The Rise of Europe: Atlantic Trade, Institutional Change, and Economic Growth

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The rise of Western Europe after 1500 is due largely to growth in countries with access to the Atlantic Ocean and with substantial trade with the New World, Africa, and Asia via the Atlantic. This trade and the associated colonialism affected Europe not only directly, but also indirectly by inducing institutional change. Where "initial" political institutions (those established before 1500) placed significant checks on the monarchy, the growth of Atlantic trade strengthened merchant groups by constraining the power of the monarchy, and helped merchants obtain changes in institutions to protect property rights. These changes were central to subsequent economic growth. (*JEL* F10, N13, O10, P10)

The world we live in was shaped by the rapid economic growth that took place in nineteenth-century Western Europe. The origins of this growth and the associated Industrial Revolution are generally considered to lie in the economic, political, and social development of Western Europe over the preceding centuries. In fact, between 1500 and 1800, Western Europe experienced a historically unprecedented period of sustained growth, perhaps the "First Great Divergence" (i.e., the first major sustained divergence in income per capita across different regions of the world), making this area substantially richer than Asia and Eastern Europe. There is little agreement, however, on why this growth took place in Western Europe and why it started in the sixteenth century.

This paper establishes the patterns of economic growth in Western Europe during this era, develops a hypothesis on the origins of the rise of (Western) Europe and provides historical and econometric evidence supporting some of the implications of this hypothesis.

We document that the differential growth of Western Europe during the sixteenth, seventeenth, eighteenth, and early nineteenth centuries is almost entirely accounted for by the growth of nations with access to the Atlantic Ocean, and of *Atlantic traders.* Throughout the paper, the term Atlantic trader refers to Britain, France, the Netherlands, Portugal, and Spain, the nations most directly involved in trade and colonialism in the New World and Asia. *Atlantic trade,* in turn, means trade with the New World, as well as trade with Asia via the Atlantic, and includes colonialism- and slavery-related activities.[1] The differential growth of Atlantic traders suggests a close link between Atlantic trade and the First Great Divergence. In fact, it appears that the rise of Europe between 1500 and 1850 is largely the rise of Atlantic

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[1] Atlantic trade opportunities became available only during the late fifteenth century, thanks to the discovery of the New World and the passage to Asia around the Cape of Good Hope. These discoveries resulted from a series of innovations in ship technology, primarily pioneered by the Portuguese, that changed the rigging and hull design of ships and developed knowledge of oceanic navigation.

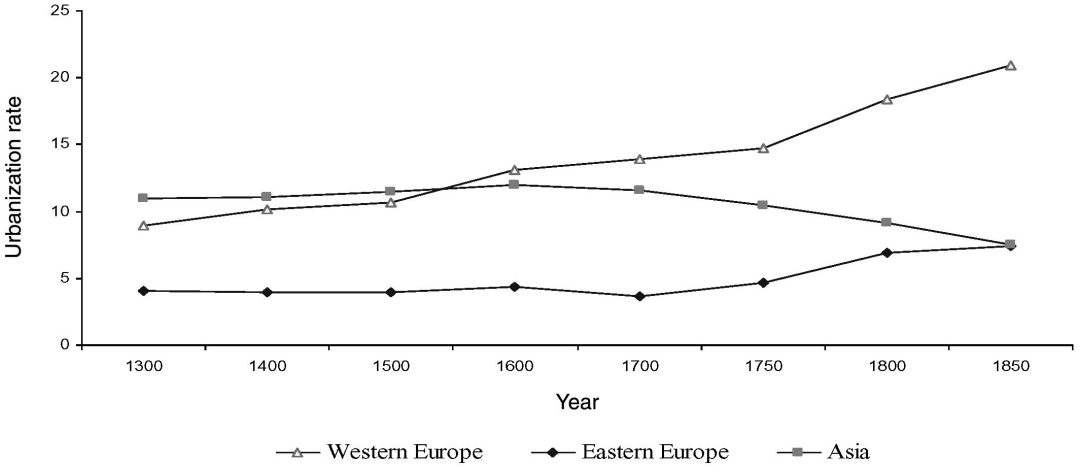

FIGURE 1A. WESTERN EUROPE, EASTERN EUROPE, AND ASIA: URBANIZATION RATES, WEIGHTED BY POPULATION, 1300–1850

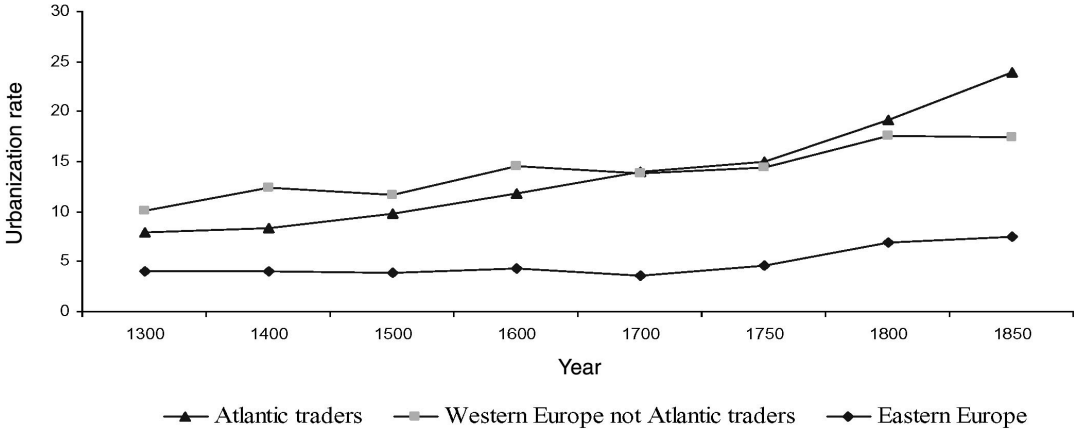

FIGURE 1B. ATLANTIC TRADERS, WEST EUROPEAN COUNTRIES NOT ATLANTIC TRADERS, AND EASTERN EUROPE: URBANIZATION RATES, WEIGHTED BY POPULATION, 1300–1850

Europe, and is quite different in nature from the European growth that took place before 1500.

Not all societies with access to the Atlantic show the same pattern of growth, however. The data suggest an important *interaction* between medieval political institutions and access to the Atlantic: the more rapid economic growth took place in societies with relatively nonabsolutist initial institutions, most notably in Britain and the Netherlands. In contrast, countries where the monarchy was highly absolutist, such as Spain and Portugal, experienced only limited growth in the subsequent centuries, while areas lacking easy access to the Atlantic, even such nonabsolutist states as Venice and Genoa, did not experience any direct or indirect benefits from Atlantic trade.

Figures 1 and 2 illustrate the central thesis of this paper. Figure 1, panel A, shows that urbanization in Western Europe grew significantly faster than in Eastern Europe after 1500.[2] Figure 1, panel B, shows that these

[2] For the purposes of this paper, Western Europe is taken to be all the countries west of the Elbe, i.e., Austria,

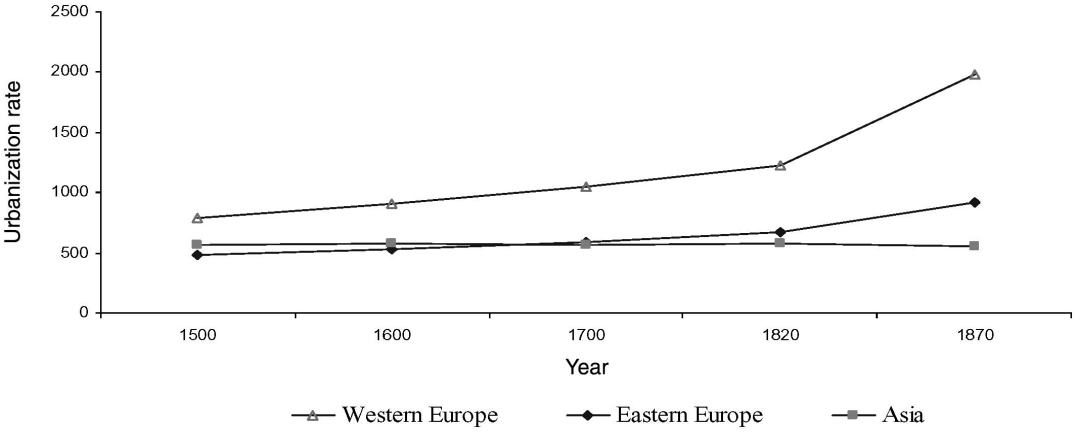

FIGURE 2A. WESTERN EUROPE, EASTERN EUROPE, AND ASIA: GDP PER CAPITA, WEIGHTED BY POPULATION, 1500–1870

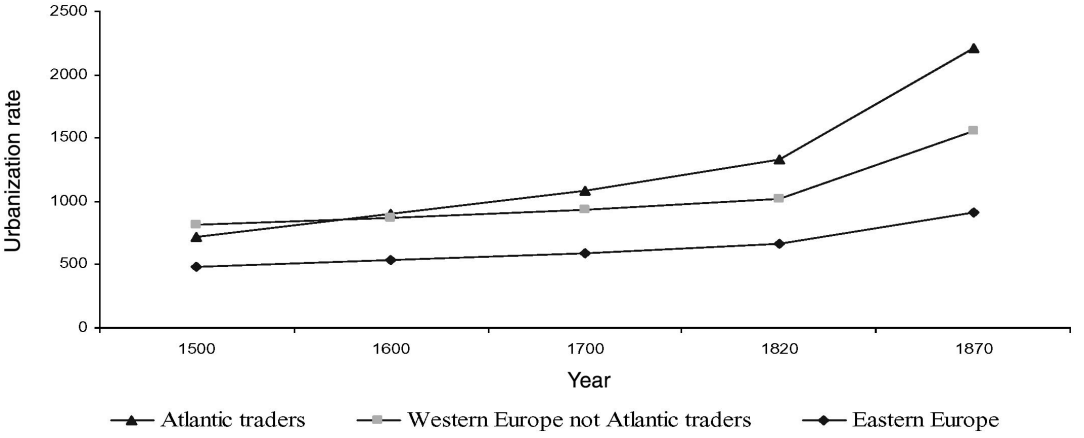

FIGURE 2B. ATLANTIC TRADERS, WEST EUROPEAN COUNTRIES NOT ATLANTIC TRADERS, AND EASTERN EUROPE: GDP PER CAPITA, WEIGHTED BY POPULATION, 1500–1870

differential trends are due in large part to the growth of Atlantic traders. The rest of Western Europe had a relatively high average urbanization rate of 10 percent in 1300 (and 11.4 percent in 1500), but grew at approximately the same rate as Eastern Europe from 1500 to 1850, by a factor of less than 2, to reach 17 percent by 1850. In contrast, Atlantic traders started with a lower average urbanization rate of 8 percent in 1300 (and only 10.1 percent in 1500), which almost tripled in the subsequent 550 years to reach 24.5 percent in 1850, overtaking average urbanization in the non-Atlantic parts of Western Europe between 1600 and 1700 (see Table 1). Panels A and B in Figure 2 show the same pattern, using Angus Maddison's (2001) estimates of GDP per capita. While GDP per capita rose by a factor of almost two among Atlantic traders between 1500 and 1820, in the rest of Western Europe it grew at approximately the same rate as in Eastern Europe, just under 30 percent.

The patterns depicted in Figures 1 and 2 do

Belgium, Britain, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, and Switzerland. Eastern Europe is all European countries to the east of the Elbe, including Russia and excluding Turkey. See Section I A for details on urbanization and GDP data. All averages are weighted by population, using numbers from Colin McEvedy and Richard Jones (1978).

TABLE 1—DESCRIPTIVE STATISTICS

	Whole sample, unweighted	Whole sample, weighted	Atlantic Western Europe	Non-Atlantic Western Europe	Eastern Europe	Asia
			Weighted by population			
Urbanization in 1300	6.6	9.9	8.0	10.0	4.1	11.0
	(5.2)	(3.2)	(2.8)	(6.1)	(3.3)	(0.7)
Urbanization in 1400	7.6	10.3	8.5	12.1	3.9	11.1
	(9.5)	(3.6)	(2.4)	(10.0)	(1.5)	(0.5)
Urbanization in 1500	8.3	10.6	10.1	11.4	4.0	11.5
	(7.6)	(3.4)	(5.3)	(6.8)	(1.8)	(0.7)
Urbanization in 1600	9.6	11.7	13.6	14.0	4.4	12.0
	(7.6)	(4.0)	(7.6)	(8.8)	(2.7)	(0.7)
Urbanization in 1700	10.7	11.2	14.5	13.1	3.7	11.6
	(8.5)	(4.1)	(6.8)	(8.1)	(2.2)	(0.7)
Urbanization in 1800	14.1	10.3	19.8	16.9	7.0	8.9
	(9.1)	(4.9)	(7.9)	(7.5)	(3.3)	(1.4)
GDP per capita in 1500	627.54	608.3	721.46	850.73	506.94	575.0
	(159.3)	(118.0)	(31.1)	(217.1)	(78.2)	(35.4)
GDP per capita in 1600	740.73	630.5	916.31	908.22	578.29	576.8
	(225.6)	(144.2)	(149.3)	(167.3)	(112.3)	(35.3)
GDP per capita in 1700	862.12	622.2	1079.21	980.82	636.0	574.2
	(348.4)	(208.1)	(321.4)	(128.2)	(136.1)	(35.3)
GDP per capita in 1820	988.00	691.7	1321.95	1095.40	719.5	575.5
	(373.6)	(264.5)	(348.7)	(125.3)	(174.9)	(45.7)
Constraint on executive in 1500	1.67	1.73	1.75	1.99	1.46	
	(0.76)	(0.79)	(0.56)	(0.99)	(0.79)	
Constraint on executive in 1600	1.67	1.53	1.62	1.54	1.45	
	(1.01)	(0.84)	(1.24)	(0.59)	(0.79)	
Constraint on executive in 1700	1.83	1.52	1.83	1.41	1.30	
	(1.31)	(1.17)	(1.76)	(0.94)	(0.76)	
Constraint on executive in 1800	2.25	2.18	4.00	1.90	1.00	
	(1.82)	(1.83)	(1.79)	(1.78)	(0.00)	
Atlantic coastline-to-area	0.0057	0.0014	0.0118	0.0026	0.00	0.00
	(0.0117)	(0.0065)	(0.0181)	(0.0052)		

Notes: First column is unweighted means; other columns are mean values weighted by total population in year indicated, from McEvedy and Jones (1978). Standard deviation is in parentheses. There are 24 European countries in these data. Atlantic Western Europe is England, France, the Netherlands, Portugal, and Spain. Non-Atlantic Western Europe is Austria, Belgium, Denmark, Finland, Germany, Ireland, Italy, Norway, Sweden, and Switzerland. Eastern Europe is Albania, Bulgaria, the Czech Republic, Greece, Hungary, Poland, Romania, Russia, and Serbia. Asia is India and China. Urbanization for Europe is percentage of population living in towns with population of at least 5,000 at some time between 800 and 1800, from Paul Bairoch et al. (1988) for Europe; comparable data for Asia are from Bairoch (1998). GDP per capita is from Maddison (2001). Constraint on executive is on a scale of 1 to 7, where a higher score indicates more constraints; this is coded using the Polity IV methodology, as explained in the text. We have not coded constraint on the executive for Asia. Atlantic coast-to-area includes those parts of Germany, Denmark, and Norway that are on the North Sea. For more detailed definitions and sources, see Appendix, Table 1.

not simply reflect the tendency of more successful nations to engage in Atlantic trade. There is no differential growth of Atlantic traders before the opening of Atlantic sea routes, and below we show similar results using an exogenous measure of *access to the Atlantic*—ratio of Atlantic coastline to land area—instead of the distinction between Atlantic traders and nontraders. Nor do the results reflect some post-1500 advantage of coastal nations: Atlantic ports grew much faster than other European cities, while Mediterranean ports grew at similar rates to inland cities.

