THE WEB OF CREDITOR AND SHAREHOLDER PROTECTION IN 25 COUNTRIES: A COMPARATIVE LEGAL NETWORK ANALYSIS

Mathias M. Siems

How different are common law and civil law legal systems? This question has occupied legal scholars for a long time. In the last twenty years the common law/civil law divide has also become a major theme in research of economics, finance and business. In many studies it is alleged that common law countries provide "better law" than civil law countries, and, as a result, more developed financial markets. This article uses a new methodology in order to examine whether there are really differences between different legal origins, or whether alternative explanations are preferable.

The bases of this article are datasets on creditor and shareholder protection in twenty-five countries. Part II describes how these datasets can be transformed into matrices showing differences between countries. It also explains the methodology of network analysis and what results one may expect. Subsequently, Part III presents the networks of all countries. Part IV analyzes more closely the relationship between the three "origin countries;" France, Germany and the U.K., that have allegedly influenced all other legal systems of the world. Part V examines whether "cliques" or "factions" of countries can be identified. Part VI concludes the analysis.

Keywords: social network analysis, comparative law, creditor protection, shareholder protection, legal origins

JEL codes: G20, K00, K22, K35, L14, O17

TABLE OF CONTENTS

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I. INTRODUCTION

How different are common law and civil law legal systems? This question has occupied legal scholars for a long time.[1] In the last twenty years the common law/civil law divide has also become a major theme in research of economics, finance and business. In many "comparative law and finance studies"[2] it is alleged that countries of English legal origin provide "better law" than countries with French or German legal origin, and, as a result, more developed financial markets. Thus, these studies argue that there are two interconnected casual relationships: first, a country's legal origin determines the content of its legal rules. This parallels a view of the comparative legal literature that emphasizes deep differences between legal families.[3] The second causal claim is that differences in legal rules explain differences in financial development. Both of these findings have received strong criticism,[4] however, there is no denying the fact that the comparative law and finance studies have been among the most influential studies of the last two decades.[5]

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[1] *See e.g.*, PIERRE LEGRAND, LE DROIT COMPARÉ (2nd ed. 2006); Pierre Legrand, *European Legal Systems are not Converging*, 45 INT'L & COMP. L.Q. 52 (1996); Esin Örücü, *Family Trees for Legal Systems: Towards a Contemporary Approach*, *in* EPISTEMOLOGY AND METHODOLOGY OF COMPARATIVE LAW 359 (Mark Van Hoecke ed., 2004); THE GRADUAL CONVERGENCE: FOREIGN IDEAS, FOREIGN INFLUENCES, AND ENGLISH LAW ON THE EVE OF THE 21ST CENTURY (B. S. Markesinis ed. 1994).

[2] Term by Mathias Siems & Simon Deakin, *Comparative Law and Finance: Past, Present and Future Research*, 166 J. INST. & THEORETICAL ECON. 120, 120 (2010).

[3] The most prominent voice is Legrand. *See supra* note 1.

[4] *E.g.*, CURTIS J. MILHAUPT & KATHARINA PISTOR, LAW & CAPITALISM: WHAT CORPORATE CRISES REVEAL ABOUT LEGAL SYSTEMS AND ECONOMIC DEVELOPMENT AROUND THE WORLD, 27-44 (2008); Lucian A. Bebchuk & Assaf Hamdani, *The Elusive Quest for Global Governance Standards*, 157 U. PA. L. REV. 1263, 1313-16 (2009); Sofie Cools, *The Real Difference in Corporate Law Between the United States and Continental Europe: Distribution of Powers*, 30 DEL. J. CORP. L. 697, 766 (2005); Mathias M. Siems, *What Does Not Work in Comparing Securities Laws: A Critique on La Porta et al.'s Methodology*, INT'L CO. & COM. L. REV. 300, 303-04 (2005).

[5] *See* Boris Durisin & Fulvio Puzone, *Maturation of Corporate Governance Research, 1993–2007: An Assessment*, 17 CORP. GOVERNANCE: INT'L REV. 266 (2009) (providing citation statistics related to finance studies in corporate governance research).

The explanatory force of legal origins can be challenged from two perspectives.[6] On the one hand, scholars suggest that other aspects, such as politics,[7] culture/religion,[8] geography,[9] and capital account liberalization[10] are more important for financial development than legal rules. This line of criticism is not the topic of the present article.

On the other hand, it is doubtful that similarities and differences between legal systems can really be explained by the distinction between countries with English, French, and German legal origin. A number of alternative explanations are conceivable. First, it can matter whether countries belong to the same international or regional organization. The European Union (EU), for example, harmonizes legal rules on many topics throughout Europe. In addition, international organizations can have an indirect effect. For instance, liberalization of trade may induce a country to make its legal systems more competitive.[11] Second, geographic vicinity and a common culture make it likely that the laws of two countries influence each other. These factors may partially explain the alleged relevance of legal origins, because countries of the same legal origin are often neighboring countries with a similar culture (e.g., all Latin American countries are usually regarded as sharing French legal origin[12]). Third, it is likely that legal systems provide similar solutions in similar circumstances, even if there is no direct link between countries with comparable laws.[13] Conversely, it may then also be expected that legal rules differ between countries that are in different stages of their economic development.[14]

This article uses a new methodology, based on quantitative data and network analysis, to examine whether differences between English, French and German legal origin countries really exist, or whether alternative explanations are preferable. The bases of this article are datasets on creditor and shareholder protection in twenty-five countries. Part II describes how these datasets can be transformed into matrices showing differences between

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[6] *See* Gani Aldashev, *Legal Institutions, Political Economy, and Development*, 25 OXFORD REV. ECON. POL'Y 257, 258 (2009).

[7] *See* Marco Pagano & Paolo Volpin, *The Political Economy of Corporate Governance*, 95 AM. ECON. REV. 1005, 1005 (2005); Marco Pagano & Paolo Volpin, *The Political Economy of Finance*, 17 OXFORD REV. ECON. POL'Y 502, 504 (2001).

[8] *See* Amir N. Licht et al., *Culture, Law, and Corporate Governance*, 25 INT. REV. LAW & ECON. 229, 231 (2005); René M. Stulz & Rohan Williamson, *Culture, Openness, and Finance*, 70 J. FIN. ECON. 313, 315 (2003).

[9] *See* Daron Acemoglu et al., *Reversal of Fortunes: Geography and Institutions in the Making of the Modern World Income Distribution*, (2001) 117 Q. J. ECON. 1231 (2002).

[10] *See* Menzie D. Chinn & Hiro Ito, *What Matters for Financial Development? Capital Controls, Institutions, and Interactions*, 81 J. DEV. ECON. 163, 164 (2006).

[11] MATHIAS M. SIEMS, CONVERGENCE IN SHAREHOLDER LAW 263-66 (2008).

[12] *See infra* Part II.B.

[13] Siems, *supra* note 11, at 249 (referring to this as "convergence through congruence").

[14] *See e.g.*, WORLD BANK, DOING BUSINESS REPORT: REFORMING THROUGH DIFFICULT TIMES (2010), http://www.doingbusiness.org/documents/fullreport/2010/DB10-full-report.pdf.

countries. It also explains the methodology of network analysis and what results one may expect. Subsequently, Part III presents the networks of all twenty-five countries. Part IV analyzes more closely the relationship between the three "origin" countries (France, Germany and the U.K.) and the other twenty-two legal systems. Part V examines whether "cliques" or "factions" of countries can be identified. The concluding Part VI discusses why in creditor protection but not in shareholder protection it is possible to identify differences between countries from different legal origins.

An implicit purpose of this article is to promote the use of social network analysis in legal research. Network analysis offers a powerful tool to analyze relationships and to identify sub-structures. This article only uses simple methods of descriptive statistics, but future research could extend this analysis in order to examine how legal differences may relate to other types of relationships, such as trade capital flows.

II. DATA AND METHODOLOGY

A. Data

This article originates from a project on Law, Finance and Development at the Centre for Business Research (CBR) of the University of Cambridge. The overall aim of this project is to consider the mechanisms by which legal institutions shape national financial systems. In particular, we are interested in the national differences and similarities in corporate governance, i.e., how well legal systems protect shareholders, creditors and workers.[15]

In the quantitative part of this project, datasets have been produced on shareholder, creditor, and worker protection for five countries for the period from 1970 to 2005, and datasets on shareholder and creditor protection have been produced for twenty-five countries for the period from 1995 to 2005. The present article uses the latter two 25-country indices. The countries considered are (in alphabetical order): Argentina, Brazil, Canada, Chile, China, Czech Republic, France, Germany, India, Italy, Japan, Latvia, Malaysia, Mexico, Netherlands, Pakistan, Russia, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, the U.K., and the United States. These countries were chosen in order to provide a good mix of countries, enabling researchers to (effectively) test whether there really are differences between civil and common law countries, European and non-European countries, and developed and developing countries.[16]

The measurement of creditor and shareholder protection is based on ten variables. The full text of the indices, the datasets and detailed

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[15] *See* Centre for Business Research, Home Page, "Law, Finance and Development" project, http://www.cbr.cam.ac.uk/research/programme2/project2-20.htm (last visited Dec. 1, 2010).

[16] *See supra* note 11 and accompanying text (explaining the potential relevance of these factors).

explanations can be found online,[17] and in other articles we have explained these indices and their coding methodology in detail.[18] Here, by way of summary, Table 1 presents an overview of the questions considered in the two indices. Table 2 illustrates, by way of example, how for the United States one variable of the creditor protection index and one variable of the shareholder protection index have been coded.

[17] *See* Ctr. Bus. Res., *Project: Law, Finance and Development*, UNIV. OF CAMBRIDGE, http://www.cbr.cam.ac.uk/research/programme2/project2-20.htm

[18] John Armour, Simon Deakin, Priya Lele & Mathias Siems, *How Do Legal Rules Evolve? Evidence From a Cross-Country Comparison of Shareholder, Creditor and Worker Protection*, 57 AM. J. COMP. L. 579-629 (2009); John Armour, Simon Deakin, Viviana Mollica & Mathias Siems, *Law and Financial Development: What We are Learning from Time-Series Evidence*, BYU L. REV. 1435-1500 (2009); Mathias Siems, *Shareholder Protection Around the World ('Leximetric II')*, 33 DEL. J. CORP. L. 111-147 (2008); Michael Schouten & Mathias Siems, *The Evolution of Ownership Disclosure Rules Across Countries*, 33 J. CORP. L. STUD. 451-483 (2010).

