

Luxembourg Income Study Working Paper Series

Working Paper No. 404

Market Economic Systems

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October 2004



Revised draft: October 20, 2004

MARKET ECONOMIC SYSTEMS¹

Abstract

The new comparative economics has focused on individual institutions, rather than the economic system as a whole. This essay argues that economic systems should be defined in terms of clusters of complementary or covarying institutions. A cluster analysis of OECD countries using data on forty different economic institutions shows that four economic systems characterize these nations. Further, these systems have no significant impact on economic growth or inflation, but they do have an important influence on the distribution of income. An analysis of systemic change suggests that with economic development, the differences between economic systems become greater while the differences among nations with the same economic system become less, at least up to 1990.

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Key words: economic system, economic institutions, OECD nations, economic performance

JEL categories: P-510, P-100, C-400

* For supplying data I would like to thank George S. Argyropoulos, John Baldwin, Thea Bosten-Eurlings, Murray Klee, Edward Lazear, Walter Park, Stu Pettingrew, Leandro Prados de la Escosura Dennis Quinn, John Ridley, and A. Maria Toyoda. I would also like to acknowledge the useful advice and assistance received from Tom Dee and Leandro Prados de la Escosura. For commenting on an early draft of this paper we are grateful to Stephen Golub, Zora Pryor, Bernard Saffran, and F.M. Scherer.

DEFINING MARKET ECONOMIC SYSTEMS

Research in comparative economics has taken a dramatic upward turn in recent years. Although the new comparative economics, a literature reviewed by Djankov *et al.* (2003), has received particular attention, a variety of related approaches can also be mentioned, e.g., Acemoglu and Johnson (2003); Rodrik (2004); and various essays included in the symposium edited by Djankov and Shleifer (2003). However, these studies deal primarily with individual economic institutions, not economic systems. This essay uses many of the empirical results of the institutional analyses to focus on the problem of defining economic systems and how they change.

If we start with a common definition that an economic system comprises the totality of institutions and organizations specifying property relations and channeling and influencing the distribution of goods and services,² we run into an immediate problem: Although we have theories telling us which of these institutions appear together to form a system, such theories focus primarily on differences between market and planned economies and are not helpful in distinguishing various types of market economic systems.

As a result, analysts are forced to employ ad hoc methods to delineate the various systems of advanced market economies. One common method involve arbitrarily choosing one or two property or distribution institutions to specify the economic system, for instance, a high degree of government regulation or a high ratio of public expenditures to the GDP. Such an approach, of course, begs the question of whether the institutions chosen are the most important and whether all other economic institutions and organizations in the economy vary in a parallel manner. Another method involves selecting different economies, pinning evocative names to their economic systems, for instance, the U.S. entrepreneurial model, the French statist model, the Swedish socialist model,

or the Japanese consensus model, and not worrying any more about the problem. Such an holistic approach focuses on the presumed spirit of the system and papers over the problem of specifying very exactly the actual institutional differences among countries.

In brief, there is no real theory of market economic systems that explains why particular institutions and organizations cluster together to form a distinct pattern or, on a more micro-level, why certain economic institutions are complements, while others are not. And, it might be added, there is also no real theory about how market economic systems change. In this essay we address both issues inductively in order to establish the stylized facts that any such theory must explain.

To carry out such an exercise we examine the covariance of a large number of economic institutions and organizations using cluster analysis as the major statistical tool. Our method is related to the new institutional economics in that it also focuses on quantitative specification of economic institutions and organizations. However, while the new institutional economics has a microeconomic focus and deals with institutions and organizations primarily as phenomena in isolation from each other, we explore these phenomena from a more macro-viewpoint and consider how specific institutions and organizations within an economy are interrelated - in short, their patterning - and how these patterns change.

The analysis below is in four steps: a general description of cluster analysis, a technique seldom employed in economics; a specific application to OECD nations using forty different institutional indicators which reveals four distinct economic systems; a short exploration of the impact of the derived economic institutions have on economic performance, which reveals that these economic systems have no impact on growth or inflation, but they do have an influence on the distribution of income; and, finally, an examination of how market economic systems change over

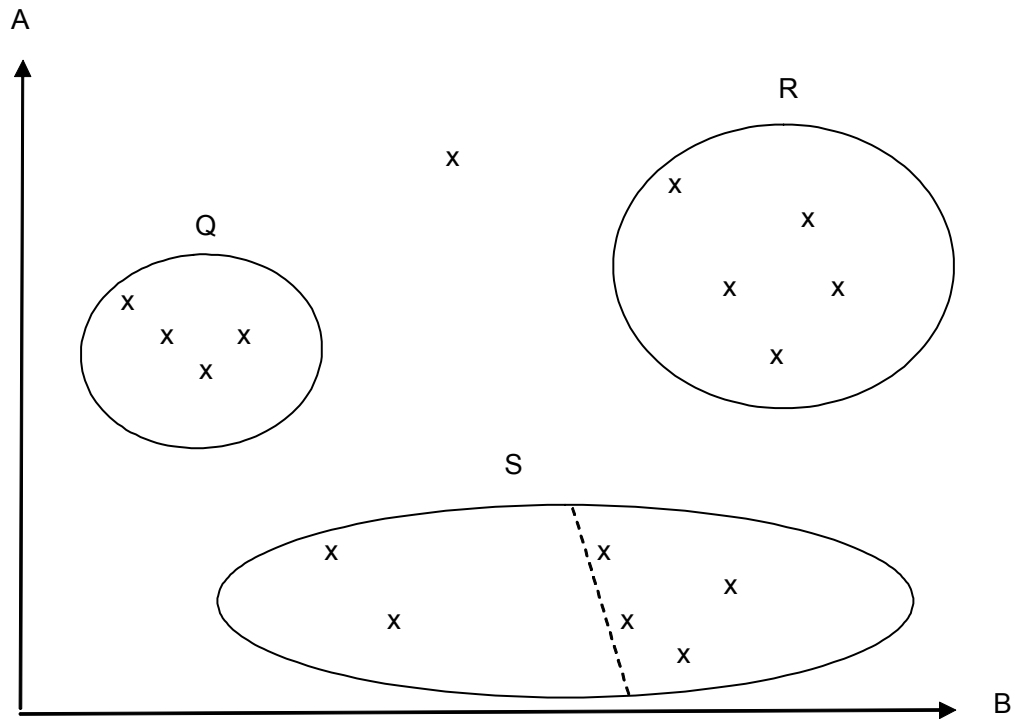
time, suggesting that with economic development, the differences between economic systems become greater while the differences among nations with the same economic system become less, at least up to 1990.

1. Using Cluster Analysis to Define Economic Systems

For a cluster analysis to be used to derive meaningful economic systems, it is necessary to start with variables for important institutions and organizations relating to the system of property or to distribution that have economy-wide importance. Moreover, because each institutional variable serves as a dimension of the economic system, it must be defined quantitatively, which is a major contributions of the new comparative economics. In preliminary studies such as this, it seems best to select as many institutional variables as possible in order to avoid missing a particular institution which may prove a critical distinguishing characteristic. The cluster analysis program used in this study calculates these multidimensional distances determine which set of societies are closest to each other, that is, which institutions and organizations cluster together.³ In turn, the derived clusters specify the different types of economic systems.

Chart 1 presents a simplified example in two dimensional space. To be very concrete, let us assume that all economic systems have only different degrees of two institutions, protection of the job rights of workers (A) and government expenditures as a ratio of GDP (B). For each society we can designate this configuration by an x on the graph. At first glance, the economies fall into four clusters, designated Q, R, and S, whose boundaries are sketched. These clusters are bunched somewhat differently, with cluster Q the most tightly packed and cluster S, the most loosely. One economy, in the upper middle portion of the graph, does not fall clearly into any of the three clusters; different estimations of the clusters might put it in either Q or R. Fortunately, experimenta-

tion reveals Chart 1: Designation of Clusters



Note: The axes A and B respectively represent the two possible institutions in this simplified example, relative protection of job rights of workers and the ratio of government expenditures to GDP. The position of each society (x) is determined by the degree to which these two institutions play a part in its economy. Q, R, and S represent the derived clusters.

situations are relatively rare.