This evidence weighs against the most popular theories for the rise of Europe, which emphasize the continuity between pre-1500 and post-1500 growth and the importance of certain distinctive European characteristics, such as culture, religion, geography, and features of the

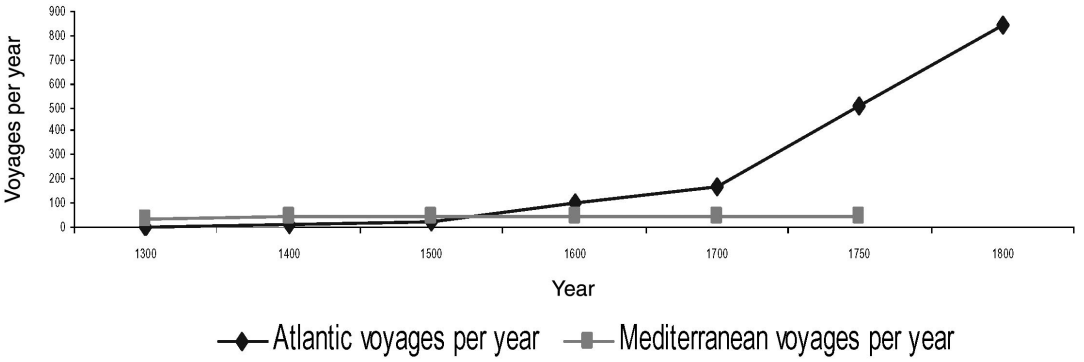

FIGURE 3. VOLUME OF ATLANTIC AND MEDITERRANEAN TRADE (VOYAGE EQUIVALENTS PER YEAR), 1300–1800

European state system.[3] Instead, it is consistent with theories that emphasize the importance of profits made in Atlantic trade, colonialism, and slavery.[4] Nevertheless, other evidence suggests that overseas trade and the associated profits were not large enough to be *directly* responsible for the process of growth in Europe. Stanley L. Engerman (1972) and Patrick K. O'Brien (1982) demonstrate that the contribution of profits from slavery and trade with the rest of the world to European capital accumulation was modest. O'Brien (1982, p. 2) writes that transoceanic trade "... could in no way be classified as decisive for economic growth of Western Europe." Although recent work by Joseph E. Inikori (2002) estimates larger trade flows than those of O'Brien, his estimates are not large enough to suggest that European growth was driven solely by the direct impact of Atlantic trade on profits or resources.

We advance the hypothesis that West European growth during this period resulted, in part, from the indirect effects of international trade on institutional development. Although there were some improvements in *economic institutions* in the late medieval and early modern period, rapid economic development did not begin until the emergence of *political institutions* providing secure property rights to a broader segment of society and allowing free entry into profitable businesses (Douglass C. North and Robert P. Thomas, 1973; North and Barry R. Weingast, 1989). The critical political institutions were those that constrained the power of the monarchy and allied groups.[5] Checks on royal power and prerogatives emerged only when groups that favored them, that is commercial interests outside the royal circle, became sufficiently powerful politically. From 1500, and especially from 1600, onward, in countries with nonabsolutist initial institutions and easy access to the Atlantic, the rise in Atlantic trade enriched and strengthened commercial interests outside the royal circle and enabled them to demand and obtain the institutional changes necessary for economic growth. Although profits from Atlantic trade were small relative to GDP, they were still substantial, and much larger than previous trading profits. For example, Figure 3 shows that by the end of the seventeenth century, the volume of Atlantic trade was much larger than that of long-distance Mediterranean trade (see the Appendix for the construction of these series). The recipients of these profits became very rich by the standards of seventeenth- and eighteenth-century Europe, and typically politically and socially very powerful.

These changes did not take place in countries with highly absolutist institutions such as Spain,

[3] See, e.g., Max Weber (1905), Eric Jones (1981), John A. Hall (1985), and David S. Landes (1998).

[4] E.g., Eric E. Williams (1944), Andre Gunder Frank (1978), and Immanuel M. Wallerstein (1974–1980).

[5] It is important to note that these new political institutions neither protected the rights of all citizens nor were democratic. They can best be characterized as oligarchic, since they increased the political power of wealthy merchants, and at least in the British case, of the gentry and nascent industrial interests. Nevertheless, they constituted a distinct improvement over the previous set of institutions, which placed many fewer checks on the power of the monarchy.

Portugal, and to a large extent France, where the crown was able to closely control the expansion of trade. Consequently, in these countries, it was the monarchy and groups allied with it that were the main beneficiaries of the early profits from Atlantic trade and plunder, and groups favoring changes in political institutions did not become powerful enough to induce them. Our hypothesis, therefore, predicts an important interaction between initial institutions and Atlantic trade, which is the pattern we find in the data.

The major premise presented in this paper is consistent with the emphasis of a number of historians, including, among others, Ralph Davis (1973a), Jan de Vries (1984), Paul Bairoch (1988), Fernand Braudel (1992), and de Vries and Ad van der Woude (1997). Although this historical literature emphasizes the differential growth of Atlantic ports and Atlantic nations, to the best of our knowledge, there are no other studies documenting the quantitative importance of Atlantic traders and Atlantic ports, or showing that the differential growth of Western Europe is accounted for largely by the growth of Atlantic traders.

On the theoretical side, our hypothesis builds on the notion that institutional change, even when socially beneficial, will be resisted by social groups that stand to lose economic rents or political power. Consequently, the process of institutional change involves significant conflict between different groups—in the European context, between the monarchy and its allies, versus commercial interests outside the royal circle.[6] Our historical account can also be viewed as a marriage between the Marxist thesis linking the rise of the bourgeoisie and the development of the world economy (e.g., among others, Williams, 1944; Frank, 1978; and Wallerstein, 1974–1980) and the neoclassical emphasis on the development of political institutions and secure property rights in Western Europe (e.g., North and Thomas, 1973; Eric L. Jones, 1981; North, 1981; J. Bradford De Long and Andrei Shleifer, 1993). Distinct from these approaches, however, we offer an explanation, based on the interaction between Atlantic trade and medieval political institutions, of why strong private property rights emerged in Western Europe, especially in Britain and the Netherlands, starting in the sixteenth century. Although some scholars have noted the important role of overseas merchants in particular instances of political change during this period (most notably Robert Brenner, 2003, and Steven Pincus, 2002, in the British case), we are not aware of a theory along the lines developed in this paper.

The paper is organized as follows. Section I documents the key premise of the paper, and shows that the pattern seen in Figures 1 and 2 is robust. Section II develops our hypothesis for the rise of Europe and the role played by Atlantic trade in this process, and provides historical evidence supporting our interpretation. Sections III and IV provide evidence on some implications of our hypothesis (Section III shows that the evolution of European institutions is closely linked to Atlantic trade, and Section IV documents an important interaction between initial institutions and Atlantic trade in European economic growth). Section V concludes. The Appendix summarizes the construction of the variables used in the empirical analysis, and further detail can be found in Acemoglu et al. (2002b).

I. Atlantic Trade and the Rise of Europe

A. *Data*

We use three data series to measure economic development. First, we construct estimates of urbanization based on the urban population numbers of Bairoch et al. (1988). This is a comprehensive dataset with information on all 2,200 European cities that had, at some time between 800 and 1800, 5,000 or more inhabitants.[7] We use these data as our measure of urban population and divide by the population

[6] See, for example, North (1981), Mancur Olson (1982), Per Krusell and Jose-Victor Rios-Rull (1996), Stephen Parente and Edward C. Prescott (1999), Acemoglu and Robinson (2000, 2002), and Raghuram G. Rajan and Luigi Zingales (2003). Ronald Rogowski (1989) is particularly notable in this context, since he also emphasizes how trade affects political coalitions via its impact on factor prices, although he does not focus on how trade might induce institutional change by strengthening commercial interests.

[7] These data begin in 800, and there are estimates for every 100 years until 1700, then for every 50 years through 1850. Bairoch et al. (1988) emphasize, however, that estimates before 1300 are rough and less reliable (and they skip the year 1100 due to lack of information). These data were used previously by De Long and Shleifer (1993).

estimates of McEvedy and Jones (1978) to calculate urbanization (percentage of the population living in cities with more than 5,000 inhabitants). We also use estimates of urbanization rates for Asia from the quantitative and qualitative assessments of Bairoch (1988). Bairoch (1988, ch. 1) and de Vries (1976, p. 164) argue that only areas with high agricultural productivity and a developed transportation network could support large urban populations. In addition, in Acemoglu et al. (2002a) we presented evidence that both in the time series and the cross section there is a close association between urbanization and income per capita before, as well as after, industrialization. We therefore take urbanization as a proxy for GDP per capita.

Second, we use estimates of GDP per capita from Maddison (2001). These estimates start in 1500 and are available for 1600, 1700, 1820, and then more frequently. Note that these estimates are no more than educated guesses, especially before 1820. We therefore think of these GDP data as a check on our results using urbanization data.

Third, we use the European city–level data from Bairoch et al. (1988) to investigate which urban centers were driving demographic and economic growth, and also to contrast the growth of Atlantic ports to other ports and to inland cities.

Table 1 gives the estimates of urbanization and income per capita at various dates. The first column is for the whole sample and is unweighted. The second column is weighted by population in the corresponding year, giving a better sense of the aggregate changes. The remaining columns give weighted means for Atlantic traders (Britain, France, the Netherlands, Portugal, and Spain), for West European countries that were not Atlantic traders (Austria, Belgium, Denmark, Finland, Germany, Ireland, Italy, Norway, Sweden, and Switzerland), for East European countries, and for the Asian countries in our sample.[8] These numbers confirm the patterns shown in Figures 1 and 2. In the regression analysis, we will report both weighted and unweighted results. The bottom third of the table also shows the evolution of our measure of institutions, constraint on the executive, which we will be described in greater detail and used in Section III.

B. *Economic Growth in Europe*

Figures 1A and 1B show the evolution of urbanization rates in Western and Eastern Europe, and contrast the behavior of Atlantic traders versus non-Atlantic traders. We first look at Atlantic traders, since the main beneficiaries from the Atlantic should be those countries that engaged in Atlantic trade and colonialism. However, whether or not a country is an Atlantic trader is clearly endogenous, i.e., it is the outcome of some political or economic process. For this reason, we also present results using a measure of access to the Atlantic, which is a country-level geographic characteristic.

We can test the idea that West European growth after 1500 was due primarily to growth in countries involved in Atlantic trade or with a high potential for Atlantic trade by estimating the following regression equation:

$$(1)\quad u_{jt} = d_t + \delta_j + \sum_{t \geq 1600} \alpha_t \cdot WE_j \cdot d_t + \sum_{t \geq 1500} \beta_t \cdot PAT_j \cdot d_t + X'_{jt} \cdot \gamma + \varepsilon_{jt}$$

where u_{jt} is urbanization in country j at time t, WE_j is a dummy indicating whether the country is in Western Europe, the d_t's denote year effects, the δ_j's denote country effects, X_{jt} is a vector of other covariates, and ε_{jt} is a disturbance term. In addition, PAT_j, our measure of the potential for Atlantic trade, is a dummy for Atlantic trader (Britain, France, the Netherlands, Portugal, and Spain) or alternatively the Atlantic coastline-to-area ratio (in both cases, a time-invariant characteristic of the country). The β_t's, the coefficients on the potential for

[8] We take current countries as the unit of observation. Although these do not always correspond to the independent polities of the time, this discrepancy should not bias our empirical inference. For example, if we had data on each Italian city-state, their average would show the same pattern as our single Italy observation (presuming that our data for the aggregate of Italy are accurate), but because of the larger number of observations, the standard errors would be smaller. The analysis of city-level growth in Section I B is informative on differential growth across historical political boundaries.

TABLE 2—ATLANTIC TRADE AND URBANIZATION
Dependent variable is country-level urbanization

	Panel, 1300–1850 (1)	Panel, 1000–1850 (2)	Panel, 1300–1850 (3)	Panel, 1000–1850 (4)	Panel, 1300–1850, unweighted (5)	Panel, 1300–1850, with Asia (6)	Panel, 1300–1850, without Britain (7)	Panel, 1300–1850 (8)	Panel, 1000–1850 (9)	Panel, 1300–1850, unweighted (10)
			Potential for Atlantic trade is measured by:							
			Atlantic trader dummy					Atlantic coastline-to-area		
			Panel A: Flexible specification							
p-value for Western Europe × year dummies, 1600–1850	[0.00]	[0.00]	[0.45]	[0.09]	[0.80]	[0.00]	[0.12]	[0.09]	[0.01]	[0.78]
Potential for Atlantic trade × 1500			0.016	0.0086	0.055	0.014	0.018	0.50	0.38	0.75
			(0.021)	(0.019)	(0.026)	(0.022)	(0.016)	(0.68)	(0.65)	(0.87)
Potential for Atlantic trade × 1600			0.006	−0.004	0.0495	0.0054	0.0085	0.21	0.03	0.94
			(0.023)	(0.021)	(0.028)	(0.028)	(0.018)	(0.68)	(0.64)	(0.94)
Potential for Atlantic trade × 1700			0.032	0.022	0.071	0.032	0.024	1.81	1.64	2.01
			(0.021)	(0.019)	(0.028)	(0.026)	(0.016)	(0.63)	(0.58)	(0.94)
Potential for Atlantic trade × 1750			0.032	0.022	0.073	0.032	0.023	2.16	1.99	2.60
			(0.021)	(0.018)	(0.028)	(0.025)	(0.015)	(0.62)	(0.57)	(0.94)
Potential for Atlantic trade × 1800			0.048	0.038	0.110	0.047	0.028	3.30	3.12	3.76
			(0.019)	(0.017)	(0.028)	(0.023)	(0.015)	(0.57)	(0.51)	(0.94)
Potential for Atlantic trade × 1850			0.085	0.076	0.115	0.084	0.043	5.05	4.88	4.67
			(0.018)	(0.016)	(0.028)	(0.022)	(0.014)	(0.51)	(0.44)	(0.94)
R-squared	0.87	0.85	0.89	0.87	0.82	0.84	0.93	0.94	0.92	0.83
Number of observations	192	240	192	240	192	208	184	192	240	192
			Panel B: Structured specification							
p-value for Western Europe × year dummies, 1600–1850	[0.00]	[0.00]	[0.35]	[0.06]	[0.83]	[0.00]	[0.11]	[0.16]	[0.02]	[0.81]
Potential for Atlantic trade × volume of Atlantic trade			0.011	0.0083	0.016	0.011	0.005	0.75	0.65	0.62
			(0.0024)	(0.0020)	(0.0034)	(0.0029)	(0.0018)	(0.07)	(0.06)	(0.11)
R-squared	0.87	0.85	0.88	0.86	0.81	0.84	0.92	0.92	0.90	0.82
Number of observations	192	240	192	240	192	208	184	192	240	192

Notes: Standard errors are in parentheses. Panel regressions with full set of country and year dummies; regressions are weighted unless otherwise stated. Weighted regressions use total population in each year as weights, from McEvedy and Jones (1978). Dependent variable is level of urbanization (percentage of population living in towns that had at least 5,000 population at some point between 800 and 1800) in each country in each year. Urbanization in Europe is from Bairoch et al. (1988), and urbanization in Asia is from Bairoch (1998). We report results with two different measures of potential for Atlantic trade: a dummy for whether a country was an Atlantic trader (one for Britain, the Netherlands, France, Spain, and Portugal; zero for all others) in columns 3, 4, 5, 6, and 7; and the ratio of Atlantic coastline to area for the Atlantic trader countries plus Belgium, Denmark, Germany, Ireland, and Norway (columns 8, 9, and 10). Column 6 includes the available data on Asia (just for India and China) and column 7 drops the data for Britain. Volume of Atlantic Trade is the log average number of voyages per year. For more detailed data definitions and sources see Appendix, Table 1.

