

Part III:

History as Social Science:

Statistics, Summaries,

Conclusions,

and

Methodological Notes

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 history face similar problems. 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. In this the preceding chapters are no different from other models and alternative historical narratives, and so are naturally open to such criticism. Although a good deal of historical evidence suggests that the models of part I can shed useful light on the emergence of Western democracy, no proof is possible.

Nonetheless, more evidence is always useful. With this in mind, chapter 19 develops quantitative evidence and statistical tests to assess the explanatory power of the model of constitutional reform developed in part I. 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.

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. Relatively large changes or a series of small changes in circumstances or interests, however, may produce sufficient interest in reform to satisfy a government's rules for formal and/or informal amendments. The models imply that constitutional reforms alter of a subset of existing procedures

and policies, rather than create entirely new constitutions, and that the amendments adopted tend to be multidimensional and linked, because they are consequences of constitutional bargaining.

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. Insofar as reforms are adopted at somewhat different times and vary in their details, the experience of other polities provides can useful evidence about the effects of particular reforms. The reforms producing the most desirable results for policymakers can be copied by other countries can be used as the basis for subsequent reforms, which produces convergence among institutions and policies.

Constitutional Reform and Economic Development as Time Series

Many predictions of the models seem are so evident in the historical narratives, that further empirical analysis may seem 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, because so much has been left out. The narratives focus on a single process of reform along a single strand of history. So, it is possible that constitutional bargaining played a smaller role in constitutional developments than the narratives suggest. Additional light can be shed on the explanatory power of the model by conducting statistical tests.

Subjecting the models to statistical tests, however, 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.

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

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

These reduced forms demonstrate that constitutional and economic systems are interdependent and substantially determined by similar past chance events and innovations. That is to say, 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).

These data problems can be bypassed to some extent, if technological and ideological innovation can be regarded as stochastic processes. In that case, 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.³⁷⁰ This makes the ideology and technology sequences analogous to those of v and u , and they 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:

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

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

with

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

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

³⁷⁰ If ideological and technological shocks are not completely exogenous, one could represent such innovations with functions such as $T_t = s(T_{t-1}, E_{t-1}, L_b^E, W_{t-1}, \tilde{z}_t, u_t)$ and $I_t = i(I_{t-1}, E_{t-1}, C_{t-1}, W_{t-1}, v_t, \tilde{z}_t, u_t)$. 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” \tilde{z}_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.

unidirectional causality or particular trigger points at which democratic politics or market economies become feasible.³⁷¹ The assumed continua of government and market types allows peaceful and gradual transitions to parliamentary democracy and to market-based economies when there are what might be called “liberal trends” in the random shocks, but stability when there are no trends.

History and the Intertemporal Equations

The historical narratives suggest that both kinds of periods have existed in Europe. Medieval forms of king and council governance were stable for centuries at time, although there were reforms and counter-reforms. Trends in economic and political reforms are evident in the nineteenth century. The historical narratives suggest that the trends reflect increased rates of technological innovation and the “radicalization” of liberalism.

There is also evidence of the predicted boot-strapping effects. The early market and educational reforms contributed to increased rates of innovation, which tended to increase support for further liberalization of economic rules insofar as new economies of scale became possible. Broader markets allowed new industrial organization to be profitable, which increased specialization and helped expand the middle and upper middle classes, who generally favored greater openness in politics and markets. Upward mobility required eliminating medieval privileges in economics and politics. Economic liberalization often advanced political liberalization, and political liberalization often supported economic liberalization. There was no conflict between democracy and economic development in the nineteenth century.

Although each transition includes unique features, the Western transitions were qualitatively similar and occurred during roughly the same time period, largely between 1825 and 1925. The remainder of this chapter suggests that Western transitions were also quantitatively similar.

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 they are sufficient demonstrate that the historical narratives developed in part II are consistent with recent efforts to quantify institutional developments.

³⁷¹ 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.

Estimates of reduced forms of the models based on that data demonstrate that the models provide useful causal theories of the constitutional developments of the nineteenth century.

