Economic Development, Legality, and the Transplant Effect

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Abstract

We analyze the determinants of effective legal institutions (legality) using data from 49 countries. We show that the way the law was initially transplanted and received is a more important determinant than the supply of law from a particular legal family. Countries that have developed legal orders internally, adapted the transplanted law, and/or had a population that was already familiar with basic principles of the transplanted law have more effective legality than countries that received foreign law without any similar pre-dispositions. The transplanting process has a strong indirect effect on economic development via its impact on legality.

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1.   Introduction.

        It is increasingly recognized that Law plays an important role in economic development, and various approaches have been used to measure its quality. One approach is to measure the quality of law on the books, which entails identifying key indicators of good rules and, then analyzing whether or not the relevant statutes of a given country include these indicators. For example, one can identify a set of rules that appear to be relevant for protecting minority shareholders and test how many of these indicators are actually included in the laws of different countries. Another approach is to measure the extent to which rules are effectively enforced. Survey data that measure the effectiveness of the judiciary, rule of law, the absence of corruption, low risk of contract repudiation and low risk of government expropriation observed during 1980-1995 are five common measures. In this paper, we use the term legality to capture the effectiveness of institutions that enforce the law, rather than the quality of the law on the books.

        Figure 1 illustrates the relationship between economic development and legality using a 49-country data set compiled by La Porta et al. (1997; 1998). Log GNP per capita in 1994 proxies for economic development; a weighted average of the five previously mentioned legality variables proxies for legality. Figure 1 plots log GNP per capita against log legality: it also plots the fitted line obtained from regressing log GNP per capita against log legality and a constant term. There is substantial variance in economic development in our sample: after converting from its log representation, GNP per capita ranges from 270 to 35,760 dollars in 1994. The strong association observed between economic development and legality in our sample is striking. The estimated linear regression coefficient implies that a 1-percent increase in legality is associated with a 4.75-percent increase in GNP per capita. The regression coefficient is statistically significant at the 1-percent level, and legality explains roughly 83-percent of the variance in economic development.

        The strong association between legality and economic development could mean simply that rich countries can afford better institutions. An alternative explanation is that good legal institutions are a precondition for long-term economic growth and development. In his analysis of economic history, North (1981)) argues that the emergence of law enforcement systems to protect private business activity has played a critical role in rapid industrialization. A growing literature emphasizes the crucial role of institutions, including legal institutions, for sustained economic growth (Knack and Keefer 1994; Landes 1998; Mauro 1995; Milgrom, North and Weingast 1990; North 1990; Williamson 1985). Just what explains the substantial variance in legality across countries is, however, an open question. Legal technical assistance programs that focus primarily on improving the statutory laws in developing countries assume that *supplying* the right laws on the books will enhance legality, and ultimately economic development. However, many of these programs have not produced the expected results.[1] This is not surprising since legal

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[1] The most glaring example is Russia, where the drafters of the corporate code now concede that the idea of picking the right laws and thereby enhance corporate governance has essentially failed (Black, Kraakman and Tarassova 1999).

scholars have long noted that the quality of law on the books does not ensure the laws will actually be enforced (Pound 1911).

This paper develops and tests the proposition that the way in which the modern formal legal order that evolved in some Western countries was transplanted into other countries is a much more important determinant of legality and economic development today than the supply of a particular legal code. Our argument is based on two key notions. First, for the law to be effective, it must be meaningful in the context in which it is applied so citizens have an incentive to use the law and to demand institutions that work to enforce and develop the law. Second, the judges, lawyers, politicians, and other legal intermediaries that are responsible for developing the law must be able to increase the quality of law in a way that is responsive to demand for legality.

In order to test our theory, we develop proxies for the way in which law has been transplanted and received and the supply of particular legal codes. Regarding supply, we note that countries around the world are commonly divided into four legal families: English-common law, French-civil law, German-civil law, and Scandinavian-civil law. Legal scholars show that these families differ significantly in style. [2] However, in a path breaking study La Porta et al (1998) demonstrate that there is a significant difference in the quality of the laws between legal families at least with respect to investor protection laws (shareholder and creditor rights). We thus use legal families as a proxy for the contents and quality of the supplied law.

In order to proxy for the way in which the law has been transplanted and received, we develop a definition of the "transplant effect". Countries can also be classified into those that developed their formal legal order internally (origins) and those that received their formal legal order externally (transplants). In order to make this classification, we choose the period during which a country first developed or received a comprehensive formal legal order. For most countries, the relevant period is the nineteenth century; for some it reaches into the first half of the twentieth century. Our basic argument is that for law to be effective, a demand for law must exist so that the law on the books will actually be used in practice and legal intermediaries responsible for developing the law are responsive to this demand. If the transplant adapted the law to local conditions, or had a population that was already familiar with basic legal principles of the transplanted law, then we would expect that the law would be used. Because the law would be used, a strong public demand for institutions to enforce this law would follow. And, legal intermediaries that are responsible for developing and enforcing this imported law would be able to develop the law so at to match demand, because the strong demand for law would provide resources for legal change. Where these

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[2] These include a specific working methodology of jurists; idiosyncratic legal concepts (i.e. the trust in common law which is not known in the German or French legal systems); the sources of law and the methods applied for interpreting it (i.e the role of precedents in common law and the supremacy of statutory law in the codified civil law systems); and ideological factors in the sense that the prevailing political/economic order is reflected in the rules (Glendon, Gordon and Osakwe 1994; Zweigert and Kötz 1998). The freedom of contract and the strong protection of private property, for example, are core elements of most Western legal systems, but were absent in the socialist legal family, and modified by religious principles in Hindu or Islamic law.

conditions are present we would expect the legal order to function just as effectively as in an origin country where the law was developed internally. However, if the law was not adapted to local conditions, or if it was imposed via colonization and the population within the transplant was not familiar with the law, then we would expect that initial demand for using these laws to be weak. Legal intermediaries would have a more difficult time developing the law to match the demand. Countries that receive the law in this fashion are thus subject to the "transplant effect": their legal order would function less effectively than origins or transplants that either adapted the law to local conditions and/or had a population that was familiar with the transplanted law.

Our econometric analysis shows that the "transplant effect" is a much more important predictor of legality than the supply of particular legal families. Controlling for the supply of legal families, we find that legality is 33 percent lower in transplant effect countries. Supplying German civil law only marginally offsets the transplant effect: legality is 24 percent lower in countries within these legal family that are subject to the transplant effect. The English common law and French civil law does not offset the transplant effect, and the Scandinavian family has no measurable impact because it includes only origins. Furthermore, it is not the case that only richer countries have better legality. Controlling for GNP per capita, the transplant effect has a strong negative impact on legality.

Our econometric analysis also shows that the transplant effect influences economic development indirectly through its impact on legality, and has no direct impact. We find that the transplant effect can explain roughly 69-percent of the variance in legality, which in turn (as shown in figure 1) explains 83-percent of the variance in GNP per capita. The transplant effect's indirect impact is quite substantial. For example, Ecuador received the French law during 1831-1881 without significant adaptation. Moreover, the citizens of Ecuador were not familiar with the transplanted law. Had Ecuador been in a position to develop its own legal system internally or to adapt the transplanted law better to its local conditions, back of the envelope calculations suggest that its 1994 GNP per capita would have increased from $1,200 U.S. to roughly Ireland's level ($13,000 U.S.). The policy implication of this result is fundamental: a legal reform strategy should aim at improving legality by carefully choosing legal rules whose meaning can be understood and whose purpose is appreciated by domestic law makers, law enforcers, and economic agents, who are the final consumers of these ruler. In short, legal reform must ensure that there is a domestic demand for the new law, and that supply can match demand. The close fit between the supply and demand for formal legal rules appears to be a crucial condition for improving the overall effectiveness of legal institutions, which over time will foster economic development. While further research is warranted before making practical policy recommendations, a cautious suggestion would be that legal borrowing should take place either from a country with a similar legal heritage, or substantial investments should be made in legal information and training prior to adoption of a law, so that domestic agents can enhance their familiarity with the imported law and make an informed decision about how to adapt the law to local conditions. This would at least increase the possibility that the new law will be used in practice. It is, however, vain to expect that an effective transplant strategy will have a direct or immediate impact on economic development.