Atlantic trade and the post-1500 time dummies, are the main parameters of interest. Since our focus is on the rise of Western Europe as a whole, our basic regressions are weighted by population in each year, but we also report unweighted regressions for completeness.

Columns 1 and 2 of Table 2 include only the interaction terms between the Western Europe dummy and dates from 1600, $\sum_{t \geq 1600} \alpha_t \cdot WE_j \cdot d_t$, which capture the differential growth of West European countries relative to Eastern Europe. The top row reports the *p*-value from the *F*-test of the joint significance of these interactions. Column 1 includes data only for 1300–1850, while column 2 extends the sample back to 1000. Consistent with Figure 1A, both specifications show significantly faster growth in Western Europe than in Eastern Europe. For example, the point estimates (not shown in the table to save space) indicate that in the specification of column 1, West European urbanization grew by 6.9 percentage points relative to East European urbanization between 1500 and 1850.

Column 3 allows differential growth for countries engaged in Atlantic trade, by including the term $\sum_{t \geq 1500} \beta_t \cdot PAT_j \cdot d_t$. We include 1500 as a "specification check" on the timing of the effects. We start with PAT_j as a dummy for Atlantic trader. Significant positive estimates of β_t's imply that Atlantic traders grew starting in the period between 1500 and 1600. The estimates confirm the pattern seen in Figure 1B and show large effects from the interaction between

the Atlantic trader dummy and dates after 1600. These effects become statistically significant after 1750; in columns 8–10, the effects are statistically significant starting in 1700. For example, the estimate for 1850, $\beta_{1850} = 0.085$, implies that urbanization among Atlantic traders grew by approximately 8.5 percentage points more than in other Western and Eastern European nations. Notice also that the estimate of β_{1500} in this column, which measures the differential growth of Atlantic traders between 1300–1400 and 1500, is insignificant and small. This is reassuring; since Atlantic trade was very limited before 1500, this finding shows that there is no differential growth for Atlantic traders *before* Atlantic trade actually became important.[9]

Consistent with the patterns shown in Figure 1B, the inclusion of the Atlantic trade interactions explains almost the entire differential growth of West European nations relative to Eastern Europe. The $\sum_{t \geq 1600} \alpha_t \cdot WE_j \cdot d_t$ terms are no longer statistically significant, and the point estimates (not shown in the table) imply that West European urbanization grew only by 2.9 percentage points relative to Eastern Europe between 1300–1500 and 1850, as opposed to 6.9 percentage points in column 1.

Columns 4 and 5 show that the results are similar for the 1000–1850 period and when observations are not weighted by population.[10] Column 6 includes Asian countries. This has little effect on the estimates of the differential growth of Atlantic traders, but now West European countries are growing faster relative to the control group, which includes Asian countries (see Figure 1A). Finally, column 7 excludes Britain from the sample and shows that the results do not simply reflect British growth. The estimates in column 7 are about half the size of those in the other columns, but they show the same pattern.

An important concern with the results reported so far is endogeneity. Being an Atlantic trader is an ex post outcome, and perhaps only countries with high growth potential—or those that were going to grow anyway—engaged in substantial Atlantic trade and colonial activity. Belgium, Ireland, Denmark, Germany, and Norway also had access to the Atlantic, either directly or via the North Sea, but they did not take a major part in long-distance oceanic trade. In columns 8, 9, and 10, we use a geographic measure of potential access to the Atlantic, Atlantic coastline-to-area ratio, as our time-invariant PAT_j variable, which gives positive Atlantic trade potential to all these countries.[11] This measure allows Atlantic trade to play a more important role in the growth of countries with more Atlantic coastline relative to their land area.[12]

[9] Although the analysis above does not count Denmark and Sweden as Atlantic traders, Sweden had a small colony on the Delaware river 1637–1681 and Denmark controlled several small Caribbean islands (now the U.S. Virgin Islands). To check the robustness of our results, we also experimented with a more inclusive definition of Atlantic trader that includes Denmark and Sweden, with results very similar to those reported in column 3. The *p*-value for Western Europe × year interactions increases to [0.51], while the pattern of coefficients on potential for Atlantic trade × year dummies is largely unchanged; the interactions before 1700 are insignificant, then 0.035 (s.e. = 0.022) in 1700, 0.035 (s.e. = 0.021) in 1750, 0.046 (s.e. = 0.02) in 1800, and 0.08 (s.e. = 0.02) in 1850.

[10] In column 4, the interaction between the West European dummy and the post-1500 dates is significant at the 10-percent level, which reflects the lower level of East European urbanization in the base period, which is now 1000–1400.

[11] Information on the length of coastline and the land area of particular countries is taken from Integrated Coastline Management (http://icm.noaa.gov/country/ICM-pro.html), which reports a standardized measure. We use only Atlantic coastline, i.e., omitting coastlines in the Mediterranean, the Baltic, and the Arctic. Details are provided in the Appendix of Acemoglu et al. (2002b). It is important to exclude the Baltic coastlines of Denmark and Germany from our measure, since significant Baltic trade predated the rise of Atlantic trade, and economic growth driven by Baltic trade could be an alternative explanation for the patterns we observe. In any case, our results are generally robust to including the Baltic or the Arctic coastlines. For example, we obtain very similar results to those reported in Tables 2 and 3 when we include the west coastline of Sweden, or when we include the entire Norwegian coastline on the Arctic and the entire German coastline on the Baltic. Our results are also generally similar when we include all the coastline of Sweden, Germany, Norway, and the entire Baltic coastline of Denmark, but the size of the coastline-to-area times year interactions are smaller than in our baseline, and Western Europe times year interactions become significant.

[12] Alternatively, we could use the Atlantic coastline-to-area measure as an instrument for the Atlantic trader dummy. The results we report can be thought of as the reduced form for this IV strategy (a univariate regression of the Atlantic trader dummy on the coastline-to-area measure

The results using the coastline-to-area measure for PAT_j are similar to those using the Atlantic trader dummy. Most notably, the differential growth related to the Atlantic, now captured by interactions with the Atlantic coastline-to-area ratio, is still strong; the point estimates for the β's are significant starting in 1700 and quantitatively large. For example, the coefficient $\beta_{1850} = 5.05$ indicates approximately 6.5 percentage points more urbanization growth in the Netherlands than in Italy between 1300–1400 and 1850 (the Atlantic coastline-to-area ratio for the Netherlands is 0.013 and for Italy it is 0). This explains over half of the differential 12-percentage-point actual urbanization growth between Italy and the Netherlands between these two dates. Other specifications using the Atlantic coastline-to-area measure in columns 9 and 10 give similar results.

Equation (1) allows for an arbitrary pattern of differential growth in Atlantic traders. Instead, we might expect the differential growth of Atlantic traders to be related to the volume of Atlantic trade. For this reason, in panel B we report results from estimating a structured model of the form

$$(2) \quad u_{jt} = d_t + \delta_j + \sum_{t \geq 1600} \alpha_t \cdot WE_j \cdot d_t + \beta \cdot PAT_j \cdot \ln AT_t + X'_{jt} \cdot \gamma + \varepsilon_{jt}$$

where AT_t denotes our estimate of the aggregate volume of Atlantic trade, shown in Figure 3. The construction of this variable is explained briefly in the Appendix, and further details and robustness results can be found in Acemoglu et al. (2002b).

Note that the model in equation (2) is more restrictive than that in (1), since we are forcing the pattern of β_t's in (1) to be the same as that of $\ln AT_t$. In all columns, the estimate of β, the coefficient on the interaction term between the log volume of Atlantic trade and potential for Atlantic trade at the country level, is highly significant, while the interaction terms between Western Europe and dates from 1600 onward are again insignificant. Notably, the R^2 of this more restrictive regression is close to the R^2 of the flexible specifications reported in panel A. These results suggest that the significant interaction between potential for Atlantic trade and dates after 1600 is due to the importance of Atlantic trade, not some other parallel process.

Table 3, which has the same structure as Table 2, provides regression evidence using log GDP per capita as the dependent variable. Maddison (2001) reports estimates of GDP per capita for 1500, 1600, 1700, 1820, and 1870. We take 1500 as the base year, and add interactions between our measure of potential for Atlantic trade, PAT_j, and the dates from 1600 on to capture the importance of Atlantic trade for the country (so we can no longer test for preexisting trends using the interaction between PAT_j and 1500). Output numbers for 1870 are already heavily influenced by differential industrialization experiences of various countries, so our baseline specification stops in 1820. For completeness, we also report regressions that extend the sample to 1870.

Parallel to our results in Table 2, West European countries grow faster after 1500, although this pattern is somewhat less pronounced, especially when we limit the sample to 1500–1820. The interactions between the Atlantic trader dummy and the dates after 1600 are typically significant starting either in 1600 or 1700, and quantitatively large. For example, the estimate of $\beta_{1820} = 0.27$ in column 3 indicates that Atlantic traders grew, on average, 31 percent ($\approx$0.27 log points) more than non-Atlantic trader West European nations between 1500 and 1820. Columns 4 to 7 report similar results to those in Table 2. The pattern is the same when the sample is extended to 1870, with unweighted regressions, when Britain is excluded from the sample, and when Asian countries are included. Columns 8 to 10 report similar results using the Atlantic coastline-to-area measure.

Panel B of Table 3 reports structured models similar to (2) where we include the interaction term, $PAT_j \cdot \ln AT_t$ instead of the full set of post-1500 interactions between PAT_j and time

in our sample has an R^2 of 0.30). Nevertheless, we prefer the specification in the text, since it is plausible that, even conditional on being an Atlantic trader, a country with greater Atlantic coastline will trade and grow more than another with less coastline, making such an IV procedure invalid. In fact, a comparison of columns 3–7 with columns 8–10 shows that the fit of the models with the Atlantic coastline-to-area ratio is marginally better than those with the Atlantic trader dummy, because the former measure gives greater potential for trade to Britain and the Netherlands, which have relatively high coastline-to-area ratios.

TABLE 3—ATLANTIC TRADE AND GDP PER CAPITA
Dependent variable is country-level log GDP per capita

	Panel, 1500–1820 (1)	Panel, 1500–1870 (2)	Panel, 1500–1820 (3)	Panel, 1500–1870 (4)	Panel, 1500–1820, unweighted (5)	Panel, 1500–1820, with Asia (6)	Panel, 1500–1820, without Britain (7)	Panel, 1500–1820 (8)	Panel, 1500–1870 (9)	Panel, 1500–1820, unweighted (10)
			Potential for Atlantic trade is measured by:							
			Atlantic trader dummy					Atlantic coastline-to-area		
			Panel A: Flexible specification							
p-value for Western Europe × year dummies, 1600–1820 or –1870	[0.44]	[0.05]	[0.92]	[0.23]	[0.17]	[0.01]	[0.89]	[0.97]	[0.58]	[0.31]
Potential for Atlantic trade × 1600			0.14	0.15	0.16	0.14	0.13	4.43	4.46	3.42
			(0.07)	(0.11)	(0.07)	(0.13)	(0.07)	(2.42)	(3.61)	(2.21)
Potential for Atlantic trade × 1700			0.18	0.19	0.21	0.18	0.14	8.84	8.80	6.32
			(0.07)	(0.10)	(0.07)	(0.12)	(0.06)	(2.27)	(3.40)	(2.21)
Potential for Atlantic trade × 1820			0.27	0.27	0.18	0.27	0.20	12.03	11.89	8.06
			(0.06)	(0.10)	(0.07)	(0.11)	(0.06)	(2.10)	(3.14)	(2.21)
Potential for Atlantic trade × 1870				0.22					15.84	
				(0.09)					(2.93)	
R-squared	0.94	0.94	0.96	0.95	0.96	0.92	0.96	0.96	0.96	0.96
Number of observations	96	120	96	120	96	104	92	96	120	96
			Panel B: Structured specification							
p-value for Western Europe × year dummies, 1600–1820 or –1870	[0.44]	[0.05]	[0.92]	[0.48]	[0.14]	[0.01]	[0.88]	[0.99]	[0.54]	[0.23]
Potential for Atlantic trade × volume of Atlantic trade			0.069	0.040	0.047	0.069	0.051	3.21	3.18	2.22
			(0.016)	(0.017)	(0.018)	(0.028)	(0.015)	(0.53)	(0.50)	(0.58)
R-squared	0.94	0.94	0.96	0.95	0.96	0.92	0.96	0.96	0.96	0.96
Number of observations	96	120	96	120	96	104	92	96	120	96

Notes: Standard errors are in parentheses. Panel regressions with full set of country and year dummies; regressions are weighted unless otherwise stated. Weighted regressions use total population in each year as weights, from McEvedy and Jones (1978). Dependent variable is log GDP per capita, from Maddison (2001). We report results with two different measures of potential for Atlantic trade: a dummy for whether a country was an Atlantic trader (one for Britain, the Netherlands, France, Spain, and Portugal; zero for all others) in columns 3, 4, 5, 6, and 7; and the ratio of Atlantic coastline to area for the Atlantic trader countries plus Belgium, Denmark, Germany, Ireland, and Norway (columns 8, 9, and 10). Column 6 includes the available data on Asia (just for India and China) and column 7 drops the data for Britain. Volume of Atlantic trade is the log average number of voyages per year. For more detailed data definitions and sources, see Appendix, Table 1.

dummies. This more structured specification again shows that the differential growth of Western Europe from 1600 is closely linked to the extension of Atlantic trader.

Overall both Table 2 and Table 3 show an important role for Atlantic trade in West European growth. When the effect of Atlantic trade is not taken into account, the estimates of α_t's are significant, positive, and large: Western Europe is growing faster than Eastern Europe and Asia. Once Atlantic trade interactions are included, α_t's are typically no longer significant, while the effect of Atlantic trade is very strong. Furthermore, the estimates show no evidence of differential growth by Atlantic traders before the age of Atlantic trade.

C. *Other Determinants of Economic Performance*

To check the robustness of our results, Table 4 adds a number of covariates to our basic regressions. The overall patterns are not affected. To save space, Table 4 reports only the structured specifications of equation (2).

Weber (1905) and Landes (1998) argue that religion is an important determinant of economic and social development. To assess the importance of religion, we allow Protestant countries to grow at rates different from non-Protestant countries by interacting a dummy for being a majority Protestant country in 1600 with year dummies starting in 1600.[13] The *p*-values from the joint significance test reported in columns 1 of panels A and C show that when the dependent variable is the urbanization rate, these interactions are either insignificant or only marginally significant. In contrast, when the dependent variable is log GDP per capita and

[13] See the Appendix for the construction of the variables used in this subsection.