It should be acknowledged that the quantitative data are imperfect in many respects. For example, per capita gross domestic production data is, for example, often used as a measure of average personal income or welfare. There are conceptual problems with doing so in contemporary work, because not all sources of income or economic welfare are measured. There are additional problems with nineteenth century data, because GDP is less precisely measured and to some extent measures the wrong thing.

Nineteenth-century GDP data are not based on extensive survey data, but are estimated from economic models that link GDP to other available quantitative data, such as tax and trade flows. Moreover, gross domestic product measures market activity and neglects domestic sources of goods and services. Household production was a much larger fraction of personal income during the first part of the nineteenth century than at the century's end, because more of economic life took place in the home in 1800 than in the money economy. The gradual reduction in household production during the nineteenth century implies that GDP per capita provides an estimate of average income that is biased downward in the early part of the century relative to the last part of the century. This tends to bias growth rates of personal income upward and exaggerate the effect of business cycles on personal income in the first half relative to the second half of the century.³⁷²

Quantitative 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. The

³⁷² This bias may be offset to some extent by reductions in environmental amenities, but tends to be increased by reduced access to communal resources.

breadth of suffrage and the division of authority between the king or president and the parliament are quite different things and the historical narrative suggest that they are not always highly correlated.

Quantitative Indices of the Relative Authority of King and Council

Nonetheless, several attempts have been made to construct indices of democracy for the nineteenth century. For example, 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 of governance for the countries in the data set. These characteristics are used to create numerical “subindices,” which are then aggregated into their widely used indices of democracy. The subindices of Polity’s 0–10 index of democracy assess both formal constitutional procedures and de facto political procedures, as judged by various country experts.

The widely used Polity index is a similar -10 to +10 index that subtracts an index of autocracy from the democracy index. Democracies (10) have broadly competitive systems for choosing their chief executives, institutional constraints on governance, and guarantees for civil liberties. Autocracies (-10) have executives that are chosen by a narrow elite, who can govern without significant institutional constraints.

Unfortunately for the purposes of this book, the Polity indices focus 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, which are the main focus of this book. 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 developed in part II, the precise manner in which prime ministers are chosen and their policymaking authority relative to the king is not entirely determined by 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, indirectly sheds light on one of the key shifts in authority required for the emergence of parliamentary democracy in the nineteenth century. The subindex XrComp characterizes the competitiveness of executive recruitment. It focuses the selection process for the executive (hereditary, designated, or

