

Part III:

History as Social Science:

Statistics, Summaries,

Methodological Notes,

and Conclusions

Chapter 19: Quantitative Evidence of Gradual Reform

Anyone who has attempted to keep a diary knows that faithfully recording history is nearly impossible, even in very small number settings. There is much that must be left out because of space and time constraints. Both deductive and inductive approaches to understanding history face similar problems in this respect. Just as every historical narrative can potentially be more complete, so can every model. Indeed, many, perhaps most, debates among historians, political scientists, and economists arise from disagreements about whether variable x or event y has been inappropriately neglected or focused on by others.

Statistical inference rarely ends debates over the relevance of models or variables, but it does allow hypothesized relationships to be examined systematically and often sheds light on the extent to which particular relationships and variables can account for the events of interest. With this in mind, this chapter develops quantitative evidence and statistical tests to assess the explanatory power of the model of constitutional reform developed in part I. The estimates and tests conducted in chapter 19 broadly support the main hypotheses: (a) that democratic governance arose gradually through a series of parliamentary and electoral reforms and (b) that constitutional and economic liberalization were interdependent phenomena during the nineteenth century.

A. The Temporal Structure of Political and Economic Development

The models developed in part I provide an explanation for ongoing reforms and for time dependency among institutions and policies. Institutions and policies are adjusted from time to time, because the circumstances and goals of persons with the authority to adopt reforms change through time. Not all such changes induce institutional reforms, because risk aversion, information problems, institutional interests, and advantages of stability produce considerable institutional conservatism. The cumulative effects of a series of small changes, or major changes, however, may produce sufficient interest in reform to satisfy the rules for formal and informal amendments. Together constitutional conservatism, changes in circumstances, and bargaining among political elites tends to imply that institutional reforms are normally modest changes of a subset of existing procedures or policies, rather than major reforms of most procedures or policies.

Another implication of the bargaining process is that policies and institutions exhibit “inertia,” rather than complete path dependency. That is to say, constitutions are not independently created in a vacuum. Although, the models characterize the decisions of a single polity at a moment in time, the same exogenous changes in circumstances may pose similar problems or create similar new

possibilities for several polities at a time. It is partly for this reason that constitutional reformers and their opponents can learn from the experience of other polities and successful reforms can be copied. The ability to observe the outcomes of the policy adjustments of other polities provides useful evidence about the effects of particular reforms. Because many of the problems and possibilities confronted are similar, their solutions will also be broadly similar, even when adopted at somewhat different times by different people in somewhat different circumstances. The most effective reforms adopted by other countries can be used as the basis for new policies, which produces convergence among institutions and policies. The presence of common “shocks” implies that polities with similar political institutions may adopt constitutional reforms at about the same time. A trend in reforms among countries can thus occur when there is a broad trend in shifting interests and/or circumstances that are relevant for political bargaining and compromise in several countries at the same time.

The historical narratives provide considerable evidence of both stability and convergence during the medieval period. Medieval forms of king and council governance were stable for centuries at a time, although there were reforms and counter-reforms. The new technologies affected the medieval bargaining equilibrium in a number of ways. New nonagricultural forms of wealth were possible, and these often required eliminating existing economic regulations or new public services to be profitable. The same technologies, thus, affected demands for public services such as highways, canals, and railroads, as well as reforms to open markets. Many also increased the cost and sophistication of capital used for military purposes. Liberal political and economic ideas were enlisted to justify modest reforms of medieval economic and political systems that had long stressed exclusivity, rather than openness and civil equality.

Trends in reforms that emerged in the nineteenth century seem to have been produced by trends in technological and ideological developments, and to some extent by the institutional reforms themselves. The rate of technological improvement accelerated during the nineteenth century, and liberalism, generally speaking, became more liberal, i.e. more supportive of open political and economic systems with equality before the law. The early policy and constitutional reforms also affected subsequent rates of innovation by expanding markets (which encouraged greater specialization and competition), increasing support for technical education (which increased both academic research and the dissemination of research results), reducing censorship, and facilitating travel. Industrialization, in turn, created a new more educated and mobile middle class, which tended to increase the number of persons with an interest in public education,

commercialization, and political liberalization. Upward mobility required eliminating medieval privileges in economics and politics.

There were common patterns in the reforms adopted because of portability of ideas and because of similarities in their initial circumstances and political institutions, which created similar opportunities for constitutional bargaining and exchange. Production technologies, scientific advances, and new liberal normative theories were universalist, rather than grounded in particular regional customs, histories, or religions. In principle, they could be applied everywhere.

Because technologies and reforms were adopted in slightly different orders in the affected countries, policy debates could include evidence of the effects of technological change and policy reforms in other countries. Among idealists, it could be said that the case for greater civic equality was made and gradually won. Among pragmatists, support for liberal reforms was largely a consequence of their own anticipated potential economic and political advantages from liberal reforms, which were often made clear by the effects of earlier reforms adopted in other countries.

Overall, there was a good deal of “bootstrapping” in the liberalization of Western governance, markets, and society. Internal and external trade was liberalized, support for public education was increased, the policymaking authority of parliament gradually increased, and suffrage gradually equalized and expanded. Secret ballots were introduced, bureaucracy was professionalized, and women’s suffrage adopted. As a consequence—or so it was often argued—average income and wealth increased, tax revenues increased, and military strength increased.

Economic liberalization often advanced political liberalization, and political liberalization often supported economic liberalization. Although each transition includes unique features, the Western transitions were broadly similar and occurred for the most part in the century between 1825 and 1925.