The chart illustrates another problem, however, that is quite common in this procedure. Might that such situations are relatively rare and in calculating cluster averages and other statistical characteristics, they are omitted from the analysis.

The chart illustrates another problem, however, that is quite common in this procedure. Might it be better to consider cluster S as really two clusters, with the dashed line marking the boundaries of each? We face a tradeoff. On the one hand, according to the principle of Occam's razor, namely that entities, such as types of economic systems in this case, should not be multiplied unnecessarily, and we should have as few clusters as possible.⁴ On the other hand, increasing the number of clusters reduces the error in defining each cluster. Obviously, if we have twenty-nine societies, each with an x on the graph, we will have no error in our description if we define twenty-nine clusters. If, however, eight x's cluster near each other and another nine x's are also close to each other, but not the first group, and a third group of eleven x's also form a distinct cluster, we lose relatively little information about the grouping of economic systems by reducing the twenty-nine clusters to three.

At this juncture it is useful to draw upon the principle of the *minimum description length*, hereafter MDL, defined by Jorma Rissanen (1989: 79 ff.; 2001), who worked from a stochastic information-theoretic approach. This technique combines the positive value of additional information gained by increasing the number of clusters with the negative value of the resulting greater theoretical complexity, both determined using information theory, and thereby arrives at a description length used for determining the optimal number of clusters.⁵ For the analysis the first step is to calculate the description length associated with each of various numbers of clusters for the data

under examination. The optimal number of clusters, defined by the minimum description length, is simply where the gain in information is exactly counterbalanced by the increase in complexity. The LOICZ computer program, which is used for this study, was written by Bruce Maxwell and is described in Maxwell, Pryor, and Smith (2002); it allows an easy calculation of the MDL over a range of numbers of clusters. Once the optimal number of clusters, that is, the number of economic systems, is selected, the program prints out the list of economies in each, as well as certain properties of each cluster such as its center and the multidimensional distance of every economy with every other economy.

The optimal number of clusters, it must be emphasized, may not be very helpful if the isolated clusters are very broad; in terms of Chart 1, this means that the lines defining the clusters encompass a very large area. A useful statistic to investigate this matter compares the variance of the distance of every point, that is, a nation, with every other point in the sample and then compares it with the summed variance of the distance of every point within a given cluster with every other point in the same cluster for each cluster. Such a calculation tells us how much of the differences among the various economies is and is not explained by the calculated clusters. Thus, if the MDL calculations determines that three clusters are optimal and if, within each of these clusters, all countries have the same institutional configuration, the reduction-in-variance is 100 percent. By way of contrast, if the points to be clustered are randomly scattered over the multidimensional space, the calculated reduction-in-variance may be only 10 percent and distinctive economic systems cannot be meaningfully determined, a situation which, fortunately, was not encountered for advanced market economies.

Although such an approach appears objective, it cannot be used heedlessly. The analyst must

base the calculations on unbiased information and select thoughtfully the dimensions by which the clusters are to be defined. The number of relevant institutions and organizations to take into account is, of course, related to the complexity of the economy and should be much greater for modern industrial nations than for foraging societies.

If more than two economic systems are derived with this statistical technique, it is impossible to place the various nations on a single continuum. With four economic systems, a four dimension graph would be necessary for this purpose. Nevertheless, some cluster analysis programs allows the multi-dimensional Euclidean distance of each society with every other society to be extracted, so that we can determine, for instance, whether a country with economic system A is closer to another country with an economic system B or to yet another country with economic system C. For the OECD nations a full analysis along these lines would require a 21 by 21 matrix of distances, a task not carried out below because of space constraints.

In brief, the economic systems derived from a cluster analysis are empirically determined, and not deduced from a particular theory about economic systems. Moreover, the starting point for the analysis takes into account many different dimensions, rather than one or two that capture the fancy of the investigator. Finally, although many societies with a given economy system may lack *some* of the characteristics defining the system, its patterns of institutions and organizations match the system type in the most important respects.

2. Economic Systems of OECD Nations in 1990

The results of this analysis of the economic systems of OECD nations are not startling, but they provide a solid basis for our intuitive beliefs and allow us to approach the issues surrounding systemic change with greater confidence. For foraging and agricultural economies (Pryor 2003,

2005a, 2005b), the cluster analysis technique yields results which are far less intuitive.

For the data on economic institutions and organizations in OECD nations, three different types of indicators are used: Some of these forty indicators are derived from the laws defining the institutions, for instance, various types of government regulation or patent protection; others, on statistics about their activities. for instance, centralization of banks or the percentage of workers covered by collective bargaining contracts; while still others, on expert opinion, for instance, the level of the economy at which wages are most often bargained or the competitiveness of the economic environment). In the summary table below, the three types of indicators involved are specified.⁶ Whenever possible, the data for these indicators refer to 1990, the year before the Maastricht agreement was signed, since the homogenization of European economic institutions allegedly accelerated thereafter. As noted below in greater detail, data on institutions for other years, especially after that point, are also difficult to find. An explanation of each indicator, as well as their sources, can be found in the various appendices presented by Pryor (2004) for this essay.

To minimize the possibility that key institutions would be overlooked, forty indicators are used and are grouped into five categories: (a) twelve indicators reporting the ways in which the product market functioned in the different countries; (b) eight indicators describing aspects of the labor market and various types of labor institutions; (c) six indicators referring to various characteristics of enterprises and the system of production; (d) seven indicators detailing the relative importance of different types of governmental activities; (e) and, finally, seven indicators reporting particular aspects of the financial system (seven indicators). Some of these indicators overlap in certain respects, but all reflect crucial aspects of the property and distribution institutions of the societies. As shown below, some of these institutions were not related to any specific economic

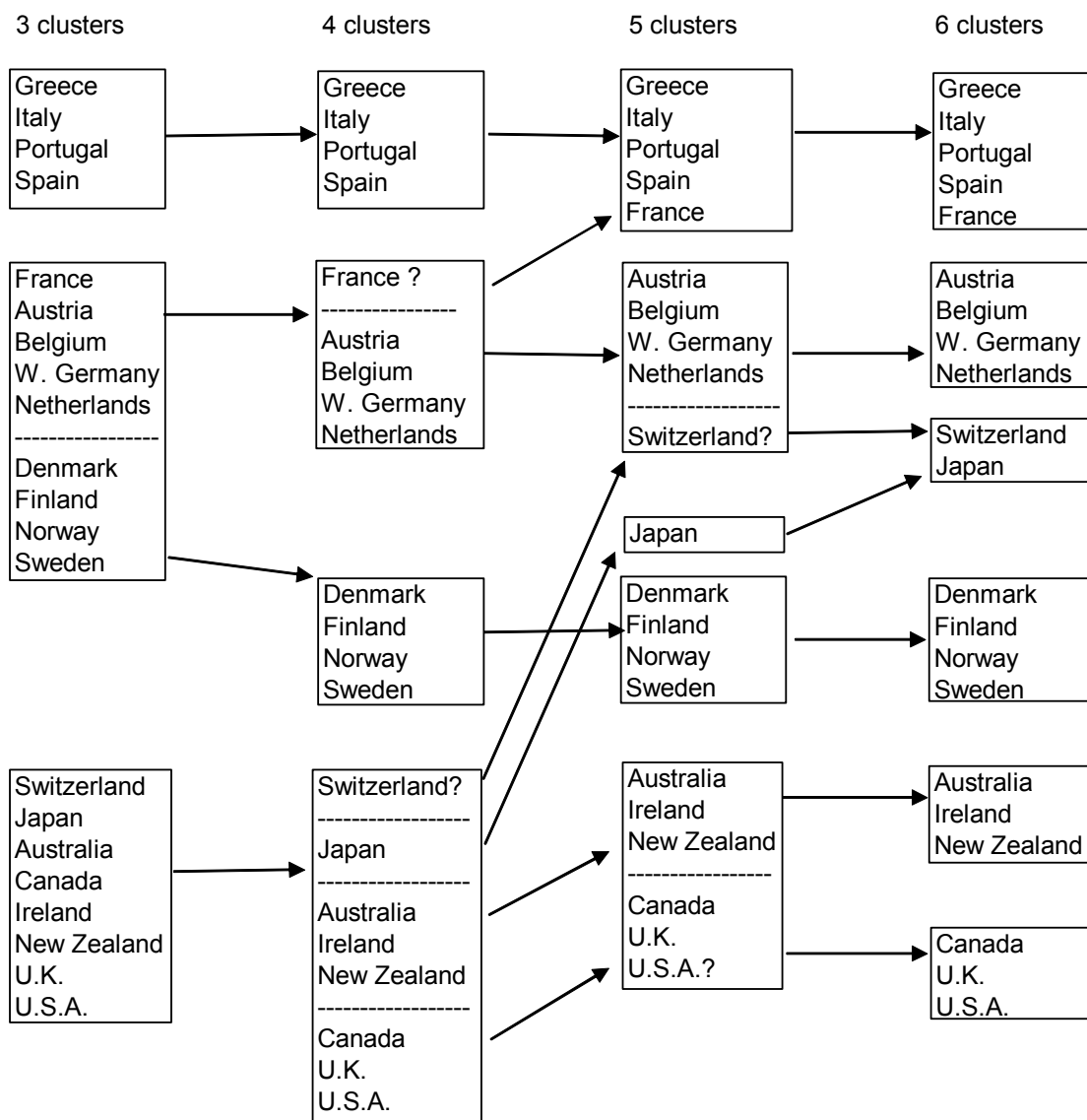
system, which means that the variance explained by the clusters is smaller than we might desire, but we cannot know which institutions are unimportant until the cluster analysis is completed.