Table 1: Overview of questions considered in the CBR indices[19]

Creditor Protection Index	Shareholder Protection Index
• Minimum capital requirement for establishment of a private company. • Dividend restrictions (i.e., restrictions of share repurchases and undervalue transactions with shareholders) • Directors' duties to creditors, in particular if company is insolvent • Extent to which non-possessory collateral may be taken over debtor's assets. • Registration requirements for such non-possessory collaterals • Enforcement of collateral (i.e., availability of out-of-court enforcement of collateral) • Entry to corporate bankruptcy proceedings mainly initiated by debtor or creditor • Stay of secured creditors only if realistic possibility of rehabilitation • Outcome of bankruptcy proceedings mainly determined by court, debtors or creditors • Subordination of secured claimants to certain types of preferred claims, or general unsecured creditors.	• Powers of the general meeting for *de facto changes* (i.e., shareholder approval needed for sale of company's assets) • Agenda setting power of shareholders (i.e., power of shareholders to put an item of the agenda of the general meeting) • Anticipation of shareholder decision facilitated (i.e., postal or proxy voting enabled) • Prohibition of multiple voting rights • Independent board members (i.e., proportion of board members that have to be independent) • Feasibility of director's dismissal (i.e., good reason or compensation not required) • Private enforcement of directors duties (i.e., requirements that shareholders have to fulfil for such actions) • Shareholder action against resolutions of the general meeting (like previous variable) • Mandatory bid (i.e., question of whether major shareholder is required to purchase remaining shares) • Disclosure of major share ownership (i.e., percentage of shareholder ownership that has to be disclosed to the public)

[19] John Armour et al., University of Cambridge, Corporate Governance Programme, Datasets, *Creditor Protection Index – 25 Countries* (forthcoming 2011), http://www.cbr.cam.ac.uk/research/programme2/project2-20output.htm (last visited Dec. 1, 2010) (providing dataset for creditor protection index); John Armour et al., University of Cambridge, Corporate Governance Programme, Datasets, *Shareholder Protection Index – 25 Countries* (2009), http://www.cbr.cam.ac.uk/research/programme2/project2-20output.htm (last visited Dec. 1, 2010) (providing data set for shareholder protection index).

Table 2: Coding of U.S. law on creditor and shareholder protection (extract)[20]

<table>
<tr><td rowspan="2">Creditor protection index (extract)</td><td colspan="2">Variable I.6: Directors' duties to creditors
Equals 0 if no duty on directors to take creditors' interests into account; equals 0.5 if duty on directors to act in creditors' interests if firm is cash-flow (commercially) insolvent; equals 1 if duty on directors to act in creditors' interests if firm is balance-sheet insolvent</td></tr>
<tr><td>US Coding: 1</td><td>Reference: Credit Lyonnais Bank Nederland NV v. Pathe Communications Corp, No Civ. A 12150, 1991 Del Ch LEXIS 215 (1991).</td></tr>
<tr><td rowspan="2">Shareholder protection index (extract)</td><td colspan="2">Variable 1: Powers of the general meeting for de facto changes
If the sale of more than 50 % of the company's assets requires approval of the general meeting it equals 1; if the sale of more than 80 % of the assets requires approval it equals 0.5; otherwise 0.</td></tr>
<tr><td>US Coding: 0.75</td><td>Reference: Delaware General Corporation Law, § 271(a) approval in case of "substantially all of its property and assets". The courts do not specify a specific qualifying percentage, but emphasize the qualitative and quantitative characteristics of the transaction at issue (Gimbal v. Signal Companies, 316 A.2d 599 (Del. Ch.) affirmed in part, 316 A.2d 619 (Del. 1974). In Katz v. Bregman, 431 A.2d 1274 (Del.Ch.1981) ca. 50 % was regarded as sufficient.</td></tr>
</table>

Using these datasets, previous articles have compared the strength of protection between the twenty-five countries.[21] One article also examined whether the level of shareholder protection is reflected in a country's financial development.[22]

The methodology and content of the present article is, however, different from these previous ones. Here, the principle focus is not on aggregates of legal protection but on the differences between the twenty-five countries. To achieve this, the differences between each variable in the law of a particular legal system, and the same variable in the law of the other

[20] *Id.* As can be seen in this example, coding is based on both statutory and case law.

[21] *See supra note* 17 for references.

[22] John Armour, Simon Deakin, Prabirjit Sarkar, Mathias Siems & Ajith Singh, *Shareholder Protection and Stock Market Development: An Empirical Test of the Legal Origins Hypothesis*, 6 J. EMPIRICAL LEGAL STUD. 343-380 (2009).

countries have been calculated.[23] Subsequently, the absolute values of these differences were added together. This has been done for the years 1995 and 2005, though the following analysis will focus on the 2005 results. The results of these mathematical operations are symmetric matrices with twenty-five columns and rows, indicating the differences in creditor and shareholder protection between each pair of countries. An extract of these matrices can be found in Table 3. For instance, one can observe that the German and Japanese laws on creditor protection are relatively similar, (the difference is just 2.87), whereas those of Germany and India are relatively different (at a difference of 5.14). The primary aim of this article is to make sense of these matrices.

Table 3: Matrix on differences in creditor protection, 2005 (max 10; min 0)

	German	France	U.K.	U.S.	India	Japan	China	Pakistan	..
German	0	3.46	3.27	4.13	5.14	2.87	3.31	4.38	..
France	3.46	0	3.17	4.09	4.74	3.49	4.25	2.84	..
U.K.	3.27	3.17	0	2.92	3.57	4.48	4.26	2.67	..
U.S.	4.13	4.09	2.92	0	2.99	5.06	5.34	2.25	..
India	5.14	4.74	3.57	3.00	0	5.07	3.35	2.9	..
Japan	2.87	3.49	4.48	5.06	5.07	0	3.4	3.31	..
China	3.31	4.25	4.26	5.34	3.35	3.4	0	4.09	..
Pakistan	4.38	2.84	2.67	2.25	2.9	3.31	4.09	0	..
....	...	...	...	...	...	...	...	...	..

The transformation of the datasets on the strength of creditor and shareholder protection into three "difference matrices" has a number of benefits. First, it aids in the identification of differences and similarities between countries. Similarities may be spurious if the factors are merely aggregated and compared based on the strength of protection. For instance, if two countries have the same score in the creditor protection index, these legal systems can still be completely different because different variables may have led to the same aggregate score. Second, this approach can assist in examination of the differences between countries of English, German, and French legal origin. Previous research tended to aggregate factors between groups of countries based on their legal origin.[24] For example, all countries of English legal origin would simply be grouped together. This disregards the fact that many legal systems are influenced by countries of different legal origins. Moreover, aggregates may be distorted by the selection of countries and outliers. Conversely, the matrices of this article analyze only two

[23] For previous use of this method *see* Priya Lele & Mathias Siems, *Shareholder Protection: A Leximetric Approach*, 7 J. CORP. STUD. 17-50 at 37-43 (2007); Siems, *supra* note 18, at 125-135; Mathias Siems, *Convergence in Corporate Governance: A Leximetric Approach* 35 J. CORP. L. 729-756 (2010)..

[24] *See e.g.*, Armour et al., *supra* note 22; Rafael La Porta et al., *Law and Finance*, 106 J. POL. ECON. 1113 (1998).

countries at a time to come to a more precise determination as to whether legal origin is truly a definitive factor in creditor and shareholder protection. The third major benefit of the data transformation is that it opens the possibility of social network analysis,[25] which enables interesting visualizations of the relationships between countries.[26]

A necessary caveat is that any quantitative legal methodology reduces the complexity of legal systems.[27] In particular, the focus on legal rules does not deny that how these rules operate in practice may vastly differ between jurisdictions.[28] Thus, any analysis has to take into account that a formal legal similarity may be misleading and that a legal dissimilarity may be explained by extra-legal substitutes.

B. Network methodology and expected results

Network analysis has become increasingly popular in the last three decades.[29] It started in sociology but it has also been used in economics, business, psychology, anthropology, and more recently, law.[30] The main interest of social network analysis is to identify, visualize, compare, and analyze the relationships between individuals or entities. In the terminology of network analysis the individuals are called "nodes" and the relationships are called "ties" or "edges."

In the present case, the "nodes" are the twenty-five countries and the "ties" are the values given to the differences between countries. Thus, the

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[25] It is also common in network analysis to turn attributes into relations. *See* ROBERT HANNEMAN & MARK RIDDLE, INTRODUCTION TO SOCIAL NETWORK METHODS 75 (2005), *available at* http://www.faculty.ucr.edu/~hanneman/nettext/.

[26] *See infra* Figures 1-13.

[27] *See* Mathias M. Siems, *Numerical Comparative Law: Do We Need Statistical Evidence in Order to Reduce Complexity?*, 13 CARDOZO J. INT'L. & COMP. L. 521 (2006).

[28] *See e.g.* Erik Berglöf & Stijn Claessens, *Enforcement and Good Corporate Governance in Developing Countries and Transition Economies*, 21 THE WORLD BANK RES. OBSERVER 123, 150 (2006); Howell E. Jackson & Mark J. Roe, *Public and Private Enforcement of Securities Laws: Resource-Based Evidence,* 93 J. FIN. ECON. 207 (2009).

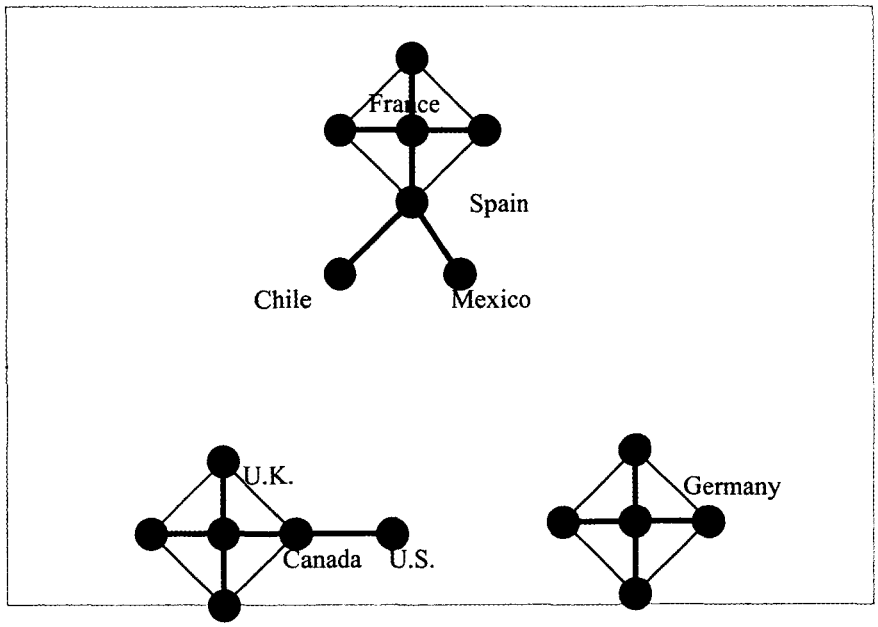
[29] *See generally* HANNEMAN, *supra* note 25; DAVID KNOKE & SONG YANG, SOCIAL NETWORK ANALYSIS, (2d ed. 2008); JOHN SCOTT, SOCIAL NETWORK ANALYSIS, (2d ed. 2000); SOCIAL NETWORK ANALYSIS (Linton C. Freeman ed. 2008).