TABLE 4—ROBUSTNESS CHECKS

	Panel, 1300–1850, controlling for religion (1)	Panel, 1300 to 1850, controlling for wars (2)	Panel, 1300 to 1850, controlling for Roman heritage (3)	Panel, 1300 to 1850, controlling for latitude (4)	Panel, 1500–1820, controlling for religion (5)	Panel, 1500 to 1820, controlling for wars (6)	Panel, 1500 to 1820, controlling for Roman heritage (7)	Panel, 1500 to 1820, controlling for latitude (8)
	Using Atlantic trader dummy measure of potential for Atlantic trade							
	Panel A: Dependent variable is level of urbanization				Panel B: Dependent variable is log GDP per capita			
p-value for Western Europe × year dummies, 1600–1850	[0.67]	[0.42]	[0.49]	[0.09]	[0.24]	[0.91]	[0.15]	[0.85]
Atlantic trader dummy × volume of Atlantic trade	0.013 (0.002)	0.011 (0.003)	0.011 (0.003)	0.011 (0.002)	0.089 (0.013)	0.070 (0.017)	0.125 (0.017)	0.078 (0.015)
p-value for Protestant × year	[0.07]				[0.00]			
Wars per year in preceding century		−0.0006 (0.008)				0.075 (0.029)		
p-value for Roman heritage × year			[0.89]				[0.00]	
p-value for latitude × year				[0.11]				[0.00]
R-squared	0.89	0.89	0.89	0.89	0.97	0.95	0.97	0.97
Number of observations	192	176	192	192	96	88	96	96
	Using Atlantic coastline-to-area measure of potential for Atlantic trade							
	Panel C: Dependent variable is level of urbanization				Panel D: Dependent variable is log GDP per capita			
p-value for Western Europe × year dummies, 1600–1850	[0.19]	[0.23]	[0.39]	[0.09]	[0.99]	[0.98]	[0.71]	[0.81]
Coastline-to-area × volume of Atlantic trade	0.79 (0.08)	0.76 (0.08)	0.75 (0.07)	0.78 (0.07)	2.78 (0.54)	3.33 (0.56)	3.32 (0.54)	2.96 (0.56)
p-value for Protestant × year	[0.51]				[0.05]			
Wars per year in preceding century		0.0082 (0.007)				0.033 (0.026)		
p-value for Roman heritage × year			[0.77]				[0.32]	
p-value for latitude × year				[0.52]				[0.38]
R-squared	0.93	0.93	0.92	0.93	0.97	0.96	0.97	0.97
Number of observations	192	176	192	192	96	88	96	96

Notes: Standard errors are in parentheses. Weighted panel regressions with full set of country and year dummies. Weights are total population of country in each year from McEvedy and Jones (1978). Dependent variable in panels A and C is level of urbanization (percent of population living in towns with more than 5,000 population). Urbanization in Europe is from Bairoch et al. (1988). Dependent variable in panels B and D is log GDP per capita, from Maddison (2001). Panels A and B use the Atlantic trader dummy as the measure of potential for Atlantic trade (one for Britain, France, Spain, Portugal, and the Netherlands; zero for all others). Panels C and D use the ratio of Atlantic coastline to area. Volume of Atlantic Trade is the log average number of voyages per year. Protestant is a dummy for whether country was majority Protestant in 1600. Protestant × year is the Protestant dummy interacted with year dummies for 1600 and after. Wars per year are in preceding century through 1700, 1700–1750 for 1750, 1750–1800 for 1800, and 1800–1850 for 1850. Roman heritage is dummy for whether country was in the Roman Empire; this is interacted with year dummies for 1600 and after. Latitude is distance from the equator for capital city of this country today; this is interacted with year dummies for 1600 and after. For more detailed data definitions and sources, see Appendix, Table 1.

we use the Atlantic trader dummy for our potential Atlantic trade measure (panel B), there is a significant effect from these religion times year interactions. Nevertheless, this has little impact on the pattern of differential growth between Western and Eastern Europe, or between Atlantic and non-Atlantic traders. Moreover, the quantitative effects of Protestantism on economic growth are smaller than those of Atlantic trade.[14]

Many social scientists view war-making as an important factor in the process of state building and subsequent economic development (e.g., Otto Hintze, 1975; Paul Kennedy, 1987; Charles Tilly, 1990). Incidence of wars might also proxy for the importance of interstate competition, which many historians, including Jones (1981) and Hall (1985), have emphasized. To assess the importance of wars, in columns 2 and 6 we include a variable which is the average number of years at war during the previous period (a century or

[14] The point estimates (not reported) imply that Protestant countries experienced 4.5 percentage points greater urbanization growth between 1500 and 1850, and 30 percent more GDP growth between 1500 and 1820. The corresponding numbers for Atlantic traders in the flexible specifications, including the Protestant dummy interacted with dates from 1600, are 8.4 percentage points more urbanization and 41 percent more GDP growth.

half-century). We find that this variable itself is insignificant in the urbanization regressions and has no effect on the patterns documented so far.[15]

A popular view sees the roots of European growth in the Roman Empire (e.g., Perry Anderson, 1974; Jones, 1981; Landes, 1998), and perhaps in the culture of Ancient Greece. To investigate whether Roman heritage is important for the rise of Europe, we created a dummy that indicates whether a country was part of the Roman Empire. We then interacted this variable with dates from 1600 onward to see whether there is differential growth depending on the extent of Roman heritage (columns 3 and 7). These interactions are typically insignificant and do not affect the patterns reported in the previous tables. The only exception is when we use log GDP per capita as the dependent variable and the Atlantic trader dummy for PAT_j. But in this case, the results indicate that countries with Roman heritage grew more rapidly between 1400 and 1600, and significantly more slowly thereafter.

Finally, in columns 4 and 8 we add interactions between distance from the equator (the absolute value of the latitude of the nation's capital) and dates from 1600 to see whether the move of economic activity away from Southern toward Northern Europe can explain the rise of Atlantic nations. Once again the addition of these variables does not affect the importance of Atlantic trade, and the latitude interactions are typically insignificant (except in panel B, where the point estimates have the wrong sign).

D. *Urban Expansion and Atlantic Ports*

We next turn to an analysis of data on the population of individual cities compiled by Bairoch et al. (1988). Figure 4A shows that the urban expansion of Western Europe was driven by cities that were Atlantic ports. Table 5 confirms this pattern with regression analysis. It estimates models similar to (1), with the log of city-level urban population as the dependent variable. The key right-hand side variable is the interaction between a dummy indicating whether the city is an Atlantic port (or in our alternative specification, whether it is a potential Atlantic port), denoted by AP_i, and dummies from 1500.[16] The sample for all regressions in Table 5 is the balanced panel of cities for which we have observations in each date.[17]

In column 1, AP_i is a dummy for Atlantic port, and observations are weighted by current population in each year. The interactions between the Atlantic port dummy and dates after 1600, the $AP_i \cdot d_t$ terms, are statistically and economically significant and positive. For example, the coefficient of 0.79 implies that Atlantic ports grew approximately 120 percent ($\approx$0.79 log points) relative to other cities between 1300–1400 and 1800. Notably, there appears to be no differential growth of Atlantic ports before 1600, once again supporting the notion that the growth of these ports is related to the emergence of trading and colonial opportunities via the Atlantic. In the bottom panel, we report results from a structured specification similar to equation (2). Once again, the coefficient on the interaction term between the volume of Atlantic trade and the

[15] As an alternative exercise more favorable to the war hypothesis, we also controlled for the average number of years at war that ended in victory during the previous 50 or 100 years. To the extent that rich nations are more likely to succeed in war, the coefficient on this variable will be biased upward. The inclusion of this variable has remarkably little effect on our estimates of the interaction between access to the Atlantic (or Atlantic trader) and the post-1500 years (or the volume of Atlantic trade), and this war variable itself is insignificant when the dependent variable is the urbanization rate and marginally significant with log GDP per capita.

[16] See the Appendix of Acemoglu et al. (2002b) for the list of Atlantic ports in our panel. In Figures 4 and 5, we use the definition of actual Atlantic port. In the regression analysis, we also report results with a dummy for potential Atlantic port. The distinction between Atlantic port and potential Atlantic port parallels our use of Atlantic trader dummy and the coastline-to-area measure of potential for Atlantic trade in Tables 2, 3, and 4.

[17] The focus on a balanced panel of cities avoids problems of composition bias, which would result from the fact that cities enter the dataset only once they exceed a certain threshold (typically 5,000 people). For example, if an area is growing rapidly, the population of the smaller cities in this area will also grow and exceed the relevant threshold, but the addition of cities with population around 5,000 may reduce the average population of the cities in this area. Nevertheless, in practice this bias does not seem to be important, and in Acemoglu et al. (2002b) we report similar results using a larger, unbalanced panel of cities.

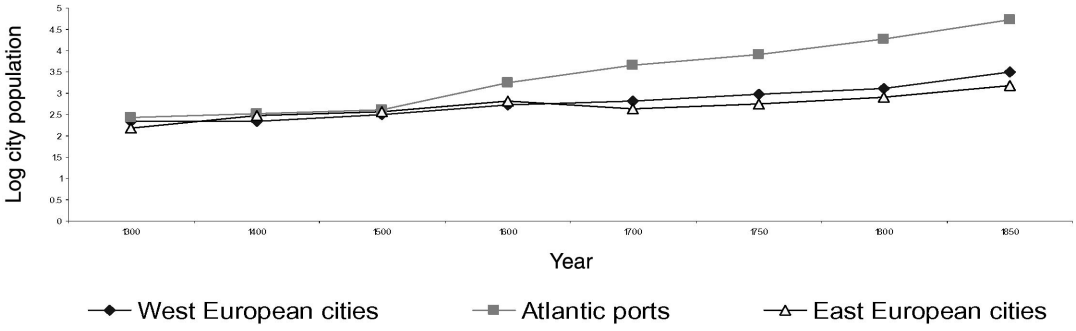

FIGURE 4A. AVERAGE OF LOG CITY POPULATION IN ATLANTIC PORTS, WEST EUROPEAN CITIES THAT ARE NOT ATLANTIC PORTS, AND EASTERN EUROPE (BALANCED PANEL), 1300–1850

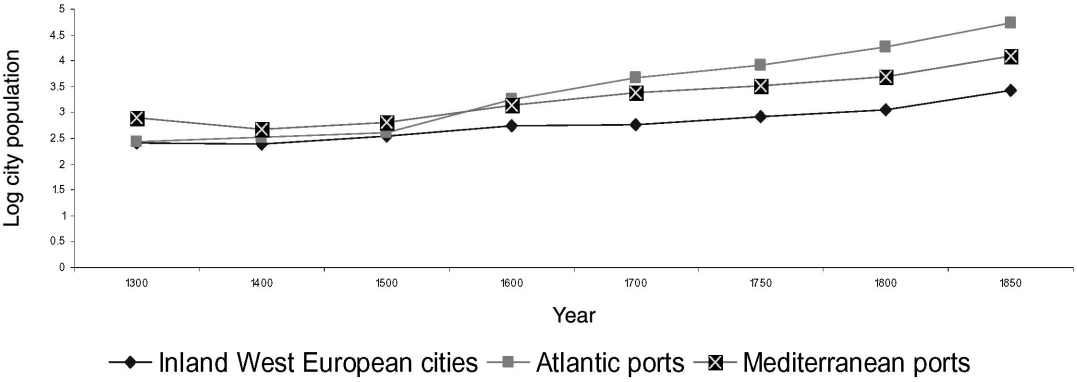

FIGURE 4B. AVERAGE OF LOG CITY POPULATION IN ATLANTIC PORTS, MEDITERRANEAN PORTS, AND WEST EUROPEAN CITIES THAT ARE NOT PORTS (BALANCED PANEL), 1300–1850

Atlantic port dummy is highly significant, and the R^2 of this more restrictive regression is almost the same as the regression reported in the top panel.

Column 2 reports estimates from an unweighted regression. The results are similar, but quantitatively smaller, since large Atlantic ports, such as London and Amsterdam, no longer get more weight. Columns 3 and 4 report weighted and unweighted estimates from similar models, with a dummy for potential Atlantic port, that is, any city that in our balanced panel could have been used as a port for Atlantic trade. The results are similar to those in columns 1 and 2.[18] Column 5 drops London and Amsterdam to show that the results are not driven by these two major cities. The coefficients on Atlantic port times year interactions are approximately halved from 1700 onward, but they remain significant. Column 6 adds a full set of country times year interactions to show the differential growth of Atlantic ports relative to other cities in the same country. The coefficients on Atlantic port times year interactions after 1700 are about half those of column 1, but still highly statistically significant.

[18] To allow for the specification test discussed in the text, these regressions use 1300–1400 as the base period. Because there was rapid growth in a few potential—but not actual—Atlantic ports from 1400 to 1500, some of the coefficients on potential Atlantic port are higher than the corresponding coefficients on Atlantic port. However, cumulative growth between 1500 and any subsequent date is always higher for Atlantic ports than for potential Atlantic ports. It should also be noted that some potential Atlantic ports flourished as a result of secondary trade from the Atlantic.

TABLE 5—GROWTH OF ATLANTIC PORTS
Dependent variable is log city population

	Balanced panel, 1300–1850, weighted (1)	Balanced panel, 1300–1850, unweighted (2)	Balanced panel, 1300–1850, weighted (3)	Balanced panel, 1300–1850, unweighted (4)	Balanced panel, 1300–1850, weighted, without London and Amsterdam (5)	Balanced panel, 1300–1850, weighted, with full set of country × year interactions (6)	Balanced panel, weighted 1300–1850, with Asia (7)	Balanced panel, weighted 1300–1850, with Mediterranean and Atlantic ports (8)
Panel A: Flexible specification								
	Atlantic port		Potential Atlantic port		Atlantic port			
p-value for Western Europe × year dummies, 1600–1850	[0.34]	[0.05]	[0.30]	[0.16]	[0.28]	[0.30]	[0.41]	[0.32]
Atlantic port × 1500	−0.04	−0.05	0.027	0.048	−0.008	−0.072	−0.03	−0.05
	(0.19)	(0.20)	(0.17)	(0.16)	(0.20)	(0.20)	(0.20)	(0.19)
Atlantic port × 1600	0.36	0.46	0.41	0.43	0.41	0.36	0.36	0.40
	(0.16)	(0.20)	(0.14)	(0.16)	(0.17)	(0.17)	(0.16)	(0.16)
Atlantic port × 1700	0.71	0.62	0.76	0.76	0.297	0.47	0.71	0.74
	(0.14)	(0.20)	(0.13)	(0.16)	(0.17)	(0.17)	(0.15)	(0.15)
Atlantic port × 1750	0.70	0.71	0.79	0.89	0.26	0.46	0.7	0.72
	(0.14)	(0.20)	(0.13)	(0.16)	(0.16)	(0.16)	(0.15)	(0.14)
Atlantic port × 1800	0.79	0.92	0.95	1.10	0.32	0.57	0.799	0.84
	(0.14)	(0.20)	(0.12)	(0.16)	(0.15)	(0.15)	(0.14)	(0.14)
Atlantic port × 1850	1.09	1.00	1.19	1.23	0.48	0.46	1.09	1.10
	(0.13)	(0.20)	(0.12)	(0.16)	(0.14)	(0.14)	(0.14)	(0.13)
p-value for Mediterranean port × year dummies, 1500–1850								[0.19]
R-squared	0.92	0.79	0.92	0.80	0.89	0.95	0.94	0.92
Number of observations	1544	1544	1544	1544	1528	1544	1624	1544
Panel B: Structured specification								
p-value for Western Europe × year dummies, 1600–1850	[0.23]	[0.04]	[0.23]	[0.10]	[0.31]	[0.33]	[0.30]	[0.20]
Volume of Atlantic trade × Atlantic port	0.17	0.16	0.17	0.16	0.065	0.078	0.17	0.17
	(0.02)	(0.02)	(0.017)	(0.024)	(0.019)	(0.018)	(0.018)	(0.017)
p-value for Mediterranean Port × year dummies, 1500–1850								[0.14]
R-squared	0.92	0.79	0.92	0.79	0.89	0.95	0.94	0.92
Number of observations	1544	1544	1544	1544	1528	1544	1624	1544

Notes: Dependent variable is log city population, from Bairoch et al. (1988). Weighted regressions use current level of city population in each year as weights. All columns report balanced panel regressions for 1300, 1400, 1500, 1600, 1700, 1750, 1800, and 1850, using only cities for which we have data in all eight time periods. The Atlantic port dummy equals one for a city used as an Atlantic port. Potential Atlantic ports are all ports that could have been used for Atlantic trade and include Atlantic ports plus ports in Belgium, Germany, and Ireland (there are no potential Atlantic ports in Denmark or Norway in our balanced panel). Volume of Atlantic trade is log average voyages per year; this is multiplied by the Atlantic port dummy (or by the potential Atlantic port dummy); the coefficient on this interaction term is multiplied by 100. Year dummies are included for all years from 1400. Western Europe × year dummies are included for all years from 1600. For a list of Atlantic ports and potential Atlantic ports, see the Appendix of Acemoglu et al. (2002b).