Before turning to the results, it is useful to see how the composition of the clusters varies when different numbers of clusters are specified, so that the implications of the choice of the number of clusters can be more clearly seen.⁷ From these calculations, we can draw several important conclusions:

Three clusters, namely those consisting primarily of South European, West European, and Nordic nations, appear relatively consistent when four to six clusters are specified and we can conclude that each of these systems was relatively homogeneous, a result which suggests that the results have a certain robustness. The cluster consisting primarily of Anglo-Saxon nations, hereafter the Anglo-Saxon- plus, or AS+, group, was the most heterogeneous, with two of the nations, namely Switzerland and Japan, hiving off when five clusters were specified and then breaking up into two separate groups when six clusters were calculated.

Three countries appeared to jump from cluster to cluster, but for different reasons. France, which was questionably in the West European group in the four-cluster calculations, moved from the West European cluster to the South European cluster; similarly Switzerland, which also was also a questionable member of the AS+ group in the four-cluster group, moved to the West European cluster, and finally to a separate cluster. This suggests that these two wandering nations laid close to the boundaries of the respective clusters, that is, away from the core nations forming each cluster; for this reason, these two nations are omitted in the calculation of the averages for each system. A different kind of boundary problem arose with the Japanese economy, which appeared in the core of the AS+ nations when three and four clusters are specified, but broke off from them thereafter to

Chart 2: Results of the Cluster Analysis for Industrialized Market Economies



A question mark indicates that less than 70 percent of the cluster runs placed the country in that particular grouping.

form a separate cluster and then two join Switzerland in still another cluster in the six-cluster calculation.

The Japanese case appears counterintuitive. In the latter part of the nineteenth century that country borrowed a variety of economic institutions from different countries so that it industrialized with a very mixed type of institutional structure and this is what Chart 2 appears to suggest. If only three clusters are specified, the cluster analysis takes into account only the most abstract similarities and differences; and as the number of specified clusters increases, the similarities and differences are judged on increasingly more detailed institutional similarities, and the institutional space of the clusters defining the economic systems become increasingly restricted. It is also possible that if comparable data on more economic institutions were available, the results might be somewhat different for this nation. It also seems likely that if more than six clusters were specified, Japan would end up as a unique economic system with no other members. A similar argument can be made for Switzerland.

Although the clusters define different economic systems, it is necessary to ask whether the systems are independent entities or merely a function of the level of economic development. For the OECD nations the South European cluster of nations has a significantly lower average per capita GDP in 1990 dollars than the other nations in the sample. Although we need not at this point determine the direction of causation between the economic system and per capita GDP, the per capita GDP must serve as a control variable at all steps of the analysis.

Using the minimum description length calculation, we can also determine that the optimal of clusters - or distinct economic systems - for our analysis is four. To determine whether the composition of nations in these clusters is robust, a similar calculation was made, but with only

thirty indicators and obtained essentially the same results.⁸ When the number of indicators are reduced to eleven, about 75 percent of the countries appeared in the same clusters as in Chart 1; but so few indicators raise some problems when examining systemic change, as discussed below.⁹ In sum, the results appear robust and, moreover, forty indicators are useful for completeness even if all are not necessary to obtain roughly the same results.

The composition of the four clusters is not surprising, and it is worth noting that other economists have recently come up with roughly the same groupings of nations, but they have dealt with only part of the economic system. For instance, Jelle Visser (2001), who focused primarily on different models of industrial relations, distinguished four distinct types: Nordic corporatism, West European social partnership, Anglo-Saxon pluralism, and Latin confrontation. Soskice (1999) and Kitschelt, *et al.* (1999b) also arrived at quite similar groupings of nations; both placed emphasis on how the firm interacts with the rest of the economy, particularly with regard to the coordination of production, vocational training, and industrial relations. Soskice focuses particularly on four criteria namely, the system of industrial relations, the financial system, the education and training system, and the system regulating inter-company relations; Kitschelt paid more attention to the coordination of production and the system of industrial relations.¹⁰ In carrying out a cluster analysis based on a wide number of indicators of governmental regulation of, and intervention in, product and labor markets, Nicoletti, Scarpetta, and Boylaud (2000) also derived roughly the same grouping of countries as that shown in the chart.

Table 1 presents data on the forty institutional characteristics used to define the types of economic systems. There is no need to try the patience of the reader by describing each characteristic in detail; they are, however, explained in Appendix 6 in Pryor (2004) and reflect the collective

efforts of a number of new institutional economists.

To clarify the role of the level of economic development on the economic system, two types of comparisons are useful. The first test, shown in the first data column, is a simple income elasticity, that is, the percentage change in the numerical value of the indicator associated with a 1 percent change in per capita GDP.¹¹ For instance, the degree of protection of patent rights is significantly and positively related to the level of economic development; while, by contrast, the share of R and D carried out in the government sector, and not by industry or universities, is inversely related; and the ratio of government subsidies to the GDP has no significant relationship at all.

The second test of the role of the level of economic development, shown in the second through fifth data columns, presents the average values for each indicator among the nations sharing a particular type of economic system. The boldfaced numbers in the table also designate if the individual systemic averages are significantly different at the 0.05 level from that of other nations in the sample when holding the level of per capita GDP constant.¹² The sign in the superscript designates whether value is significantly higher or lower; and a question mark in the superscript distinguishes significance at the 0.10 from the 0.05 level. Thus, significantly more workers in the South European nations belonged to labor unions, while among the AS+ nations, significantly fewer belonged. Finally, the last data column presents the average value of the indicator for the entire sample to provide more perspective on the values for the individual systems.

In major respects the AS+ economic system embodied the characteristics of a traditional liberal market economy, with organized labor in a relatively weak position. Controlling for per capita GDP, the countries with this type of economic system had, among other significant character-

istics, fewer barriers to starting new enterprises, greater freedom of firms to set their own prices, a smaller share of workers belonging to labor unions, less legal protection against job loss and fewer safeguards for collective bargaining, greater protection of shareholder rights, little role of workers in firm decision-making, and a lower ratio of government transfer expenditures to the GDP.¹³

The Nordic economic system reflected a type of ordered market economy which was, in many ways, the opposite of the AS+ system, particularly with regard to the economic role of the government. Among the statistically significant characteristics of these economies were bargaining of wages at the national or industrial level, greater power of national employer organizations, a higher share of government consumption expenditures in the GDP. that is, government expenditures excluding transfers, subsidies, and investment, a larger share of total employment by the government, greater coverage of the social security system.¹⁴

The West European economic system reflected a different type of ordered market economy. When the level of economic development is factored out, these nations had a larger share of workers belonging to labor unions, minority stockholder had fewer rights, and government transfers were a higher ratio to the GDP.¹⁵

Finally, the South European economic system revealed yet another admixture of characteristics, some related to a lower average level of economic development of the various nations, others unique to this group of countries. When the per capita GDP is held constant, we find that these nations had more regulation of the product market, a more unfavorable legal environment for markets, more barriers to starting new businesses, more legal protection against job loss and more safeguards for collective bargaining, a smaller share of workers belonging to labor unions, fewer stockholder rights, and less concentration of banking activities.