[30] *See, e.g.*, Reza Dibadj, *Networks of Fairness Review in Corporate Law*, 45 SAN DIEGO L. REV. 1 (2008); Reza Dibadj, *Networks of Heightened Scrutiny in Corporate Law*, 46 SAN DIEGO L. REV. 1 (2009); Paul H. Edelman & Tracey E. George, *Six Degrees of Cass Sunstein: Collaboration Networks in Legal Scholarship*, 11 GREEN BAG 19 (2007); J. H. Fowler et al., *Network Analysis and the Law: Measuring the Legal Importance of Precedents at the U.S. Supreme Court* 15 POL. ANALYSIS 324, 346 (2007); Anton Geist, *using Citation Analysis Techniques for Computer-Assisted Legal Research in Continental Jurisdictions* 59-65 (April 2009) (unpublished LLM Dissertation, University of Edinburgh) (*available at* http://ssrn.com/abstract=1397674); Thomas A. Smith, *The Web of Law*, 44 SAN DIEGO L. REV. 309 (2007).

data from the relationship matrices on creditor and shareholder protection[31] can be extracted to plot network relationships. For purposes of deciding when a relationship is close enough to be considered as a tie between two countries the following cut-off points have been chosen: the median of the difference observations, the closest 25% of the observations, and the closest 15% of the observations.[32]

A simple visualization of a network can be based on the following procedure: legal systems that are very similar (e.g., the 25% of the closest ties) are connected with a bold line and legal systems that are somewhat similar (e.g., the 50% of the closest ties) are connected with a normal line. Depending on the data, the outcome may resemble Figure 1.

Figure 1: Possible network relationships



This figure would confirm a strong legal origin theory. The network is divided into three unconnected parts. The origin countries, France, Germany, and the U.K., are the center of the sub-networks. For instance, the "German" sub-network is comprised of four countries of distinct/strong German legal origin. To be sure, even a strong legal origin theory would not assume that all German legal origin countries are perfect copies of German law. Thus, these four countries are themselves only connected by normal ties. In the "English" and "French" sub-networks some anomalies have been permitted. In the former, the United States is close to Canada but not to the

[31] *See supra* Part II.A.

[32] The values are 3.44, 2.68, and 2.25 for creditor protection and 3.38, 2.75, and 2.36 for shareholder protection.

United Kingdom. In the latter, Chile and Mexico are very close to Spain but not France itself.

In reality many legal systems are hybrids. For instance, South African law derives from both civil law and common law traditions; Japanese company law used to be based on the German model, but since the 1950s has been heavily influenced by U.S. law; Swiss company law is influenced by U.K. company law and, due to the influence of the E.U., U.K. law itself has become more "continental."[33] Network analysis enables us to identify these mixtures because, a country whose legal system is equally influenced by all three origin countries would be in the center of such network pictures, connected by normal-strength ties with all three legal origin countries.

It is also necessary to decide on categories of countries that can then be tested. A good proxy for legal origins is language because most English-speaking countries are common law countries.[34] Thus, in this article, all countries whose main legal language is English (U.K., U.S., Canada, India, Pakistan, Malaysia, and South Africa) are regarded as countries of English legal origin.[35] The second group, countries of French legal origin, can also be related by language because French law often heavily influences countries whose primary language is a Romance language. Thus, the second group consists of France, Italy, Spain, Mexico, Argentina, Chile, and Brazil. The final group covers the remaining countries of the sample (Germany, Switzerland, the Netherlands, Sweden, Czech Republic, Slovenia, Latvia, Russia, Turkey, China, and Japan). These legal systems have in common that, to some extent, they have been influenced by German law. These countries are referred to as countries of German legal origin—with the caveat that this is a relatively loose conglomerate of countries, since the lack of a common language makes exchange of information more difficult.[36]

III. NETWORKS OF ALL COUNTRIES

The figures of this Part show the relationships among all twenty-five countries in creditor and shareholder protection. Different symbols stand for the three legal origins: English legal origin countries have a black spot;

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[33] For a detailed discussion, *see* Mathias M. Siems, *Legal Origins: Reconciling Law & Finance and Comparative Law*, 52 MCGILL L.J. 55, 62-70 (2007).

[34] *Id.* at 72-81.

[35] This working hypothesis does not deny that there may have also been some civil law influence in these countries, e.g., South Africa, Quebec, and Louisiana. *See* THE WORLD SOCIETY OF MIXED JURISDICTION JURISTS, http://www.mixedjurisdiction.org/ (last visited Dec. 1, 2010) (showing the studies of mixed jurisdictions that include South Africa, Quebec, and Louisiana).

[36] *See* M. Gelter and M. Siems, *Language, Legal Origins, and Culture before the Courts: Cross-Citations between Supreme Courts in Europe* (Fordham University Law School Working Paper 2010), *available at* http://ssrn.com/abstract=1719183 (discussing the importance of a common legal language for communication between legal regimes).

French legal origin countries a white box; and German legal origin countries a yellow (grey) triangle.

A. Creditor protection

Figure 2: Creditor protection network of strongest 50% ties

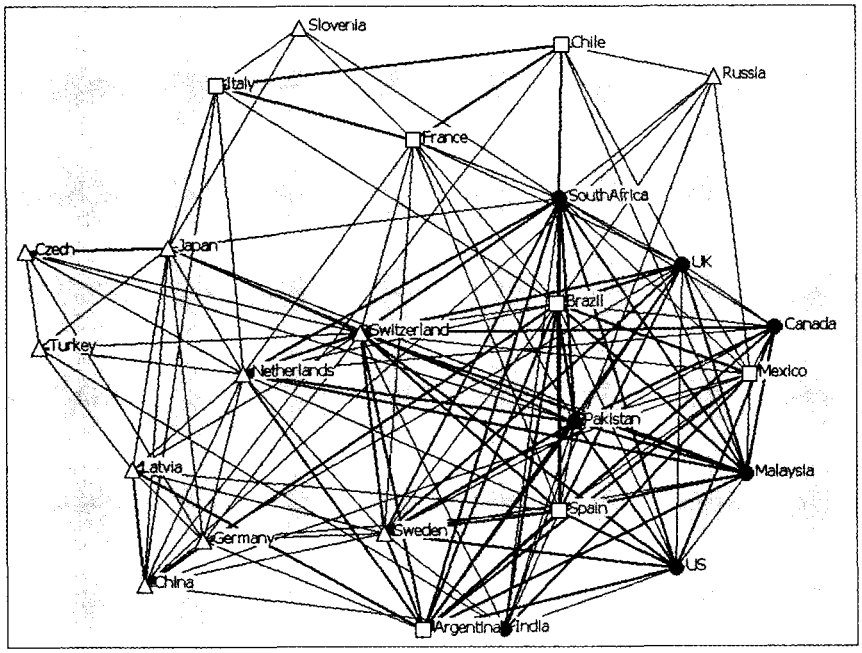

Figure 2 displays a network of creditor protection, which uses a similar method to the stylized Figure 1. The weakest 50% of ties are omitted, and the bold lines indicate very strong relationships.[37] Moreover, Ucinet (the program used in this part)[38] can shift the position of nodes according to the strength of their relationships. Thus, countries whose creditor protection is relatively similar are moved closer together.[39]

A clear difference from Figure 1 is that the network is not divided into different, unconnected parts. It is, therefore, not the case that groups of countries follow completely different concepts of creditor protection. This does not mean that certain groups cannot be identified: the common law countries are all connected and relatively close together at the right corner of the figure. Interestingly, four of the five Latin American countries are close to the common law group, and there are also a number of ties between the

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[37] *See supra* Part II.B.

[38] *Available at* http://www.analytictech.com/downloaduc6.htm (last visited Dec. 1, 2010).

[39] The following function has been used: Netdraw – Layout – Ordination/Scaling – Iterative Metric MDS (adjust to the nearest Euclidian).

Latin American and German legal origin countries. This does not come as a complete surprise since the legal systems of Latin America have not only been influenced by France, Portugal, and Spain but also Germany and the United States.[40]

Furthermore, Figure 2 helps to identify the countries that are well connected to many other countries, presumably, because their legal systems have been influenced by different traditions. These countries can also be identified by way of descriptive statistics. Table 4 presents how close each country is to the other 24 countries. The countries with the lowest average distances (lower than 3.0) are shaded and include Argentina, Brazil, Malaysia, South Africa, Sweden, and Switzerland. In Figure 2, these countries are connected to countries of all three legal origins.

Table 4: Descriptive statistics creditor protection

Country	*Mean*	*Std. Deviation*	*Minimum*	*Maximum*
Argentina	2.780	1.113	0.840	4.720
Brazil	2.946	1.079	1.660	5.040
Canada	3.358	1.127	0.840	5.680
Chile	3.740	1.021	1.800	6.210
China	3.679	0.881	2.000	5.640
Czech Republic	4.095	0.995	2.240	6.040
France	3.643	0.897	2.050	5.760
Germany	3.768	0.871	2.473	5.473
India	3.566	0.913	1.810	5.210
Italy	4.048	1.039	2.050	5.870
Japan	3.673	0.820	2.240	5.400
Latvia	3.698	0.889	2.100	5.140
Malaysia	2.863	0.925	0.840	4.840
Mexico	3.682	1.122	1.680	6.040
Netherlands	3.097	0.787	2.040	5.540
Pakistan	3.093	0.861	1.930	4.430
Russia	4.033	0.788	2.650	5.540
Slovenia	4.257	0.760	2.930	5.600
South Africa	2.867	0.747	1.660	4.040
Spain	3.052	1.168	0.840	5.240
Sweden	2.921	0.771	1.290	4.070
Switzerland	2.853	1.061	1.040	5.000
Turkey	4.046	0.916	2.830	6.210
U.K.	3.309	1.003	1.900	5.600

[40] *See* KONRAD ZWEIGERT & HEIN KÖTZ, INTRODUCTION TO COMPARATIVE LAW 115 (Tony Weir trans., 3d ed. 1998) (explaining the German influence); M.C. Mirow, *The Code Napoléon: Buried but Ruling in Latin America*, 33 DENV. J. INT'L L. & POL'Y 179, 185-187 (2005) (explaining the U.S. influence).

U.S.	3.600	1.255	1.660	5.800

The similarity between countries of the same legal origin can also be established by way of calculating the density of these networks. For a valued network (as here), density is defined as "the total of all values divided by the number of possible ties; in this case the density gives the average value."[41] This function is very useful in the present case because one can calculate both the density of the overall network and the density of specific groups of countries, such as legal origins.

Table 5: Density matrix creditor protection

Countries	*Number of Countries*	*Average Value*	*Standard Deviation*
All Countries	25	3.4667	1.0622
English Legal Origin	7	2.5638	0.6554
French Legal Origin	7	3.0143	1.0866
German Legal Origin	11	3.4984	0.9006

Table 5 confirms that countries of English legal origin have a very close relationship, since the average distance of their ties is almost one point lower than the average distance of all countries. The likely explanation is that only these countries, but not most countries of French and German legal origin, share a common legal language and culture.[42] More specifically, creditor protection in English legal origin countries is different from other countries because the former usually do not have a minimum capital requirement for companies but protect creditors by other means. Such means may include, for example, the availability of revolving collateral, i.e. accounts receivables that change from day to day, such as a floating charge or floating lien.[43] It is also possible to test whether the means of these average values are statistically significant. The result is that at a 95% significance level one can reject the hypothesis that there is no difference between countries of English and German legal origin; however, there is no statistically significant difference between countries of English and French legal origin, and countries of French and German legal origin.[44]

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[41] *Overview of Help* 218, *available at* http://www.analytictech.com/ucinet6/reference.rtf (last visited Dec. 1, 2010).

[42] *See* Siems, *Shareholder Protection, supra* note 18, at 142-3.