Column 7 adds Asian cities from Tertius Chandler (1987), so now West European cities are being compared to both East European and Asian cities. The results are similar, but also show the differential growth of all West European cities relative to Asian cities.[19]

Is there something special about ports, or is it Atlantic ports that are behaving differently after 1500? To answer this question, Figure 4B and column 8 show that Mediterranean ports grew at similar rates to inland European cities; what we find is not a general port effect but an *Atlantic port effect.*

Was the urban and economic expansion of Atlantic nations driven solely by the growth of Atlantic ports? Figure 5A shows the expansion of Iberian (Spanish and Portuguese) Atlantic ports, other Iberian cities, and West European inland cities. Almost all of the differential growth of Spain and Portugal comes from Atlantic ports. In fact, non-Atlantic parts of Spain and Portugal grew more slowly than West European inland cities. Relevant to our hypothesis

[19] We also investigated the importance of the same controls used in Table 4 for country-level growth. The results, which are reported in Acemoglu et al. (2002b), show that the pattern in Table 5 is robust to the inclusion of these controls.

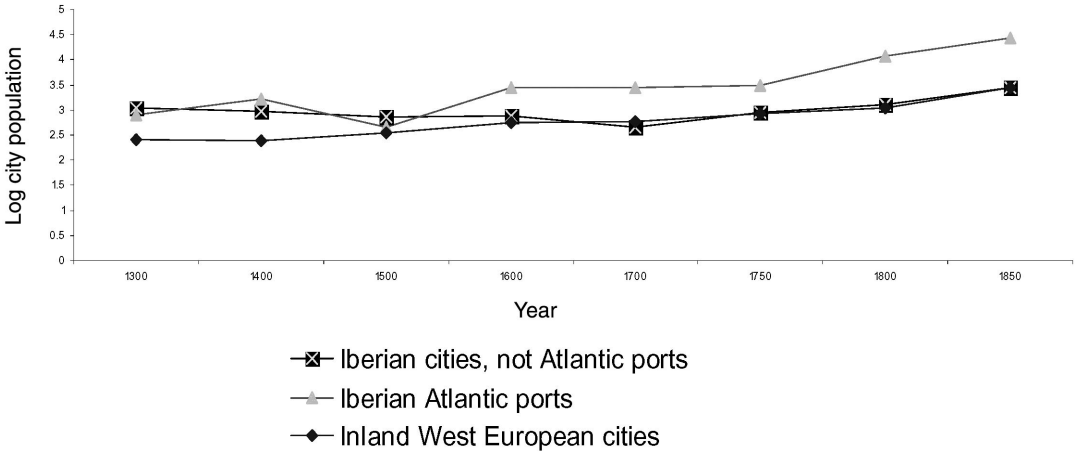

FIGURE 5A. AVERAGE OF LOG CITY POPULATION IN IBERIAN ATLANTIC PORTS, OTHER IBERIAN CITIES THAT ARE NOT ATLANTIC PORTS, AND INLAND WEST EUROPEAN CITIES (BALANCED PANEL), 1300–1850

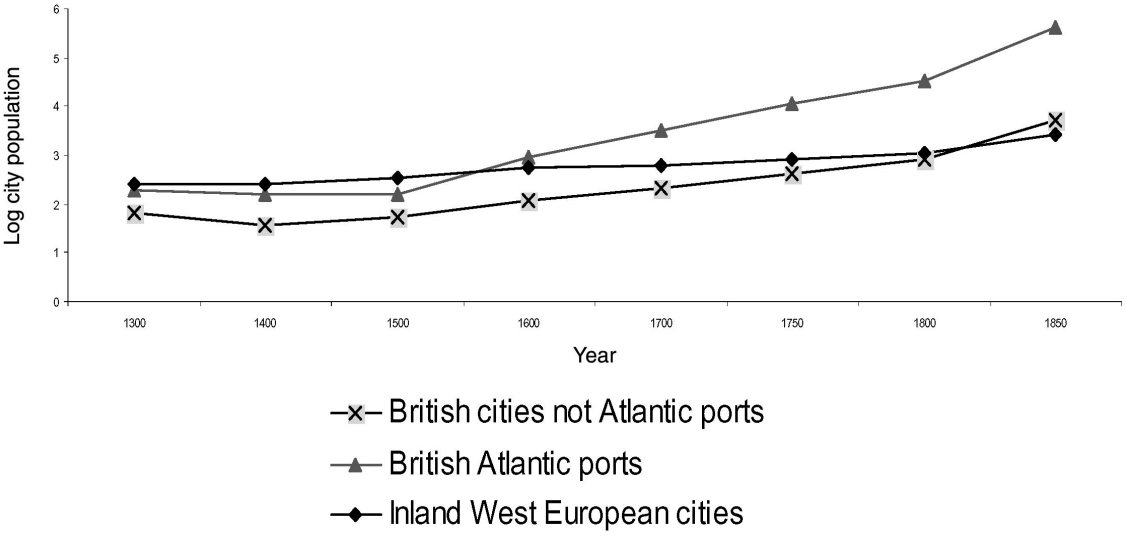

FIGURE 5B. AVERAGE OF LOG CITY POPULATION IN BRITISH ATLANTIC PORTS, OTHER BRITISH CITIES THAT ARE NOT ATLANTIC PORTS, AND INLAND WEST EUROPEAN CITIES (BALANCED PANEL), 1300–1850

below, this Iberian pattern contrasts with the steady growth of non-Atlantic British cities shown in Figure 5B. (Notice that the non-Atlantic British line starts below the West European line and overtakes it by 1850; see Acemoglu et al., 2002b, for further evidence.)

E. *Interpretation*

The evidence presented so far has established a significant relationship between the potential for Atlantic trade and post-1500 economic development, and suggests that the opportunities to trade via the Atlantic, and the associated profits from colonialism and slavery, played an important role in the rise of Europe. This evidence weighs against theories linking the rise of Western Europe to the continuation of pre-1500 trends driven by certain distinctive characteristics of European nations or cultures, such as Roman heritage or religion.

At face value, this evidence is more consistent

with theories emphasizing the direct contribution of profits from Atlantic trade, colonialism, and slavery, such as those advanced by Williams (1944), Frank (1978), and Wallerstein (1974–1980). It is undoubtedly true that colonial relations with the New World and Asia contributed to European growth. Nevertheless, quantitative analyses, for example, Engerman (1972), Engerman and O'Brien (1991), O'Brien (1982), and Bairoch (1993, ch. 5), suggest that the volume of trade and the profits generated by Atlantic trade appear to be too small to account for much of European growth directly. Atlantic trade may also have played an important direct role by inducing a reallocation of resources within Europe, even if profits from trading were low (as would be the case in a competitive economy). This direct channel is unlikely to be the whole story, however, since the volume of trade was small. For example, Bairoch (1993) calculates that commodity trade between Western Europe and the rest of the world amounted to less than 4 percent of the GNP of Western Europe before 1800. Although recent work by Inikori (2002) argues that profits from colonial activities, in particular from the slave trade, were larger than those estimated by O'Brien, even with his estimates, the direct effect of Atlantic trade and colonialism could account for the rise of Europe only with significant increasing returns to scale in leading sectors.[20]

Overall, therefore, the weight of evidence inclines us toward a view in which the rise of Europe reflects not only the direct effects of Atlantic trade and colonialism but also a major social transformation induced by these opportunities.

[20] For example, O'Brien (1982) calculates that total profits from British trade with less developed regions of the world during the late eighteenth century were approximately £5.6 million, while total gross investment during the same period stood at £10.3 million. Inikori (2002, Table 4.2) suggests that imports from the periphery around 1800 were about double O'Brien's estimate. During this period, the aggregate savings rate was between 12 and 14 percent, so if we assume that this savings rate also applies to profits from trade, the contribution of these profits to aggregate capital accumulation would be less than 15 percent, even using Inikori's estimates. Even assuming considerably higher savings rates, the contribution would remain relatively small.

II. Our Hypothesis

A. *The Argument*

Our hypothesis is that Atlantic trade—the opening of the sea routes to the New World, Africa, and Asia and the building of colonial empires—contributed to the process of West European growth between 1500 and 1850, not only through direct economic effects, but also indirectly by inducing fundamental institutional change. Atlantic trade in Britain and the Netherlands (or, more appropriately, in England and the Duchy of Burgundy) altered the balance of political power by enriching and strengthening commercial interests outside the royal circle, including various overseas merchants, slave traders, and various colonial planters. Through this channel, it contributed to the emergence of political institutions protecting merchants against royal power.[21] Our hypothesis also implies that the tendency for institutional change to emerge should have been much stronger in societies with existing checks on royal power than in countries with absolutist regimes and monarchy-controlled trade monopolies, because in these latter countries Atlantic trade did not enrich and strengthen merchant groups outside the royal circle as much, and did not disturb the political status quo.

This hypothesis can be broken into 4 subhypotheses:

(a) Political institutions placing limits and constraints on state power are essential for the incentives to undertake investments and for sustained economic growth;
(b) In early modern Europe, such political institutions were favored by commercial interests outside the royal circle, but were not welcome by the monarchy and its allies;
(c) Institutions favored by economically and

[21] An additional channel via which Atlantic trade may have contributed to institutional change may be the desire of the monarchy to secure the property rights of merchants in order to encourage long-term investments in long-distance trade. Our reading of the relevant history, discussed below, makes us believe that the greater contribution of Atlantic trade to the development of capitalist institutions was by strengthening commercial interests in favor of political change in their fight against the monarchy.

politically powerful groups are more likely to prevail; and

(d) In countries with nonabsolutist initial political institutions, Atlantic trade and colonial activity enriched and strengthened commercial interests, including new groups without ties to the monarchy.

Together these four subhypotheses yield our main hypothesis. In countries with easy access to the Atlantic and without a strong absolutist monarchy, Atlantic trade provided substantial profits and political power for commercial interests outside the royal circle. This group could then demand and obtain significant institutional reforms protecting their property rights. With their newly gained power and property rights, they took advantage of the growth opportunities offered by Atlantic trade, invested more, traded more, and fueled the First Great Divergence.[22]

Initial institutions placing sufficient checks on the monarchy are essential for the fourth subhypothesis, so that merchants not directly associated with the crown benefit significantly from Atlantic trade. When the power of the crown was relatively unchecked, as in Spain, Portugal, and France, trade was largely monopolized and regulated, the crown and its allies became the main beneficiaries of the Atlantic expansion, and institutional change did not take place. Therefore, our hypothesis explains not only the major role played by Atlantic trade in West European growth, but also why economic growth took off in Britain and the Netherlands, and not in Spain and Portugal.

Acemoglu et al. (2002b) provide historical evidence consistent with these subhypotheses. Space constraints preclude us from going into details here. We refer the reader to that paper for a more detailed discussion, and briefly discuss the evidence related to the fourth subhypothesis, which is perhaps the most important for our argument.

B. *Atlantic Trade and Commercial Interests*

We now discuss the major changes in the political institutions of Britain and the Netherlands. Our argument highlights that in both cases: (a) the political institutions at the beginning of the sixteenth century, though not as absolutist as in Spain and Portugal, did not provide secure property rights to commercial interests outside the royal circle;[23] (b) there was significant conflict between these merchant groups and the monarchy; (c) Atlantic trade created large profits for some of these merchants who were in favor of institutional change, and who then used part of these profits to support the conflict against the crown.

Britain.—In the British case the two milestones in the emergence of political institutions constraining royal power are the (English) Civil War of 1642–1649, when Parliamentarian forces defeated Charles I, and the Glorious Revolution of 1688–1689, where James II was deposed by Parliament with the help of an invading Dutch army, and replaced by William of Orange and a parliamentary regime with a constitutional monarchy. Although there is no consensus among historians on the relative importance of these two events, this is secondary for our focus. What is important is that there was a major improvement in British political institutions between the mid-seventeenth and early-eighteenth centuries.

Although after the War of the Roses, Britain was never as absolutist as France, Portugal, and Spain, both the Tudor and Stuart monarchs consistently attempted to expand their powers. The insecurity of property rights was clear during the reign of Henry VIII, when there were continual attempts to regulate trade and undermine the powers of Parliament (see Geoffrey R. Elton, 1991). A significant attempt to establish a form of absolutism came during the period of so-called "personal rule" of Charles I, after he dissolved his third Parliament in 1629, raised taxes in an unconstitutional way, and used the

[22] The establishment of political institutions limiting the power of the monarchy may have also created positive spillovers in the rest of the economy, especially for industrial capitalists (consistent with the subsequent growth of non-Atlantic British cities in Figure 5B).

[23] More explicitly, these commercial interests included merchants not receiving crown-granted monopolies, slave traders, various producers in the colonies and parts of the gentry in Britain, and the majority of the Dutch merchants not allied with the Habsburg monarchy in the Netherlands.

Star Chamber to manipulate legal decisions in his favor (Kevin Sharpe, 1992).

Although undoubtedly complex social events, both the Civil War and the Glorious Revolution were also battles over the rights and prerogatives of the monarchy.[24] In both cases, commercial interests (including large segments, but not all, of the merchants and the gentry) predominantly sided with those demanding restrictions on the power of the monarchy. During the Civil War, for example, the majority of the merchants, and even many of those with royal monopolies, supported Parliament (see Brenner, 1973, 2003; Mary Keeler, 1954; Douglas Brunton and D. H. Pennington, 1954).[25] Members of the Commons from the City of London, which was the main center of mercantile activity, as well as many non-London commercial constituencies, such as Southampton, Newcastle, and Liverpool, supported Parliament against the King. David H. Sacks (1991, pp. 230–47) shows that in Bristol trading, commercial and industrial interests outside of the Merchant Adventurers (the trading company then enjoying the royal monopoly) were Parliamentarians. Brunton and Pennington (1954, p. 62) also note that "in the country as a whole there was probably a preponderance of Parliamentarian feeling among merchants."

