]$ after the range of each factor has been rescaled on this interval (Saltelli et al. 2008, pp. 110, 120).⁶⁶ Although this method also varies one factor at a time, it computes several elementary effects for each variable at different points of the input space. Averaging over these elementary effects allows one to arrive at a sensitivity measure that is increasingly independent of the specific points at which the elementary effects are computed (Saltelli et al. 2004, pp. 92–93). It is thus a global method in the sense of exploring several regions of the input space. This also ensures that possible interactions among input factors can be detected.

Since it is impossible to compute all elementary effects, special techniques have been developed that lead to an

⁶⁵ Note that our focus remains on how shifts in the configurations of interests and control have an impact on the resulting alliance system (instead of looking at sensitivity of point predictions, e.g.). This follows from the purpose of the sensitivity analysis being to test the robustness of our main substantial inference. The overriding importance of clearly defining the underlying purpose of a sensitivity analysis and to focus on a model’s key implications of interest is stressed by Saltelli et al. (2008, p. 41).

⁶⁶ More precisely, Δ is a value in $\{1/(p-1), \dots, 1-1/(p-1)\}$, since the sampling steps occur on the p -level grid Ω into which the input space has been discretized. Also, the point that one arrives at when incrementing or decrementing a factor in (X_1, X_2, \dots, X_k) by Δ has to lie still in Ω (Saltelli et al. 2008, pp. 110, 120).

efficient sample of elementary effects (Morris 1991; Campolongo et al. 2007). Denoting the number of input factors by k , the idea is to build “ r trajectories of $(k + 1)$ points in the input space, each providing k elementary effects, one per input factor, for a total of $r(k + 1)$ sample points” (Saltelli et al. 2008, p. 113). Thus, a trajectory constitutes a particular path through the multidimensional input space that varies one factor at a time. Following the sampling strategy developed by Campolongo et al. (2007), we select the r trajectories in a way that maximizes their spread in the input space (Saltelli et al. 2008, pp. 110, 120). Following recommendations in the literature, we select a set of 10 (out of 500 randomly generated) trajectories that satisfies this criterion.

In applying the elementary effect method to corroborate our main conclusion, a number of special features have to be taken into account. Most important, we rely on the method’s capability to vary groups of input parameters since several dependencies exist among input parameters. In total, the control and interest matrices (each of size 4×4) for the weak and strong state centralization amount to 64 input parameters. The effective number is smaller since parameters that do not vary with state centralization are held constant. Assumed to be identical for weak and strong centralization are the central elite’s interests, the peripheral elite’s interest in taxation, the masses’ interest in military support, and the masses’ control over political decision making and over provision of public goods. This means that we retain our theoretical assumption that these parameters are not related to state centralization. Subject to the sensitivity analysis are the specific values at which these parameters are held constant. We also retain our simplifying assumption that both masses have identical shares of control and relative interest.

Besides these equality restrictions that represent substantial assumptions of our application, the general properties of Coleman’s exchange model imply that relative interests of each actor sum up to 1, as do relative shares of control over each resource. Both kinds of restrictions mean that one cannot vary each parameter independently. Rather, parameters are varied within groups so that all restrictions are met when randomly drawing parameter values.

The restrictions just described yield eight groups of parameters: control over political decision making, control over public goods provision, control over military support, control over taxation for weak state centralization, control over taxation for strong state centralization, interests of the central elites, interests of the peripheral elites, and interests of the masses. Table C1 gives the intervals of the input parameters used in the sensitivity analysis. The intervals are generally of size 0.10 and are centered at the empirically measured or assumed value reported in the main text. The random draws can select one of three levels: the mean value or the lower or upper bound of the intervals. Whenever a group moves within a trajectory, a set of parameter values that satisfies its internal restrictions is drawn randomly. Together, this implies that individual parameters shift either by .05, .10, or not at all. We modified these rules for parameter values already close to the extremes. For example, where relative interest is assumed to be practically zero, it seems sufficient to vary it by .05.

Since there are eight groups of parameters, a trajectory in which each group moves once encompasses nine different parameter lists. Each parameter list corresponds to a different specification of weak and strong state centralization (within the intervals given in table C1). As in the main text (cf. fig. 3), six model evaluations are used to analyze the shift from one to the other scenario. Thus, in total, our sensitivity analysis is based on 90 parameter lists (10 maximally spreading trajectories, each comprising nine parameter lists) and 540 model evaluations.