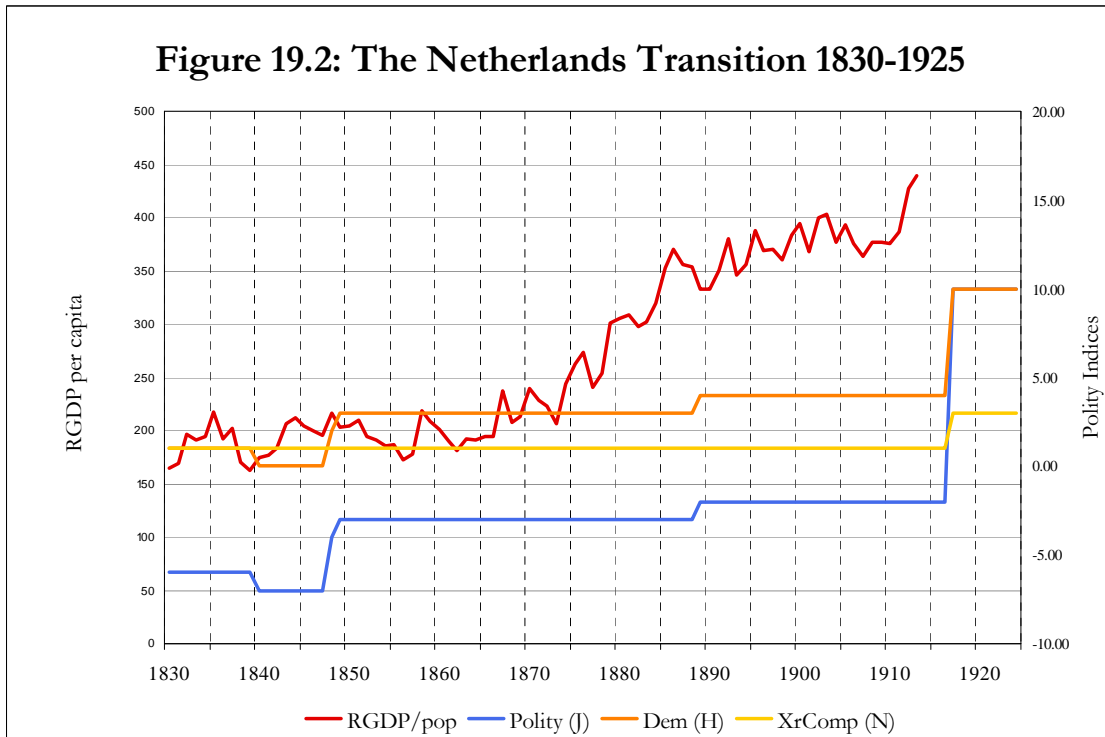
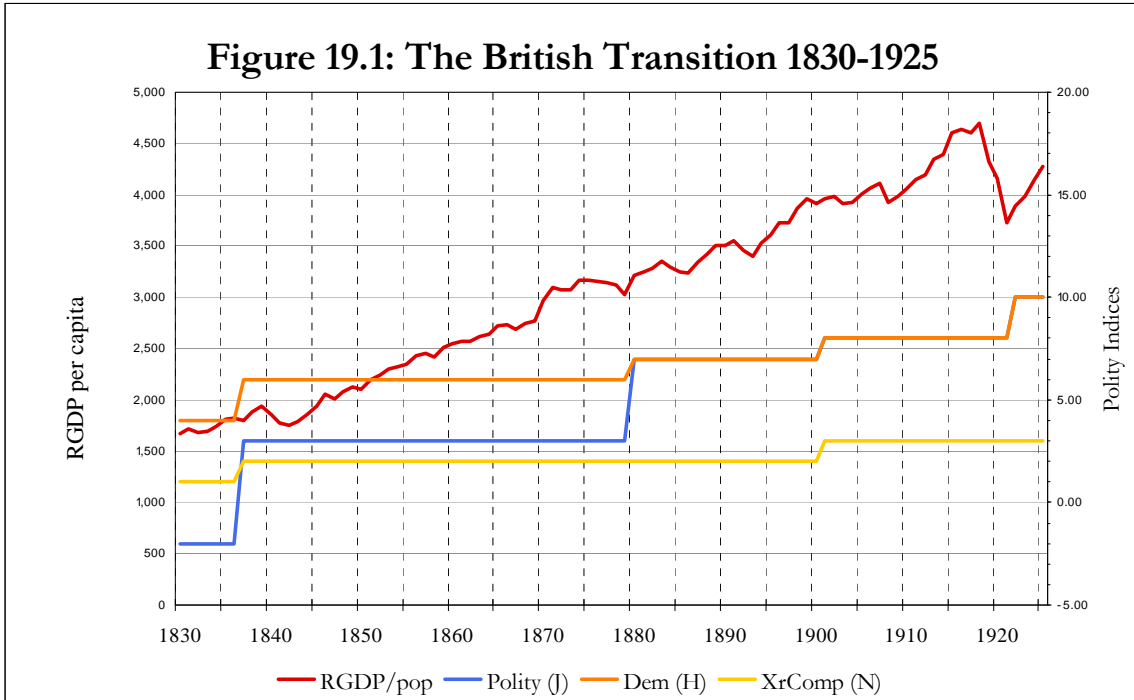
elected). In nineteenth-century Europe, a value of 1 implies royal dominance, 2 sharing between a king and an (indirectly) elected prime minister, and 3 dominance by an (indirectly) elected prime minister (Marshall and Jagers 2005: 24). Clearly, three categories can only roughly measure the continuum of policymaking authority. The other subindices for the democracy index provide equally coarse assessments of the extent to which “chief executives” are politically and constitutionally constrained.³⁷³