The situation for the Glorious Revolution is similar. The East India Company under the control of Josiah Child supported James II, his claim to tax without consent of Parliament, and his right to grant trading monopolies—of which it was the main beneficiary. But the majority of commercial interests, alienated by James II's grants of various monopoly privileges, and especially the interlopers—merchants trying to break into trade with Asia—were on the side of the revolution (Bruce G. Carruthers, 1996; Pincus, 2002). These merchants also received strong support from Whigs who sought to constrain the king (Henry Horwitz, 1978). Summarizing the evidence, Pincus (2002, p. 34) concludes, "England's merchant community actively supported William's plan for invasion, and provided a key financial prop to the regime in the critical early months."

The victory of Parliament in the Civil War and after the Glorious Revolution introduced major checks on royal power and strengthened the rights of merchants. After the Civil War, the fraction of MPs who were merchants increased dramatically. Although even in the 1690s this number was not large enough to constitute a majority on its own, as David Stasavage (2003) shows, the interests of merchants were assured by the formation of the Whig coalition of merchants and Protestant landowners. This period also witnessed a series of policies favoring merchants, including the Navigation Acts of 1651 and 1660, which restricted trade with British colonies to British ships and merchants (J. E. Farnell, 1964; J. P. Cooper, 1972) and strengthened the position of British overseas traders, especially slave traders (see Geoffrey Holmes, 1993, p. 64). Similarly, the Glorious Revolution led to a series of economic reforms sought by merchants outside the royal circle, including the dismantling of all monopoly charters, except the East India Company (Perry Gauci, 2001) and the establishment of the Bank of England. The conventional wisdom in economic history emphasizes the importance of these institutional changes for the protection of property rights, and how they led to a wave of innovations in economic institutions, particularly in financial markets (e.g., North and Weingast, 1989; Carruthers, 1996; Larry Neal, 2000).

Critically for our thesis, the major changes in political institutions and the new assertiveness of merchant groups coincided with the expansion of British mercantile groups trading

[24] Other prominent interpretations of the English Civil War have emphasized various factors apart from those we stress here. Conrad Russell (1990) argues that the Civil War was a plot by the traditional aristocracy to regain power it had lost under the Tudors. Many, for example, John S. Morrill (1993), focus on the role of religious differences in determining who supported which side, and recent work by Brian Manning (1996) stresses more general class conflict. Although there are doubtless elements of truth in these approaches, the general role of mercantile interests seems undeniable (see Roger C. Richardson, 1998, for a balanced overview of the debate).

[25] Valerie Pearl's seminal study (1961) argued that there were political divisions between such groups as the Merchant Adventurers, who benefited from monopolies granted by the crown, and new merchants, who did not. For example, the two pre–Civil War MPs for Bristol, Humphrey Hooke and Richard Long, were Royalists. Robert Ashton (1979, 1996), on the other hand, documented that even merchants who enjoyed monopolies tended to oppose the crown by the time of the Civil War, and argued "the majority of the City fathers, far from being the natural supporters of Stuart absolutism at the end of the period of Charles I's personal rule in the late 1630's, were as alienated from royal policies as were the vast majority of the political nation" (1996, p. 3).

through the Atlantic. The East India Company was founded in 1600, and from 1600 to 1630 there was an unprecedented wave of investment by merchants, gentry, and even some aristocracy in overseas ventures (Theodore K. Rabb, 1967). Virginia tobacco cultivation boomed in the 1620s, and beginning in the 1640s, the highly profitable Caribbean sugar colonies developed. Finally, in the 1650s the British began to take over the Atlantic slave trade.

A number of historians, most notably Brenner (2003), have emphasized that Atlantic merchants were critical in ensuring the military victory of Parliament in the Civil War. In his famous book, Lawrence Stone also points out that "... other important merchant elements can now be identified, men interested especially in the American trades, in New England colonization, and in breaking the monopoly of the East India and Levant Companies. They were new men in new fields of entrepreneurial endeavor who chafed at the political and economic stranglehold of the older established monopolistic oligarchies. These men were important members of the group of radicals who seized control of London at a critical moment in 1641, and so swung the power and influence of the city decisively on the side of Parliament" (1973, p. 144).

Atlantic trade indeed created large profits for the fortunate who succeeded in this high-risk endeavor. In the Appendix, we use data on profits from K. N. Chaudhuri (1965) and de Vries and van der Woude (1997), on investment from Rabb (1967), on trade from Inikori (2002) and de Vries (2003), and on rates of return from Richard Grassby (1969, 1995) and O'Brien (1982) to estimate profits of various merchant companies, slave traders, and colonial planters from Atlantic trade during this period. These estimates suggest that profits from Atlantic trade were negligible before 1575, about £40,000 on average per annum from 1576 to 1600 (mostly from a few highly profitable privateering expeditions), perhaps £200,000 on average per annum from 1601 to 1650, and around £500,000 per annum from 1651 to 1675. Profits then rose with the expansion of sugar and the slave trade to around £900,000 per annum from 1676 to 1700, £1.7m per annum from 1701 to 1750, and probably about £5m per annum in the late eighteenth century (all figures adjusted to 1600 prices using the index of building craftsmen's wages from E. H. Phelps Brown and Sheila V. Hopkins, 1955). These profits were substantial relative to the personal wealth of merchants and gentry during this time period. For example, personal wealth of £10,000 in the early seventeenth century was enough to be very rich. A minimum investment of £2,000 was required to become a director of the East India Company, and £200 represented a substantial investment (Brenner, 1973, pp. 62–63; Brenner, 2003, p. 78). Moreover, because profits from Atlantic trade were highly concentrated, they created a number of very wealthy merchants (see Grassby, 1995, pp. 248 and 263). These profits were also large relative to the resources necessary to make a difference politically and militarily.[26]

Many merchants used their profits from Atlantic trade to support the conflict against the crown. For example, the Earl of Warwick, who earned at least £50,000 from privateering in one year prior to the Civil War (W. Frank Craven, 1930), applied his fortune and experience with naval warfare to effectively oppose the king.[27] More generally, Parliament during the Civil War was partly financed by taxes on, and profits from, Atlantic trade. Parliamentary leaders such as Sir Edwin Sandys and John Pym were active in colonization and trade with the Americas. James I, well aware of the links between major Atlantic trading ventures and parliamentary

[26] From 1550 to 1688, the English monarch was always short of cash, and war typically required additional funds. For example, King Charles I was forced to recall Parliament in 1640 because he needed to raise about £300,000 (£250,000 in 1600 prices) for war against Scotland—enough to pay and equip about 12,000 soldiers for a year (Ashton, 1960, p. 176). Total English government revenues were around £500,000 in 1600 and about £850,000 in 1640 (Richard Bean, 1973). Armies on both sides of the English Civil War were small, 10,000 to 20,000 men, and most of the conflict was small-scale local operations by regional forces (Geoffrey Parker, 1988, pp. 28 and 41). Parliament fielded 27,000 at the battle of Marston Moor and just 13,000 at Naseby; the presence or absence of a few thousand troops was therefore decisive (Parker, 1988, p. 41). Kennedy (1987, p. 63) estimates that the average annual cost of a soldier was around £27 in 1657 (about £20 in 1600 prices).

[27] A privateer is an armed private vessel bearing the authorization or commission of a sovereign power to attack an enemy, i.e., a privately funded and manned extension of a country's naval forces. Privateers typically engaged in trading activities as well as fighting (see, for example, the case of John Hawkins discussed in N. A. M. Rodger, 1997, p. 201).

opposition, intervened in the election of treasurer for the Virginia Company, saying, "Choose the devil if you will, but not Sir Edwin Sandys" (Rabb, 1998, p. 349). Similarly, for the Glorious Revolution, Pincus (2002, pp. 32–33) provides evidence that "the merchant community poured money into William of Orange's coffers in 1688"—perhaps around £800,000 (about £500,000 in 1600 prices), enough to pay for a sizable army.

The Netherlands.—Dutch merchants always had considerable autonomy and access to profitable trade opportunities. Nevertheless, prior to the Dutch Revolt, the Netherlands (in fact, the entire Duchy of Burgundy) was part of the Habsburg Empire, and the political power of Dutch merchants was limited. The Habsburg monarchy consistently attempted to increase its political dominance over and fiscal revenues from the Netherlands (W. Fritschy et al., 2001). The critical improvement in Dutch political institutions was therefore the establishment of the independent Dutch Republic, with political dominance and economic security for merchants, including both the established wealthy regents and the new merchants immigrating from Antwerp and Germany.[28]

Dutch politics was shaped by the conflict between Dutch merchants and the Habsburg monarchy starting in the fifteenth century, and before then by the conflict between merchants and the Duke of Burgundy. By 1493 Maximilian of Habsburg had reversed the Grand Privilege of 1477, which gave the states general the right to gather on their own initiative and curbed the right of the ruler to raise taxes. After 1552, war with France and England increased the Habsburgs' fiscal needs and led them to impose a large tax burden on the Netherlands. Growing fiscal and religious resentment in 1572 led to a series of uprisings, mostly orchestrated by commercial interests (see Jonathan I. Israel, 1995). These culminated in a war of independence, which began with the Revolt in the 1570s and did not end until 1648, punctuated by Philip II diverting resources to intervene in France after 1590, the successful Dutch offensives of 1591–1597 under the command of Maurice of Nassau, the embargoes against Dutch trade with Spain and Portugal in 1585–1590, 1598–1609, and 1621–1647, and the Twelve Years Truce from 1609 to 1621.

The major turning point came in the 1590s when important changes in Dutch military and commercial strategy became evident. New military tactics made it possible for the Dutch to hold their own against experienced Spanish infantry (Geoffrey Parker, 1988, pp. 19–20). This was combined with a fiscal and financial "revolution" that allowed states, particularly Holland, both to increase their tax revenues and borrow against future taxes in order to finance the war effort (Fritschy, 2003). At the same time, the Dutch took the critical strategic step of seeking direct access to Asian and American trade centers. This both enriched a generation of Dutch merchants and undermined Spanish and Portuguese revenues sufficiently to induce Philip III to offer peace. By 1605 it was clear to a Spanish royal councillor, the Count of Olivares, that victory would go to "whoever is left with the last escudo" (Parker, 1977, p. 238).

Merchants were naturally the primary political and economic force on the side of independence. De Vries and van der Woude (1997) argue that "urban economic interests ultimately believed it advantageous to escape the Habsburg imperial framework" (p. 369). They also note that, in the case of Amsterdam, the "[Habsburgs'] opponents included most of the city's international merchants ... . [I]n 1578 a new Amsterdam city council threw the city's lot in with the Prince of Orange ... among the merchants returning from ... exile were [those whose families] and several generations of their descendents would long dominate the city" (1997, p. 365).

Commercial interests involved in the Atlantic were particularly important in the shaping of the conflict (see, for example, Israel, 1982, 1995; Herman van der Wee, 1993, pp. 272–73). In 1609, in an attempt to prevent the creation of the Dutch West India Company, Philip III offered peace and independence in return for a Dutch withdrawal from both the West and East Indies. But these terms were "simply not feasible politically because many regents and elite merchants had invested heavily in the [Dutch East India Company]" (Israel, 1995, p. 402).

[28] By the year 1600, a third of the population of Amsterdam was immigrants (Israel, 1995, p. 309). In 1631, there were 685 citizens of Amsterdam with wealth over 25,000 florins. Only half of them were native Hollanders (Parker, 1977, p. 251).

Prominent in the anti-peace camp was the famous Dutch leader and general Maurice of Nassau, who was heavily involved in colonial trades, and "Reynier Pauw, the preeminent figure and leader of the anti-truce faction in Holland who, besides being a champion of the West India Company project, had been a founder member of the East India Company and for many years a director of its Amsterdam chamber" (Israel, 1982, p. 40).

It is therefore no surprise that independence put merchants firmly in control of the political process. De Vries and van der Woude (1997, p. 587) describe the new political elite following the Dutch Revolt as "6 to 8% of urban households with incomes in excess of 1,000 guilders per year. This was the *grote burgerij* from whom was drawn the political and commercial leadership of the country. Here we find, first and foremost, the merchants." They also point out how merchants dominated the governments of Leiden, Rotterdam, and the cities in the two largest states, Zeeland and Holland.

The Dutch economy had been expanding since the fifteenth century and experienced advances in economic institutions, including in shipping, agriculture, and finance, particularly public finance, prior to this revolt (James D. Tracy, 1985; Jan Luiten van Zanden, 1993). Nevertheless, the potential of these institutions was severely limited under the Habsburg yoke because of the threat of arbitrary taxation. For example, Marjolien Hart et al. (1997, fig. 2.3, p. 19) show that, despite the changes in financial institutions in the mid-sixteenth century, interest rates did not fall systematically until after 1600, when they declined to about one-third of their pre-revolt level. Consequently, the economy appears to have experienced a major transformation after the process of political change began. Van Zanden (1993) notes, "We can see the starting point of the rapid urbanization at 1580" (pp. 35–36), and continues, "during this transformation process, the pre-1580 protocapitalist structure disappeared ... out of this 'unspecialised' class of small-holders, fishermen, homeworkers and sailors, separate classes of large farmers, agricultural laborers and craftsmen arose" (p. 39). Similarly, Braudel (1995, p. 547) dates the start of the divergence between the South and North of Europe to 1590 with the "explosion" of Dutch commerce and the rise of Amsterdam.

Critical was the Dutch merchants' improving economic fortunes, partly from Atlantic trade, which were used to field a powerful army against the Habsburg Empire. The Baltic trade is widely recognized as important for the Dutch economy in the sixteenth century, but profits from Atlantic trade quickly surpassed those from Baltic trade and provided the funds necessary for the Dutch military effort against the Habsburgs (Israel, 1989). De Vries and van der Woude (1997) estimate that the annual profits of the Dutch East India Company alone between 1630 and 1670, 2.1 million guilders per annum, were more than twice the total annual profits from the Baltic grain trade between 1590 and 1599 (pp. 373 and 447).

Fritschy (2003) estimates that, as a result of these developments, tax revenue per head in Holland rose nearly fivefold from 1575 to 1610, while population increased by a third (see also Tracy, 2001, Table 7.2). These revenues enabled Holland to provide 960,000 guilders for the war in 1579 and to pay five million guilders in 1599 (Parker, 1977, p. 251). Israel (1995, pp. 241–42) summarizes the basic reason for the Dutch victory as follows: "From 1590, there was a dramatic improvement in the Republic's economic circumstances. Commerce and shipping expanded enormously, as did the towns. As a result, the financial power of the states rapidly grew, and it was possible to improve the army vastly, both qualitatively, and quantitatively, within a short space of time. The army increased from 20,000 men in 1588 to 32,000 by 1595, and its artillery, methods of transportation, and training were transformed." By 1629, the Dutch were able to field an army of 77,000 men, 50 percent larger than the Spanish army of Flanders (Israel, 1995, p. 507).

Overall, both the British and Dutch evidence, therefore, appears favorable to our hypothesis that Atlantic trade enriched a group of merchants who then played a critical role in the emergence of new political institutions constraining the power of the crown.