Constitutional Reform and Economic Development as Time Series

Many features of the reforms predicted by the models seem so evident in the historical narratives, that further empirical analysis seems unnecessary. On the other hand, the historical narratives were written with the models in mind, and it is possible that the factors focused on were given greater prominence than they deserved. It is also possible that the pattern of reform was less regular and predictable than the narratives make them appear, in part because so much has been left out. The narratives focus on particularly important constitutional bargains, rather than the thousands of small procedural matters decided in the course of the nineteenth century. Some light can be shed on the explanatory power of the model by conducting statistical tests.

Subjecting the models to statistical tests requires a somewhat more quantitative and coarser formulation than used in the narratives. Recall that the models of part I imply that the bargaining equilibrium determines the nature of a government's constitution (C_t) in period t . These reflect preexisting distributions of ideological (I_{t-1}) and economic (W_{t-1}) interests; the preexisting constitutional architecture (C_{t-1}), and political shocks (v_{t-1}) random "shocks" in the previous period that affect the bargains reached by the parliament and the king. Some of these shocks may be sufficiently large to be considered crises, but crises are not necessary for constitutional reforms to be adopted.

The extent of economic liberalization (L_t) in period t reflects past political decisions and so the extent of economic liberalization is determined by the same political and economic variables as those that determine the current constitution. The distribution of human capital (E_t) reflects past education policies and the distribution of wealth (W_t); so it is largely determined by the same past political and economic variables as constitutional and economic liberalization. The distribution of economic interests (W_t) is largely determined by economic regulations (L_t), the past distribution of available resources (including human capital), the state of production technology (T_t) and economic shocks (u_t). Economic inertia exists because the distribution of natural resources and capital (physical, human, and organizational capital) and past regulations tend to change relatively slowly because of institutional conservatism with respect to economic regulations and the economic enterprises themselves. Consequently, W_{t-1} is an important determinant of present economic opportunities.

The general temporal logic of the models can be summarized with a series of intertemporal equations:

$$C_t = C_{t-1} + c(I_{t-1}, W_{t-1}, v_t) \tag{19.1}$$

$$L_t = l(I_{t-1}, W_{t-1}, C_{t-1}, v_{t-1}, u_{t-1}) \tag{19.2}$$

$$E_t = e(I_{t-1}, W_{t-1}, C_{t-1}, v_{t-1}, u_{t-1}) \tag{19.3}$$

$$W_t = W_{t-1} + x(L_t, T_t, E_t, u_t) \tag{19.4}$$

To simplify for the purposes of statistical analysis, C_t can be thought of as an index of liberal democracy, W_t as average real wealth, and I_t as an index of the liberalness of the ideology of the median member of parliament. Natural resources are assumed to be determined by national boundaries, geographic location, and geological factors, which are taken as given for the period of

interest. Technology and ideology are exogenous variables in this model, and reflect past innovations and experience in science and philosophy. Note that even with these simplifications, time dependency in a constitutional bargaining model is not an unexplained property of the “error term,” but rather is predicted by the internal logic of the model.

The implicit function theorem allows the constitutional and economic systems to be characterized as functions of the predetermined and exogenous variables.

$$C_t = \alpha(u_t, v_t, C_{t-1}, W_{t-1}, I_{t-1}, T_{t-1}, v_{t-1}, u_{t-1}, I_{t-2}, T_{t-2}, v_{t-2}, u_{t-2} \dots) \quad (19.5)$$

$$W_t = \chi(u_t, v_t, C_{t-1}, W_{t-1}, I_{t-1}, T_{t-1}, v_{t-1}, u_{t-1}, I_{t-2}, T_{t-2}, v_{t-2}, u_{t-2} \dots) \quad (19.6)$$

These reduced forms demonstrate that constitutional and economic systems are interdependent and substantially determined by similar past chance events and innovations.

Constitutional liberalization and economic development are predicted to be highly correlated, because they are determined by the same variables.

Unfortunately, there are no good quantitative measures of the magnitude of past ideological and technological changes. Indeed, the importance of particular innovations are normally assessed by looking at their economic and political impacts, rather than through independent measures of the innovations themselves (Burke 1978, Mokyr 2002).

This data problem can be bypassed to some extent, if innovation can be regarded as a stochastic process. It can be argued that innovations are substantially unpredictable insofar as they are produced by men and women with random collections of talents and knowledge, whose new ideas are catalyzed by chance events.⁴⁴² In this case, the ideology and technology sequences are analogous to those of v and u , and can be treated in a similar manner for purposes of statistical tests.

This additional assumption allows equations 19.5 and 19.6 to be approximated as:

$$C_t = \gamma(C_{t-1}, W_{t-1}, u_t, v_t, z_{t-1}, z_{t-2} \dots) \quad (19.7)$$

$$W_t = \chi(C_{t-1}, W_{t-1}, u_t, v_t, z_{t-1}, z_{t-2} \dots) \quad (19.8)$$

with

⁴⁴² If ideological and technological shocks are not be completely exogenous, one could represent such innovations with functions such as $T_t = s(T_{t-1}, E_{t-1}, L_b^E, W_{t-1}, \xi_t, u_t)$ and $I_t = i(I_{t-1}, E_{t-1}, C_{t-1}, W_{t-1}, v_t, \xi_t, u_t)$. These relationships can be substituted into equations 19.5 and 19.6, and would yield reduced forms similar to those of 19.7 and 19.8, but without explicit technological and ideological variables. Nonetheless, if genius and/or luck are required for innovation, the “genius factor” ξ_t remains an important variable both in the T and I models and in the reduced forms. In such cases, “genius” and “luck” drive both economic and constitutional development in the long run, which provides a role for exceptional men and women in the model.

$$z_{t-1} = v_{t-1} + u_{t-1} + T_{t-1} + I_t \quad (19.9)$$

Equations 19.7 and 19.8 are similar to those used in most contemporary empirical work on the political economy of institutions, although the models predict that the stochastic parts of even reduced form models tends to be serially correlated and are likely to be mixed, rather than pure, distributions. The models also differ from much empirical work in that they do not imply unidirectional causality or particular trigger points at which democratic politics or market economies become feasible.⁴⁴³ Instead, the models imply that a continuum of government and market types exist, and that it is that continuum which allows peaceful and gradual transitions to parliamentary democracy and to market-based economies.