By and large, the major results of this statistical exercise confirm in a rigorous fashion what we already intuit about these economies. Nevertheless, it must be emphasized that this is a static picture and that many of the institutional characteristics defining the particular types of economic systems have been changing over time, a matter discussed in greater detail below. These results also raise the critical question of the impact of these institutional differences on the performance of the economy, a topic discussed below. However, before turning to this question, several additional findings deserve emphasis.

The direct role of the government is not necessarily the best indicator of the economic system. More specifically, the seven direct indicators for the size of the government sector turned out to be no more likely to distinguish the types of economic systems than the other four classes of indicators. This suggests that the traditional focus on the size of the government sector as an exclusive means of categorizing an economic system is misplaced, and that we must pay just as much attention to economic institutions in the other sectors.

A number of the indicators, which many seem to assume to differentiate between the economic systems, did not play such a role. Among others, these included patent protection; the ratio of government subsidies to the GDP; barriers to foreign trade; the presence of business clusters, which are groups of separately-owned businesses in different industries operating together; centralization of umbrella labor organizations (peak labor unions); the power of union representatives in the work place; the relative share of employment in large manufacturing firms, creditor rights; the government's direct share of fixed investment; the employment share of state-owned enterprises; the share of R and D carried out by the government, restrictions on bank activities; and openness of external capital flows. This means that in carrying out such a cluster approach, it is

useful to include as many indicators as possible.

One warning in using these results deserves emphasis. The foregoing discussion focuses on averages of nations with the same type of economic system. Although all nations with the same system were similar in some respects, this is not true in all respects; and, of course, within the four main groupings, the economic system of each nation had its own unique features.

3. Economic Performance and Economic Systems

Most of the theories about the relative performance of various economic systems refer to differences between centrally planned and market economies, for instance, that the former have lower static efficiency than the latter. Turning to the economic performance of the various OECD, it can be plausibly argued for three reasons that there should be no differences between the systems at all: (a) It is government policies and human capital, not institutions, which are critical in determining economic performance; (b) It is often very difficult to tie certain performance variables, such as economic growth, to particular economic institutions (Glaeser, *et al.*, 2004); (c) If a particular type of economic performance is relatively apparent to all, then in a set of functioning democracies where voters are aware of what is happening in other nations, voters would demand changes in the institutions responsible for such outcomes, such as, for instance, the Thatcher revolution in the UK.

Several counter arguments can also be offered against such propositions: (a) If the major institutions of an economic system were specifically designed to achieve certain economic outcomes corresponding to values quite different than those in other nations, it is quite possible that economic performance would be significantly different from others. In this regard, the income redistribution system, whereby the government transfers income from one group to another, comes immediately to mind. (b) Voters are often not aware of what is happening in other countries and also may not

understand the relationship between institutions and economic performance; (c) The existing economic system might maintain its inertia if changing one institution required changing many other institutions as well.

Given our current lack of theoretical clarity about the impact of economic systems on economic performance, it is necessary to proceed cautiously. Table 2, which is set up much like the previous table, shows the average performance of countries with different economic systems for five common macroeconomic criteria.

Panel A shows one instance of a very visible consequence of the economic system, namely its impact on income distribution. This indicator is not related to the level of economic development, as shown by the development elasticity in the first data column. When we look at income inequality in terms of the ratio of incomes at the 20th and 80th percentile to the median income, it is apparent that the direct distribution of incomes before taxes and transfers, that is, factor incomes, was not significantly different between three of the four economic systems, but the AS+ had significantly higher relative factor incomes in the upper part of the income distribution. By contrast, the distribution of income after taxes and transfers, that is, disposable personal income, was significantly more unequal in the AS+ nations and significantly more equal in the Nordic countries. In the West European nations, the ratio of income of those in the 20th percentile to the median shows significantly greater equality than the other nations when the impact of per capita income is factored out.¹⁶ The extent of the redistribution of income through the fiscal system in each economic system can be measured by comparing the percentile ratios for the two concepts of income, which showed much greater redistribution in the Nordic and West European economic systems than in the other two systems.

Panel B of Table 2 presents four other common macroeconomic performance indicators, which are generally believed to reflect the well-being of a large part of the population and which are endlessly repeated by leading politicians of all ideological stripes. These indicators cover the period 1980 through 2000, thus spanning the year 1990 for which the systems were determined.

The data in the first column show that both the unemployment and inflation rates were lower in those countries with a higher level of per capita GDP. When the 1990 level of per capita GDP is held constant, the data reveal that, with one exception, the differences between the performance levels of the economic systems were not statistically significant. For the rate of per capita GDP growth, the regression was rerun holding not just per capita GDP in the initial year constant, but also the average years of education of those in the labor force in the initial year and the ratio of gross capital investment to the GDP from 1975 through 1995 to account for lags in the impact of investment. These three variables, according to Levine and Renelt (1992), constitute the minimum required for testing growth models. The results, however, were the same as before and showed that the economic system had no impact on growth rates. It is noteworthy that when a similar analysis of economic system and per capita GDP growth is carried out for the four economic systems of developing nations (Pryor, 2005-a), a significant relationship between system and growth is found.

The single exception to the relative unimportance of the economic system in explaining macroeconomic behavior of the OECD nations was the rate of inflation, which was significantly higher in the Southern European nations. In part, the greater fiscal indiscipline of these Southern European nations, which underlay this inflation, might be attributed to the lack of the central bank's policymaking independence from the ministry of finance, as shown in Table 1. To prevent tut-tutting, it might be added that inflation - unless it is extremely severe - has not usually had an adverse

impact on either growth or unemployment in my sample of OECD nations.¹⁷

Unraveling the quite different roles that particular institutions may play within a given economic system provides a useful perspective to understand the impact of the system on economic performance.

The economic performance of a nation may depend on a few institutions, rather than on the entire economic system. For instance, an enormous amount of scholarly energy has been devoted to isolating those few institutions which directly account for differences in the rate of economic growth, such as particular structures of the financial system. It is noteworthy, however, that some of these financial structures, in turn, have been related to more basic institutions of the economic system.¹⁸ Nevertheless, contrary evidence to such an approach can be seen in the quite different relative economic performance of the same countries in different periods of time, or between nations with the same economic institutions.

Any such analysis is further complicated by the complex interaction between economic events, such as shocks, to a particular country, its institutions, and the performance outcomes.¹⁹ Additional problems arise because, in some cases, institutions can reinforce the impact of other institutions,²⁰ while in other cases the influence on performance of one institution can offset that of another.²¹

These are complex issues, but two main conclusions can be quickly drawn. First, in linking the economic system to economic performance, it is essential to take into account variables representing the changing economic environment. Second, in many cases the economic system variable is too broad to link directly to economic performance, and we must look instead at the individual components of the system and the ways they reinforce or counteract each other.

4. Systemic Change

Up to now we have focused on economic systems at a single point in time. Our approach, however, also helps us to explore systemic change over time. Before starting, it is useful to specify four different patterns of change:

Fixed versus fluid patterning: Fixed patterning means that the overall configurations of institutions defining particular economic systems are relatively fixed over time, while fluid patterning means that this patterning of institutions changes over the course of economic development. Given the vastly different development elasticities of the various institutions shown in the previous chapters, fluid patterning appears much more likely.

Parallel versus polyvalent change: Parallel change indicates that over the course of time, the nations sharing the same type of economic system experience the same institutional transformations so grouping of nations remain, even while the specific institutional characteristics may change. Polyvalent change takes place when the composition of nations for the various clusters change.

Contracting versus expanding clusters: Contracting change indicates that the multidimensional distances *among* nations with the same economic systems becomes smaller. This means that the clustering of nations with a given economic system has become tighter, that is, the technological/environmental constraints influencing variations within a given economic system have become stronger. Expanding change is the reverse.