Spain, Portugal and France.—There is general agreement that Spanish and Portuguese political institutions at the turn of the sixteenth century were more absolutist than those in

Britain and the Netherlands, and did not experience similar reform.[29]

A key difference between these cases and the British-Dutch patterns is the organization of trade which, in turn, reflected differences in political institutions. Throughout this period, the granting of trade monopolies was a central tool for the rulers to raise revenue. When the power of the monarchs was constrained, they were unable to use this fiscal tool. For example, the English Parliament successfully blocked many attempts of both Tudor and Stuart monarchs to create such monopolies (Christopher Hill, 1969). Consequently, in Britain "most trade was carried on by individuals and small partnerships, and not by the Company of Merchant Adventurers, the Levant Company ... or others of their kind" (Davis, 1973a, p. 41). At least by 1600 there was quite free entry into the British merchant class (R. G. Lang, 1974). In contrast, Rondo Cameron (1993, p. 127) describes the Portuguese situation as follows: "The spice trade in the East Indies of the Portuguese Empire was a crown monopoly; the Portuguese navy doubled as a merchant fleet, and all spices had to be sold through the *Casa da India* (India House) in Lisbon ... no commerce existed between Portugal and the East except that organized and controlled by the state." (See also Charles R. Boxer, 1985; Earl J. Hamilton, 1948.) Similarly, in Spain colonial trade was a monopoly of the Crown of Castille and was delegated to the *Casa de Contratación* (House of Trade) in Seville, which was itself closely monitored by the government (James H. Parry, 1966, ch. 2).

France, on the other hand, can be viewed as an intermediate case. Although French institutions were equally absolutist (W. F. Church, 1969; David Parrott, 2001), early Atlantic activity enriched some merchant groups, in particular the protestant Huguenots. However, the monarchy soon clashed with and defeated the Huguenots, first with the siege of La Rochelle by Louis XIII and then the outlawing of the Protestant church by Louis XIV (see, e.g., Warren C. Scoville, 1960). The monarchy then kept much of overseas trading activity as a royal monopoly, especially under Colbert (see, e.g., Davis, 1973b, pp. 222–24; William Doyle, 1974, pp. 210–11). Nevertheless, certain strong French commercial and industrial interests developed and, arguably, forced institutional change before, during, and after the French Revolution (see G. Lefebvre, 1947, and Doyle, 1988, for the debate on the origins of the French Revolution).

Overall, the evidence is therefore consistent with our thesis that in Spain and Portugal, and also largely in France, merchant interests with sufficient power to challenge the crown did not develop because the crown, and groups allied to it, were the main beneficiaries of the profits from transoceanic trade and plunder.

III. Atlantic Trade and Institutional Change

We now attempt to substantiate our hypothesis further by providing empirical evidence on the link between changes in political institutions and Atlantic trade. A prerequisite for this exercise is a measure of relevant political institutions. Unfortunately, no such measure exists for this period.[30] So as a first step, we attempted to create a measure of political institutions for European countries between 1300 and 1850, adapting the definition of "constraint on the executive" from Gurr's Polity dataset. This is a useful concept since it measures limitations on the arbitrary use of power by the executive (for the relevant time period, the monarchy), and is

[29] Davis (1973a, p. 66), for example, emphasizes the high degree of absolute control by the monarchy in Spain, as follows: [in Castille] "the king ruled subject only to weak constitutional restraints. In the first decades of the sixteenth century the crown had reduced the pretensions of the Castillian nobility and towns, so that the representative body, the Cortes, could obstruct but not in the last resort prevent royal tax raising," and contrasts this with the situation in Britain (e.g., Davis, 1973a, p. 210).

The modern literature, in particular, I. A. A. Thompson (1994) and Michael A. R. Graves (2001), suggests that the extent of Spanish absolutism has been overemphasized by scholars such as North and Thomas (1973), and points out important differences between Castille and such other parts of Iberia as Aragon and Catalonia. Nevertheless, it is certainly true that the Spanish Crown was able to create trade monopolies and raise taxes in ways that the Tudor and Stuart monarchies could not.

[30] An alternative approach would be to use the terms of finance for trading entities, as suggested by one of our reviewers. Although there are some data on this, the coverage is not broad enough for our purposes. Moreover, the terms of finance may be affected by the demand for and supply of financial resources, as well as the underlying security of property rights.

presumably correlated with the security of property rights for merchants and the control over the monopoly of overseas trade by the monarchy.[31]

We follow the Polity IV coding handbook, giving a score of between 1 and 7 for constraint on the executive to each country.[32] For 1800 and 1850, we use the Polity coding for constraint on the executive, where available. For earlier periods, we coded these measures ourselves. The main source for this exercise was William L. Langer (1972), a classic historical encyclopedia, written with a focus on constitutional events. We supplemented this work with the more recent edition by Peter N. Stearns (2001). While there may be disagreement about the precise values used in particular years, the general level of constraint on the executive does not appear to be controversial. For example, the absolutist regimes of France, Portugal, and Spain clearly had much less constraint on the executive than did the Netherlands after independence or England after the Civil War. Acemoglu et al. (2002b) give further details and report the entire series.

Table 6 documents the differential changes in institutions between Atlantic traders and other West European nations by estimating an equation similar to (1) with constraint on the executive as the left-hand-side variable. The results show significant differential improvements in institutions among Atlantic traders and no evidence of differential existing trends. Unlike our results when urbanization was the dependent variable, however, even after the inclusion of Atlantic trade interactions, there is some evidence of differential West European effects.

Other columns use the same controls and time interactions as in Table 4. Although the *F*-statistics show that many of these time interactions are significant, neither Protestantism, nor wars, nor Roman heritage, nor latitude appears to have led to greater institutional change after 1500 (for example, institutions in Protestant countries improved more rapidly until 1750, and significantly more slowly thereafter).

Overall, these results suggest that, following the surge in Atlantic trade, there were greater strides toward better political institutions in nations engaged in Atlantic trade and colonialism (or in those with a greater potential to engage in Atlantic trade).

IV. The Role of Initial Institutions

We now investigate whether, as implied by our hypothesis, it was predominantly societies with less absolutist initial institutions (and relatedly, those without widespread royal granted monopoly rights in overseas trade) that took advantage of the opportunities offered by Atlantic trade. We also investigate the related hypothesis of North and Thomas (1973) and Jones (1981) that post-1500 developments largely reflect divergence between societies that had very different political institutions at the turn of the fifteenth century. This differs from our hypothesis, which emphasizes the *interaction* between initial political institutions and Atlantic trade.

To investigate these ideas, we estimate models of the following form:

$$(3)\quad u_{jt} = d_t + \delta_j + \sum_{t \geq 1600} \alpha_t \cdot WE_j \cdot d_t + \beta \cdot \ln AT_t \cdot PAT_j + \sum_{t \geq 1500} \gamma_t \cdot I_{j,1415} \cdot d_t + \eta \cdot \ln AT_t \cdot PAT_j \cdot I_{j,1415} + \varepsilon_{jt}$$

[31] The measure of constraint on the executive may not be ideal for our purposes, however, since a number of significant constraints on monarchs were imposed by the nobles and did not necessarily serve to protect the rights of merchants. For example, in much of the 1500–1750 period, Poland had a highly constrained executive. But there was relatively little protection for urban merchants; most of the rights rested with the nobility. For this reason, we modified the definition of constraint on the executive to create an alternative measure, which we refer to as "protection for capital." The coding of this measure depends on the formal rights given to urban merchants, particularly their protection in the event of a dispute with the nobility or monarch. The results using this measure are similar to those using constraint on the executive, and are contained in Acemoglu et al. (2002b).

[32] A value of 1 means "there are no regular limitations on the executive's actions," 3 means "there are some real but limited restraints on the executive," 5 means "the executive has more effective authority than any accountability group, but is subject to substantial constraints by them," and 7 means "accountability groups have effective authority equal to or greater than the executive in most activity." Scores of 2, 4, and 6 are used for intermediate values. See Monty G. Marshall and Keith Jaggers (2000).

TABLE 6—ATLANTIC TRADE AND INSTITUTIONS
Dependent variable is constraint on the executive

	Panel, 1300–1850 (1)	Panel, 1300–1850 (2)	Panel, 1300–1850 (3)	Panel, 1300–1850, controlling for religion (4)	Panel, 1300 to 1850, controlling for wars (5)	Panel, 1300 to 1850, controlling for Roman heritage (6)	Panel, 1300 to 1850, controlling for latitude (7)	Panel, 1300 to 1850, using Atlantic coastline-to-area measure of potential for Atlantic trade (8)	Panel, 1300 to 1850, using Atlantic coastline-to-area measure of potential for Atlantic trade (9)
p-value for Western Europe × year dummies, 1600–1850	[0.00]	[0.35]	[0.00]	[0.00]	[0.00]	[0.26]	[0.00]	[0.00]	[0.00]
Potential for Atlantic trade × 1500		−0.42 (0.47)						−20.83 (22.94)	
Potential for Atlantic trade × 1600		−0.14 (0.52)						10.94 (22.91)	
Potential for Atlantic trade × 1700		0.29 (0.48)						62.12 (21.14)	
Potential for Atlantic trade × 1750		0.32 (0.46)						81.45 (20.78)	
Potential for Atlantic trade × 1800		2.07 (0.44)						79.81 (18.97)	
Potential for Atlantic trade × 1850		2.96 (0.41)						72.25 (17.13)	
Potential for Atlantic trade × volume of Atlantic trade			0.42 (0.06)	0.45 (0.06)	0.43 (0.06)	0.39 (0.06)	0.43 (0.06)		12.99 (2.31)
p-value for Protestant × year effect				[0.00]					
Wars per year in preceding century					−0.034 (0.20)				
p-value for Roman heritage × year						[0.05]			
p-value for latitude × year							[0.49]		
R-squared	0.75	0.85	0.81	0.84	0.81	0.82	0.81	0.81	0.79
Number of observations	192	192	192	192	176	192	192	192	192

Notes: Standard errors are in parentheses. Weighted panel regressions with full set of country and year dummies. Weights are total population in each country in each year, from McEvedy and Jones (1978). Dependent variable is constraint on executive, which ranges from 1 to 7 where a higher score indicates more constraints on arbitrary action by the executive. All columns use the Atlantic trader dummy (one for Britain, France, Spain, Portugal, and the Netherlands; zero for all others) as the measure of potential for Atlantic trade, apart from columns 8 and 9, which use the ratio of Atlantic coastline to area (including Atlantic traders plus Belgium, Denmark, Germany, Ireland, and Norway). Volume of Atlantic trade is the log average number of voyages per year. Protestant is a dummy for whether country was majority Protestant in 1600. Protestant × year is the Protestant dummy interacted with year dummies for 1600 and after. Wars per year are for the preceding century through 1700, 1700–1750 for 1750, 1750–1800 for 1800, and 1800–1850 for 1850. Roman heritage is dummy for whether country was in the Roman Empire; this is interacted with year dummies for 1600 and after. Latitude is distance from the equator for capital city of this country today; this is interacted with year for 1600 and after.

where, as before, u_{jt} is the urbanization rate, $\ln AT_t$ is our measure of Atlantic trade, PAT_j is again either a dummy for Atlantic trader or the Atlantic coastline-to-area ratio, and $I_{j,1415}$ is country j's initial institutions, calculated as the average of its constraint on the executive in 1400 and 1500. We choose the average of these two dates to capture the long-term institutional differences in the pre-1500 period. The $\gamma_t \cdot I_{j,1415} \cdot d_t$ terms allow any differential economic trends related to differences in initial institutions that would apply even with no access to the Atlantic. Significant coefficients on these interaction terms would imply that at least part of the post-1500 developments in Europe reflect divergent paths taken by countries with different initial institutions, independent of the effects of Atlantic trade. The table reports the *p*-value from a joint significance test for all of these interaction terms. The $\ln AT_t \cdot PAT_j$ term, on the other hand, measures the effect of Atlantic trade for a given level of institutions. In the table, this term is evaluated at the lowest score of institutions, i.e., for $I_{j,1415} = 1$, so the coefficient on this term measures the growth contribution of Atlantic trade and access to the Atlantic for a society with the worst possible initial institutions.

The variable $\ln AT_t \cdot PAT_j \cdot I_{j,1415}$ tests the hypothesis of interest. A significant coefficient η implies that there were divergent paths taken by countries with different initial institutions, but this divergence relates significantly to whether they took advantage of the opportunities presented by Atlantic trade.

The results are reported in Table 7 using the Atlantic trader dummy for the potential for Atlantic trade, PAT_j (results using the coastline-

TABLE 7—INTERACTION BETWEEN INITIAL INSTITUTIONS AND ATLANTIC TRADE

	Using Atlantic trader dummy as measure of Atlantic trade									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Panel A: Dependent variable is urbanization									
	Panel, 1300–1850	Panel, 1300–1850	Panel, 1300–1850	Panel, 1300–1850	Panel, 1300–1850, unweighted	Panel, 1000–1850	Panel, 1000–1850	Panel, 1000–1850	Panel, 1000–1850	Panel, 1000–1850, unweighted
Atlantic trader dummy × volume of Atlantic trade		0.011	0.011	−0.0095	−0.0026		0.0082	0.0084	−0.012	−0.009
		(0.002)	(0.002)	(0.0049)	(0.0062)		(0.0020)	(0.0020)	(0.004)	(0.005)
p-value for initial institutions × year (1600, 1700, 1750, 1800, 1850)	[0.61]		[0.51]	[0.71]	[0.85]	[0.12]		[0.08]	[0.42]	[0.92]
Volume of Atlantic trade × initial institutions × Atlantic trader dummy				0.021	0.017				0.021	0.022
				(0.004)	(0.005)				(0.004)	(0.004)
R-squared	0.87	0.88	0.89	0.90	0.83	0.86	0.86	0.87	0.87	0.81
Number of observations	192	192	192	192	192	240	240	240	240	240
	Panel B: Dependent variable is Log GDP per capita									
	Panel, 1500–1820	Panel, 1500–1820	Panel, 1500–1820	Panel, 1500–1820	Panel, 1500–1820, unweighted	Panel, 1500–1870	Panel, 1500–1870	Panel, 1500–1870	Panel, 1500–1870	Panel, 1500–1870, unweighted
Atlantic trader dummy × volume of Atlantic trade		0.069	0.069	−0.068	−0.079		0.040	0.040	−0.123	−0.110
		(0.016)	(0.016)	(0.028)	(0.028)		(0.017)	(0.017)	(0.030)	(0.028)
p-value for initial institutions × year (1600, 1700, 1750, 1800, 1850)	[0.40]		[0.31]	[0.004]	[0.08]	[0.66]		[0.64]	[0.01]	[0.58]
Volume of Atlantic trade × initial institutions × Atlantic trader dummy				0.14	0.12				0.16	0.11
				(0.03)	(0.02)				(0.03)	(0.02)
R-squared	0.94	0.96	0.96	0.97	0.97	0.95	0.95	0.95	0.96	0.96
Number of observations	96	96	96	96	96	120	120	120	120	120
	Panel C: Dependent variable is constraint on the executive									
	Panel, 1300–1850	Panel, 1300–1850	Panel, 1300–1850	Panel, 1300–1850	Panel, 1300–1850, unweighted	Panel, 1500–1850	Panel, 1500–1850	Panel, 1500–1850	Panel, 1500–1850	Panel, 1500–1850, unweighted
Atlantic trader dummy × volume of Atlantic trade		0.43	0.42	−0.001	−0.096		0.35	0.34	−0.11	−0.15
		(0.06)	(0.06)	(0.12)	(0.12)		(0.05)	(0.05)	(0.10)	(0.09)
p-value for initial institutions × year (1600, 1700, 1750, 1800, 1850)	[0.27]		[0.14]	[0.008]	[0.69]	[0.43]		[0.33]	[0.01]	[0.95]
Volume of Atlantic trade × initial institutions × Atlantic trader dummy				0.44	0.26				0.47	0.29
				(0.11)	(0.09)				(0.09)	(0.07)
R-squared	0.76	0.81	0.82	0.84	0.76	0.72	0.77	0.78	0.70	0.71
Number of observations	192	192	192	192	192	240	240	240	240	240

Notes: Standard errors are in parentheses. Weighted panel regressions with full set of country and year dummies. Weights are total population in each country in each year, from McEvedy and Jones (1978). Dependent variable is urbanization in panel A, log GDP per capita in panel B, and constraint on the executive in panel C. Western Europe dummies interacted with years (from 1600) are included in all columns, but not reported to save space. Urbanization in Europe is from Bairoch et al. (1988), and urbanization in Asia is from Bairoch (1998). Log GDP per capita is from Maddison (2001). Constraint on the executive is coded from Langer (1972); initial institutions are the average of institutions in 1400 and 1500. We use the Atlantic trader dummy as the measure of potential for Atlantic trade. Volume of Atlantic Trade is the log average number of voyages per year and is demeaned. Main effects are evaluated at initial institutions equal to one. For data definitions and sources, see Appendix, Table 1.

to-area ratio measure are identical, and are contained in Acemoglu et al., 2002b). Panel A presents estimates of equation (3), while panel B presents estimates of a similar equation with log income per capita as the dependent variable. Panel C shows the role of the interaction between initial institutions and Atlantic trade for the evolution of institutions.