B. Descriptive Statistics for the Nineteenth Century

Economic historians and political scientists have constructed macroeconomic and macro-political data sets for the nineteenth century. These data are less precise than their contemporary counterparts, but are sufficient to shed some light on the extent to which the model developed in part I can account for constitutional developments in the nineteenth century.

For example, per capita gross domestic production data in the nineteenth century can be used to proxy personal income. There are a few conceptual problems with doing so in contemporary work, as not all sources of income or economic welfare are measured. These problems are greater in the nineteenth century. GDP, itself, is less precisely measured, because the component data are not nearly as complete. Nineteenth-century GDP data are not based on extensive survey data, but are estimated from models that link GDP to other available quantitative data, such as tax and trade flows. Another problem is that, conceptually, gross domestic product is based on market activity, rather than total domestic production or income. Household production was a much larger fraction of personal income during the first part of the nineteenth century than at the century's end, as more of economic life took place in the money economy in 1900 than in 1800. The gradual reduction in household production during the nineteenth century implies that GDP per capita provides an estimate of average income that is more biased downward in the early part of the century than in the last part of the century, and also that growth rates of personal income are biased upward.⁴⁴⁴

⁴⁴³ For an extensive overview of the contemporary literature on the interdependence between economic and political development, see Paldam and Gundlach (2008). Congleton and Swedenborg (2006) provide an overview of the contemporary rational choice–based empirical research on the policy effects of alternative democratic constitutions.

⁴⁴⁴ This bias may be offset to some extent by reductions in environmental amenities, but tends to be increased by reduced access to communal resources.

Political indicators are also problematic for much of the nineteenth century. With the exception of vote counts and seats in parliament, evidence about the nature of constitutions is inherently less numerical than data about economic income. Even election data tend to be sparse in the early part of the nineteenth century, because voting was often by voice and division, rather than ballot, and because elections for seats in parliament were often not contested. Data on party affiliation are also unreliable during the first half of the nineteenth century, because disciplined political parties emerged in most of Europe only in the late nineteenth century, although various more or less stable factions have long existed. The absence of party platforms and good voting records implies that the standard measurements of party and voter ideology are unavailable.

Moreover, one can say with some confidence that average wealth or suffrage are each twice as large in country A than in country B, but one cannot so easily conclude that the parliament in country A is twice as powerful or its government twice as democratic as that of country B.

Quantitative Indices of the Relative Authority of King and Council

The competitiveness of elections for higher office and changes in authority through time, however, can be assessed by experts, and several attempts have been made to construct indices of democracy for the nineteenth century. The Polity IV data base extends back to 1800 for many countries. That data series is based on expert appraisals of a number of common characteristics for the countries of interest. These characteristics are used to create numerical “subindices,” which are then aggregated into two widely used indices of democracy. Polity’s 0–10 index of democracy is the most relevant for the purposes of this book. It is computed from several subindices that characterize formal constitutional procedures and de facto political procedures, as judged by various country experts.

Unfortunately for the purposes of this book, the index of democracy focuses for the most part on the procedures through which a country’s “chief executive” comes to office, rather than on the distribution of policymaking authority between the executive and parliament, or the election laws for parliament. Democracies (10) have broadly competitive systems for choosing their executives, institutional constraints on governance, and guarantees for civil liberties. The widely used Polity index is a similar -10 to +10 index that subtracts an index of autocracy from the democracy index. Autocracies have executives that are chosen by a narrow elite, who can govern without significant institutional constraints.

In nineteenth-century parliamentary systems, determining who the chief executive is and whether he or she is elected or not requires determining whether the prime minister or king is

actually the chief executive in a given year, and who ultimately chooses the prime minister. As noted above, the precise manner in which prime ministers are chosen and their authority relative to the king is rarely codified in constitutional documents. Consequently, the polity indices implicitly require assessing the relative importance of policies controlled by the king and cabinet and the extent to which the king or parliament determines the membership of the cabinet. Because of this, one of the democracy subindices, XrComp, sheds light on one of the key shifts in authority required for the emergence of parliamentary democracy in the nineteenth century.⁴⁴⁵ Other subindices for the democracy index provide coarse assessments of the extent to which “chief executives” are politically and constitutionally constrained, which tends to reflect parliamentary authority and judicial independence.⁴⁴⁶