There seems to be a moderate direct impact of supplying a particular legal family on economic development. However, not only is the direct effect dominated by the indirect transplant effect, it also appears sensitive to the impact of a few outliers, and might therefore proxy some other unobservable effects. Thus, there is no reason to conclude from our analysis that a transplant strategy that favors a particular legal family would make a significant difference.

The transplant effect, while strongly path dependent, is not irreversible. Several countries that received law in the fashion of Ecuador have considerably better legality ratings than our model predicts. Examples include Hong Kong, Taiwan, Singapore, Spain, and Portugal. Most, but not all, of these countries have relatively recently overcome authoritarian rule in a peaceful manner and have made considerable investments in their legal system, including a reform of the judiciary. These changes suggest a growing demand for a formal legal order, which was met by a state that at least now was committed to investing into and upholding a formal legal order. These results also suggest that even though our theory has strong explanatory power, it does not explain everything. In particular, it does not capture how ethnolinguistic fractionalization, or natural resource endowment, factors that – as others have shown – (La Porta et al. 1999; Mauro 1995; Sachs and Warner 1995) impact on the quality of government institutions.

This paper contributes to an emerging literature that attempts to explain the variance in legality across countries. With the exception of work by La Porta et al (1997, 1998) and North (1990), to date most of this work has been theoretical. For example, Skaperdas (1999) and Grossman and Kim (1995) develop models that derive conditions under which citizens allocate resources to productive or predatory behavior that undermines legality. There is also an emerging literature on just why legality emerges or fails to emerge in formerly socialist economies that are making a transition to a market economy. Shleifer and Vishny (1993) explain the emergence of corruption during the transition, and Berkowitz and Li (1999) explain why Chinese local governments have been typically much more effective than Russian local governments in providing a stable business environment. Roland and Verdier (1999) show how policies observed in transition economies can be interpreted as mechanisms to improve legality.

The rest of this paper is organized as follows. In the next section, we develop our argument that the way in which the law is transplanted is a critical determinant of legality, code our 49 countries accordingly, and develop a definition of the transplant effect. In section three, we test the hypothesis that the way in which the law was transplanted and received matters more than the supply of a particular family for the effectiveness of legal institutions (legality). In section four, we analyze the relationship between economic development, legality (represented by a weighted average of the legality proxies), and the transplant effect. Section five addresses two important potential problems with our econometric analysis. Firstly, it examines whether the use of a weighted average (principle component) legality variable might have distorted the underlying story; secondly, it combines system inferential procedures (specification search and elimination) with Monte Carlo simulation techniques to fully account for the fact that all implied coefficient restrictions in our model are highly non-linear and that the sample size is relatively small. A striking finding is that the techniques utilized virtually capture the full interaction between the demand and supply variables, the five

legality proxies and economic development. A practical implication of this is that it is possible to extend our analysis to include countries that have less than five of the legality proxies. Section 6 concludes with policy implications and directions for future research.

2.   The Transplant Effect

Virtually all countries today have a set of rules embodied in codes or court cases that were established by designated state organs, and state institutions in charge of enforcing these rules. We call this set of rules the formal legal order. Although it is quite important in many countries today, the formal legal order is but one element of the governance structure of society. All societies, including the most developed ones, are also governed by informal norms and institutions. This informal legal order evolves over time mostly by internalizing existing norms of a social group (Coleman 1990; Sunstein 1996). It is enforced not by the state, but relies largely upon trust and reputation effects as well as monitoring devices. As we will further discuss below, the existing formal legal order in most countries around the world was shaped by transplanting formal legal systems that have evolved in several European countries in the late eighteenth and early nineteenth centuries. While many, although not all of the countries that received these formal legal orders from the West had formal legal orders prior to transplantation, the transplantation of the Western formal legal systems accelerated the development of the formal legal order.

In this section we introduce the "transplant effect" in order to characterize the transplanting process. We propose that countries that have developed formal legal orders internally, adapted the transplanted law to local conditions, and/or had a population that was already familiar with basic legal principles of the transplanted law should be able to further develop the formal legal codes and build effective legal systems. By contrast, countries that received foreign legal systems without similar pre-dispositions are much more constrained in their ability to develop the formal legal order and will have greater difficulties to develop effective legal systems (the transplant effect). In order to test these propositions empirically, we divide our 49 countries into ten that developed their formal legal order internally (origins) and 39 that received their formal legal order externally (transplants); we then divide the transplants into those that are and those that are not subject to the transplant effect. We conclude by demonstrating the transplant effect with a simple model.

2.1   Origins vs. Transplants

Most countries derived their current formal legal order from Europe during the nineteenth century and the early twentieth century. Earlier legal transplants are well known, including the reception of Roman law in Europe, the enactment of the Chinese codes in other parts of Asia, or the transfer of Spanish and Portuguese law to Latin America. Indeed, as Watson (1974) argues, legal transplants are as old as the law is. The transplanting process that occured in the nineteenth and early twentieth centuries superseded all earlier transplants. Moreover, despite lively borrowing and transplantation since then, most countries have

retained the core characteristics of the legal system they had received during this period. The wholesale transplantation of legal systems was made possible by the consolidation and formalization of legal systems in Europe that coincided with the development of the nation state. The expansion of European influence through war and conquest was primarily responsible for the transplantation of these laws to countries in Asia, Africa, North America and Latin America, although some of these non-European countries transplanted these laws voluntarily.

Three legal families, the English common law, the French civil law and the German civil law, dominated the process of consolidation and formalization of formal legal orders in Europe. The English common law has evolved over centuries and, in contrast to the French and German civil families, was never systematized and codified. Case law, or precedents established by courts, defined legal principles that were applied to other cases. The roots of the common law date back to the Norman conquest of England in 1066, but only in the late fifteenth centuries was a firm body of legal principles established that replaced preexisting customary law. The publication of law since the sixteenth century (Ross 1998) and the development of legal reports - which was completed in the second half of the nineteenth century (Katz 1986) - contributed to the formation of a consistent body of law that was widely accessible. Statutory law gained in importance in the nineteenth century, but case law remains the hallmark of the English legal system to this day.

In continental Europe, codification resulted in a formal legal order that is very different than the English common law. The French issued the first comprehensive national civil, commercial and criminal codes, as well as separate civil and criminal procedure codes between 1804 and 1811. The French (Napoleonic) codes consolidated legislation operating before the French revolution and codified existing business practice (Katz 1986; Zweigert and Kötz 1998) in language that was systematic and accessible to lay people. Politically, the codification movement manifested the superiority of the parliament over the executive and the judiciary in making new law. The other major codification of the nineteenth century is the German civil code of 1886, which had been preceded by commercial, criminal, civil and criminal procedure codes, as well as a bankruptcy law. Codification in Germany was delayed until the end of the nineteenth century primarily for political reasons. Only with unification in 1871, did codification move forward. The German codes, in particular the civil code, differ from the earlier French codification. Legal scholars compiled a consistent system of civil law based on Roman legal principles, and, as such, wrote codes that were highly technical and thus much less accessible to lay people.

Most legal families operating currently are derived either from the English common law, the French civil law or the German civil law. We denote England, France and Germany as origin countries, or simply origins, because their formal legal orders developed largely internally and display highly idiosyncratic features, some legal borrowing notwithstanding, and because their formal legal order served as a model for other countries. Comparative legal scholarship also distinguishes a fourth legal family, the Scandinavian one (Zweigert and Kötz 1998). The Scandinavian legal family is not built around a major codification, like the French or the German legal family, nor does it have a body of case law like the

English common law. However, early codification of existing business practices and the close political and economic relations among the four Scandinavian countries have given rise to a legal system based on statutory law, that is distinct from the legal systems described above. Thus, Denmark, Finland, Norway and Sweden are origins.