The results in all three panels are similar. The interaction between the aggregate measure of Atlantic trade and potential for Atlantic trade, ln $AT_t \cdot PAT_j$, is generally significant by itself, and also when entered against the $\gamma_t \cdot I_{j,1415} \cdot d_t$ terms. This shows that the ability to take advantage of Atlantic trade was of major importance for post-1500 developments. When we add the triple interaction ln $AT_t \cdot PAT_j \cdot I_{j,1415}$, this is typically the only significant term.[33]

[33] When the ln $AT_t \cdot PAT_j \cdot I_{j,1415}$ term is included, ln $AT_t \cdot PAT_j$ has typically a negative and sometimes significant

For example, the coefficient of 0.021 on this triple interaction term in column 4 implies that urbanization in an Atlantic trader with an initial constraint on the executive equal to 3, like the Netherlands, grew by 15.7 percentage points more than urbanization in an Atlantic trader country with the worst initial institutions, 1 ($0.021 \times 2 \times 3.74 \approx 0.157$, where 3.74 is the change in the log volume of Atlantic trade between 1500 and 1800).

These results imply that the patterns reported so far are explained almost entirely by the fact that countries with initially constrained rulers were able to take advantage of the opportunities presented by Atlantic trade. Although Spain and Portugal benefited from the transfer of resources from the New World during the sixteenth century, they neither developed the political institutions to support economic growth nor experienced sustained economic development. Our evidence suggests that these differential patterns are closely related to the fact that they started the post-1500 era with absolutist regimes in control of overseas activity. On the other hand, it appears that the Italian city-states, which started with relatively nonabsolutist institutions around 1500, did not experience further economic development because they did not have as easy access to the Atlantic as Britain and the Netherlands did. Britain and the Netherlands were the economic winners because they had both relatively good political institutions to start with *and* ready access to the Atlantic.

V. Conclusion

This paper documents a distinctive and interesting fact related to the process of European growth: between 1500 and 1850, the growth of nations with access to the Atlantic, and the growth of Atlantic ports, account for most of the differential growth of Western Europe relative to Eastern Europe. It therefore appears that the rise of Europe between 1500 and 1850 was largely the rise of Atlantic Europe and the rise of Atlantic ports. This fact weighs against theories of the origins of European development emphasizing distinctive European characteristics and purely internal dynamics, but is consistent with those that give a prominent role to Atlantic trade and deemphasize the continuation of pre-1500 trends or permanent European characteristics, such as religion, Roman heritage, or European culture. If these factors are important, it must be because of the interaction between them and the opportunity to trade in the Atlantic.

We suggested that Atlantic trade contributed to European growth through an indirect institutional channel as well as via its more obvious direct effects. Our hypothesis is that Atlantic trade generated large profits for commercial interests in favor of institutional change in countries that met two crucial preconditions: easy access to the Atlantic and nonabsolutist initial institutions. These profits swung the balance of political power away from the monarchy and induced significant reforms in political institutions, which introduced more secure property rights and paved the way for further innovations in economic institutions. With their newly gained property rights, English and Dutch merchant nations invested more, traded more, and spurred economic growth.

Our analysis stopped before West European industrialization, focusing instead on economic and political developments between the sixteenth and nineteenth centuries. Consequently, we did not investigate why some successful Atlantic nations, like the Dutch, did not industrialize early, while Britain and some non-Atlantic nations such as Germany did. We suspect that the answer is related to interstate competition, "defensive modernization" responses of certain European nations, and, possibly, the adverse effects of oligarchies on industrialization, but we leave further investigation of this issue for future research.

The process of early modern European growth is undoubtedly multifaceted. We are aware that our account leaves out many important aspects of the social and economic development of Western Europe. Our intention is not to offer a mono-causal explanation for the rise of Europe, but rather to suggest that Atlantic trade played a major role in this process. It is our hope that our hypothesis and the empirical patterns documented in this paper will encourage further research.

coefficient, reinforcing the conclusion that nations with absolutist institutions did not benefit much, or at all, from the opportunity to trade in the Atlantic. In addition, in three specifications in Table 7, the interactions between initial institutions and dates after 1600 are jointly significant, but the coefficients (not shown in the tables) are *negative*.

Appendix: Construction of Key Variables

Country-Level and City-Level Urbanization Data.—Calculated from the urban population dataset of Bairoch et al. (1988) and country population estimates from McEvedy and Jones (1978). Details are provided in the Appendix of Acemoglu et al. (2002b).

Trade Measures.—Acemoglu et al. (2002b) explain in detail the construction of Atlantic and Mediterranean trade volume measures. These series are annual average voyages equivalent for ships of 400 deadweight tons. The Mediterranean trade estimates are based on information on Venetian trade levels from Frederic Chapin Lane (1934), but we also include Genoa, Catalonia, and other trading centers (Carla Rahn Phillips, 1990). Estimates exclude short-haul coastal trade and trade by the British and Dutch—these countries also engaged in Mediterranean trade as they built their naval power and trading empires after 1600.

Key sources for our Atlantic trade series are de Vries (2003), Tracy (1990), Davis (1962), and N. Steensgaard (1974). We have also constructed an alternative Atlantic trade series based on Kevin H. O'Rourke and Jeffrey G. Williamson (2002). Robustness results using this series are reported in Acemoglu et al. (2002b). The growth of our volume-based Atlantic trade series matches closely the sum of annual value of Europe-Africa-New World commerce series in Inikori (2002, Table 4.8, p. 202) and de Vries' (2003) trade flows with Asia.

Estimates of British Profits from Trade.—All figures are approximately in 1600 prices using the index of building craftsmen's wages, constructed by Phelps Brown and Hopkins (1955), which shows a doubling of wages from 1500 to 1600, then a 50 percent increase from 1600 to 1650, followed by rough stability through 1700 and a further 50 percent increase during the eighteenth century.

1576–1600:—Rabb (1967, pp. 61–62) calculates that total profits from privateering in 1585–1603 were £700,000. Dividing by 25 years gives an average of £28,000 per year, approximately £40,000 in 1600 prices.

1601–1650:—Profits for the vertically integrated Dutch East India Company from 1630–1670 were 2.1m guilders (de Vries and van der Woude, 1997, p. 447); British trade with Asia was around a half of Dutch levels in the seventeenth century (de Vries, 2003); and the guilder-pound exchange rate fluctuated around 10, so total British profits from Asian trade (including interlopers and suppliers) were likely around £100,000 per annum (which is consistent with Chaudhuri, 1965). Around £10m was invested between 1600 and 1630 in joint stock companies active in the New World and Africa (Rabb, 1967). Even when a company failed to show returns, as with the Virginia Company, individual colonists and their suppliers could earn good profits. Privateering in the 1630s and 1640s was highly profitable (Craven, 1930). We assume the same level of earnings in the New World as in East India trade, i.e., £100,000 per annum, yielding an estimate of average annual profits of £200,000 in 1600 prices.

1651–1675:—From 1650 we use the annual value of export production in British America from Inikori (2002, p. 181). This was £421,000 in 1651–1670 and £2.7m per annum for 1711–1760; we take the average value for 1651–1700 to be £1m. O'Brien's (1982) numbers suggest that profits were 50 percent of import volume, implying profits of £500,000. To this, we add £100,000 per annum from the East India trade with the same calculation as above, yielding profits of £600,000 per annum, or approximately £500,000 in 1600 prices.

1676–1700:—Inikori's British America trade estimate is £2.7m per annum for 1711–1760; we assume £2m per annum for 1676–1700, which implies profits of £1m. Adding East India profits of £100,000 gives an average annual profit estimate of £1.1m, or £900,000 in 1600 prices.

1701–1750:—Inikori's British America trade estimate is £6.8m for 1761–1780; we take the average value for 1701–1750 to be £4m, thus profits of £2m. Adding again profits of £100,000 from East India gives an average annual profit estimate of £2.1m, about £1.7m in 1600 prices.

APPENDIX, TABLE 1—VARIABLE DEFINITIONS AND SOURCES

Variable	Description	Source
Log GDP per capita in 1500, 1600, 1700, 1820, and 1870	Logarithm of GDP per capita	Maddison (2001)
Population in 1000, 1200, 1300, 1400, 1500, 1600, 1700, 1750, 1800, and 1850	Total population	McEvedy and Jones (1978)
Urban population in 1000, 1200, 1300, 1400, 1500, 1600, 1700, 1750, 1800, and 1850	Population living in urban areas	Bairoch et al. (1988), as described in the Appendix. We use Bairoch (1988) for urbanization in Asia and Chandler (1996) for Asian city population.
Atlantic and Mediterranean ports	City that is on the Atlantic or Mediterranean	Bairoch et al. (1988) for cities; location from Doring Kindersley (DK) Publishers (1997).
Ratio of Atlantic coastline to area	Length of Atlantic coastline divided by land area. Both assume modern borders. Atlantic coastline includes the whole coast of Portugal, Ireland, Belgium, the Netherlands, and Britain. It also includes half the coastline of Spain, two-thirds the coastline of France, half the coastline of Germany, one-quarter the coastline of Denmark, and half the coastline of Norway.	Coastline is from Integrated Coastline Management (on the Web). Land area is from the World Bank, *World Development Indicators,* CD-Rom, 1999.
Dummy for Atlantic trader	Equals one for Britain, France, the Netherlands, Portugal, and Spain	Coded by authors based on composition of Atlantic trade. Acemoglu et al. (2002b) for details.
Dummy for Atlantic port	Equals one for a city that was used as an Atlantic port; zero otherwise	Bairoch et al. (1988) for cities; location from DK Publishing (1997).
Dummy for potential Atlantic port	Equals one for a city that is on the Atlantic; zero otherwise	Bairoch et al. (1988) for cities; location from DK Publishing (1997).
Volume of Atlantic trade	Average voyages per year equivalent	See Appendix. Acemoglu et al. (2002b) provide full details.
Constraint on executive in 1800, 1850, 1960, 1970, 1990, and intervening years	A seven-category scale, from 1 to 7, with a higher score indicating more constraints. Score of 1 indicates unlimited authority; score of 3 indicates slight to moderate limitations; score of 5 indicates substantial limitations; score of 7 indicates executive parity or subordination. Scores of 2, 4, and 6 indicate intermediate values.	Polity IV dataset, downloaded from Inter-University Consortium for Political and Social Research. Variable described in Gurr (1997).
Constraint on executive from 1000 to 1800	A seven-category scale, from 1 to 7, with a higher score indicating more constraints. Score of 1 indicates unlimited authority; score of 3 indicates slight to moderate limitations; score of 5 indicates substantial limitations; score of 7 indicates executive parity or subordination. Scores of 2, 4, and 6 indicate intermediate values.	Coded by authors from Langer (1972); see Appendix for more details.
Religion variables	Majority religion of city or country	Coded by authors from Langer (1972)
Roman heritage	Coded equal to one for countries that were part of the Roman Empire and not subsequently part of the Ottoman Empire.	Coded by authors from Langer (1972)
Wars per year	Number of years of war in preceding 50 or 100 years. Civil wars and colonial wars outside Europe are excluded.	Coded by authors from Kohn (1999)
Latitude	Absolute value of the latitude of the country, scaled to take values between 0 and 1, where 0 is the equator	Country data from La Porta et al. (1999). City data from Bairoch et al. (1988).

1751–1800:—Inikori's British America trade estimates of £19,545 for 1781–1800 implies annual profits of around £10m, i.e., double O'Brien's profit estimate (approximately £5m in 1600 prices).

It is worth noting that our profit estimates would be significantly higher prior to 1650 if we also included British and Dutch trade in Asian goods passing through Portugal, Spain, and the Levant (Israel, 1989; Brenner, 2003).

Religion.—From Langer (1972) and Stearns (2001), Britain, the Czech Republic, Denmark, Finland, Germany, the Netherlands, Norway, Sweden, and Switzerland were majority Protestant in 1600. Germany was largely Protestant, but the balance remained unclear until the end of the 1600s. The results are robust to coding Germany as Catholic. We have also tried an alternative specification in which religion is coded directly as Catholic, Muslim, Orthodox, or Protestant, with essentially identical results.

Roman Heritage.—From Langer (1972) the following countries had a Roman heritage: Belgium, Britain, France, Italy, the Netherlands,

Portugal, Spain, and Switzerland. Bulgaria, Greece, Romania, and Yugoslavia had their Roman traditions eradicated by a long period of Ottoman rule. If they are also coded with Roman heritage, the effect of this variable is weakened further.

Wars.—George Childs Kohn (1999) lists the dates of every European war from about AD 1000, and a brief explanation of participants, duration, intensity, and outcome. We calculate the average number of years of war in a time interval before each date in our dataset: for the preceding 100 years through 1700 and for the preceding 50 years for 1750, 1800, and 1850, excluding purely civil wars and colonial wars outside Europe. Alternative codings such as dropping "minor" wars does not affect our main results. Kohn (1999) does not provide reliable information on the wars of Finland and Greece during this period, so we drop these countries from regressions involving the "wars per year" variable.

Constraint on Executive.—This variable is coded using the method of Polity IV as described in footnote 32. Our primary source in this exercise is the historical encyclopedia of Langer (1972), supplemented with Stearns (2001). Acemoglu et al. (2002b) provide more details on our coding, the full series, and robustness checks with some reasonable alternatives. We also checked our results using the three codings of institutions in De Long and Shleifer (1993), which are somewhat different from ours, for example awarding a much better score to feudal systems than does coding based on the Polity criteria. Using their measures leads to very similar results to those reported in the text.

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