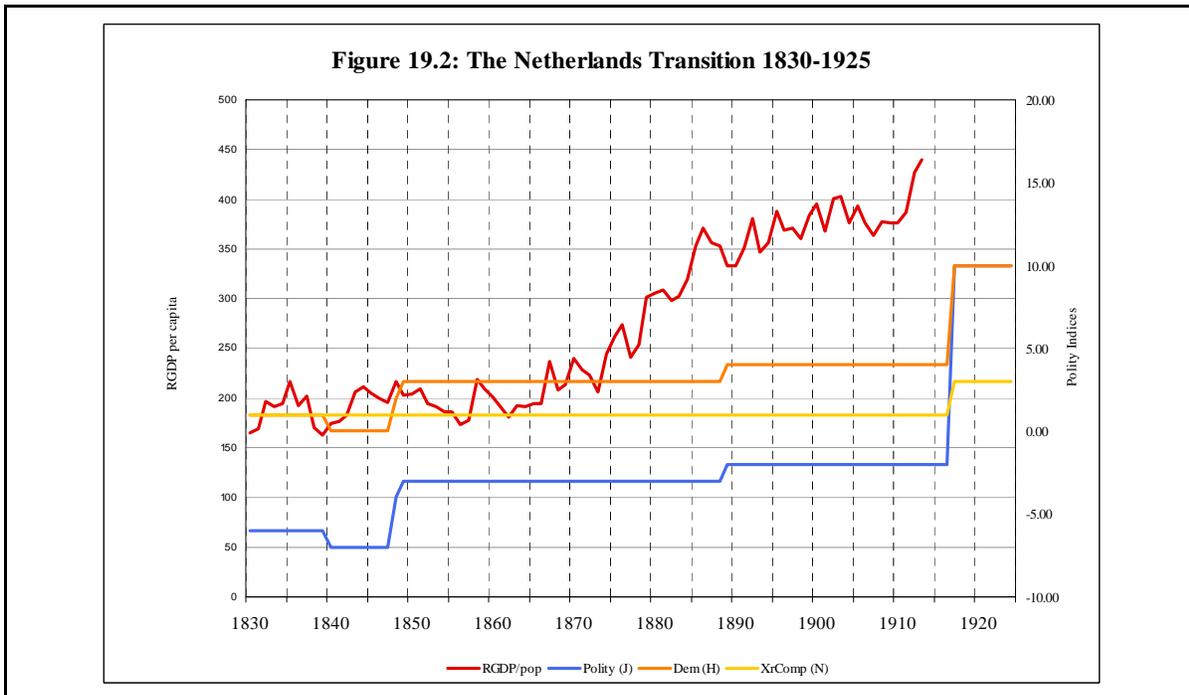
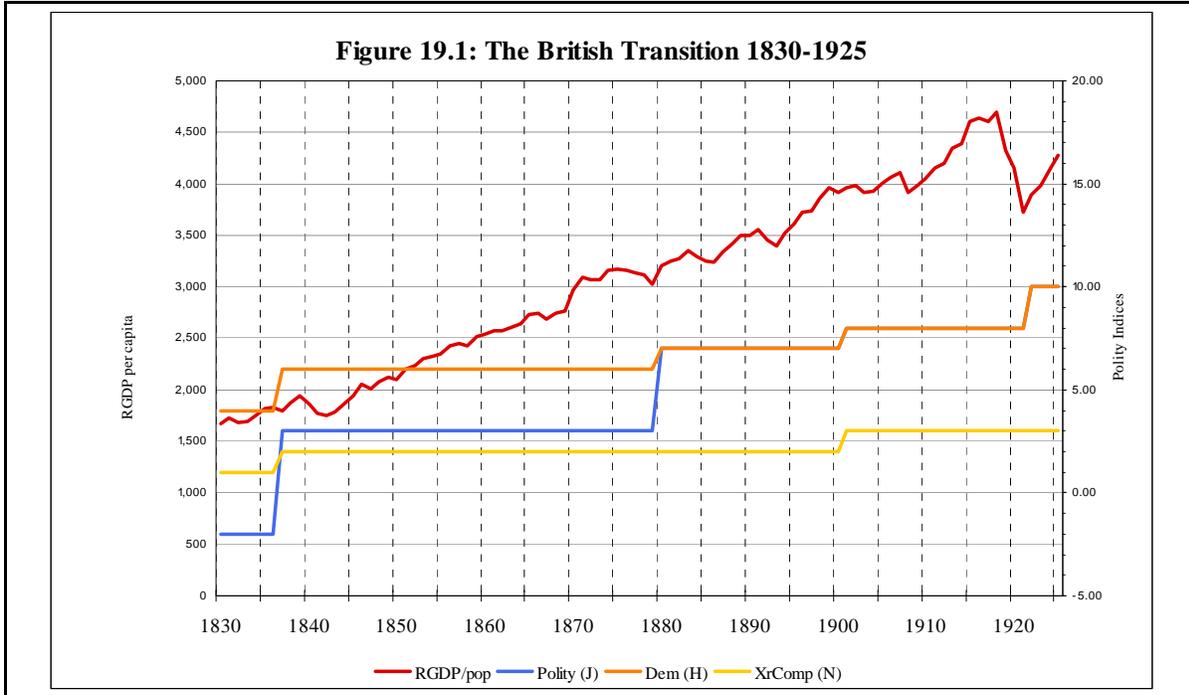
Some Suggestive Data Plots