In our 49 country-sample, the United States, Austria and Switzerland are also origins because the development of their formal legal order was highly idiosyncratic. While English common law influenced the legal system in the United States during the colonial period, legal development in the United States has sharply diverged from the English system after the colonial period.[3] Each new state that broke away from the colony decided how much of the common law of England would be part of the new legal order (Posner 1998).[4] Moreover, statutory law has played an increasingly important role since the adoption of the American constitution.[5] Austria and Switzerland are also origins. According to standard classification, both countries belong to the German legal family. The codification that forms the basis of the Austrian civil law, the AGBGB, was adopted in 1811, over ninety years before the adoption of the German civil code. It influenced the development of the German code, rather than the other way around. The major Swiss codification (the law on obligations of 1881 and the civil code of 1907) followed the German codification. However, it did not incorporate Roman law to the same extent as the German codifications, and differs considerably in style and organization from the German code (Zweigert and Kötz 1998). Table 1 lists the ten origins in our sample and notes the time when these systems were formed. All other countries (or territories that were later organized as independent states) received their formal legal orders, either voluntarily or involuntarily, from these ten origin countries. We call these countries "transplants".

Table 2a summarizes the finding by La Porta et al. (1998) that the legal families capture differences in the quality of law on the books. Shareholder rights and creditor rights are cumulative indices developed in La Porta et al. (1998) that measure the quality of the protection of shareholder and creditor rights by statutory law. The categorical means on the top half of table 2a show that the English have strongest and the French have the weakest protection of shareholder and creditor rights, while the German and Scandinavian families are in the middle. The p-values in the bottom half of table 2a show that these difference in categorical means across the English family and the three civil law families are statistically significant.[6] Thus, the legal families are used as an indicator of the quality of the law supplied by different legal families.

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[3] The distinctiveness of American law is apparent, when one compares it with the development of law in Australia, Canada and New Zealand, all of which stayed much closer to the English common law system.
[4] A similar process took place in other colonies when they became independent. This took place, however, much later and had little impact on the formal legal order that developed initially in these territories.
[5] This is evident, for example in the development of bankruptcy law in the two countries, which increasingly diverged over time. According to Franks and Sussman, different patterns of law makin, or legal innovation account for this. (Franks and Sussman 1999).
[6] La Porta et al (1998) analyze all the indicators of shareholder and creditor rights and conclude that the French have the worst investor-protection laws.

In order to characterize the transplantation process, we note that a legal order existed in transplants at the time when the European law was transplanted and that many countries had formalized at least part of their legal systems. A legal order is a property of every society (Coleman 1990). Norms may be formalized, i.e. embodied in written rules, or they may be based on conventions, customs, and remain informal. Most societies today have both informal and formal legal systems.[7] Many societies that received European law in the nineteenth century were familiar with a formal legal order. Legal texts had a long tradition in Hindu, Islamic and Chinese law. In content and style, these legal texts, however, differ substantially from the modern European codification. For example, Hooker (Hooker 1978) shows that issues of morality are much closer interwoven with legal rules and ambiguity rather than specificity characterizes their wording. Other societies did not have a formal legal order that was embodied in codes or case law and enforced primarily by the state. They were governed by an informal legal order that was enforced by social sanctions, including reputation effects and mutual monitoring (Kronman 1985; Newman 1983). The social norms and enforcement mechanisms used differed considerably from society to society.[8] The preexisting legal order typically persisted after the process of transplantation was complete. In part, this was the indended outcome. In some instances, for example, the transplanted European law applied only to the European population, while local people continued to be governed by local custom. This was true in particular for Dutch colonies (Hooker 1975). In other cases, criminal and administrative law was applied to local people, but in family, inheritance, but also commercial matters, local law prevailed. This was the practice in many English colonies, although the jurisdiction of common law courts was often extended over time (Katz 1986; Knapp 1972). Even when transplanted law was not as clearly circumscribed, and therefore in principle applicable to all subjects in all areas of the law, the government organs did not always enforce the transplanted formal legal order against the indigenous population.

We do not have data on the effectiveness of the initial legal order and can only speculate at the ability of countries to develop an effective legal order internally, had they not received the legal order from the West. Our data, however, allow us to determine whether the transplantation of foreign law has helped or hindered these countries to develop levels of legality that are comparable with those of origins. Legal scholars have long observed that there is a gap between formal law on the books and law in action (Pound 1911). While this gap exists in origins, we would expect to observe a larger gap between law on the books and law in action in transplants. The logic of this prediction follows from the idea that the law is primarily a "cognitive institution" (Means 1980). This is self-evident with respect to the informal legal order. Observance of this law requires knowledge of the customs and habits of a social group. The fact that formal legal orders have put the key elements of the legal order in writing tends to disguise the fact that the effectiveness of these rules also rests on knowledge and understanding of these rules and their underlying values by social actors. While most members of society will not, and in fact need not, be familiar with the

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[7] There is an extensive literature on the importance of informal legal orders in the US, including (Bernstein 1992; Ellickson 1991; Macaulay 1962).

[8] For an account of the complexity and variety of pre-colonial law in South/East Asia see (Hooker 1975).

specifics of individual rules and regulations, they are familiar with the basic concepts of the legal order. Moreover, they can rely on legal professionals as intermediaries, who have a better knowledge of the formal legal order. But even for professionals to apply a special rule, they must not only grasp the wording of that rule, but also the concept behind it, the value judgments on which its rests, and its position within the overall legal order. Even a seemingly clear law - do not steal! - raises a host of interpretative problems when applied to real world cases. What about taking from a common pool, or overgrazing? What about taking something with the intention of returning it later, or picking up

an object that (apparently) has been abandoned by the owner? An identical rule like this one will be interpreted differently by those charged with applying it and their understanding of the underlying values on which this norm rests. This is true even within the same legal system. If this was not the case, countries would not need several court instances and a supreme court with the task of ensuring the uniform interpretation and application of the law.

When a transplant country applies a rule that it has transplanted from an origin, it is effectively applying a rule to its own local circumstances that was developed in a foreign socioeconomic order. Thus, we would expect that the interpretation of a legal rule will differ more within a transplant than an origin. Applying a simple rule that prohibits stealing in the context of communal property is a case in point. Other examples include:

1. the enforcement of the freedom of contract principle in a society governed by kinship relations or guangxi - the Chinese term that refers norms of reciprocity or more generally, human emotions (Hamilton 1998);

2. the introduction of the corporate form in pre-Revolutionary mainland China, where mistrust in the state prevented entrepreneurs from registering their business with the state (Kirby 1995);

3. the introduction of the corporate form in a country like Colombia, which at that time was dominated by a handful of state run enterprises, overwhelmingly agricultural production, and state policies that discouraged the formation of private capital (Means 1980).

In each of the above cases the transplanted law was largely ineffective. In early 20th century China, for example, family owned businesses frequently called themselves limited liability company but in fact were unincorporated family owned businesses. In the words of Kirby, "it had become fashionable and modern to attach the term youxian gongsi (limited company) to almost any enterprise. But it was not in vogue to register with the government, even with the very weak central government of 1916-28" (Kirby 1995, p. 50). Even where the corporate form was used, outside finance was marginal, as kinship networks provided the most important financial resources (Hamilton and Feenstra 1997). They also ensured that obligations would be honored. And in Colombia, the introduction of the corporate law did not lead to the establishment of corporations or the reorganization of existing partnerships. In fact, there is evidence that knowledge of the existence of this law was not wide spread (Means 1980). The context specificity of formal legal order has important implications for the effectiveness of the legal order (legality) in transplant

countries. Where the meaning of specific legal rules or legal institutions is not apparent, they will either not be applied or applied in a way that may be inconsistent with the intention of the rule in the context in which it originated. This in turn has implications for the perception and trustworthiness of the institutions applying them, and thus for the future demand for these institutions. However, if a transplant country adopts foreign laws from origins in a way that is sensitive to its initial conditions, then the meaning of these rules becomes clearer, and it is also simpler to develop institutions such as the courts, procurators, anti-trust agencies, etc. that enforce these rules. We conjecture that there are two reasons for this. First, when the law is adapted to local needs, people will use it and want to allocate resources for enforcing and developing the formal legal order. Second, legal intermediaries responsible for enforcing and developing the formal legal order can be more effective when they are working with a formal law which is broadly compatible with the preexisting order, or which has been adapted to match demand.