[43] *See* John Armour et al., University of Cambridge, Corporate Governance Programme, Datasets, *Creditor Protection Index – 25 Countries* (forthcoming 2011), http://www.cbr.cam.ac.uk/research/programme2/project2-20output.htm (last visited Sept. 12, 2010).

[44] English and German legal origin: the t-statistic is 2.37 and the actual confidence level is 0.969. For French and German legal origin these numbers are 1.027 and 0.681, and for English and French legal origin they are 0.939 and 0.634.

Figure 2 provides a comprehensive picture of the web of creditor protection in twenty-five countries, since only the weakest 50% ties have not been displayed. However, the interconnectedness of the nodes makes it difficult to identify individual relationships. Thus, Figure 3 reduces the network to the forty-five (i.e. top 15%) strongest links. Like in Figure 2, the position of the countries is determined by the closeness to each other, i.e. the differences between each pair of countries.

Figure 3: Creditor protection network of strongest 15% ties

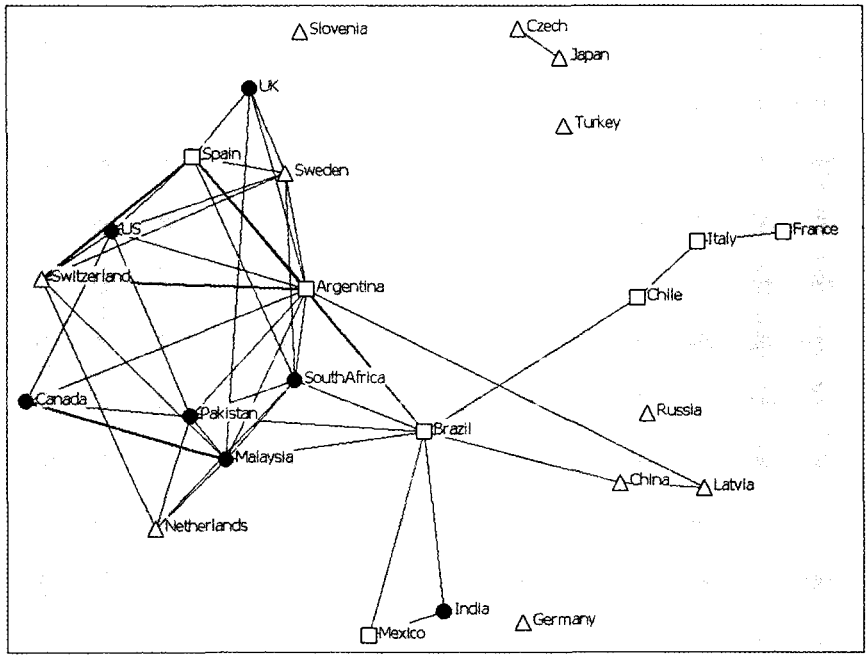

Figure 3 shows again that the common law countries, but not the civil law ones, are relatively well connected to each other. The only exception is India.[45] Interestingly, there is also a "clique" between Brazil, India, and Mexico, which means that the ties of these three countries all refer to each other.[46] Furthermore, it can be noted that countries of French legal origin are linked by a chain: Argentina, Brazil, Mexico, Chile, Italy, and France. Surprisingly, it is Brazil, as the only Portuguese speaking country, that forms a "hinge" between Argentina, Chile and Mexico. Finally, the countries of German legal origin are the most dispersed: Slovenia, Russia,

[45] *See also* John Armour & Priya P. Lele, *Law, Finance, and Politics: The Case of India*, 43 LAW & SOC'Y REV. 491, 491 (2009) (finding little support for the idea that "India's legal heritage as a common law country has been influential in speeding the path of regulatory reforms and financial development"; rather, political explanations account for India's success in software and services, the strength of its financial markets in terms of outside equity and the success of its stock market regulation).

[46] *See also infra* Part V (discussing cliques).

Turkey an Germany are not connected with any other country, and the remaining German legal origin countries are only connected with one of the other German legal origin countries. Given the problem with the German legal origin category,[47] this "looseness" of the German network does not come as a surprise.

B. Shareholder Protection

Figure 4: Shareholder protection network of strongest 50% ties

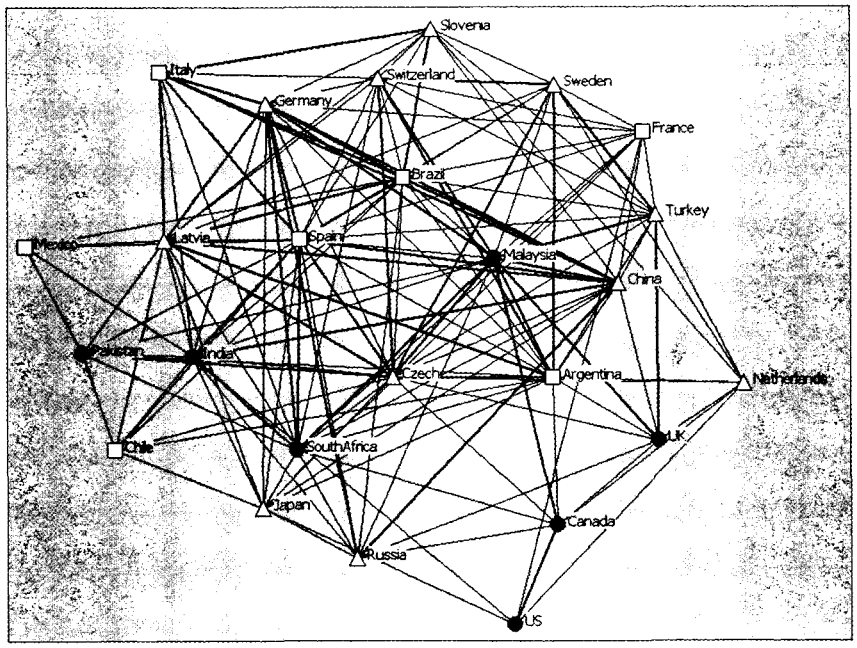

Figure 4 presents the comprehensive network of shareholder protection in twenty-five countries, using the same approach as Figure 2 for creditor protection. The general relationship between countries appears to be relatively untidy. At best, one can identify that the common law countries are all located in the lower half of the figure. It is also plausible to posit that civil law countries with Americanized company law, such as Japan and Russia,[48]

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[47] *See supra* Part II.B.

[48] *See* SIEMS, *supra* note 11, at 20-22 (discussing Japan); Bernard Black & Reinier Kraakman, *A Self-Enforcing Model of Corporate Law*, 109 HARV. L. REV. 1911 (1996) (discussing Russia). *See also* Bernard Black et al., *Legal Liability of Directors and Company Officials Part 1: Substantive Grounds for Liability*, COLUM. BUS. L. REV. 614 (2007); Bernard Black, et al., *Legal Liability of Directors and Company Officials Part 2: Court Procedures, Indemnification and Insurance, and Administrative and Criminal Liability*, COLUM. BUS. L. REV. 1 (2008).

are close to common law countries. Indeed, some academics argue that Japan should indeed be classified as a mixed legal system.[49]

Table 6: Descriptive statistics shareholder protection

Country	*Mean*	*Std. Deviation*	*Minimum*	*Maximum*
Argentina	2.979	0.938	0.250	5.125
Brazil	3.200	0.840	1.850	4.750
Canada	3.698	0.972	2.000	5.600
Chile	4.125	1.041	2.500	6.000
China	2.792	0.861	0.850	4.400
Czech Republic	2.906	0.948	0.250	4.875
France	3.664	0.883	2.500	6.000
Germany	2.890	0.922	0.850	4.750
India	3.401	0.779	1.958	5.375
Italy	3.456	1.123	1.850	5.600
Japan	3.740	0.922	2.500	5.375
Latvia	3.177	1.017	1.250	5.125
Malaysia	2.981	0.986	1.550	5.000
Mexico	4.351	0.882	2.625	6.000
Netherlands	4.125	0.940	2.500	5.750
Pakistan	3.622	0.688	2.333	4.667
Russia	3.469	0.762	1.750	5.150
Slovenia	3.714	0.868	2.225	5.375
South Africa	3.115	0.810	1.833	4.667
Spain	2.692	0.762	1.250	4.500
Sweden	3.510	1.072	1.750	5.375
Switzerland	3.283	1.037	1.550	5.200
Turkey	3.400	0.976	1.925	5.950
U.K.	3.755	0.916	1.925	6.000
U.S.	4.035	0.945	2.000	5.600

Figure 4 and Table 6 can be used to identify the most interconnected countries. The countries with the lowest average distances—lower than 3.0 out of ten variables—are Argentina, China, Czech Republic, Germany, Malaysia, and Spain. Argentina and Malaysia have already been found to be relatively similar to most of all the other countries in the protection of

[49] *See, e.g.*, Hiroshi Matsuo, *Reception of Law and Civil Law Traditions*, *in* LAW AND LEGAL CULTURE IN COMPARATIVE PERSPECTIVE 50 (Guenther Doeker-Mach & Klaus A. Ziegert eds., 2004).

creditors.[50] It can also be noted that five of the six countries are civil law countries with common law transplants.[51]

Table 7: Density matrix shareholder protection

Countries	*Number of Countries*	*Average value*	*Standard Deviation*
All countries	25	3.4432	1.0201
English legal origin	7	3.1628	0.8258
French legal origin	7	3.4429	1.0408
German legal origin	11	3.2709	1.0249

Table 7 confirms that there are similarities in the group of English legal origin countries but not in the two other groups. A test of means leads to the result that even at a 90% significance interval we cannot be sure that there are differences between English and French, English and German, and French and German legal origins.[52] Overall, only a weak, if any, legal origin effect can be observed in shareholder protection. Interestingly, however, comparing the first lines of Tables 5 and 7, it can be seen that the mean density and standard deviation of all twenty-five countries are very similar in creditor and shareholder protection. Thus, on a general level, there are as many similarities and differences in shareholder as in creditor protection, but in shareholder protection this variation does not relate to different legal origins.[53]

[50] *See supra* Part III.A.

[51] A prime example is the requirement to have independent directors. *See* John Armour et al., University of Cambridge, Corporate Governance Programme, Datasets, *Shareholder Protection Index – 25 Countries* (2009), http://www.cbr.cam.ac.uk/research/programme2/project2-20output.htm (last visited Dec. 1, 2010) (providing the full data set).

[52] English and French legal origin: the t-statistic is 0.558, and the actual confidence level is 0.413. For English and German legal origin, these numbers are 0.234 and 0.182, and for French and German legal origin, they are 0.345 and 0.266.

[53] For an attempt to explain this result see *infra* Part VI.