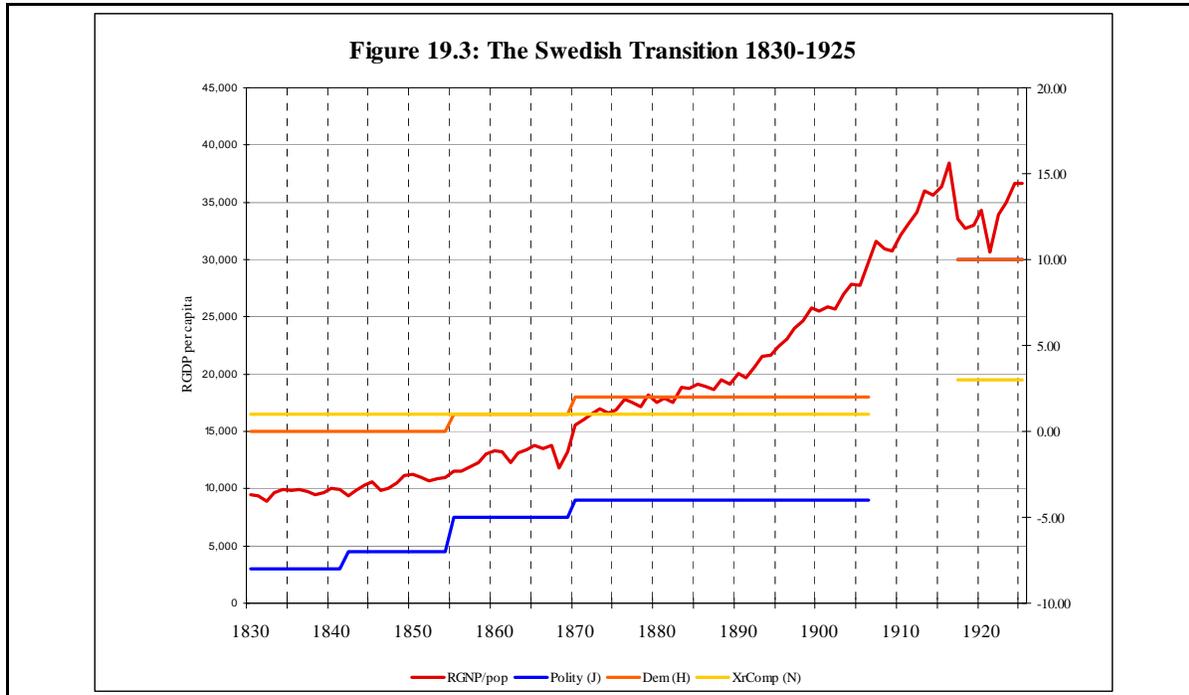
Figures 19.1, 19.2, and 19.3 plot economic and political indicators for the United Kingdom, Sweden, and the Netherlands. The figures include per capita gross domestic product in constant dollar terms (RGDPpp) and three Polity indices. The RGDPpp data are from Offisor (2006) for the United Kingdom, from Van Zanden (2000) for the Netherlands, and from Edvinsson (2005) for Sweden.⁴⁴⁷ The political liberalization indices include (i) the executive competition subindex, XrComp, which takes values from 1–3, (ii) the polity democracy index, which takes values from 1–10, and (iii) the polity index, which takes values from –10 to +10. Because there are different experts for different countries, cross-country comparisons are less than completely reliable, although the country indices are internally self-consistent.

⁴⁴⁵ Polity suggests that XrComp characterizes the competitiveness of executive recruitment. It includes consideration of the selection process (hereditary, designated, or elected). In nineteenth-century Europe, a value of 1 implies royal dominance, 2 sharing between a king and an elected prime minister, and 3 dominance by an elected prime minister (Marshall and Jaggers 2005: 24). Clearly, three categories can only roughly measure the continuum of policymaking authority.

⁴⁴⁶ The democracy index is an 11 category index that attempts to represent three characteristics: (1) the existence of institutions through which citizens “express effective preferences about alternative policies and leaders,” (2) the extent to which there are “institutionalized constraints on the exercise of power by the executive,” and (3) aspects of civil liberties and the rule of law. The index attempts to measure “the competitiveness of political participation, the openness of executive recruitment, and constraints on the chief executive.” Many of the subindices are simple 0-1 variables. (Marshall and Jaggers 2005: 17–18).

⁴⁴⁷ Most studies of this period rely on Maddison’s (2003) compilation of data. I use the country-level studies of Van Zanden, Offisor, and Edvinsson, which were created after the initial Maddison studies and make use of more recently available information. Trends in the Maddison RGDP per capita estimates are similar to these individual country studies.





The data plots reveal that average income increased more or less continuous during the nineteenth century in Great Britain, the Netherlands, and Sweden, although there were several business cycles. Business cycles are evident in spite of the fact that the estimated RGDPpp data have been smoothed somewhat by researchers to reduce various measurement errors. Indeed, many of the business cycles were severe and international in scope.⁴⁴⁸

The political indices also show a gradual increase in the democratic basis of executive political authority, as kings became less important and prime ministers and parliament more so during the century. The latter is directly indicated by the executive competition index, which unfortunately takes only three values. The political indices have also been smoothed somewhat, but their integer values tend to make very gradual transitions appear to be step functions. Both real per capita GDP and the political indices of democracy increase gradually throughout the period, although the timing of economic growth and institutional reforms differ somewhat in these three countries.⁴⁴⁹

⁴⁴⁸ See Jacobs and Smits 2001. Van den Berg et al. (2006) note that business cycles in the nineteenth century had significant effects on quality of life and mortality.

⁴⁴⁹ The polity indices for Sweden rise more slowly than seems consistent with the rise of parliament and expansion of Swedish suffrage in the late nineteenth century. The distribution of authority over the cabinet (as opposed to authority over budgets) was not completely resolved until the twentieth century. As noted in chapter 14, significant reforms of its parliament were adopted in