Our core proposition is that legality is determined by the ability of a country to give meaning to the transplanted formal legal order and to apply it within the context of its own socioeconomic conditions. Countries that developed a formal legal order internally, i.e. origins, should develop more effective legal institutions than countries that received the formal legal order externally by way of transplant. However, there may be cases where the transplanted law is more or less compatible with the initial order and this could offset the fact that law was transplanted. This possibility is reflected in our classification of different transplants.

2.2   Receptive and unreceptive transplants

Table 3 distinguishes voluntary from involuntary transplants. Voluntary transplants are countries that have made an informed decision to copy a foreign legal system. This decision may have been made under pressure - as in the case of Japan during the Meji restoration, which had just been forced into signing unequal treaties with Western powers. In light of this experience, the establishment of a modern legal system was seen as a prerequisite for a an economically and military strong, independent country (Baum and Takahashi 2000; Oda 1999). Yet, the choice of the legal system and its ultimate design was still in the hands of the Japanese government. By contrast, involuntary transplants are countries on which a foreign power imposed a formal legal order by colonization and/or war. Colonization usually establishes foreign rule for long periods of time and leaves strong imprints on the institutions of a given country. Wars, however, may be only short lived. Once they are over, the decision to retain or abrogate the legal system that was imposed during the war is again in the hands of the domestic government. Large parts of Europe, for example, received the French codes during the Napoleonic wars. These wars ended soon with the defeat of France. After 1815 the countries on which the Napoleonic codes had been imposed were free to decide whether or not to retain these codes. Most countries did, albeit on a preliminary basis. Many of these countries subsequently initiated their own national codifications. They usually drew heavily on the French

codes. But this time, the reception was voluntary, rather than involuntary. Since this national codification rather than the earlier imposed Napoleonic codes have shaped their long term legal development, we call them voluntary transplants. Thus, involuntary transplants in our data base are only countries on which a foreign legal system was imposed during colonization. Table 3 shows that there are a total of 20 voluntary and 19 involuntary transplants in our data base.

The fact that a transplant country voluntarily receives a formal legal order does not imply this transplanted formal legal is compatible with its initial conditions. Domestic policy makers may decide to copy the law and are free to choose from different models. The decision to import a foreign legal system may, however, be determined by national pride, the desire to bring a country up to standards with the so called "civilized world", or the hope to increase the prospects of foreign investments. None of these considerations necessarily suggests that the formal legal order will be understood and can be meaningfully applied to real world cases in the receiving country. This is the case only, if additional conditions exist, that make a country receptive to the transplanted law.

Our argument is that a voluntary transplant increases its own receptivity by making a significant *adaptation* of the foreign formal legal order to initial conditions, in particular to the preexisting formal and informal legal order. Changes in the transplanted rules or legal institutions indicate that the appropriateness of these rules has been considered and modifications were made to take into account domestic legal practice or other initial conditions. Means (1980), for example, reports that Colombia voluntarily, but almost blindly, transplanted the Spanish commercial code of 1829. The few changes were made in ignorance of the implications of these rules for business practice. For example, a provision requiring state approval for the formation of a corporation, which at the time was still common throughout Europe, was eliminated from the books. Years later when the code was amended, this time using Chilean law as a model, state approval became mandatory, despite the fact that this rule had meanwhile been liberalized in most other countries. *Adaptation* does not necessarily require that the transplanted law is changed significantly. However, at the very least, an informed choice about alternative rules must have been made. Extensive comparative research prior to the adoption of a foreign legal system is indicative for an informed choice. A good example is Japan, where extensive debates about the adoption of English or French law, and several drafts based on the French model preceded the promulgation of codes that were largely based on the German model (Haley 1991; Oda 1999).

Another indicator that a voluntary transplant is *receptive* to formal legal order is that it has *familiarity* with the legal system that it uses as a model for legal borrowing. Countries that share a common legal history will be familiar with the transplanted legal concepts and will therefore have little reason to make major adaptations or to choose a system that is less familiar to them. Common roots in the distant past are, however, not sufficient. Most of the European countries can trace their legal history back to the Roman Empire. Yet, quite distinct legal systems developed on the basis of the Roman law, which incorporated centuries of legal practice that combined elements of Roman law with customary rules. Not all countries in Europe shared this experience in the same way. Spain, for example had codified Roman law already in the

thirteenth century and supplemented these rules periodically with imperial ordinances. However, Spain did not develop the legal principles that gave rise to the modern business corporation or an elaborate system of property rights based on the (political) recognition of the right to ownership. This also implies that Latin America, which received Spanish law in the 16th century, was exposed to Roman legal heritage, not, however, to the development of the private law, which formed the core of the formal legal orders that emerged in Europe in the nineteenth century. Similarly, Greece can trace the roots of its legal system back to the Roman law. In fact, the famous compilation of the classic Roman jurists' texts under emperor Iustinian, the corpurs iuris civilis, which is the basis of the European Roman legal heritage, was a product of the East Roman empire (Stein 1999). However, the Byzantine law Greece enacted in 1821 after independence from Turkish rule differed significantly in content and style from the modern French law it transplanted subsequently, despite the fact that the French law is also based on Roman law. Finally, the legal development of Korea and Japan was long influenced by Chinese law (Haley 1991). But when Japan transplanted its law to Korea, this was the new Japanese law that had been transplanted from Germany (Hahm 1996a; Wang 1997) . There is no definite time limit to distinguish a distant legal heritage from a more recently shared common legal history. From our discussion of law as a cognitive institution, it follows that the common history must still be recognizable in legal practice at the time when the foreign law is transplanted.

To summarize, if a voluntary transplant has familiarity with the country or countries from which it takes the formal legal order, and/or it transplants the formal legal order with significant adaptation to its initial conditions, then the voluntary transplant is *receptive.* Otherwise, the voluntary transplant is *unreceptive.* These definitions are summarized in box 1; following these definitions, table 3 categorizes our 20 voluntary transplants into the receptive and unreceptive categories.

Involuntary transplants, under certain conditions, may also be categorized as *receptive.* Involuntary transplants received their formal legal order as colonies, and this transmission process varied across countries. As noted already, in the Dutch colonies, the foreign law applied primarily to members of the colonizing power. English common law was introduced in the early colonies in a gradual fashion. The East Indian Company established the first courts on the subcontinent, which applied English common law. Whether this law applied only to the English subjects or also to the local population remained unclear for decades. Only when the British government took over control from the company in the middle of the nineteenth century was the general jurisdiction of the common law established. A court system, which referred to the privy council as the highest court was created. For the purposes of transplanting English common law to other parts of the empire, it was codified, which greatly accelerated the transplantation of the common law to the Indian subcontinent and later to other parts of the empire. The introduction of English common law to other countries was swifter. Kenya and Zimbabwe were colonized only at the end of the 19th century. They received English law by decree, which stipulated that the law in force in England at a certain day would now apply in the territory. Still, exemptions were sometimes made for certain matters of

the law such as family inheritance (Mann and Robert 1991). Similar principles applied to the imposition of French law in French colonies.

In some colonies, the transplantation of foreign law took quite a different form. The English Empire distinguished between "settled" and "conquered" territories. Settled territories were considered to be barren land, the existence of indigenous people like the Indians in North America, the Aborigines in Australia, or the Maoris in New Zealand notwithstanding. But these territories were designated for migration from Europe and, in fact, experienced a massive influx of European people. The migrants used violence and their control of economic resources to seize power from the indigenous population. English law was transplanted to these territories through migration. The first settlers brought the law with them. In some cases, the applicability of English law remained in doubt or was disputed, and was only confirmed by the English crown. For our purposes, however, the important point is that in the case of the so-called settled territories, European law was not imposed on people accustomed to an entirely different legal order, but was applied to people who were familiar with the basic principles of the colonial legal order.[9] Therefore an involuntary transplant is *receptive* if, because of the migration process, it exhibits *familiarity* with the formal legal order. Otherwise, the involuntary transplant is *unreceptive.* There are 11 receptive, transplants and 28 unreceptive transplants: 6 out of 11 of the receptive transplants are voluntary, and 14 of 28 unreceptive transplants are voluntary.