None of them resulted in a pattern of alliance systems that contradicted our conclusion that greater state centralization leads to the emergence of nationhood, while acting against ethnic closure and populism. Our sensitivity analysis therefore establishes the robustness of this result, at least within the intervals as presented in table C1.

Trivially, if we increased the intervals on which the sensitivity analysis was performed, we would ultimately run into shifts of alliance systems that contradicted our result.⁶⁷ However, we deem it sufficient that our main conclusion holds in intervals of size .10 around the empirically measured or substantially plausible values specified in the main text. Differences of .10 are substantial, given that parameters range from 0 to 1 and constitute relative interests or shares of control (so that a shift by .10 implies an equally sized counteracting shift with respect to the remaining interest or control parameters).

⁶⁷ Note that we refrain from doing so since we employ the elementary effect method in order to check the robustness of our main conclusion within a range of reasonable values. Such an “uncertainty analysis” is different in purpose from a sensitivity analysis that is substantially interested in different sources of uncertainty in model output (Saltelli et al. 2008, p. 1).

Table C1. Parameter Intervals on Which the Sensitivity Analysis Was Conducted and for Which the Impact of State Centralization Was Confirmed

	POLITICAL DECISION MAKING				PUBLIC GOODS PROVISION			
	cE	pE	cM	pM	cE	pE	cM	pM
C_{weak}	[.7 .8] (.75)	[.2 .3] (.25)	[0 .05] (0)	As cM	[.5 .6] (.56)	[.35 .45] (.38)	[0 .05] (.03)	As cM
C_{strong}	[.85 .95] (.90)	[.05 .15] (.10)	As C_{weak}	As cM	[.85 .95] (.91)	[0 .1] (.03)	As C_{weak}	As cM
	MILITARY SUPPORT*				TAXATION			
	cE	pE	cM	pM	cE	pE	cM	pM
C_{weak}	[.05 .15] (.13)	[.05 .15] (.38)	[.35 .45] (.25)	As cM	[.15 .25] (.20)	[.15 .25] (.20)	[.25 .35] (.30)	As cM
C_{strong}	Held constant (.05)	Held constant (.05)	As C_{weak} (.45)	As cM	[.45 .55] (.50)	[.05 .15] (.10)	[.15 .25] (.20)	As cM
	cE				pE			
	Decision	Public	Military	Taxes	Decision	Public	Military	Taxes
X_{weak}	[.15 .25] (.20)	[0 .05] (.01)	[.15 .25] (.20)	[.55 .65] (.59)	[.05 .15] (.10)	[.1 .2] ^a (.15)	[.4 .5] (.50)	[.2 .3] (.25)
X_{strong}		As X_{weak}			[.25 .35] (.30)	[.15 .25] ^a (.20)	[.2 .3] (.25)	As C_{weak} (.25)
	cM				pM			
	Decision*	Public	Military	Taxes	Decision*	Public	Military	Taxes
X_{weak}	[.45 .55] (.20)	[.15 .25] (.20)	[0 ^b .05] (0)	[.15 .4] ^c (.60)			As cM	
X_{strong}	Held constant (.50)	[.35 .45] (.40)	As C_{weak}	[0 .2] ^c (.10)			As cM	

NOTE.—Parameter values used in the main text are given in parentheses below the intervals used in the sensitivity analysis.

*Indicators of mass mobilization are varied together and held constant within each trajectory.

^aRestriction: Peripheral elite’s interest in public goods provision under strong state centralization is at least as high as under weak state centralization.

^bIn the sensitivity analyses, we use a value of .001 instead of 0 for the masses’ interest in military support. The reason is that a relative interest of exactly 0 leads actors to give away their control over the resource for free. In our context, this is an unrealistic scenario and produces a few instances of sensitivities. All the results reported in the main text are robust with regard to this technical decision.

^cMasses’ relative interest in taxation is set equal to the remaining share after the other three interest parameters have been drawn.