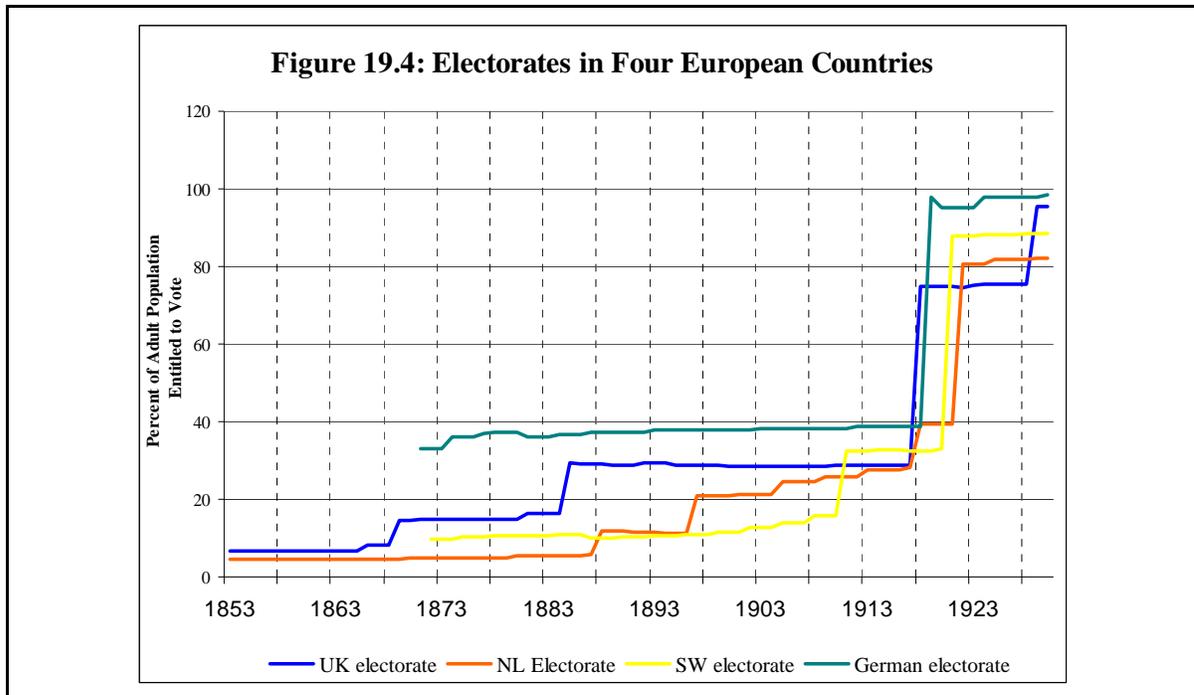
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Quantitative Indicators of Suffrage Reform

A more direct indicator of the use of democratic procedures for selecting members of parliament, as opposed to the chief executive, is the number of votes cast in national elections for seats in parliament. Records exist for suffrage law reforms, population, and the number of votes cast in late nineteenth-century elections. This information has been used by Flora et al. (1983) to calculate eligibility to vote within Europe, although the estimates do not cover the entire nineteenth century. Time series of eligibility for the United Kingdom, the Netherlands, Sweden, and Germany are plotted below in figure 19.4. (Aidt provided the interpolated values of the Flora estimates.)

The Flora calculations clearly indicate a gradual expansion of suffrage—more or less as step functions for the countries depicted. Suffrage reform was not an all-or-nothing revolutionary event, rather significant reforms were adopted occasionally throughout the nineteenth century. Several significant revisions are evident in each of the four countries. The individual “steps” tilt upward somewhat, reflecting the suffrage effects of increasing personal wealth under the existing wealth-based suffrage laws.

that period. For example, the 1907 election law reforms established universal (unweighted) suffrage and proportional representation for the selection of parliament. Negotiation over control of the executive, however, remained informal and was resolved in favor of parliament during this period. This result is reflected in the increases in competition for the executive competitive index (XrComp), which from 1916 on, focuses on the prime minister, rather than the king. It is also reflected in the democracy index, which includes XrComp as a major component. Some of the coding for the Swedish case is coded as “88” from 1907–16, which indicates a period of “transition” (Marshall and Jagers 2005: 18) in which the usual indices cannot be definitively judged. This coding indicates that there was greater ambiguity in this period than usual over who could appoint the cabinet and prime minister. Although there were several large public demonstrations in favor of economic and political reform, elections continued to be held as constitutional reforms were introduced, debated, and adopted. Some of the reforms adopted in this period had delayed effects, for example, turnover in the upper chamber took place during nine years. The effects of parliamentary reforms are only indirectly reflected in the Polity indices (Congleton 2003, ch. 3; Verney 1957, ch. 8–9).



Voter turnout in the early nineteenth century is more difficult to assess than eligibility to vote, because early elections were often by voice vote, and many candidates for parliament ran unopposed before the emergence of well-organized national political parties. Both factors tended to make casting votes less important in the early nineteenth century. This may have reflected the relatively smaller influence of parliaments at that time. Vote tabulations, however, are available for the second half of the nineteenth century, as more elections for seats in parliament were contested and as paper ballots and secret ballots were introduced. Table 19.1 lists votes cast, population, and fraction of the population voting using data from Paxton and Cook (1998) for the number of voters and population. The Paxton and Cook data for the Netherlands and Sweden are supplemented by data taken directly from Dutch and Swedish election records.

Population figures from national census data do not align perfectly with election dates and are interpolated from the nearest available data points. Turnout rates are rough approximations, based on the assumption that adults make up half of the population and that the adult population is equally divided between men and women. As long as the true ratios are stable, the relative magnitudes of turnout will be similar to those included in the table. Note that electoral participation gradually expands both numerically and proportionately throughout the century. It bears noting that the

largest suffrage reforms occurred just before or just after World War I, when most adult women became eligible to vote.