2.3   Direct vs. Indirect Transplants

A final distinction we use to classify transplants, is between transplants that received their formal legal order directly and those that received if from another transplant. The former are called direct transplants, the latter indirect transplants. Because the law - as we have argued - is a cognitive institution, it is important to understand the context in which a rule originated and operates for making an informed decision about its possible impact in the new domestic context. The development of a very flexible, or enabling, corporate law in the United States that gives shareholders wide discretion in designing the internal structure of the corporation, for example, can hardly be understood without appreciating the role of the judiciary as an instance of last resort in defining the boundaries of this flexibility (Coffee 1989) . Countries that do not offer shareholders recourse to the courts to a similar extent, tend to have a much more rigid structure. Transplanting one element of the law (a flexible rule) without another (effective enforcement institutions) is unlikely to produce the desired results.[10]

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[9] That these territories greatly benefited from the legal order they had brought with them was noted already by Adam Smith (1976 book IV chapter 7). The contrast with Latin America, which had been colonized earlier by imperial Spain, and where the Spanish elite was by far outnumbered by locals and Slaves was indeed striking. Finer (1997 pp. 1394) notes that these different territories represented not only geographic differences, but different historical periods.

[10] Coffee (1996) is even skeptical about the possibility of extending shareholder suits in a legal system, such as Germany, despite its effective legal institutions, without the body of case law that exists in the US, but is absent in Germany.

In order to have a better understanding of the functioning of a legal rule in the context of a legal system, it is helpful to be closer to the legal system in which a rule originated. This facilitates access to information about the interpretation and application of the law to real world cases. Countries that borrow from another transplant are more remote from this information. The other transplant may have altered the original law in the process of transplanting it. While this may have increased the receptivity of the law in the first transplant, the second transplant now has neither access to the original rule nor necessarily understands the reasons for its adaptation. Thus, it will be difficult to make an informed decision about the impact of this rule on the receiving country's social and economic structure. Even if the rules remained unchanged, the first transplant may still be in the process of giving meaning to the new rules by applying them to real world cases. In this process, the meaning of the rule may change. No two cases are alike in a given legal order, and cases that originate in different legal orders are likely to vary even more from one another. This will undoubtedly lead to different results, even when identical rules are applied. Indirect transplants face the task of trying to understand the original meaning of a rule by inferring from the application of this rule in a context that differs from the one in which the rule originated, but also from their own context. This process can be compared to translating a text from the original language to a second, and from this to a third language. Even under the assumption that good translators are at work, the second translation is likely to differ from one that was made directly from the original.

Another reason why indirect transplants may end up with a less effective legal system is that transplanting becomes excessively easy. In particular, when countries share a common language, the temptation to simply enact the laws of a neighboring country may be great, especially when the second country lacks the resources for developing its own legal order independently. If initial conditions in the two countries are similar, the indirect transplant may be just as successful (or unsuccessful) as the first transplant. However, if initial conditions differ, the lack of adaptation decreases the receptivity of the second transplant.

We have 26 direct transplants, and 13 indirect transplants. Italy, Spain, Portugal, the Netherlands, Belgium, Greece and Egypt are all direct-French-family transplants. All English colonies received the common law directly from England. This applies to "settled" as well as to "conquered" territories. Within the German legal family, Japan received the formal legal order directly from Germany. The highest concentration of indirect transplants in our sample can be found in Latin America. These countries were first exposed to European law under Portuguese and Spanish rule. As noted earlier, these laws, however, reflect a different stage of economic and legal development in Europe. The nineteenth century European codes came to Latin America indirectly. The French origin was transplanted to Spain and Portugal. Both countries first received this law when they were invaded by Napoleon. When they subsequently enacted their own national codes, they copied the French codes almost word by word, but this time voluntarily. The Spanish commercial code of 1829 served as a model for many Latin American countries. Some, including Brazil, Colombia, and Peru, transplanted the foreign codes without major adaptations. Others, however, made significant adaptations. Argentina used a variety of sources, including several transplants (Spain,

Portugal, Brazil) and the French origin for its codification and made important changes in these rules. Chile was less eclectic and relied primarily on Spanish and French law, but incorporated legal practice in Europe since the beginning of the century. Thus, both Argentina and Chile were receptive-indirect transplants. Yet others did not use the Spanish code, but a Latin American transplant as a model. This was the case in Uruguay, Venezuela, and Ecuador. Uruguay chose the Argentine model, Venezuela the Chilean, and Ecuador even used a third order transplant, the Venezuelan codes. These countries are all unreceptive-indirect transplants. There are also some indirect transplants in the German legal family. In particular, Korea and Taiwan received the formal legal order from Japan - itself a transplant of German law - when they came under Japanese colonial rule.

The two criteria we have used to classify transplants can be combined into four groups of transplant countries: direct-receptive transplants, direct-unreceptive transplants, indirect-receptive transplants, and indirect-unreceptive transplants. Table 4 groups our transplants into these categories, lists the major period of legal transplantation, and gives some historical background information. A more detailed summary of the coding is available upon request. Our argument implies that all of our transplants, except the direct-receptive group, are subject to the transplant effect.

Tables 2a and 2b provide a useful comparison of the origin and transplant categories with the legal families. As already noted, the legal families are excellent predictors of the quality of law on the books. However, Table 2b shows that the origin and transplant categories have almost no ability to explain the quality of law on the books: in 19 of the 22 possible binary comparisons, there is no statistically significant difference between the different categories. While families are superior predictor of law on the books, in the rest of the paper, we will show that the origin and transplant categories are a much stronger predictor of legality.

2.3   A Simple Model

The mechanics of the transplant effect are formalized in the following model. Consider an aggregate production function, that represents how a country converts inputs into GNP per capita. In order to produce GNP, any country needs both legality and variable inputs. For simplicity, labor time, denoted W, is the only variable input and the aggregate production function is:

(1) $Y = L^{\alpha}W^{1-\alpha}$

In this specification, Y denotes GNP per capita (aggregate output), L denotes legality, W denotes labor time, α (1-α) is output elasticity with respect to legality (labor).

We have argued that both informal legal order and the formal legal order determine legality in a particular country. In order to formalize this idea, we posit a legality production function that requires resources allocated to both the informal and formal legal order:

(2) $L = (aF^{\zeta} +(1-a)I^{\zeta})^{1/\zeta}$

where I and F are resources allocated to the informal and formal legal order, $\zeta = \rho/(\rho - 1)$, where $\rho \geq 0$ is the elasticity of substitution between the informal and formal legal order, and a ε (0,1) measures F's productivity relative to L's productivity. To ensure that resources are always allocated to I and F, we assume that $\rho \varepsilon [0, 1)$.[11] Total legal resources are $R = I + F$, and $\theta = (F)/(I + F) = F/R$ denotes the share of legal resources allocated to F. The legality production function can be re-written in terms of R and θ:

(3) $L = (a\theta^{\zeta} + (1-a)(1 - \theta)^{\zeta})^{1/\zeta} R$

In this specification, legality is strictly increasing in R and strictly concave in $\theta \varepsilon$ [0,1). Thus, for any R, the share of resources allocated to F that maximizes legality is:

(4) $\theta^{max} = \{1 + (1/a - 1)^{\rho - 1} \}^{-1}$

There is a representative consumer that maximizes a one period utility function that is increasing in consumption, C, and leisure. Labor supply is fixed and normalized at unity: leisure is $1 - W$ and consumption is GNP net of legal resources: $C = Y - R$. Combining equations (1) and (3), consumption is a function of work time, legal resources, and the share of legal resources allocated to formal legal order:

(5) $C \equiv C(W, R, \theta) = (a\theta^{\zeta} + (1-a)(1 - \theta)^{\zeta})^{\alpha/\zeta} R^{\alpha} W^{1-\alpha} - R$

In countries that are not subject to the transplant effect, consumer demand determines the share of resources allocated to the formal legal order (θ). In transplant effect countries, consumer demand for formal legal order is constrained to be no greater than some $\theta^{T} < 1$. The way in which transplant countries receive the formal legal order affects the way that legal intermediaries such as the courts, the legal profession and the government, can adapt it to match demand. If the formal legal order is transplanted in an indirect and/or unreceptive fashion, legal intermediaries have trouble developing the modern order to match demand years after transplantation. Legal intermediaries in indirect transplants have difficulties matching demand because they work with a formal legal order that was received primarily from another transplant, rather than from an origin. And, legal intermediaries in unreceptive transplants have difficulties because they must work with a formal legal order that was not adapted and well suited to local conditions when it was first received. In order to derive the demand for θ, we solve the representative consumer's problem:

        Choose $(W, R, \theta) \varepsilon [0,1] x [0, Y] x [0,1]$:

(6.1)   Maximize $U = C^{\beta} (1 - W)^{1-\beta}$,

(6.2)   subject to $\theta \leq \theta^{T}$,

where the constraint in equation (6.2) is binding in transplant effect countries, and non-binding in countries that are not subject to the transplant effect.