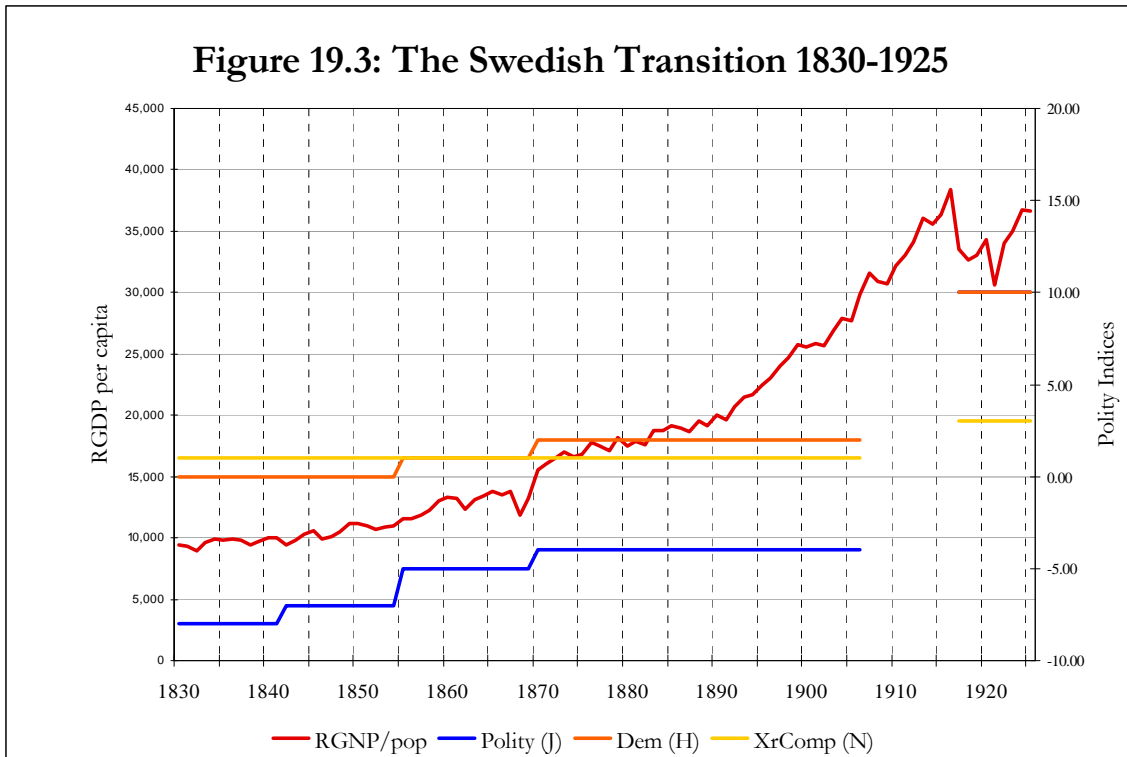
Some Suggestive Data Plots

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 Officer (2006) for the United Kingdom, from Smits, Horlings and Van Zanden (2000) for the Netherlands, and from Edvinsson (2005) for Sweden. The political liberalization indices include (i) Polity’s executive competition subindex, XrComp, which takes values from 1–3, (ii) Polity’s 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.³⁷⁴

³⁷³ The democracy index focuses on 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. Overall, 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 Jagers 2005: 17–18).

³⁷⁴ 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.





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.³⁷⁵

The political indices reflect the gradual increase in the democratic basis of executive political authority. Kings became less important and prime ministers and parliament more so during the century. The latter is most directly indicated by the executive competition index, which unfortunately takes only three values. The political indices have been “smoothed” somewhat, but their integer values tend to make very gradual transitions appear to be step functions. 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 and early twentieth centuries. As noted in chapter 14, significant reforms of its parliament were adopted in that period. For example, the 1907 election law reforms established universal (unweighted) suffrage and proportional representation for the selection of

³⁷⁵ Most studies of this period rely on Maddison’s (2003) compilation of data. The country-level studies of Smits, Hurlings and Van Zanden; Officer; and Edvinsson are used here because they make use of more recently available information and tend to be more fine grained. Trends in the Maddison RGDP per capita estimates are similar to these individual country studies.

parliament. Control over the cabinet (as opposed to authority over budgets), however, was not completely resolved until the period of World War I. Unfortunately, the effects of parliamentary reforms are only indirectly measured by the Polity indices.³⁷⁶

Overall, real per capita GDP and liberal democracy increased gradually throughout the period, although the timing of economic growth and institutional reforms differed somewhat.