References (Appendices B and C)

- Barkey, Karen. 1991. “Rebellious Alliances: The State and Peasant Unrest in Early Seventeenth-Century France and the Ottoman Empire.” *American Sociological Review* 56:699–715.
- . 2008. *Empire of Difference: The Ottomans in Comparative Perspective*. Cambridge: Cambridge University Press.
- Barnes, John Robert. 1987. *An Introduction to Religious Foundations in the Ottoman Empire*. Leiden: Brill.
- Campolongo, Francesca, Jessica Cariboni, and Andrea Saltelli. 2007. “An Effective Screening Design for Sensitivity Analysis of Large Models.” *Environmental Modelling and Software* 22:1509–18.
- Duby, Georges. (1961) 1998. *Rural Economy and Country Life in the Medieval West*. Philadelphia: University of Pennsylvania Press.
- Eisenstadt, Samuel N. 1963. *The Political Systems of Empires*. New York: Free Press.
- Gellner, Ernest. 1983. *Nations and Nationalism*. Ithaca, N.Y.: Cornell University Press.
- Hechter, Michael. 2000. *Containing Nationalism*. Oxford: Oxford University Press.
- Howe, Stephen. 2002. *Empire: A Very Short Introduction*. Oxford: Oxford University Press.
- Inalcik, Halil. 1980. “Military and Fiscal Transformation in the Ottoman Empire, 1600–1700.” *Archivum Ottomanicum* 6: 283–337.
- Kiser, Edgar, and April Linton. 2001. “Determinants of the Growth of the State: War and Taxation in Early Modern France and England.” *Social Forces* 80:411–48.

- . 2002. “The Hinges of History: State-Making and Revolt in Early Modern France.” *American Sociological Review* 67:889–910.
- Lachmann, Richard. 1989. “Elite Conflict and State Formation in 16th and 17th Century England and France.” *American Sociological Review* 54:141–62.
- Le Blévec, Daniel. 2000. *La part du pauvre: L’assistance dans les pays du bas-Rhône du XIIIe siècle*, vols. 1 and 2. Rome: École Française de Rome.
- Lewis, Bernard. 1937. “The Islamic Guilds.” *Economic History Review* 8:20–37.
- Lynn, John Albert. 1997. *Giant of the Grand Siècle: The French Army, 1610–1715*. Cambridge: Cambridge University Press.
- Mann, Michael. 1993. *The Sources of Social Power*, vol. 2: *The Rise of Classes and Nation States, 1760–1914*. Cambridge: Cambridge University Press.
- Morris, Max D. 1991. “Factorial Sampling Plans for Preliminary Computational Experiments.” *Technometrics* 33:161–74.
- Mousnier, Roland. 1970. *Peasant Uprisings in Seventeenth-Century France, Russia, and China*. New York: Harper Torchbooks.
- Oliver, Pamela E. 1993. “Formal Models of Collective Action.” *Annual Review of Sociology* 19:271–300.
- Oliver, Pamela E., and Daniel J. Myers. 2002. “Formal Models in the Study of Social Movements.” Pp. 32–61 in *Methods of Research in Social Movements*, edited by Bert Klandermans and Suzanne Staggenborg. Minneapolis: University of Minnesota Press.
- Rogers, Clifford J., ed. 1995. *The Military Revolution Debate*. Boulder, Colo.: Westview.
- Saltelli, Andrea, Marco Ratto, Terry Andres, Francesca Campolongo, Jessica Cariboni, Debora Gatelli, Michaela Saisana, and Stefano Tarantola. 2008. *Global Sensitivity Analysis: The Primer*. New York: Wiley.
- Saltelli, Andrea, Marco Ratto, Stefano Tarantola, and Francesca Campolongo. 2006. “Sensitivity Analysis Practices: Strategies for Model-Based Inference.” *Reliability Engineering and System Safety* 91:1109–25.
- Saltelli, Andrea, Stefano Tarantola, Francesca Campolongo, and Marco Ratto. 2004. *Sensitivity Analysis in Practice: A Guide to Assessing Scientific Models*. New York: Wiley.
- Scott, James C. 1976. *The Moral Economy of the Peasant: Rebellion and Subsistence in South-East Asia*. New Haven, Conn.: Yale University Press.
- Tilly, Charles. 1975. “Western State-Making and Theories of Political Transformation.” Pp. 601–38 in *The Formation of National States in Western Europe*, by Charles Tilly. Princeton, N.J.: Princeton University Press.