Figure 5: Shareholder protection network of strongest 15% ties

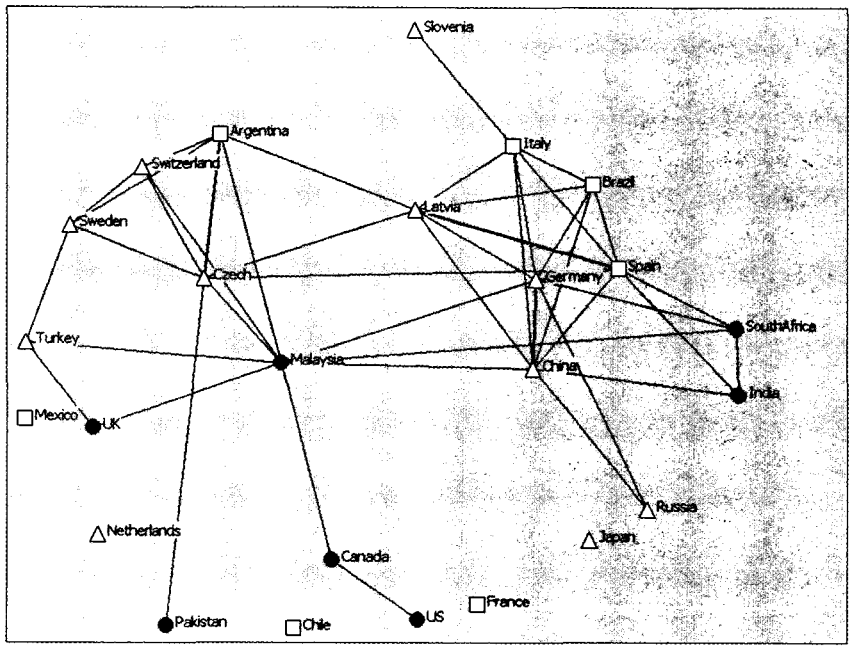

Figure 5 is the equivalent of Figure 3 for shareholder protection. Some linkage of countries that share a common legal origin can be observed. In the civil law world there are cliques between Germany, Russia, and China; Germany, Latvia, and China; Sweden, Switzerland, and the Czech Republic; and, Italy, Brazil, and Spain. A chain connects all common law countries, with the exception of Pakistan. Pakistan is an outlier because it is the only common law country that does not score well in the shareholder protection index.[54] Likewise, Mexico and Chile have relatively low scores,[55] which explains why they are not connected to other countries. Conversely, shareholder protection in France and Japan is "too high,"[56] which again makes them different from the rest of the world.

There are also a number of ties that may not make sense, for instance, the ones between Pakistan and the Czech Republic, Canada and Malaysia, and Spain and India. Most remarkably, the difference between Argentina and the Czech Republic is only 0.25 out of 10 variables.[57] However, such similarities are not implausible. Today many parts of shareholder protection are based on an international model of what is regarded

[54] Pakistan's aggregate score is 3.583, whereas the other common-law countries have scores between 5.667 and 7.375. *See* Armour et al., *supra* note 51.
[55] The values are 3.375 for Mexico and 4.25 for Chile. The mean of all countries is 5.61. *See id.*
[56] The values are 7.25 for France and 7.0 for Japan. *See id.*
[57] *See also supra* Table 6.

"good corporate governance."[58] For instance, the Organisation for Economic Cooperation and Development ("OECD"), as well as private initiatives, have drafted standards on how companies should be managed, what the structure and responsibilities of the board of directors should be, and what rights and duties belong to shareholders.[59] These guidelines were particularly aimed at transition and developing countries. Thus, there is no reason why legal systems as diverse as Argentina and the Czech Republic may not impose similar requirements on, say, major shareholder ownership.[60]

IV. RELATIONSHIPS BETWEEN ORIGIN AND OTHER COUNTRIES

The legal origins view not only claims that there are significant differences between legal origins but also that these differences originate from the influence that the three origin countries (U.K., France, and Germany) had on all other legal systems of the world.[61] This Part will use two methods to scrutinize this claim: ego-networks and scatter-plots. As in the previous part, creditor and shareholder protection are treated separately.

A. Creditor protection

An ego-network is defined as "a subgraph of the communications graph that consists of the ego and all nodes (the 'alters') that are directly connected to it."[62] In other words, ego-networks focus on the relationships between certain nodes to the rest of the network. In the following, it will be visualized according to which countries are most similar to the three origin countries: the U.K., Germany and France, i.e. these three countries are the "egos" and the remaining countries are the "alters."

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[58] *See, e.g.*, Gainan Avilov, et al., *General Principles of Companies for Transition Economies*, 24 J. CORP. L. 190 (1999).

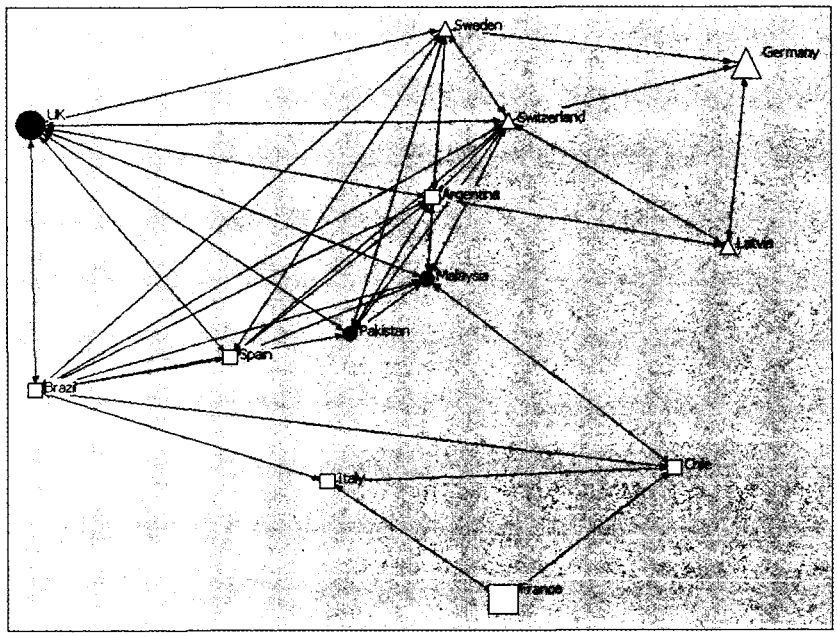
[59] *See, e.g.*, OECD, PRINCIPLES ON CORPORATE GOVERNANCE 2004; Global Corporate Governance Forum, http://www.gcgf.org (last visited Dec. 1, 2010).

[60] *See* Armour et al., *supra* note 51.

[61] *See supra* Part I; Siems, *Shareholder Protection*, *supra* note 18, at 138-39 (providing a critical analysis).

[62] Jaime Montemayor, et al., *SocialRank: An Ego- and Time-centric Workflow for Relationship Identification* (Milton Eisenhower Res. Ctr., The Johns Hopkins University Applied Physics Laboratory 2008) at fn 1, *available at* http://www.cpdiehl.org/PDF/vast08-poster.pdf.

Figure 6: Ego-network of creditor protection in the U.K., Germany, and France



As in the previous section, only the strongest ties are displayed. Now, however, the location of the countries does not indicate closeness but is manually adjusted in order to show how other countries relate to U.K., German, and French law. There are some indicators that confirm the relevance of legal origins. Only German legal origin countries are part of the German network (Sweden, Switzerland, Latvia), the two English legal origin countries (Malaysia, Pakistan) are part of the English network, and the only two countries connected to France are French legal origin countries (Italy, Chile). The other three French legal origin countries (Brazil, Spain, Argentina) are, however, closer to the U.K. than to France because some French legal origin countries have improved creditor protection mechanisms using Anglo-Saxon models.[63] It is therefore also plausible that the U.K. is connected with more countries than France and Germany. Finally, ego-networks can be used to compare the distances between the "egos": it takes just two steps to get from Germany to the U.K. (e.g., step one: Germany to Sweden, and step two: Sweden to the U.K.), but three steps from the U.K. to France and five steps from France to Germany. Thus, the German and U.K. laws on creditor protection seem to have more in common than the French and U.K. ones.[64]

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[63] *See, e.g.*, Armour et al., *supra* note 43 (for Argentina and Mexico). In France, a similar type of charge was only introduced in 2006 by Ordinance no. 2006-346 du 23 mars 2006 relative aux sûretés.

[64] *See* Armour, *Legal Rules*, *supra* note 18, at 612-15; Armour et al., *supra* note 43.

The ego-network of Figure 6 is useful in presenting the relationships between all three origin countries and the other countries in one picture. An alternative is to focus on just two of the origin countries at the same time, and use scatter-plots[65] to display and analyze the closeness to particular origin countries. The following two figures present scatter-plots on the differences between U.K. and French law and the other countries (Figure 7) and U.K. and German law (Figure 8) and the other analyzed countries.[66] English legal origin countries have a black spot, French legal origin countries a white box, and German legal origin countries a white triangle.[67]

[65] For a technical definition of a scatter-plot *see* PAUL NEWBOLD ET AL., STATISTICS FOR BUSINESS AND ECONOMICS, 6TH EDN 32 (2006) ("We can prepare a scatter plot by locating one point for each pair of two variables that represent an observation in the data set").

[66] Since the core interest of this paper is the difference between common and civil law countries, the scatterplot on the differences from German and French law is omitted.

[67] The following abbreviations are used: AR (Argentina), BR (Brazil), CA (Canada), CH (Switzerland), CL (Chile), CN (China), CZ (Czech Republic), DE (Germany), ES (Spain), FR (France), IN (India), IT (Italy), JP (Japan), LV (Latvia), MX (Mexico), MY (Malaysia), NL (Netherlands), PK (Pakistan), RU (Russia), SE (Sweden), SI (Slovenia), TR (Turkey), U.K. (United Kingdom), U.S. (United States), and ZA (South Africa).

Figure 7: Difference from U.K. and French law on creditor protection (max 10)

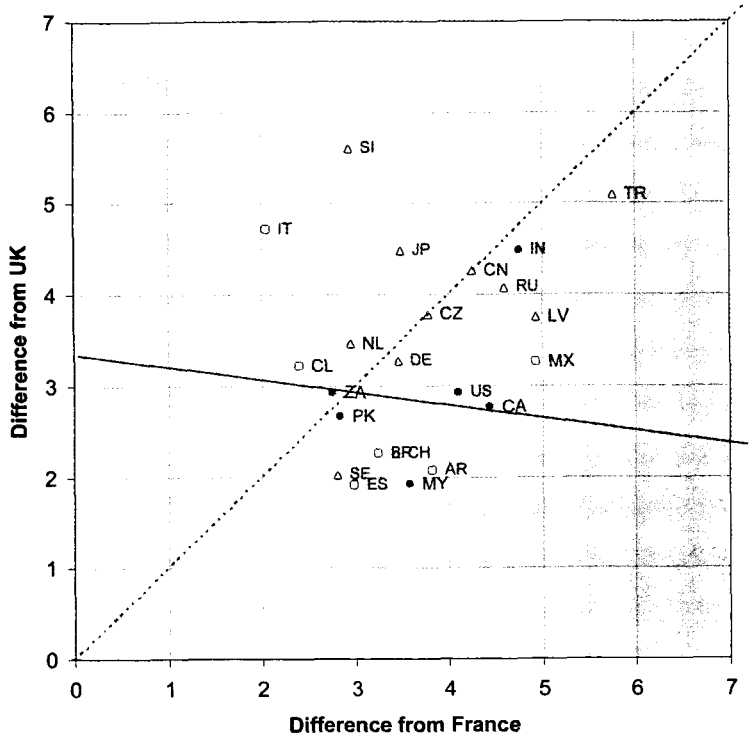
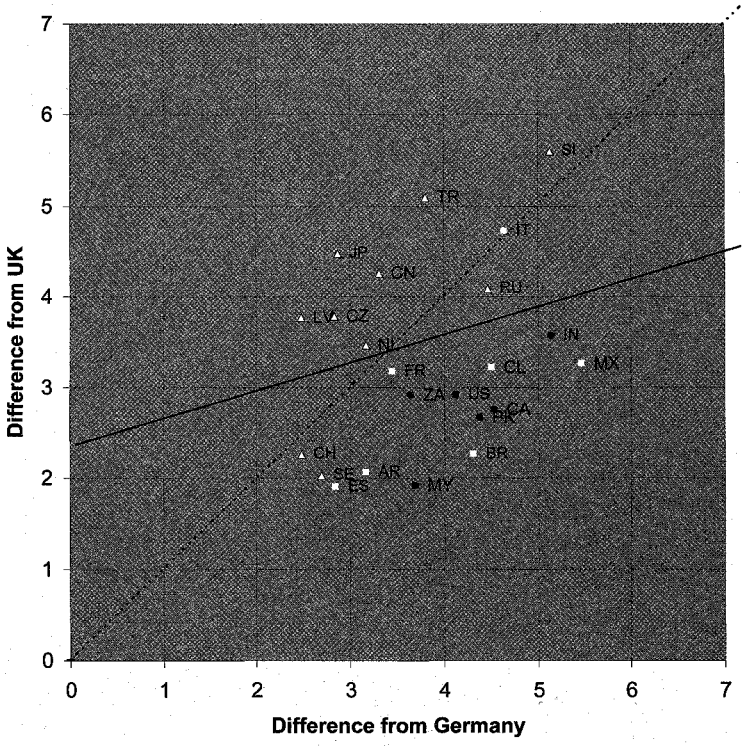