Convergent versus divergent change. Convergent change indicates that the multidimensional distance *between* economic systems becomes smaller. This means that the cluster of nations have become closer and reveals another way that the technological/environmental constraints limiting systemic variation have become stronger. Divergent change is the reverse.

Comparisons of the economic systems of developing nations and of the OECD in 1990 provides some important insights about general systemic changes. Before plunging into the discussion, however, we must consider two hazards of using evidence from a single point in time in other parts of the world to generalize about events occurring over several centuries. First, poor and rich countries respond differently to certain important economic forces. For instance, the development elasticities of certain institutional variables, such as the share of public consumption in the GDP, are much different. Second, some causal forces operate quite differently over a period of time than at a single point in time. For instance, from 1879 to the present, the ratio of government expenditures to the GDP in the OECD nations was highly correlated with per capita income; but at a single point in time, no such relation could be found.²² These two methodological pitfalls mean that we must proceed cautiously.

The major results of a cluster analysis of these countries are summarized elsewhere (Pryor 2005a) and the calculations employs roughly the same institutional variables used for the OECD nations. The comparisons of these two sets of nations allow us to focus on the results most relevant to the problem of systemic change.

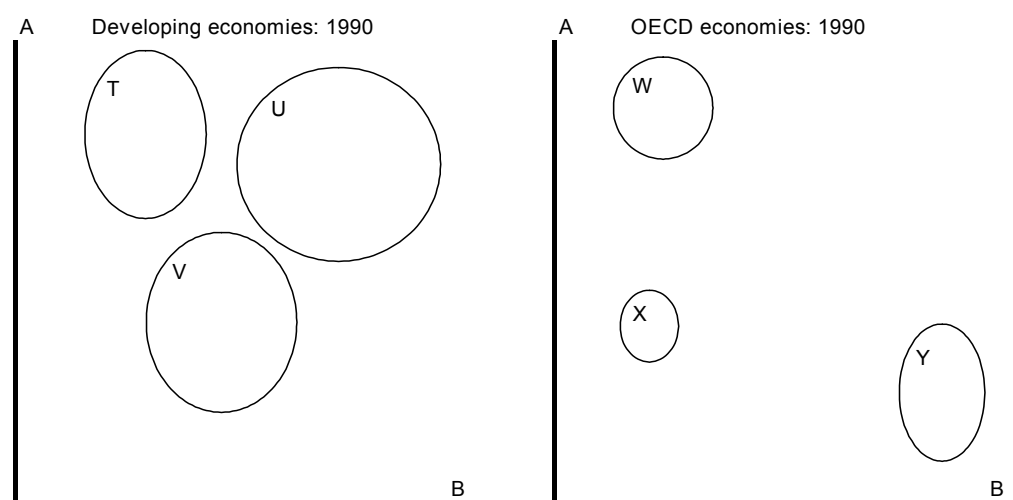
With regard to fluid patterning, the institutions and organizations that served to distinguish the economic systems in the OECD from each other were quite different from those defining the economic system of developing nations. For instance, regulation of product markets, which differentiated OECD economic systems, did not emerge as important distinguishing characteristics between the economic systems of developing nations. This suggests that the institutional configurations defining economic systems of OECD nations could have been quite different thirty or fifty years ago. To investigate this matter further, the samples of OECD and developing economies were

combined to carry out a supervised cluster analysis, which means that the computer program was forced to classify the economic system of each developing nation into one of the four economic systems of the OECD nations. Almost all of them fell within the Southern European cluster, which constituted that group of OECD nations with the lowest levels of per capita GDP. This exercise provides yet another example of the interrelations between the economic system and the level of economic development, so it is not surprising that the economic systems of developing nations would be defined by quite different characteristics than those of the industrialized market economies of the OECD.

For the examination of expanding or contracting clusters and for divergent and convergent change, the results are shown schematically in Chart 3. The calculations showed much smaller clusters for the OECD nations than for the sample of developing nations. That is, the cluster analysis explains a greater percentage of the variance of the multidimensional distances between each country and every other country as development proceeds. This smaller range of variation suggests that the technological/environmental constraints on systemic variation tighten over the course of economic development.

Although systemic change appears contracting, such a conclusion must be drawn cautiously for several reasons. The developing nations had a greater percentage variation in per capita GDP than the OECD nations, and since many institutions are related to the level of economic development, these developing nations would reveal greater differences in particular institutions. Moreover, the developing nations were spread over the entire world except Europe and Oceania, and, as a result, the forces of diffusion, that is, the borrowing of institutions, between them were weaker. Finally, a successfully functioning agricultural economy is less complex and, therefore, requires

Chart 3: A Schematic Representation of Economic Systems of Developing and OECD Economies



Note: A and B are the institutions defining the economic systems; T, U, and V are economic systems of developing countries; and W, X, and Y are the economic systems of OECD countries.

This is a schematic view since, In actuality, five systems were defined for this exercise.

fewer restriction on its constituent elements.

The results also show divergent systemic changes. That is, the distances between the clusters appear greater among the OECD nations than the developing economies. Such a result seems to confirm an hypothesis of While Kitschelt, *et al.*, (1999b) and Hall and Soskice (2001), who point out that by working within a given economic system, the workforce of a nation develops core competencies that are advantageous in the international marketplace and this works against systemic convergence. However, such results may have also occurred because the clusters in the OECD countries are more tightly defined.

Turning from a cross-section to a time-series approach exploring systemic changes over the second half of the twentieth century, some serious data problems arise. More specifically, time-series of quantitative data characterizing economic institutions of OECD nations are quite scarce and we could find only eleven such indicators for the post World War II period. We are, therefore, limited in our analysis primarily to investigating parallel versus polyvalent change.

An indirect method of determining whether the same nations remain grouped together over the postwar period focuses on the relative ranking of each economic system for each institutional indicator. If systemic change is parallel, then the rank orders of these various institutional variables for the different groups of nations should remain the same over time.

Since the OECD nations had largely recovered from the effects of World War II by 1960, the analysis starts with data for four benchmark years thereafter, namely 1960, 1970, 1980, and 1990. Then the rank orderings of the average values of the four economic systems for each of the eleven indicators in each benchmark years are determined. Finally, the investigation focuses on whether these rank orderings for the eleven indicators were related in the four years by calculating

a Kendall concordance coefficient. This coefficient ranges between zero, where there is no relationship in the rank orderings for a particular indicator in the four benchmark years, to one, where the rank orderings are the same for all four years. The resulting coefficient can then be tested for statistical significance.²³

The test results are clean. For ten out of the eleven institutional indicators, the relative rank orderings of the four economic systems are similar over the period under investigation, that is, the concordance coefficient is statistically significant for all four years under investigation. The only exception is the indicator showing the government's share in total investment. Such results suggest that regardless of whether the particular characteristics of the economic systems in the OECD changed from 1960 through 1990, the four groups of countries maintained their distinct differences with each other - in brief, they revealed parallel institutional change and the groups of nations with a similar economic system did not greatly change.

More insight can be gained by looking at indicators whose rank orderings changed somewhat over the years, even though the degree of concordance remained significant. For instance, the ratio of public consumption to total public plus private consumption in the Nordic nations was roughly the same as the OECD average in 1952, but it had moved ahead of all other OECD systems by 1960 and, in the following years, this gap widened. Thus, this distinctive characteristic of the current Nordic economic system in the 1990s began to emerge only in the mid- 1950s, even though the ideological seeds may have been planted decades earlier.

The Nordic nations have also placed more emphasis on transfers-in-kind, as opposed to the cash transfers found in Western Europe. We might conjecture that part of this difference might be attributed to the greater homogeneity of the Nordic populations and the greater trust they place in

the government, which means that a system of transfers-in-kind is less difficult to administer than with a heterogeneous population with considerable distrust of government. Moreover, in the immediate post-World War II years in Western Europe, a governmental response to assist quickly those suffering from various war injuries and property damage was a more complicated administrative task than faced in the Nordic countries and was most easily solved by giving funds directly to needy individuals, who could then purchase the necessary services themselves.²⁴ Certain political factors have also influenced the extent and form of the welfare system which would take us too far afield to investigate.²⁵

One immediate objection to this analysis must be raised. These comparisons of rank orderings cover only thirty years. Would such relationships hold over a longer period? For instance, data on public expenditures extending back to 1870 show sharp breaks in the rank ordering before and after World War II.²⁶ Similarly, with regard to the openness of foreign trade, as measured by average tariff rates, the rank orderings of the four groups of nations greatly changed over the last 120 years, showing sharp breaks after both world wars.²⁷ In addition, certain institutional features, such as the relative importance of cartels or direct governmental measures to direct production were not very important in the latter part of the twentieth century in most OECD nations, but played an important role in the economic systems of certain of my sample nations during the period between the world wars. In these ways as well, the economic systems did not appear to change in a parallel fashion over the century.