        The elasticity of substitution parameters used in the output and legality production functions ensure that, if an economy can produce positive output, then $R^* > 0$, $W^* > 0$ and $\theta^* \varepsilon$ (0,1) in a feasible and

[11] This is a sufficient but not necessary condition to ensure that both F and I are used. Much of the analysis

optimal solution. Similarly, the Cobb-Douglas utility function ensures that in a feasible and optimal solution, consumption and leisure are strictly positive: $W^* \varepsilon$ (0,1), and $R^* \varepsilon$ (0, Y).

It useful to represent the consumer's problem in the Lagrangian form:

Choose $(W, R, \theta, \lambda) \varepsilon$ [0,1] x [0, Y] x [0,1] x R_+ :

(7)   Maximize L $= C^\beta (1 - W)^{1-\beta} + \lambda(\theta^T - \theta)$

$\qquad = [Y(L(R, \theta),W) - R]^\beta (1 - W)^{1-\beta} + \lambda(\theta^T - \theta)$

where λ is the shadow price of θ^T: it measures the utility gain following a marginal increase in θ^T. The first order conditions for a feasible and optimal solution can be expressed as:

(8.1) $\delta L/\delta W = \beta((1 - W)/C)^{1-\beta} (\delta Y/\delta W) - (1-\beta)(C/1 - W)^\beta = 0$

(8.2) $\delta L/\delta R = \delta Y/\delta R - 1 = 0$

(8.3) $\delta L/\delta \theta = \beta((1 - W)/C)^{1-\beta} (\delta Y/\delta L)(\delta L/ \delta\theta) - \lambda = 0$

(8.4) $\lambda(\delta L/\delta\lambda) = \lambda(\theta^T - \theta) = 0$

In solving this program, equations (8.1) and (8.2) can be combined to obtain explicit solutions for W^* and R^*: $W^* = \beta$, and $R^* = \beta\Omega(a, \rho, \theta^T, \alpha)$, where Ω is continuous function of parameters $a, \rho, \theta^T, \alpha$ defined over the parameter space (0,1) x [0,1) x (0,1] x (0,1). Plugging these results into equation (8.3) and (8.4) we can characterize the shadow price, λ. [12] When equation (8.4) is non-binding, $\lambda = 0$ and the solution to equation (8.3) is $\delta L/ \delta\theta = 0$. If there is no constraint on the allocation of legal resources between I and F, θ maximizes legality: $\theta^* = \theta^{max}$ (see equation (4)). If $\theta^{max} > \theta^T$, λ is computed from equation (8.3). The next Proposition derives several important properties of λ.

Proposition 1. Suppose that $\theta^T < \theta^*$. Then

1. $\delta\lambda/\delta\theta^T$ < 0;

2. $\delta\lambda/\delta a$ > 0;

3. $\delta^2\lambda/\delta a\delta\rho$ < 0.

Proof. See the Appendix.

When formal legal order is constrained, the allocation of legal resources is inefficient: increasing θ^T reduces this efficiency loss: it increases legality, which in turn increases GNP per capita, which then increases welfare. The first point in Proposition 1 is that cost of an inefficient allocation falls as as θ^T increases, and the allocation of legal resources between F and I approaches θ^*. An implication of this result is that a country that manages to relax the constraint on allocation of legal resources to the formal legal order can reverse the transplant effect, and improve legality.

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is robust to cases where $\rho \geq 1$.

Since historical evidence suggests that the parameter a has increased over time while ρ has fallen, the second and third points have the striking implication that the impact of constraining the allocation of legal resources to F on welfare, output and legality is exacerbated. The informal legal order, I, captures the legal order that typically preceded the formalization of law and that relied on social sanctions, including mutual monitoring, reputation effects, and trust. These mechanisms are effective in relatively small, homogenous, groups (Kronman, 1985). The formal legal order, F, in contrast is a system of contracts, codified regulations, and legal procedures that can be enforced even against parties without preexisting relationships and in an environment with high information costs. Thus, with growing complexity of social and economic relations, the productivity of F relative to I (as captured in the parameter a) increases. Point 2 says that as F becomes relatively more productive, constraining its development becomes more costly. It is also the case that in less complex settings it is easier to substitute between the informal and formal legal order. However, over time, the elasticity of substitution between I and F decreases: it becomes harder to replace formal contracts and formal methods of dispute resolution with informal contracts that rely mainly upon trust and reputation. Point 3 says that the increase in λ driven by the relative productivity gains in F accelerates as it becomes more difficult to substitute between I and F. Integrating over λ(θ), the transplant

$$
\begin{aligned}
\textit{transplant effect} &= -\int_{\theta^T}^{\theta^*} \lambda(\theta)\partial\theta \\
&= U(\theta^T) - U(\theta^*)
\end{aligned}
$$

effect is the total welfare loss:

The next proposition characterizes the transplant effect.

Proposition 2. Suppose that $\theta^T < \theta^*$. Then the transplant effect is negative and:

1. $\delta(\text{transplant effect})/\delta\theta^T > 0$;
2. $\delta(\text{transplant effect})/\delta a < 0$;
3. $\delta^2(\text{transplant effect})/\delta a \delta\rho > 0$.

Proof. These results follow trivially from Proposition 1.

Points 2 and 3 predict that there is a large difference in GNP per capita and legality between countries that are and are not subject to the transplant effect.

3. Legality and the Transplant Effect

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[12] The formal solution is in the Appendix.

In this section we present tests of our hypothesis that the way in which the law is transplanted is a more important determinant of legality than the supply of a particular family. The testable implications are that origins and receptive-direct transplants are not subject to the transplant effect; receptive-indirect, unreceptive-direct and unreceptive-indirect transplants are subject to the transplant effect; and, the transplant effect has much greater impact on legality than the supply of a particular legal family. For ease of presentation, all the analysis is conducted by means of single equation ordinary least squares (hereafter OLS) techniques. System validation of our results will be provided separately in section four.

Table 5 reports regressions for each of the five legal proxies on transplant and legal family dummy variables. In view of the significant multicollinearity between the five legal proxies, we introduce a univariate 'legality' measure that is defined as the leading principle component of these legality proxies and account for 83% of their overall (unconditional) variance. The English dummy variable and the origin dummy variables are both normalized at zero. Thus, a coefficient on a transplant dummy estimates the difference in legality between that transplant category and an average origin, and there is a "transplant effect" when a transplant dummy is negative. The coefficient for a legal family dummy estimates the difference in legality between that family and an average English country.

The results in Table 5 for the five legality proxies and the legality variable support these hypotheses. The coefficient for receptive-direct transplant is never statistically significant; thus, receptive-direct transplants are not significantly different than origins. The other three transplant groups seem to suffer from a transplant effect: their coefficients are all significantly negative, and 15 of these 18 coefficients are significant at the 1-percent level.

To check that the transplant effect is more important than the supply of a particular legal family, we perform several tests. First, we test the null hypothesis that joint impact of these legal families is negligible (French = 0, German = 0, Scandinavian = 0). Because the p-value of these F-statistics always exceeds .05, we do not reject the null. The F-test for receptive-indirect = 0, unreceptive-direct = 0, unreceptive-indirect = 0 tests the null that these transplant effect groups jointly have a negligible impact on legality and can be set to zero. Because the p-values are always less than .01, we reject this null even at the 1-percent level. Thus, the joint impact of the transplant effect is always significantly negative, while the joint impact of families is negligible. In the three cells where the family effect is significant, the absolute impact of families on legality is always lower than the absolute impact of any of the three transplants effect groups. These results all support the hypothesis that the transplant effect has a stronger impact than the supply of legal families on legality.