Figure 8: Difference from U.K. and German law on creditor protection (max 10)



To analyze these figures, it is convenient to introduce a distinction between two types of legal origin effects. The "type 1 effect" means that the countries are on a downward sloping line (the bold line in the figures above). For a relationship such as the one in Figure 7, this infers that the closer a country is to French law, the more distant it is from English law (and vice versa). Statistically, this is the case if the value of the correlation coefficient between the difference from U.K. and French law is negative.[68] Moreover, the following will indicate the significance level, i.e. how confidently the hypothesis that there is no positive relationship may be rejected.[69] The "type 2 effect" means that the individual countries are closer to their respective own origin country than to the other origin country. Thus, here, the x and y values of each country are compared. For a relationship such as the one in Figure 7, it is expected that the French legal origin countries are all left of and the English legal origin countries are all right of the forty-five degree ray from the

[68] This involves a one-sided test of the significance between the correlation coefficient in question and a zero correlation coefficient (using the Fisher r-to-z transformation).

[69] For a general definition of "significance level" see NEWBOLD ET AL., *supra* note 65 at 333 ("probability of rejecting the null hypothesis when the null hypothesis is true").

origin (the dotted line in the figures above). Statistically, this should be the result if the "relative distance value" is negative,[70] but the following will also indicate the significance level, i.e. how strongly the results support rejecting the hypothesis that its value is not positive.

The two figures show surprisingly different effects. Figure 7 has a negative slope, but not Figure 8.[71] So, in the relationship between the U.K. and French law on creditor protection we may have a type 1 legal origin effect. However, even at a 90% significance level, the hypothesis that the slope of Figure 7 is positive and the slope of Figure 8 is negative cannot be rejected.[72] In both figures, as expected, the countries of English legal origin (the black spots) are on the right side of the ray from origin. However, in Figure 7 many of the French legal origin countries (the white boxes) are closer to U.K. law than to French law, whereas in Figure 8, the German legal origin countries are on the left side as expected. In detail, in Figure 7 only 7 of 12 countries are on the correct side, whereas 13 of the 16 countries in Figure 8 are on the correct side. Thus, for the differences between U.K. and German law, but not the U.K. and French law, a type 2 legal origin effect is observed.[73]

The general difference between type 1 and 2 legal origin effects can be described as follows: if there is no type 1 effect, the "problem" is with the origin countries because these countries are not really very different. If there is no type 2 legal origin effect, the "problem" is with the transplant countries because these countries have not relied on the specific model of the respective origin country only. It may therefore be concluded that German and U.K. law on creditor protection have more in common than French and U.K. law. However, countries of French legal origin are more diverse than countries of German legal origin because they do not rely on the French model of creditor protection only. This confirms the results of the ego-network in Figure 6.[74]

B. Shareholder protection

The previous part already indicated that the broad categorization into legal origins is less relevant for shareholder protection than for creditor protection.[75] This section will show that a similar picture emerges using ego-networks and scatter-plots.

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[70] The "relative distance value" is established as follows: (1) for each country, deduct distance from the foreign origin country from distance from the own origin country; (2) calculate the mean of these values. The test is a one-sided t-test.

[71] The correlation coefficients are -0.16 for Figure 7 and 0.26 for Figure 8.

[72] Figure 7: z-statistic -0.34 (p-value 0.37); Figure 8: z-statistic: 0.68 (p-value 0.25).

[73] Figure 7: relative distance value -0.31 (standard deviation 1.45) and t-statistic 0.73 (p-value 0.24); Figure 8: relative distance value -0.89 (standard deviation 0.79) and t-statistic 4.52 (p-value 0.0002).

[74] *See also supra* note 63.

[75] *See supra* Part III.B.

Figure 9: Ego-network of shareholder protection in U.K., Germany and France

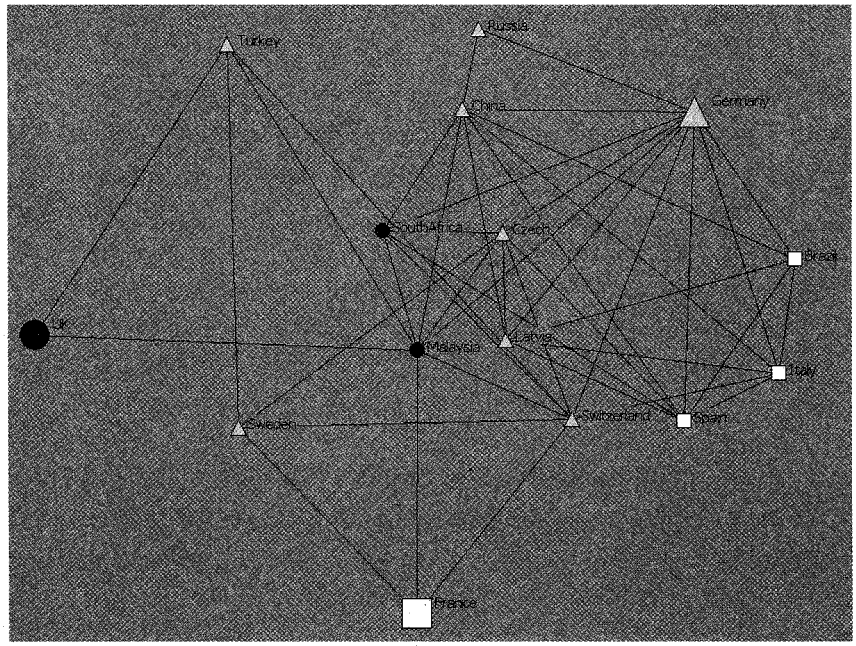


Figure 9 shows that the legal origin classification is not very relevant to shareholder protection across countries. For instance, France is not connected to the three countries of French legal origin, but it is connected to one English and two German legal origin countries. The primary difference between France and countries of French legal origin is that France has a higher level of shareholder protection than Italy, Spain, and the Latin American countries.[76] In contrast to creditor protection, it is not the U.K., but Germany that is connected to most other countries, five of which are not of German legal origin.[77] The distances between the three origin countries are only two steps. Thus, it appears that the U.K., French, and German laws have less variance on the issue of shareholder protection than that of creditor protection. This can also be confirmed by way of scatter-plots.

[76] France has the aggregate value of 7.25, whereas the average of French legal origin is 5.075. *See* Armour et al., *supra* note 51 (providing the data set).
[77] *See* Siems, *Shareholder Protection, supra* note 18, at 131-32.

Figure 10: Difference from U.K. and French law on shareholder protection (max 10)

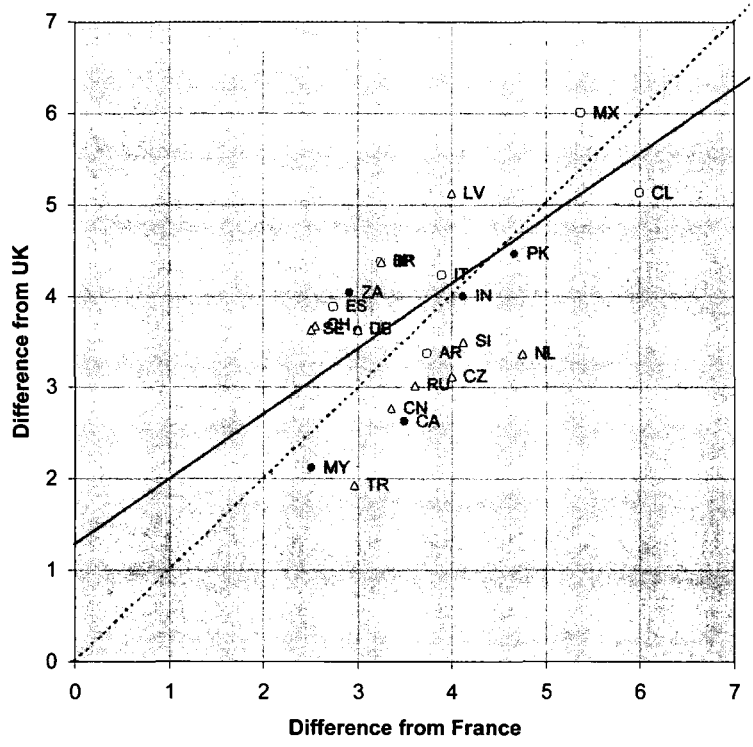
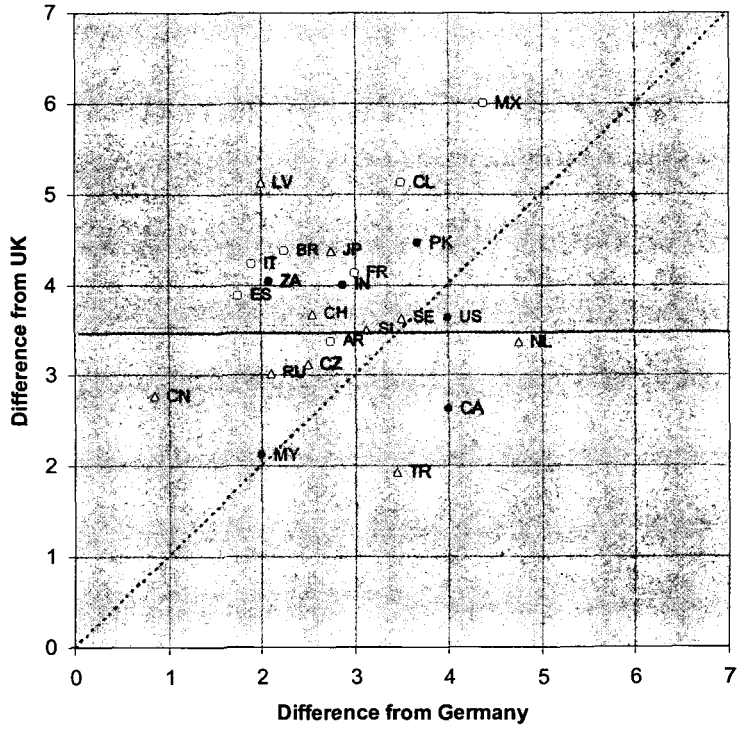


Figure 11: Difference from U.K. and German law on shareholder protection (max 10)



Neither of these two figures shows an observable type 1 legal origin effect.[78] With respect to the U.K. and France, there is now a clear positive relationship; therefore, even at a 99% significance level[79] the hypothesis that the correlation coefficient is negative can be rejected.[80] There is no correlation, i.e., no relationship, between the differences from U.K. law and the differences from German law. There are also no statistically significant type 2 legal origin effects in either of these two relationships: in Figure 10 only eight out of twelve countries are on the correct side of the ray from origin and in Figure 11 only ten out of sixteen countries are on the correct side.[81]

The positive or flat slope of the correlation lines (thus, no type 1 effect) may be counterintuitive. Generally, the slope of the correlation line may be explained as follows: if the graph is close to the forty-five degree ray

[78] *See supra* Part IV.A (for an explanation of the difference type 1 and 2 legal origin effect).