This kind of test of parallel versus polyvalent change is, of course, indirect. Nevertheless, the results suggest parallel change, namely that the same groups of countries cluster together over time, at least in the middle run, whatever the defining institutional characteristics of the economic

systems are at a given level of economic development.

Nevertheless, an economic system is not just of set of economic institutions randomly assembled, but institutions in a distinctive relationship to each other and we must look at the overall pattern of these institutional variables as well. Therefore, the eleven indicators might be used to derive economic systems just as the forty indicators were in the previous chapter for the OECD nations in 1990.

Unlike the forty indicators used above for 1990, the eleven indicators available for the historical analysis are not necessarily representative of the entire economic system. Thus, the two data sets might not necessarily yield the same results for 1990, the overlapping year. Such a calculation put this fear to rest and showed that for 1990, slightly more than three-fourths of the countries in the eleven-indicator sample were in the same clusters derived from the cluster analysis for the same year using forty indicators.²⁸ It is noteworthy that distinct Nordic and AS+ groups emerge in the eleven-indicator sample, as in the more extensive analysis. This finding gives us a certain confidence to proceed, especially since comparability problems are not as serious when we use the same eleven indicators for each of the benchmark years. To avoid any confusion with actual economic systems, however, the results of the eleven-indicator cluster analysis are labeled as pseudo-systems.

The results of this exercise suggest a certain degree of polyvalent change. More specifically, the similarity of composition of the pseudosystems seemed also to decline as we move back in time. For instance, in 1980, 48 percent of the nations remained in the same cluster that the forty-indicator analysis had assigned them; for 1970, 57 percent; and for 1960, 38 percent (Pryor, 2004, Appendix 7). Moreover, since most of the eleven indicators do not necessarily capture the key systemic

elements, the derived pseudosystems should also be more volatile over time than systems derived from an analysis using more indicators. As expected, only slightly more than one-third of the nations remained in the same pseudosystem from one decade to the next.

The results from the cluster analysis are also supported by other evidence. For instance, the calculations previously discussed for 1990 show that the economic system of France appears close to the border separating the Western and Southern European systems, and that the economic system of Switzerland is similarly situated close to the border of the Western European and the AS+ nations, which suggests that in later years they might be grouped by the statistical analysis in different clusters than their present location. And the U.K. appeared to move from a highly regulated economy with a Western European economic system to the AS+ system over the last half of the twentieth century, which provides additional evidence about polyvalence.

Thus, the results of the rank order concordance and the cluster analysis tests provide rather different answers to the question about parallel versus polyvalent change. Although the latter test appears to be more appropriate, a definite conclusion can not be drawn at this time.

5. Summary

We have shown how data on various major institutions of an economic system, combined with a cluster analysis, allows us to define economic systems in a more comprehensive manner than before. By using the economic systems of OECD nations, which are already known to us, we show that the results accord with the conventional wisdom about these nations. This technique, however, can be used for foraging and preindustrial agricultural economies as well to obtain results which are much less obvious.

Once the economic systems are isolated, we can carry out a relatively standard analysis of

the economic performance of these systems. Such an analysis, nevertheless, raises questions which have seldom been considered in a systematic fashion, namely whether the similarities or differences in such performance are due to the system itself, particular groups of institutions, or single institutions or whether policy decisions, exogenous events or random factors play the key role.

Comparison of the results of the cluster analysis of different countries at various stages of development or of the same countries at different points in time allow us to describe the evolution of economic systems in a very precise way, even though, at the present time, we have no means of explaining these results. Three important generalizations can be drawn from the comparison of developing and OECD nations: the clusters of institutions defining economic systems change over the course of economic development; over the long term the clusters defining the various economic systems contract; and over the long-term the clusters also become further apart from each other. It is also noteworthy that economic growth is much more closely tied to the economic systems of developing nations than of the OECD, which suggests that differential growth rates will not serve as a source of systemic change in the OECD nations in the future. In looking at middle-run systemic change among the OECD nations we find no trends toward changing cluster size or distance between clusters. The statistical analysis of whether the same nations are grouped together in the same economic systems over time does not yield conclusive results.

Employing an inductive approach we provide a set of stylized facts about the economic systems of advanced market economies and how they change. In particular, we show that the countries of the OECD nations have four distinct economic systems; that for most performance indicators except those reflecting basic national values, the economic systems are not greatly different; and that, over time, advanced economic systems reveal more similar institutional patterns

among those with the same economic system and more different institutional patterns between nations with different economic systems. Any deductive theory about comparative market systems which is proposed in the future must explain these results.

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Table 1: Defining Characteristics of Four Industrial Economic Systems in 1990

						Economic systems				Average
Features		Indicator		Range	Devel.	South	AS+	Nordic	West	Total
A	B				elasticity	European			European	sample
Product market										
1	L	D	Regulation of product market	0.6 - 3.1*	-0.40	2.800 ⁺	1.086	2.100	2.000	1.876
2	L	P	Protection of patent rights	0 - 1	+0.66	0.599	0.698	0.702	0.805	0.707
3	L	P	Good legal environment for markets	0 - 1	+0.19	0.747 ⁻	0.846	0.882	0.880	0.842
4	LS	PD	Barriers to starting new businesses	0 upwards	-2.21 [?]	0.542 ⁺	0.074 ⁻	0.104	0.321 ⁺⁺	0.237
5	LSX	P	Social partnership of capital and labor	0 - 1	+1.16	0.313	0.371 ^{-?}	0.852 ⁺⁺	0.777	0.548
6	S	D	Ratio of government subsidies to GDP	0 - 1	-1.04	0.028	0.017	0.032	0.028	0.024
7	S	D	Intersectoral grants for R & D	0 - 1	-0.36	0.366	0.261	0.290	0.304	0.296
8	S	D	Foreign trade barriers	0 - 1	-0.25	0.621	0.703	0.501	0.693	0.636
9	XL	D	Freedom to set prices	0 - 1	+0.52	0.539	0.748 ⁺	0.650	0.637	0.663
10	X	D	Product market competition	0 - 1	+0.08	0.700	0.726	0.654 ^{-?}	0.758	0.713
11	X	D	Effectiveness of antitrust laws	0 - 1	+0.22 [?]	0.436	0.529 ⁺⁺	0.471	0.516	0.493
12	X	PD	Presence of business clusters	0 - 1	+0.54	0.513	0.626	0.650	0.663	0.616
Labor market										
1	S	D	Coverage of collect. barg. agreements	0 - 1	-1.20	0.797 ⁺	0.459 ⁻	0.673	0.888 ⁺	0.663
2	L	D	Centralization of largest peak union org.	0 - 1	-0.62	0.476	0.367	0.464	0.607	0.457
3	L	D	Power of workplace representative	0 - 1	-0.48*	0.250	0.036	0.125	0.188	0.138
4	L	D	Legal protection: workers, employment	0 - 1	-0.63	0.662	0.362 ⁻	0.418	0.485	0.464
5	L	D	Legal protection: labor bargaining rights	0 - 1	-0.82	0.698 ⁺	0.331	0.444	0.384	0.452
6	X	D	Coordination of wage negotiations	0 - 1	-0.84*	0.417	0.292 ^{-?}	0.688	0.750	0.520
7	XS	D	Strength of vocational training system	0 - 1	+3.88*	0.500	0.000 ⁻	0.938 ⁺	0.750	0.500
8	X	D	Level of economy where wages bargained	0 - 1	-0.12*	0.385	0.323 ^{-?}	0.750 ⁺	0.594	0.482
Production and business sector										
1	S	P	Widespread firm ownership	0 - 1	+1.14*	0.000 ⁻	0.557 ⁺	0.200	0.100 ^{-?}	0.267
2	S	P	Importance of large manufacturing firms	0 - 1	+1.26	0.203	0.427	0.344	0.409	0.364
3	L	P	Power of peak organizations	0 - 1	-1.07*	0.476	0.245 ⁻	0.857 ⁺	0.464	0.468
4	L	P	Shareholder rights	0 - 1	+0.45	0.250 ⁻	0.771 ⁺	0.500	0.250 ⁻	0.476
5	L	P	Creditor rights	0 - 1	-0.07	0.500	0.400	0.550	0.650	0.486
6	L	P	Significant worker role in firm's decision	0 - 1	-1.12*	0.283	0.000 ⁻	0.650 ⁺	0.533	0.298
Government sector										
1	S	PD	Govt. direct share of fixed investment	0 - 1	-0.21	0.152	0.139	0.133	0.114	0.137
2	S	D	Govt. share of total consumption	0 - 1	+0.31	0.197	0.217	0.317 ⁺	0.222	0.233
3	S	D	Ratio of govt. domestic transfers to GDP	0 - 1	+0.13	0.149	0.127 ⁻	0.198	0.221 ⁺	0.167
4	S	P	Direct govt. share of total employment	0 - 1	+0.34	0.149	0.142 ^{-?}	0.316 ⁺	0.155	0.181
5	S	P	State enterprise share of total employment	0 - 1	-0.93	0.036	0.023	0.043	0.043	0.036
6	S	D	Share of R & D in government sector	0 - 1	-1.66	0.273	0.204	0.152	0.114	0.184
7	L	D	Coverage of social security system	0 - 1	-0.02	2.248	2.106	2.560 ⁺	1.950	2.206
Financial sector										
1	L	D	Central bank independence	0 - 1	+0.99	0.330	0.498	0.406	0.604 ⁺⁺	0.479
2	L	PD	Restriction on bank activities	0 - 1	-0.09	0.354	0.393	0.313	0.250	0.317
3	L	D	Openness of external capital flow	0 - 4	+3.48	3.225	3.429	3.525	3.750	3.490
4	S	PD	Comprehensiveness of accounting stds.	0 - 1	+0.49	0.603	0.802	0.822	0.669 ^{-?}	0.736
5	S	P	Bank concentration	0 - 1	-0.72	0.550 ⁻	0.611	0.827 ⁺	0.653	0.638
6	S	D	Relative size of financial system	0 upwrds.*	+1.01	0.812	1.186	0.835	1.210	1.101
7	S	D	Stock market activity/bank activity	0 upwrds.	+0.34	0.074 ⁻	0.671 ⁺⁺	0.280	0.188 ^{-?}	0.367
Per capita GDP (1990 dollar prices)						12342	17149	17870	17507	16696