Table 19.1
Votes Cast in National Elections and Population
in Nineteenth-Century Netherlands, Sweden, and the United Kingdom
(in thousands, from Cook and Paxton, *European Political Facts 1848-1918*)

Election Years (NL and UK)	Netherlands			Sweden			United Kingdom		
	Voters	Pop (interpolat ed)	Turnout (est)	Voters (nearest yr)	Pop (interpolat ed)	Turnout (est)	Voters	Pop (interpolat ed)	Turnout (est)
1831							435.4	26081.571	0.033
1833							652.8	26211.457	0.05
1866							1056.7	30206.1	0.07
1869							1995.1	30973.32	0.129
1883							2618.5	35454.42	0.148
1886							4380.5	36308.85	0.241
1888	292.6	4471.267	0.131	274.7	4719.196	0.116			
1891	293.8	4629.92	0.127	288.1	4784.98	0.12		37732.9	
1894	299.1	4807.7	0.124	339.9	5101.258	0.133			
1897	576.6	4985.48	0.231						
1901	609.6	5254.84	0.232				6730.9	41458.7	0.325
1905	752.7	5556.52	0.271						
1909	843.5	5858.2	0.288	503.1	5445.2	0.185	7710	44976.44	0.343
1913	960.6	6243.4	0.308	1066.2	5558.837	0.384			
1918	1081.5	6690.1	0.323	1124	5777.462	0.389	21392.3	43833.754	0.976
1922	1844.8	7079.36	0.521				21127.6	42957.442	0.984

Together, figure 19.4 and table 19.1 demonstrate that election law and the pattern of voting changed fundamentally between 1850 and 1925. They also demonstrate that suffrage reform did not take place in one revolutionary step, but through a series of reforms. In the period just before World War I, the lower chambers of parliament were elected by universal male suffrage via secret ballot. Very shortly afterward, suffrage for most adult women was introduced.

Overall, the data plots and table support the hypothesis that the cumulative changes in economic and political life during the nineteenth century were “revolutionary,” but that the “revolution” was the consequence of a series of reforms, rather than a single great innovation or change in institutions.⁴⁵⁰ This pattern of reform is evident for the constitutional monarchies of Great Britain, Sweden, and the Netherlands. Similar tables and diagrams could be constructed for Belgium, Denmark, Italy, and Japan, and also for the republics of the United States, Switzerland, and France. Although each of these countries had a somewhat different path of electoral and parliamentary reform, their beginning and end points were remarkably similar.

In combination with the Polity indices, the data support the contention that substantially new procedures for selecting public policy gradually emerged in the nineteenth century. Broadly elected parliaments gradually obtained broad authority over public policy (through their prime ministers).

C. Statistically Significant Correlations

The same data sets allow statistical tests of some of the “bootstrapping” hypotheses of the bargaining model of constitutional reform. For example, equations 19.7 and 19.8 imply that there will be significant correlation between per capita RGDP and the democracy indices during the nineteenth century. Such correlation is evident in the figures above, insofar as RGDP per capita and the various Polity indices of democracy generally increase throughout the century.

To determine whether or not these visual regularities are statistically significant, regressions were run on real per capita GNP and the democracy index for the period from 1830 to 1929 for the United Kingdom, the Netherlands, and Sweden. These are the countries that best fit the model, which are also the ones for which the democracy index provides the best measure of the degree of political liberalization. Linear estimates of equations 19.7 and 19.8 are reported in table 19.2.

⁴⁵⁰ It seems clear, for example, that women’s suffrage was based on ideological considerations, rather than a response to revolutionary threats or economic development. The women’s movement never organized armed militias, nor did economic income expand at unprecedented rates in the decade before suffrage was granted to women. A majority of men (who were directly represented in parliament) had become persuaded that women were sufficiently competent and independent to cast a thoughtful vote.

Table 19.2
Ordinary Least Squares Estimates
of the Relationship between Real Domestic Product
Per Capita and Polity's Democracy Index
 United Kingdom, Netherlands, and Sweden
 1830–1929

	UK RGDP per capita (ls)	UK RGDP per capita (arch)	NL RGDP per capita	SE RGDP per capita
Constant	-588.435 (-2.47)**	-1017.974 (-8.32)***	140.654 (8.86)***	12584.35 (23.97)***
Democracy Index	545.860 (34.16)***	630.203 (38.78)***	46.751 (8.94)***	2515.341 (19.31)***
R-square	0.72	0.68	0.49	0.81
F-statistic	255.33***	39.83***	79.93***	373.21***
DW	0.16	1.7	0.15	0.06
N Observations	100	100	84	90
	UK Democracy (LS)	UK Democracy (Arch)	NL Democracy (LS)	SE Democracy (LS)
Constant	2.667 (9.89)***	3.863 (13.72)***	-0.0864 (-.25)	-3.584 (-10.37)***
Real GDP per capita	0.001 (15.97)***	0.001 (15.25)***	0.011 (8.94)***	0.000322 (19.32)***
R-square	0.72	0.94	0.49	0.81
F-statistic	255.33***	252.98***	79.93***	373.21***
DW	0.19	1.42	0.15	0.05
N Observations	100	99	86	90

* Denotes significance at the 10 percent level. ** Denotes significance at the 5 percent level.
 *** Denotes significance at the 1 percent level.

The hypothesized positive correlations between economic and political developments are present at statistically significant levels. Similar correlations between income and political developments are often found in studies of late twentieth-century governance in cross-sectional and panel studies. See, for example, Lipset (1959), Grier and Tullock (1989), Knack and Keefer (1995), Przeworski (2000), Bueno de Mosquita et al. (2003), and Paldam and Gundlach (2008).

The model also has implications about the stochastic component of the estimates. The models imply that both systematic and stochastic components should be evident and important. When pivotal decisionmakers differ in their goals, face different circumstances, or have somewhat different information, they will favor somewhat different policy and institutional reforms. The statistical results support this prediction, insofar as “unsystematic factors” are evident in each of the estimates

reported above. The “error terms” account for a significant fraction of the variation in the economic and democratic developments in the United Kingdom, the Netherlands, and Sweden.