[79] For a definition of significance level see *supra* note 69 and accompanying text.

[80] The correlation coefficient of Figure 10 is 0.75 (z-statistic 2.48; p-value 0.0066).

[81] Thus, even at a 90% significance level we cannot reject the hypothesis that the relative distance value is positive. Figure 10: relative distance value -0.15 (standard deviation 0.76) and t-statistic 0.68 (p-value 0.25); Figure 11: relative distance value -0.29 (standard deviation 1.40) and t-statistic 0.84 (p-value 0.21).

from the origin, we have a misclassification of legal origins. A strictly positive relationship should only have occurred if two very similar legal systems were used as benchmarks (e.g., Germany and Austria). If the graph is either almost horizontal (or almost vertical), we cannot say whether the two origin countries are really similar; but, here too, the distinction between legal origins does not matter since the value of y is independent of x (and vice versa).

In the present case, three specific factors can be brought forward to explain the lack of a type 1 legal origin effect. First, the origins of company and securities law are not fundamentally different across the legal origin countries, namely the establishment of colonial corporations by English, Dutch, and French merchants.[82] Later on, exchange of ideas continued, and thus it is no surprise that by the end of the nineteenth century the most important features of corporate law were relatively uniform across countries.[83] Second, the Europeanization of company law has further decreased any remaining differences.[84] It is therefore not implausible that there is no type 1 legal origin effect. Third, French company and securities law incorporated a number of Anglo-Saxon elements in the 1980s and 90s.[85] Thus, U.K. and French law on shareholder protection are relatively similar, explaining the strong positive relationship.

It is also interesting that no statistically significant type 2 legal origin effect can be observed. In Figure 10, the United States and South Africa are closer to France than to the U.K., and Chile and Argentina are closer to the U.K. than to France. In Figure 11, South Africa, India, Pakistan, and Malaysia are closer to Germany than to the U.K., and the Netherlands and Turkey are closer to the U.K. than to Germany. In some instance, these "wrong" similarities may originate from the fact that countries have transplanted rules from different countries. For instance, there could be some Anglo-Saxon influence on the company laws of Chile and Argentina.[86] The other cases may be more puzzling, for example it is unlikely that there was a conscious intent to replicate German law in Malaysia. Still, such similarities are not implausible because today many parts of shareholder protection are

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[82] *See* Henry Hansmann & Reinier Kraakman, *The End of History for Corporate Law* 89 GEO. L.J. 439, 439-40 (2001); Siems, *Shareholder Protection, supra* note 18, at 140; Siems, *supra* note 11, at 17-22.

[83] Siems, *supra* note 11, at 17-22.

[84] This concerns the variables on mandatory bid and disclosure of major shareholder ownership (*see supra* Part II.A.) due to the Directive 2004/25/EC on takeover bids and the Council Directive 88/627/EEC on the information to be published when a major holding in a listed company is acquired or disposed of.

[85] *See* Lele and Siems, *supra* note 23, at 32.

[86] *See* Mirow, *supra* note 40 (discussing Latin America).

based on an international model of what is regarded as "good corporate governance."[87]

V. IDENTIFYING GROUPS OF COUNTRIES

In network analysis there are various methods of grouping nodes but two main approaches can be distinguished. On the one hand, one can look for "subgroups," such as cliques and factions.[88] This approach measures the direct relationship between countries. On the other hand, one can use "structural equivalence measures," such as clustering tools. This approach examines if two nodes have the same relationship to all other nodes.

Michael Graff has used clustering methods in order to identify groups of countries based on La Porta et al.'s anti-director rights index.[89] However, for the difference matrices of this article,[90] it is preferable to simply identify subgroups. The matrices demonstrate differences between countries even where the aggregates of countries may be similar. For instance, assume that both Germany and the United States have a score of five out of ten in the shareholder protection index, but that these aggregates are based on five completely different variables. Thus, the United States and Germany should not be part of the same group. However, let it further be assumed that Japanese company law is close to both legal systems because it is a mixture of German and U.S. company law.[91] Thus, cluster analysis would lead to the wrong result that German and U.S. law are part of the same group because both legal systems are similar to Japan.

A. Creditor protection

This part will first examine whether "cliques" lead to a meaningful distinction between different groups of countries. A clique is defined as "a set of nodes where each node is connected by an edge to each other node."[92] For example, in Figure 6 above, Italy, France and Chile belong to one clique since all three countries are connected with each other. Because cliques need

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[87] *See supra* Part III.B. The impact of recent global trends is also confirmed by the fact that the 1995 data still showed a statistically significant type 2 legal origin effects. For the difference from U.K. and French law (equivalent to Figure 6): relative distance value -0.36 (standard deviation 0.88) and t-statistic 1.42 (p-value 0.09). For the difference from U.K. and German law (equivalent to Figure 7): relative distance value -1.00 (standard deviation 1.69) and t-statistic 2.36 (p-value 0.016).

[88] *See infra* Part V.A. (providing details). In addition, there are other forms of subgroups, such as N-cliques, N-clans, K-plexes, K-cores, and F-groups.

[89] Michael Graff, *Law and Finance: Common-law and Civil Law Countries Compared - An Empirical Critique*, 75 ECONOMICA 60 (2008).

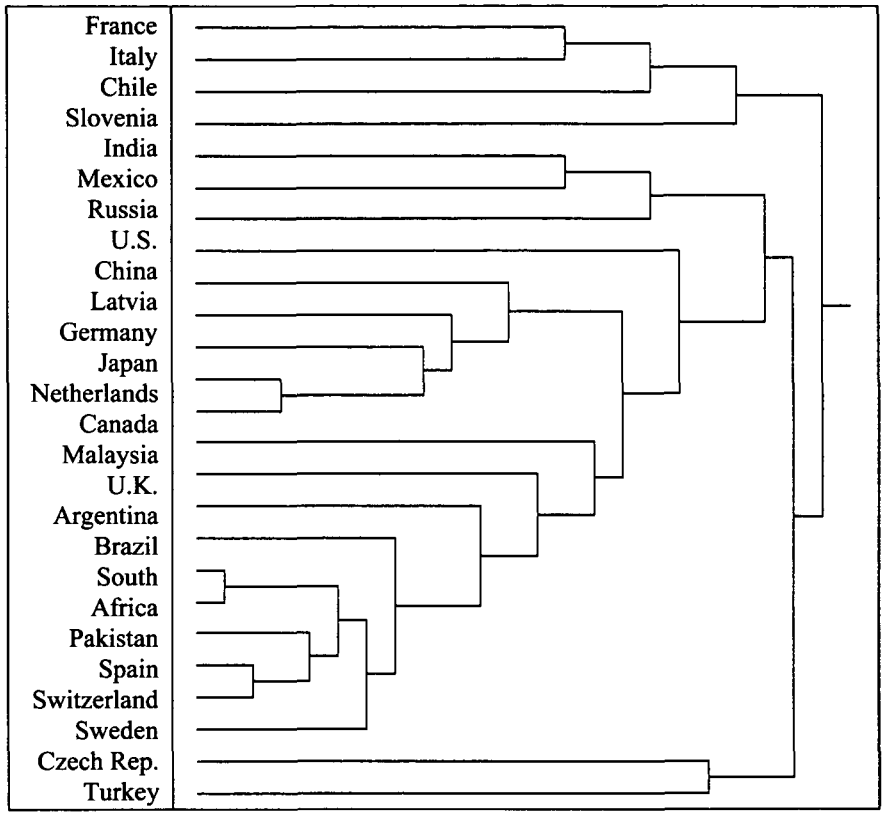
[90] *See supra* Part II.A.

[91] That is indeed the case. *See* SIEMS, *supra* note 11, at 20-22.

[92] G. David Garson, *Network Analysis*, North Carolina State University, http://faculty.chass.ncsu.edu/garson/PA765/networkanalysis.htm (last updated July 19, 2009).

binary data, it is necessary to decide on a cut-off point. This article uses the median as a cut-off point since this makes best use of the information contained in the valued data. It is also necessary to indicate the minimum set size of a clique. Initially, the size was set as high as necessary to get a small number of cliques, but since nodes can be part of different cliques, these cliques were almost identical. Conversely, if one sets the minimum size at just three, this leads to thirty-five cliques, whose relationships can be well displayed in a dendrogram (Figure 12).

Figure 12: Cliques of creditor protection



The cliques of Figure 12 can be interpreted as follows: France, Italy, and Chile are all countries of French legal origin, and adding Slovenia, leads to a clique of three E.U. countries. There is also another clique of three E.U. and one non-E.U. countries: the Netherlands, Japan, Germany and Latvia. Here, all countries are of German legal origin (and, in addition, China joins this group in the next step). A second clique of countries sharing German legal origin includes the Czech Republic and Turkey. More difficult to evaluate is the large clique of Argentina, Brazil, South Africa, Pakistan, Spain, Switzerland, Sweden and, later on, Canada, Malaysia, and the U.K. At best, one can say, five of the seven common law countries belong to this clique. Finally, there is a loose clique of India, Mexico, and Russia form a loose clique of countries that have large emerging economies.

Another method of sub-grouping is to identify "factions." The calculation of factions is based on an "algorithm that finds optimal arrangements of actors into factions to maximize similarity to the ideal type."[93] Therefore, it is useful to examine whether a node is similar to members of the same faction but different from other members. This

[93] HANNEMAN, *supra* note 25, at Ch. 11.

approach is similar to the type 1 legal origin effect since, here too, it matters whether there was a close relationship to a particular benchmark but not other countries.[94] In contrast to cliques, factions do not require binary data: it is possible to make use of the entire information of the difference matrices.