A striking pattern observed by inspection of the regressions for all five legal proxies is the transplant effect coefficient is roughly uniform across the three transplant effect groups. Therefore the next hypothesis we test is that for each legal proxy and for legality the coefficients of the three transplant effect groups are equal. This hypothesis is tested individually for each of the six variables. Since the p-values for these F-tests are never lower than .216, the null is not rejected, and the transplant effect appears to be uniform across the three transplant effect groups.

Table 6 reports our best estimate of a reduced form for the determinants of legality. Following the results in Table 5, we exclude the receptive-direct coefficient, and combine the three transplant effect countries into a transplant effect group. Since single equation specification searches can be notoriously inefficient (neglecting important cross-equation information) and, thereby, produce a variety of 'acceptable' alternative specifications, we chose to report only OLS estimates for the specification that was ultimately selected by the full system search implemented in section 5 (columns 2 and 4 in table 6; columns 1 and 3 supporting evidence for our final implementation of the legal family effects). Table 6 reports regression equations that complement the reduced form equations in table 5 in a way that will be clarified further in section 5. The first column reports regression results for legality on the transplant effect and the German and Scandinavian families. While the transplant effect is significantly negative, the separate German and Scandinavian variables are positive but insignificant (the p-values are .13 and .19). By inspection of the point estimates and the standard errors, the German and Scandinavian variables have a roughly similar impact on legality. The F test for the null hypothesis that the German effect equals the Scandinavian effect supports this observation: it has a p-value of .9211 and allows us to combine the German and Scandinavian families into one German&Scandinavian dummy variable.

The second column in Table 6 reports the best restricted reduced form for legality. Three points are noteworthy. First, the fit is striking: the adjusted R^2 of .6874 is higher than any of the reduced forms for legality in Table 5. Second, this reduced form statistically encompasses the less restricted reduced form for legality in Table 5. The F-test for the null hypothesis that these two specifications encompass each other has a p-value of .7582, and cannot be rejected. Finally, this reduced form provides evidence that the transplant effect is more important than the supply of any particular legal family. The transplant effect has a coefficient of –6.603 and is significant at the 1-percent level; the German&Scandinavian coefficient has a coefficient of 1.759 and is significant at the 10-percent level. To compare the impact of these two effects, note that our legality measure ranges from 8.50 to 21.90 and has a standard deviation of 4.32. Thus, for a transplant effect country in the English or French family, the impact of reversing the transplant effect would be a one and a half standard deviation increase in legality. A reversal for a transplant effect country in the German family would be a still impressive 1.1 standard deviation increase in legality.[13]

It is not possible to infer from our data, however, that picking a particular legal family would have a significant impact on legality. Evidence in Table 5 suggests that legal families may be a spurious explanatory variable. The relative impact of legal families is different for the five legal proxies, and this implies that they are not statistically robust. Evidence provided by La Porta et al (1998, Table 6) shows that the relative impact of the legal families on the legality proxies changes even after controlling for GNP per capita. Legal families, by themselves, have very little power to explain the legality proxies: their share of the variance in the five legality proxies is between 17.4% and 26.3% . Further evidence that legal families are not statistically robust explanatory variables for legality is presented in Section 5.

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[13] There are no Scandinavian transplants, so we cannot say anything about this family's impact.

A criticism of our restricted reduced form is that it ignores the impact of economic development on legality. Figure 1 suggests that once we control for log GNP per capita, the transplant effect would have no explanatory power. In Table 7 we control for log GNP and check for the impact of the transplant effect and legal families on legality.[14] The transplant effect still is significant at the 1-percent level, and depresses legality by more than half a standard deviation.

4. Economic development, legal families and the transplant effect

An understanding of the relationship between the transplant effect, the supply of legal families and economic development is critical for the design of legal reform. If there is a direct relationship between the transplanting process and economic development, then there is reason to believe that a well designed legal reform would have an immediate impact of GNP per capita. If, however, the transplant effect has primarily an indirect impact through its impact on legality, then an effective legal reform can improve legality, which, over time, will raise economic development. We have shown in section three that legal families have a small, if not negligible, impact on legality. This implies that supplying a particular legal family has no indirect impact on GNP per capita. However, if legal families had a direct impact on GNP per capita, then policy makers could perhaps expect to get a direct and immediate gain in GNP per capita by picking the best family.

The unrestricted reduced form for log GNP per capita in the last column of Table 5 provides a useful overview of the impact of transplant effect and legal families on economic development. The test statistics provide evidence that the receptive-direct transplant can be excluded; the legal families can be jointly excluded; the three transplant effect dummy variables cannot be excluded; and, these three transplant effect categories can be combined into a single transplant effect. The last column in Table 6 presents our best restricted reduced form for Log GNP per capita: it includes a transplant effect and a French&German dummy variable. Several test statistics provide intuition for its derivation. First, as shown in the third column in Table 3, the F-test for the null that the German and French families have similar impact has a p-value of .2745 and cannot be rejected. The F-test for the null that the best reduced form for legality encompasses the less restricted reduced form in Table 5 is reported in the last column of Table 6: it has a p-value of .6438, and cannot be rejected.

This reduced form for log GNP per capita in Table 6 supports our hypothesis that the transplant effect is more important than supply of a particular legal family. The transplant effect and French&German dummies are both significant at the 1-percent level. By inspection of the regression coefficients, the absolute impact of the transplant effect is much stronger than the French&German effect. To see how this works, consider the transplant effect country of Ecuador. It received the French law indirectly primarily from the two transplant countries: Spain and Venezuela. And, even though Ecuador voluntarily received the French law, it is an unreceptive transplant because it did not meaningfully adapt the law to its local

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[14] These regressions combine explanatory variable from the best restricted reduced form for both legality

circumstances and there was no historical familiarity between Ecuador and France. If Ecuador had managed to avoid or reverse the transplant effect, then its 1994 GNP per capita would have increased roughly ten-fold to Ireland's level ($13,000 U.S.). Legal families only marginally change the impact of the transplant effect on economic development. For example, if Ecuador had received the German civil law without the transplant effect, then its 1994 GNP would have been at Ireland's level. However, if it had received the English common law without the transplant effect, then its 1994 GNP per capita would have risen only to roughly the level in Greece ($7390 U.S.). However, this marginal impact may be spurious. If we exclude the families from the last regression in Table 6, the adjusted R^2 falls only marginally from .5756 to .5484. Furthermore, if we regress any combination of families on log GNP per capita and exclude the transplant effect, the highest adjusted R^2 that we obtain is an unimpressive .21[15].

The first regression in Table 7 shows that the transplant effect on log GNP per capita is completely indirect. The transplant effect coefficient in this regression is the direct effect, since it measures the transplant effect after accounting for its impact via legality. The direct transplant effect coefficient is statistically insignificant. Multiplying the legality coefficient in the second regression (.323) times the transplant effect coefficient in the best restricted reduced form for legality in table 6 (-6.603), the approximate indirect effect of transplant effect on log GNP per capita is – 2.13 (roughly 1.42 standard deviations away from the mean log GNP per capita).

As already noted in the introduction, the policy implication of this result is fundamental. An effective legal reform strategy should include measures that would avoid the transplant effect. Furthermore, because the impact of the transplant effect on economic development is purely indirect, there is no reason to believe that a legal reform would have a direct and immediate impact on GNP per capita. Finally, because the transplant effect dominates the impact of legal families, and legal families may have a spurious impact on economic development, our econometric results provide no support for the idea that picking the correct family would lead to a direct and immediate gain in economic development

To check for robustness of the results in Tables 5, 6 and 7, we change Mexico from a unreceptive-indirect transplant to half a unreceptive-indirect and half a receptive-indirect transplant; we also change Portugal and Spain from unreceptive-direct to half unreceptive-direct and half receptive-direct. While Mexico copied the Spanish commercial code in an unreceptive fashion in 1854, twenty years later Mexico promulgated a civil code using various sources and including lessons from legal practice, and subsequently also revised the commercial code. While we usually use the date of the first reception, these two dates are very close. Moreover, it is questionable whether the earlier code had a long-term impact, because it was quickly superseded. Spain and Portugal are included in robustness test, because their proximity to France and Germany could suggest that they were fairly familiar with the modern formal legal order that developed

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and log GNP per capita.