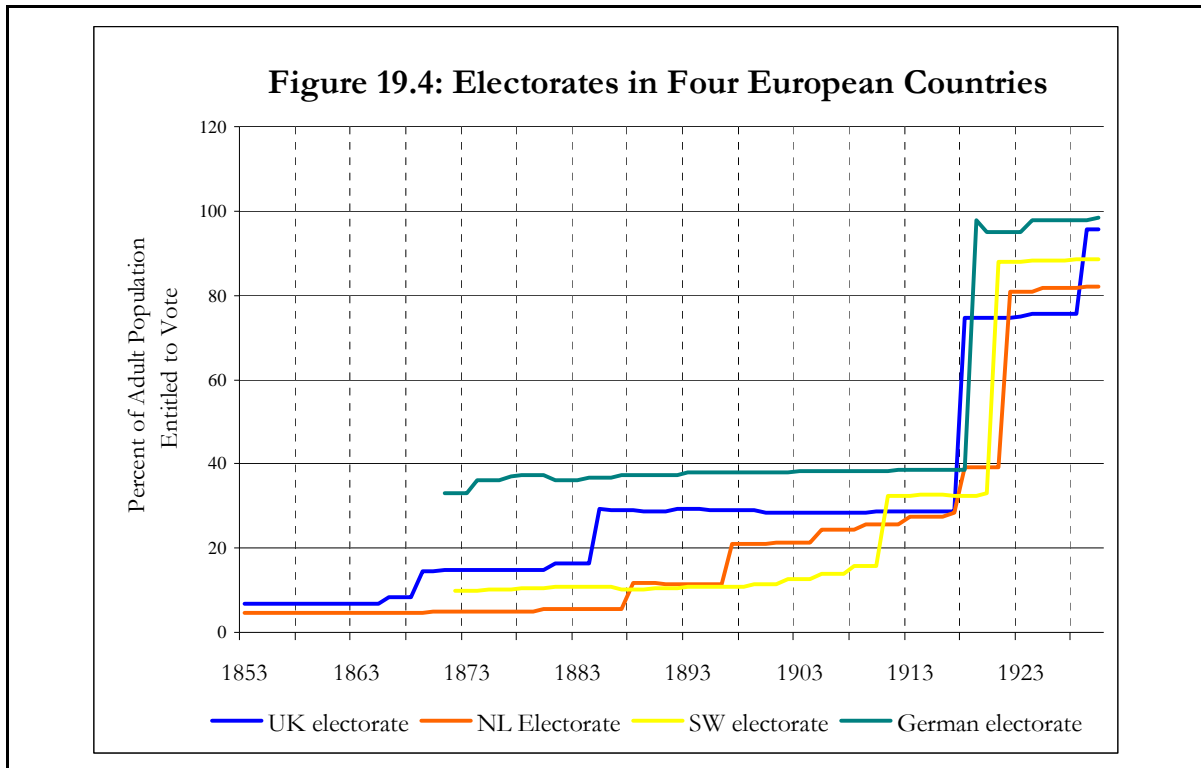
Quantitative Indicators of Suffrage Reform

A more direct indication 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. (The individual “steps” should tilt upward somewhat, reflecting the suffrage effects of increasing personal wealth and tax payments under the suffrage laws of that period.)

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.

³⁷⁶ Some of the coding for the Swedish case is coded as “88” from 1907–16, which indicates a period of “transition” in which the usual indices cannot be definitively judged (Marshall and Jagers 2005: 18). This coding indicates that there was greater ambiguity in this period than usual over who could appoint the cabinet and prime minister.