The model also predicts that the stochastic components of the model estimates should exhibit time dependency, because of institutional conservatism and the cumulative nature of physical, human, and organizational capital. Changes in technology and ideology that are not immediately reflected in political liberalization or average income will create a time dependency in the stochastic components of equations 19.7 and 19.8. The presence of statistically significant autocorrelation, thus, is also consistent with the internal logic of the model.

Overall, the regression estimates suggest that choice framing variables focused on in the models are relevant ones that help to describe the course of constitutional history, notwithstanding the various measurement problems. The estimates suggest that somewhat more than half of Western economic and constitutional developments in the nineteenth century were jointly determined.⁴⁵¹

D. Joint Causality Tests for Economic and Political Liberalization

The regressions reported in table 19.2 support the contention that economic and political liberalization were associated with one another in the nineteenth century, but they do not shed much light on the nature of that dependence. The theory developed in part I suggests that constitutional and economic liberalization are jointly determined, rather than causally related. Although interdependent, economic and political liberalization are consequences of a long series of past innovations, experiments, and random shocks that produce constitutional gains from exchange and compromise.

Somewhat more direct tests of the bootstrapping and joint-causality hypotheses are possible using the statistical causality tests developed by Granger (1969). The Granger approach uses past values (lags) of the two variables as estimators for each other. If past values of variable *X* contribute to the explanation of current values of variable *Y*, then *X* is said to “Granger cause” *Y* in the sense that past values of *X* help predict current values of *Y*. Joint causality is said to exist if past values of *Y* also help to predict present values of *X*. Joint causality would, thus, provide evidence that economic and political liberalization are common outcomes of other similar (or correlated) variables. Granger causality tests are possible for five of the six case study countries using data similar to that used above. Table 19.3 summarizes the results.

⁴⁵¹ Similar results can be found for other countries of interest for the purposes of this study, including Belgium, Germany, and the United States, although the Polity indices less faithfully reflect the path of parliamentary reform in these other countries.

Table 19.3
Granger Causality Tests for Economic and Political Change

United Kingdom (UK), the Netherlands (NL), Sweden, Germany (DE), and the United States (US)
Nineteenth Century to Early Twentieth Century

UK Rgdp per capita does not Granger Cause U.K. democracy	7.96***
UK democracy does not cause Rgdp per capita	2.12*
NL Rgdp per capita does not Granger Cause NL democracy	242.62***
NL democracy does not cause NL Rgdp per capita	25.77***
SE Rgdp per capita does not Granger Cause SE democracy (logs)	3.48**
SE democracy does not cause SE Rgdp per capita (logs)	0.49
DE Rgdp per capita does not Granger Cause DE democracy	1.59
DE democracy does not cause DE Rgdp per capita	3.81**
US Rgdp per capita does not Granger Cause US democracy	7.00**
US democracy does not cause US Rgdp per capita	26.87***

* denotes significance at the 10 percent level.

** denotes significance at the 5 percent level.

*** denotes significance at the 1 percent level.

(The period of interest is 1830–1929, although the data sets were somewhat incomplete for the Netherlands and Germany. Some periods of transition in Germany and Sweden are coded as not available.)

The results reveal somewhat stronger causality from economic to political developments, although joint causality for economic and political developments is found in three of the five cases. Joint causality of economic and political liberalization in the United Kingdom, the United States, and the Netherlands—cannot be rejected at plausible levels of statistical significance. Swedish causality is stronger from economic to political liberalization. German causality is stronger from political to economic reform. The result for the United States is the most surprising, because so much of its economic and political liberalization took place before 1830.

Given the coarseness of the Polity indices and the fact that the democracy indices focus on the executive, rather than parliament, or parliament-executive relations, the statistical results are stronger than might have been expected. In general, they support the predictions of the models.

E. Empirical Support for the Constitutional Bargaining Model

Overall, the historical narratives and statistical analysis suggest that the constitutional exchange model can shed significant light on the great reforms of the nineteenth century. More or less constant constitutional bargaining is evident in that century, as are constitutional conservatism, persuasive campaigns by well-organized interest groups, and a long series of liberal reforms. Although, men and women of genius and luck clearly mattered in each case, much was common in the Western transitions to democracy.

The visual and statistical tests of this chapter demonstrate that the broadest conclusions of the historical analysis are also supported by quantitative analysis of aggregate data. Causality between economic and political development tends to be bidirectional in most cases as predicted. The regression estimates account for between 50 and 80 percent of the aggregate economic and political developments in the West, which suggests that the choice settings modeled in part I were commonplace and important in Europe during the nineteenth century.⁴⁵² Evidently, relatively similar constitutional gains to trade emerged at more or less the same time throughout the West.

Of course, institutional reforms are not literally driven by year-to-year changes in per capita real gross domestic product, nor are year-to-year variations in average income driven by recent institutional changes alone. Economic growth reflected past policies, and past policies reflected past political interests and institutions, which were themselves slowly adjusted through time, as the interests of the occupants of high government offices gradually changed and allowed new bargains to be reached. The historical narratives suggest that technological innovations, increased literacy, improved political organizations, and ideology made liberal reforms easier to negotiate in nineteenth-century Europe than they had been in previous centuries.

⁴⁵² It bears noting, however, that the variance of the true error term is likely to be somewhat larger than the results suggest, because both the RGDP and Polity data series have been smoothed by the social scientists who assembled them to reduce measurement errors, which tends to increase intertemporal correlation within and across data series.