Table 8: Factions of creditor protection

Group assignments					
1	Japan, Latvia, Czech Republic, Turkey				
2	China, Malaysia, Chile, Mexico, Brazil, Russia				
3	Italy				
4	U.K., U.S., India, Pakistan, South Africa, Spain, Argentina, Canada, Switzerland, Sweden				
5	Germany, France, Slovenia, Netherlands				
Density table					
	1	*2*	*3*	*4*	*5*
1	3.17	4.34	4.56	3.88	3.55
2	4.34	2.80	3.47	3.30	3.99
3	4.56	3.47	n.a.	4.48	3.31
4	3.88	3.30	4.48	2.33	3.65
5	3.55	3.99	3.31	3.65	3.55

Table 8 presents the group assignments. The density table shows how close the countries of these groups are to each other and to the other groups. Faction 1 is a group of German legal origin countries. The countries of faction 2 are relatively big emerging economies of various legal origins and regions. Faction 4 covers all but one common law country. As in Figure 12, Argentina, Spain, Switzerland, and Sweden are part of this common law group. The countries of faction 5 are all E.U. countries. In addition, this faction is similar to factions 1 and 3 (see the density table). With the exception of Japan and Turkey, the countries of these factions are also E.U. countries.

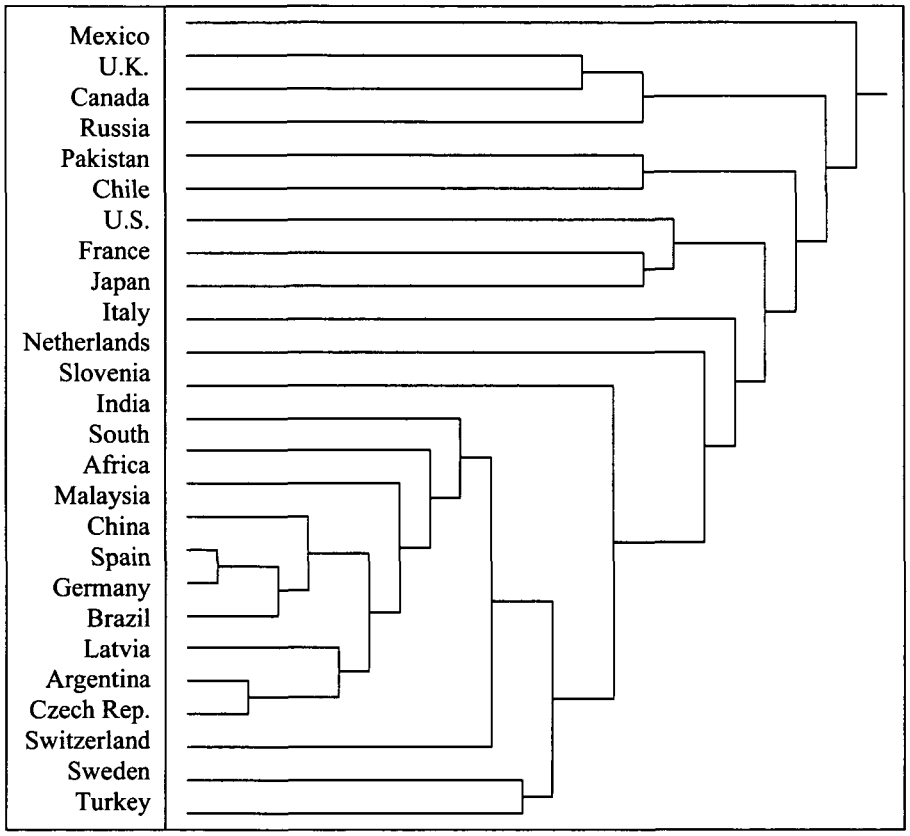
It follows that while cliques and factions are not entirely random, there is no simple explanation for the resulting group. To some extent, Figure 12 and Table 8 show that countries of the same legal origin belong to the same clique or faction.[95] It has also been found that E.U. countries often belong to the same group and that some of the groups show a distinction between developed and developing countries.

[94] *See supra* Part IV.A.
[95] *See also supra* Parts III.A and IV.A.

B. Shareholder protection

The same approach has been used as in the previous section. Fifty-eight cliques can found where the cut-off point is at the median and with a minimum clique size of three.[96]

Figure 13: Cliques of shareholder protection



The cliques in Figure 13 can be interpreted as follows: The commonality between the U.K. and Canada follows naturally from the common law. Russia joins this clique in the next step, which is plausible since modern Russian company law has been heavily influenced by Anglo-Saxon transplants.[97] There is also a clique consisting of the United States, France, and Japan, which, similarly, can be explained by some Americanization of French and Japanese corporate law.[98] A counter-model seems to be the interconnected cliques of Argentina, the Czech Republic, Latvia, Brazil, Germany, Spain, and China. These are all civil law

[96] *See supra* Part V.A.
[97] *See* Black, *Self-Enforcing Model*, *supra* note 48.
[98] *See* Lele & Siems, *supra* note 23, at 32; *Supra* note 48 and accompanying text.

countries–though from different origins and different continents. Interestingly, three countries of English Legal origin, Malaysia, South Africa and India, join this clique later. Finally, there are two small cliques, Pakistan and Chile, and Sweden and Turkey. It is difficult to find commonalities, though Pakistan and Chile have in common that they have a relatively weak level of shareholder protection.[99]

Table 9: Factions of shareholder protection

Group assignments					
1	Pakistan, Chile, Mexico, Latvia				
2	Germany, France, South Africa				
3	U.K., China, Malaysia, Italy, Spain, Brazil, Switzerland, Slovenia, Sweden, Turkey				
4	Argentina, Czech Republic, Netherlands				
5	U.S., India, Japan, Canada, Russia				
Density table					
	1	*2*	*3*	*4*	*5*
1	3.06	3.90	3.89	3.76	4.11
2	3.90	2.67	2.97	3.58	3.20
3	3.89	2.97	2.80	3.23	3.87
4	3.76	3.58	3.23	1.83	3.67
5	4.11	3.20	3.87	3.66	3.08

It is also possible to group the countries into five factions (Table 9). The first faction is a group of four transitioning and developing countries. The second one has two Western European countries plus South Africa. The third faction is a mix of ten countries from various legal origins and regions. Faction four is the only pure faction of civil law countries. The final faction has five countries: three of them are common law countries and the remaining two, Japan and Russia, have an Americanized corporate law.

The overall result confirms that in shareholder protection similarities and differences cannot be categorized easily. A country's legal origin does not help predict which clique or faction it will be grouped with. Alternative categories, such as distinctions between regions, and developing and developed countries, are also not very helpful. Thus, the general picture is that in shareholder protection countries do not follow clear and distinct legal models. It is often only possible to identify specific links, for instance, some Anglo-American transplants in other parts of the world.

VI. CONCLUSION

[99] *See supra* notes 54 and 55.

The main aim of this article has been to explore the differences between countries and their laws on creditor and shareholder protection. Part III used network analysis in order to explore the relationships between all countries. With respect to creditor protection, clear similarities were found between countries of English legal origin, and some similarities between those of French legal origin. With respect to shareholder protection, it was possible to identify the civil law countries that had incorporated Anglo-American concepts into their company laws. However, there was no statistically significant difference between the English, French and German legal origin sub-networks in shareholder protection. Part IV analyzed the relationships between specific countries, using ego-networks and scatter-plots. With respect to creditor protection, the main result was that countries of English and German legal origin simulate their respective origin country's model. Conversely, in shareholder protection there is only a weak link between the English, French and German origin and transplant countries. Finally, Part V identified cliques and factions of countries. In creditor protection these subgroups could be explained by a combined effect of legal origins and the distinction between EU/non-EU and developed/developing countries, whereas in shareholder protection, countries do not appear to follow distinct legal models that could be explained by factors such as legal origin, politics and geography.

There is no easy answer for why these differences exist between creditor and shareholder protection. It would be tempting to treat shareholder protection as the "problem" because it is possible to make some sense of the similarities and differences in creditor protection. However, it is preferable to take the opposite stance. There is a long tradition of legal transplants in commercial law[100] and some studies suggest that by the end of the nineteenth century the most important features of company law were already relatively uniform across countries.[101] Moreover, recent non-quantitative research has found that, at least today, convergence forces have led to a clear approximation of legal systems in shareholder law.[102]

Three explanations can be offered as to why different models of creditor protection are more persistent. First, creditors operate less internationally than shareholders. Notwithstanding international project finance contracts and debt securities, debtors and creditors of a normal loan are usually based in the same country. Thus, there is less pressure to develop a global model of creditor protection than shareholder protection.[103]

Second, the existing differences in creditor protection are more fundamental than in shareholder protection: some countries use company law, for instance minimum capital requirements,[104] others contract and property

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[100] *See* Detlev Vagts, *Comparative Company Law – The New Wave*, *in* FESTSCHRIFT FÜR DRUEY 595, 598-99 (2002).

[101] *See* Hansmann, *supra* note 82.

[102] SIEMS, *supra* note 11.

[103] *See also supra* notes 58 and 87 (discussing shareholder protection).

[104] In the EU public companies are required to have minimum share capital. This is based on Second Council Directive 77/91/EEC of 13 December 1976 on coordination of safeguards which, for the protection of the interests of members and others, are

law,[105] and others are mainly concerned with the protection of creditors in insolvency proceedings.[106] As a consequence, for a country to change its model of creditor protection, there would be high upfront costs.[107] For instance, if a country wished to abolish minimum capital requirements, it could cause major repercussion on the entire structure of its company law, since many further questions, such as the distribution of dividends or the calculation of account, are linked to these capital requirements.[108]

Third, the conflict between creditor and debtor interests is more contentious than the one between shareholders and directors. Cross-country data shows that shareholder interests are increasingly regarded as worth protecting,[109] whereas countries strongly differ over the question of whether, for example, insolvency law should be more debtor or creditor friendly.[110]

Overall, the simplistic view of the existence of deep differences between countries of disparate legal origins must be rejected. This also calls into doubt the claim that the "better law" of the common law countries explains their advanced financial markets.[111] Furthermore, it should be distinguished whether creditor protection is more path-dependent than shareholder protection. Thus, with respect to creditor protection, different models of protection are identifiable making worldwide legal transplants less successful than in the law of shareholders.

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required by Member States of companies within the meaning of the second paragraph of Article 58 of the Treaty, in respect of the formation of public limited liability companies and the maintenance and alteration of their capital, with a view to making such safeguards equivalent, [1977] OJ L 26/1.

[105] The prime example are floating charge and floating lien, which are common in the Anglo-Saxon world. *See supra* note 43 and accompanying text.

[106] Here, the best example may be whether insolvency law allows rehabilitation proceedings geared to the rescue of the company, such as Chapter 11 in the United States. A distinction between liquidation and rehabilitation proceedings is also suggested by the International Monetary Fund. *See* IMF, ORDERLY AND EFFECTIVE INSOLVENCY PROCEDURES (1999), available at http://www.imf.org/external/pubs/ft/orderly/.

[107] *See also* Armour et al., *Law and Financial Development*, *supra* note 18, at 1488-90.

[108] For the debate about minimum capital in the EU *see* John Armour, *Legal Capital: an Outdated Concept*, 7 EUROP. BUS. ORGANIZATION L. REV. 5 (2006); Luca Enriques and J.R. Macey, *Creditors Versus Capital Formation: The Case Against the European Legal Capital Rules*, 86 CORNELL L. REV. 1165 (2001).

[109] Lele & Siems, *supra* note 23; Siems, *Shareholder Protection, supra* note 18.

[110] Armour et al., *supra* note 43.

[111] For such claims *see supra* Part I.