Chapter 14 suggests, however, that intermediate values of XrComp (2) would have been appropriate for this period. 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 (Congleton 2003c, 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. These factors, together with parliaments limited authority, tended to make casting votes less important in the early nineteenth century. 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 Cook and Paxton (1978, 1998) for the number of voters and population. The Cook and Paxton 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 also bears noting that the

largest single suffrage reforms occurs just before or 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 (interpolated)	Turnout (est)	Voters (nearest yr)	Pop (interpolated)	Turnout (est)	Voters	Pop (interpolated)	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

In combination with the Polity indices, the election 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).

Overall, the data plots and table support the hypothesis that the political and economic “revolutions” of the nineteenth century were the consequence of a long series of reforms, rather than a single great innovation or change in institutions.³⁷⁷ Similar diagrams and tables could be

³⁷⁷ It seems clear, for example, that women’s suffrage was based on ideological considerations,

Continued on next page...

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. Liberal parliamentary democracy did not emerge in a single great step, even in France, where major reforms were experimented with.

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.

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).

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 (LS)	SE RGDP per capita (LS)
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 statistical significance at the 10 percent level. ** Denotes statistical significance at the 5 percent level. *** Denotes statistical significance at the 1 percent level.

The model also has predictions about the stochastic components (residuals) of the estimates. The models imply that both systematic and stochastic components should be evident in the residuals. Note that the linear estimates support both predictions. 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 predicted time dependency is evident in the Durban-Watson statistics, which indicate the presence of statistically significant autocorrelation.

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.

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 estimates suggest that somewhat more than half of Western economic and constitutional developments in the nineteenth century were jointly determined. 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 even less faithfully reflect the path of parliamentary reform in these other countries.

The theory developed in part I suggests that constitutional and economic liberalization are jointly determined, rather than causally related. Both are induced by trends in technological and ideological developments that produce constitutional gains from exchange and/or compromise.

Direct tests of the bootstrapping and joint-causality hypotheses can be undertaken with 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.

Table 19.3	
Granger Causality Tests for Economic and Political Change	
United Kingdom (UK), the Netherlands (NL), Sweden (SE), Germany (DE), and the United States (US) Mid-Nineteenth Century to Early Twentieth Century (two lags)	
UK Rgdp per capita does not Granger cause U.K. democracy	7.96***
UK democracy does not Granger cause Rgdp per capita	2.12*
NL Rgdp per capita does not Granger Cause NL democracy	242.62***
NL democracy does not Granger cause NL Rgdp per capita	25.77***
SE Rgdp per capita does not Granger Cause SE democracy (logs)	3.48**
SE democracy does not Granger cause SE Rgdp per capita (logs)	0.49

DE Rgdp per capita does not Granger Cause DE democracy	1.59
DE democracy does not Granger cause DE Rgdp per capita	3.81**
US Rgdp per capita does not Granger Cause US democracy	7.00**
US democracy does not Granger 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 joint-causality 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 are consistent with the predictions of the models of part I and the narratives of part II.

E. Empirical Support for the Constitutional Bargaining and Reform Model

The visual and statistical tests of this chapter demonstrate that the predictions of the models of part I and the conclusions of the historical analysis are supported by statistical analysis of the data available for the nineteenth century. 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.³⁷⁸ Evidently, relatively similar constitutional gains to trade emerged at more or less the same

³⁷⁸ 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.

time throughout the West. Causality between economic and political development tends to be bidirectional in most cases as predicted.

The unexplained residuals suggest, as historians often argue that men and women of genius and luck clearly mattered in each case, and that the negotiations reflected chance events and states of mind. On the other hand, the statistical analysis of this chapter and the historical narratives of part II suggest that there was much in common. Together with the historical narratives, the statistical analysis suggests that constitutional and quasi-constitutional bargaining produced a long series of liberal reforms during the nineteenth century. The political subset of those reforms produced what we refer to today as Western democracy.

It is interesting to note that most contemporary indexes of “institutional quality” are simply indexes of the “liberalness” of a polity’s political and economic institutions. Such indices may be said to measure how far a given polity has moved from its medieval or authoritarian political and economic systems toward a liberal one (Gwartney, Lawson, and Holcombe 2006; Keefer and Knack 1995; Congleton 2007b).