Notes:

Features: Column A designates if the indicator is based on legal definitions (L), statistics (S), or expert evaluations (X), or some combination thereof. Column B designates whether the indicator refers primarily to property (P) or distribution (D). **Range:** An asterisk designates that the range is not absolute, but is based on the highest and lowest recorded values. **Development elasticity** designates the percentage change of the indicator resulting from a 1 percent change in the per capita GDP; and a rough estimate is designated with an asterisk. The second through fifth data columns present averages (excluding France and Switzerland). The level of significance is determined when per capita income is held constant, and the sign of the coefficient in this regression is designated in a superscript. A statistically significant result at the 0.05 level is boldfaced, with a question mark placed as a superscript if the level of significance is 0.10.

Sources and exact meaning of the data are discussed in Pryor (2004), Appendix 6.

Table 2: Economic Performance Indicators for OECD Countries

elasti-	Devel.	<u>Average values</u>				Total sample
	city	<u>Economic systems</u>				
		South	<u>AS+</u>	<u>Nordic</u>	West	
		<u>European</u>			<u>European</u>	
		Panel A: Income distribution around 1990: Ratios of incomes at specified percentiles				
<u>20th to 50th percentile</u>						
Factor income	- 1.23	n.a.	0.389	0.269	0.379	0.384
Disposable personal income	+0.03	0.624	0.590⁻	0.700⁺	0.695⁺?	0.654
<u>80th to 50th percentile</u>						
Factor income	- 0.09	n.a.	1.758⁺	1.609	1.625	1.661
Disposable personal income	- 0.11	1.544	1.601⁺	1.341⁻	1.428	1.479
Panel B: Macroeconomic indicators: Average annual rates, 1980-2000						
GDP per capita	- 0.35	1.99%	2.27%	1.80%	1.89%	1.95%
GDP per worker	- 0.44	1.59	1.78	2.16	1.70	1.73
Unemployment rate	- 1.20	10.68	7.66	6.18	6.79	7.65
Inflation rate	- 1.85	9.30⁺	3.54	4.03	2.47	3.47

Notes: Development elasticity designates the percentage change of the variable associated with a 1 percent change in the per capita GDP.

In the second through fifth data columns, the tests of statistical significance are made by calculating ordinary least squares regressions of the following type:

Indicator = a + b Ycap + c EcSys, where Ycap is per capita GDP, EcSys is a dummy variable with a value of 1 for a particular economic system and a value of 0 for all other economic systems; and a, b, and c are calculated coefficients. France and Switzerland are excluded from these calculations (but not the calculation of the elasticities).

The income distribution statistics are estimated from data sets of the Luxembourg Income Study <www.lisproject.org>. In these calculations, data are missing for Japan, New Zealand, Greece, and Portugal, which means that for the South European system, only two countries are included and, therefore, the results should be carefully interpreted.

Appendix 6 in Pryor (2004) discusses all sources of data.

ENDNOTES

1. For supplying data we would like to thank George S. Argyropoulos, John Baldwin, Thea Bosten-Eurlings, Murray Klee, Edward Lazear, Walter Park, Stu Pettingrew, Leandro Prados de la Escosura Dennis Quinn, John Ridley, and A. Maria Toyoda. We would also like to acknowledge the useful advice and assistance received from Tom Dee and Leandro Prados de la Escosura. For commenting on an early draft of this paper we are grateful to Stephen Golub, Zora Pryor, Bernard Saffran, and F.M. Scherer.
2. The key terms are institutions and organizations and many employ the useful definitions proposed by Douglas C. North (1981, 201-2). Institutions are “a set of rules, compliance, procedures, and moral and ethical behavioral norms designed to constrain the behavior of individuals.” In a later essay (1998: 81) he added: “If institutions are the rules of the game, organizations and their entrepreneurs are the players. Organizations are made up of groups of individuals bound together by some common purpose to achieve certain objectives. Organizations include political bodies (e.g., political parties, the Senate, a city council, regulatory bodies), economic bodies (e.g., firms, trade unions, family farms, cooperatives), social bodies (e.g., churches, clubs, athletic associations) and educational bodies (e.g., schools, universities, vocational centers).”
3. The clustering program uses a partitioning method with support for missing data. Each of the institutional or organizational variables is cardinally scaled and the program then rescales each variable so that it has a mean of zero and a standard deviation of one. It uses an iterative method of calculation, starting with random points in the dimensional space and employs K-means to minimize the within-cluster distance and maximize the between-cluster distance. The similarity measure between both points and clusters is the scaled Euclidean distance over all the variables.

4. In modern information theory this means that we should keep theoretical complexity to a minimum, where complexity is defined mathematically as the number of bits used to represent the model generating the clusters. A model with ten parameters, each with two possible values (1 or 0), would be of equal complexity to a model with one parameter with 1,024 potential values.
5. More specifically, the MDL is defined in terms of variance reduction (described in the next paragraph) and the complexity measure described in the previous footnote.
6. The development of these indicators has been carried out principally by four teams: a primarily Harvard-based team composed of a shifting combination of Juan Botero, Simeon Djankov, Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny; a World Bank team composed of Daniel Kaufmann, Aart Kraay, M. Mastruzzi, and Pablo Zoldo-Lobatón; an OECD team of Giuseppe Nicoletti, Stefano Scarpetta, and Olivier Boylaud; and an independent team of Peter A. Hall and David Soskice. My intellectual debts to them should be readily apparent.
7. The program starts with a random seed and uses an iterative procedure to derive the prespecified number of clusters. We instructed the program to iterate two hundred times and then averaged the results of one hundred such calculations. We then repeated this procedure ten times and, for the four cluster calculations, twenty-five times and then averaged the results of these runs. For each column, each country was placed in the cluster where it most often appeared, designating with a question mark those cases where it did not appear in its most common cluster 70 percent or more of the runs and, as noted above, these countries were not included in the statistical calculations. Except for the calculations with five clusters, the various countries were found over 90 percent of the runs in the particular clusters specified in Chart 2.
8. To make this test more difficult, we also estimated a number of the indicators in a somewhat different way (see Pryor 2005a).

9. Two other tests of robustness were also made. One was a variance test, which started with the variance of the multidimensional distance between countries using the forty indicators and then compared this with the multidimensional variance between countries within the same cluster. For four clusters, the variance is reduced 41.5 percent; for six clusters, 53.8 percent.

A second test was making twenty five runs and determining the percentage of times a given nation was placed in the cluster where it most often occurred. In the four cluster case for the entire sample in these different runs, the various nations always appeared in the same cluster 93.9 percent of the time. Omitting France and Switzerland, the two wandering nations, this rose to 97.7 percent.

10. More specifically, both start with Soskice's (1999) distinction between nations with coordinated market economies and those with liberal market economies. The latter group includes Britain, Canada, Ireland, US, Australia and New Zealand, although the authors note that the latter two nations have special characteristics that do not fit nicely into their schema. In the former group they distinguish between those economies coordinated through industries and those coordinated through groups of companies across industries (e.g., the keiretsu of Japan and chaebol of Korea). Kitschelt and his colleagues (1999b) also differentiate between those countries coordinated at the national level (Nordic countries) and those coordinated at the sectoral level (some West European nations, such as Belgium, Germany, and Switzerland). For particular purposes, Soskice has also distinguished between West European and South European economies, placing France toward the latter group.

11. In order to use the entire sample, the borderline nations are included in these calculations. Such a calculation, of course, tells us nothing about the direction of causation.

12. More specifically, to determine whether the type of economic system can be explained by a

particular institutional indicator, regressions of the following type were calculated:

$EcSys = a + b \text{ DevLev} + c I$, where $EcSys$ is a dummy variable which is equal to 1 if the society has the specified economic system and equal to 0 if it doesn't; $DevLev$ is the level of economic development; I is the indicator under examination; and a , b , and c are the calculated regression coefficients. For 40 indicators and 4 economic systems, this required calculating 160 regressions. Because the variable to be explained is equal either to 1 or 0, a probit regression technique was used.

13. The AS+ nations also had significantly more widespread firm ownership, a weaker system of vocational education, and fewer national organizations representing employers. Less certain characteristics (the significance level is 0.10) included a less apparent social partnership between management and labor, more effective antitrust laws, less coordination of wage negotiations (which were more likely to be carried out at the enterprises level), a smaller share of total employment by the government, and more financing of enterprise investment through the stock market, rather than banks.

14. The nations with a Nordic economic system also had a greater strength of the vocational system and a higher concentration of banking activity. At a lower level of statistical confidence, these nations also had a greater social partnership of capital and labor and less competition in the product market.

15. The nations with a West European economic system had, at a lower level of statistical confidence, a greater social partnership of capital and labor, less widespread firm ownership, higher central bank independence, less comprehensive accounting standards, and a smaller share of industrial investment financed through the stock market.

16. These conclusions also hold when other percentile ratios and other measures of income distribution (gini coefficients and Atkinson ratios) are used.

17. We also looked at a variety of other performance criteria in the areas of health, pollution, innovations, and social conflict using more than a dozen indicators. Unfortunately, this exercise yielded little of interest and we found only three significant statistical relations: the Southern European countries had higher strike days per worker, the Nordic nations had fewer babies with low birth weights while the AS+ had more babies in this category. The sources of all data used in this and the following paragraph are discussed in Appendix 6 in Pryor (2004). The statistical analysis is carried out in the same manner as in Table 2, with per capita GDP held constant.

18. This literature is reviewed by Beck, Demirgüç-Kunt, and Levine (2003), who trace the origin of these financial structures and institutions to the type of legal system. However, other possible causal factors, such as the presence of certain types of joint stock companies or other types of property institutions, come readily to mind.

A clearer example of the impact of institutions on economic growth is provided by Timur Kuran (2004) who, in a fascinating essay, argues that the Middle East became economically underdeveloped after 1000 C.E. because of the influence of three interlocking institutions: the Islamic law of inheritance, the absence in Islamic law of the concept of a corporation, and the existence of the waqf (a charitable foundation), which locked vast resources into unproductive organizations.

19. This discussion draws especially upon the work of Blanchard (1997), Blanchard and Wolfers (2000), Bertola, Blau, and Kahn (2001) and Lazear (1990).

20. In the context of wage differentials such issues are discussed in the empirical and theoretical work of Blau and Kahn (1994) and Card (1998).

21. This issue is raised by Peter Lindert (2002), who asks an interesting question: Why did the Nordic nations, which tax heavily and spend lavishly on social welfare, show growth rates little

different from other nations when such taxes should discourage investment and growth, at least according to conventional belief as well as sophisticated statistical studies (e.g., de Avila and Strauch, 2003)? He argues that the impact of the types of the governmental tax and expenditures, which provide incentives for growth, offset the high rates.

22. Total government expenditures include consumption, transfers, subsidies, and capital consumption. In the OECD nations the ratio of these expenditures to the GDP increased from an average of 9.2 percent in 1870 to 45.9 percent in 1990, and the relationship between this ratio and per capita GDP was strongly significant. By contrast, there is no significant relationship between per capita GDP and this government expenditure ratio among the OECD nations at single points in time, taking cross-sections for 1870, 1910, 1950, and 1990. New technologies, new ideas and values, and new political or economic opportunities can influence changes in the economic system over time; at a single point in time, however, they are roughly the same for all nations. The ratios of total government expenditures to GDP come from Cusack and Fuchs (2003).

23. This follows the procedure for calculating concordance coefficients described by Sheskin (1997): 641-51. The text describes the results only from 1960 through 1990, but roughly similar results are obtained when 1952 is included in the calculation. Data for 2000 were not available.

24. It is difficult to assess whether those in the Nordic or Western European nations were more likely to misuse a cash transfers system, so this alternative conjecture cannot be easily investigated..

25. For instance, some have argued that the relatively late (but not very late, as in Southern Europe) industrialization in the Nordic nations also encouraged a political alliance between industrial workers and farmers, which gave greater power to social democratic parties and their program of direct supply of welfare services.

26. The underlying data come from Cusack and Fuchs (2003). However, it was necessary to make

a number of estimates to extend some of the series back to 1870. Another series of public expenditures for social purposes by Lindert (2004a, 2004b) goes back to the eighteenth century, but these appeared too late to be used in this study. He shows that many of the changes in the rank orderings among nations can be traced to changes in the extent of the voting franchise and the degree of democracy.

27. The long-term pattern of trade openness is complex. Tariff rates in a worldwide sample of thirty-five nations slowly rose from the 1870s to the first decade of the twentieth century, then rose dramatically from the 1920s to the late 1930s, so that at their peak they were roughly twice as high as the late-nineteenth-century average, and then slowly declined from the late 1940s to the 1990s (Blattman, Clements, and Williamson, 2003). During these three periods, the relative position of countries changed considerably. For instance, the U.S. was a high-tariff nation in the late nineteenth century, but in the interwar period up to the enactment of the Smoot-Hawley tariff bill in the early 1930s, it had relatively low tariff rates, in comparison both to its previous rates and rates in other countries. Obviously certain changes in the external international economic environment, such as the influence of GATT and the European common market after World War II, greatly influenced these tariff differences among nations.

28. The minimum description length (MDL) analysis of the eleven-indicator samples suggests that a grouping of five different economic systems is the most appropriate in 1990, 1980, and 1960, but not 1970. To achieve comparability, it was necessary to use a five-cluster analysis for all years and also for the comparisons with the forty-indicator sample in 1990. The percentage of variance explained by the cluster analysis was roughly 60 percent for all four benchmark years.