[15] More evidence is provided in Section 5.

in these countries, even though they themselves did not directly participate in this development. All of our results are robust to these modifications.

5.   Further statistical investigations

        In sections 3 and 4, we defined legality as being the principal component of five out of six of our initial measures of legal performance. It is critical to emphasize here the fact that a principal component is defined as the linear combination of the initial variables, which has maximal variance, *unconditionally* on any regressors. This is obviously not what we are interested in per se. Our primary interest lies instead in analyzing the relationships between economic development, legality, the transplant effect and legal families. While the use of a principal component for legality appears to have produced a truly interesting and easily interpretable story, we have no guarantee at this stage of our analysis that it has not overly simplified or even grossly distorted the underlying story.

        The object of the present section is that of estimating and extensively testing a *joint* econometric six equations model for our five measures of legal performance together with GNP per capita, conditional on all other variables introduced earlier. Our objective is that of fully validating our use of a principal component to represent legality. Since the parametric restrictions implied by this scenario are highly non-linear cross-equation restrictions, we can no longer use single equation regression techniques as in section 4. Therefore, we shall now rely upon full information Maximum Likelihood (hereafter ML) estimation techniques and Likelihood Ratio (hereafter LR) testing procedures. Furthermore, in view of our relatively small sample size (49 countries), we shall use Monte Carlo (hereafter MC) simulation techniques to produce finite samples standard deviations for all estimated parameters (*including* those of the principle components themselves, which until now have been treated as given) and p-values for all test statistics. This section aims at presenting the main steps of our statistical analysis in (relatively) non-technical terms. All technical derivations are regrouped in an Appendix.

        For the ease of notation we present our model with reference to a single arbitrary country. Let y denote the vector comprising the five measures of legal performance retained for analysis and g the log of GNP per capita. Let x regroup all relevant exogenous variables consisting of four transplant variables and three legal families as in section 4. Each equation also includes a constant term capturing the reference scenario (origin—English). We immediately eliminate these constant terms from the model by expressing all variables in deviations from their sample means. This elimination implies that the intercepts are *not* subjected to any of the restrictions, which are implemented below, in reflection of the fact that the five measures of legal performance are not mean-standardized.

        Our baseline (maintained hypothesis) model consists of six fully unrestricted reduced form equations for y and g, conditionally on x. Actually such a model can be *equivalently* represented in the form of five reduced form equations for y given x and of one unrestricted *regression* equation for g, given y and x. This latter representation will prove to be particularly operational for the purpose of our analysis. Therefore, let

(9.1)
$$y = \Pi' x + u \qquad , u \sim N_5(0,\Omega)$$

(9.2)
$$g = b'y + c'x + v \quad , v \sim N(0, v^2)$$

denote our baseline model, where $\Pi \in \Re^{8X5}$, Ω is a 5x5 symmetric Positive Definite Matrix, $b \in \Re^5$, $c \in \Re^8$ and $v^2 > 0$; $N_p(m,V)$ denotes a p-dimensional Normal distribution with mean vector m and covariance matrix V. Note that u and v are *independent* from one another by construction. For the ease of comparison with results derived by La Porta et al. (1998) it is useful to present also the reverse factorization of our baseline model, denoted as follows

(10.1)
$$y = \delta g + \Gamma' x + \mu \quad , \mu \sim N_5(0, D)$$

(10.2)
$$g = p'x + v \qquad , v \sim N(0, w^2)$$

These two factorizations are *observationally* equivalent, merely corresponding to alternative one-to-one reparametrizations of the unrestricted reduced from of the model. Their respective parameters are linked by the following identities.

(11)
$$E\left(\begin{matrix} y \\ g \end{matrix} \middle| x \right) = \left(\begin{matrix} \Pi' \\ (c + \Pi b)' \end{matrix}\right) x = \left(\begin{matrix} (\Gamma + \delta p)' \\ p' \end{matrix}\right) x$$

(12)
$$V\left(\begin{matrix} y \\ g \end{matrix} \middle| x \right) = \left(\begin{matrix} \Omega & \Omega b \\ b'\Omega & v^2 + b'\Omega b \end{matrix}\right) = \left(\begin{matrix} \Delta + w^2 \delta \delta' & w^2 \delta \\ w^2 \delta' & w^2 \end{matrix}\right)$$

The parametric restrictions we will discuss in a moment are naturally related to factorization (9). The implied restrictions on factorization (10) would be exceedingly tedious to derive analytically, but are trivial numerically implement by means of the identities (11) and (12).

The very first step toward validating the use of a principal component consists of testing whether or not the five components of y are actually proxies of a common univariate concept. The statistical translation of this question corresponds to the following hypothesis.

H_a: Π *is of rank 1, that is to say that there exists* $\beta \in \Re^5$ *and* $\gamma \in \Re^8$ *such that* $\Pi = \gamma \beta'$.

Note that β and γ are only defined up to a proportionality factor. To remove this ambiguity and identify β and γ, we impose the condition that $\beta'\beta = 1$. *Under* H_a we can reinterpret the equation system in

(9.1) in the following observationally equivalent form: there exists a univariate latent variable ξ (which is obviously to be interpreted as legality) which is such that:

(13.1) $$\xi = \gamma'x + \varepsilon \quad, \varepsilon \sim N(0, \sigma^2)$$

(13.2) $$y = \beta\xi + \eta \quad, \eta \sim N_5(0, \Sigma)$$

which, by elimination of ξ produces the system (9.1) subject to H_a. The corresponding reinterpretation of Ω is given by

(14) $$\Omega = \Sigma + \sigma^2 \beta\beta'$$

While β is identified by assumption H_a, Σ and σ^2 are not identified in full, but Ω is.

An assumption which naturally complements H_a is that whereby only ξ enters the GNP regression equation (9.2), not all five y's individually

$$H_b: b \text{ is proportional to } \beta.$$

If H_a and H_b hold together we reach the conclusion that there indeed exists a univariate legality concept ξ which fully captures the interactions we wish to analyze. However, there is still nothing at this stage of the discussion that tells us that the linear combination $\beta'y$ does coincide with the principal component of the y. The missing link is provided by a third assumption that we formulate as follows:

$$H_c: \Sigma\beta = 0$$

This assumption whereby Σ is singular, fully identifies Σ and σ^2 in equation (14), since it now defines σ^2 as the eigenroot of Ω corresponding to the eigenvector β. More importantly, it also implies that the linear combination $\beta'\eta$ in equation (13.2) is identically equal to zero, which in turn implies that

(15) $$\xi \equiv \beta'y$$

Thus, the fact that the linear combination $\beta'y$ *is* legality not merely a proxy thereof.

Under H_a and H_c we can now explicitly relate β to the principal component introduced earlier. Under H_a, the *unconditional* covariance matrix of y can be written as

(16) $$V = \Omega + \Pi'\Phi\Pi = \Sigma + (\sigma^2 + \gamma'\Phi\gamma).\beta\beta'$$

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where Φ denotes the covariance matrix of the x's. Add H_c and we also have that

(17)
$$V\beta = (\sigma^2 + \gamma'\Phi\gamma).\beta$$

so that β is an eigenvector of V with eigenroot $\sigma^2 + \gamma'\Phi\gamma$. Let then q_i (i = 2 5), all orthogonal to β, denote the four remaining eigenvectors of V with corresponding eigenroots λ_i. Since $\beta'q_i = 0$, we find that

(18)
$$Vq_i = \Sigma q_i = \lambda_i q_i.$$

Therefore, it suffices that $\lambda_i \leq \sigma^2 + \gamma^1\Phi\gamma$ to produce the key result that β is the principal component of the y's under H_a and H_c. In view of the significant variability of the x's which is represented by the covariance matrix Φ, of the order of magnitude of the γ's and of the relatively good fit of equations (13.1) and (13.2), these inequalities are fully supported by the data which, in particular, immediately explains why we will find that the ML estimation of β under assumption H_a and H_c virtually coincides with the principal component of the y's.

As detailed in Appendix, we can estimate the model (9) by ML under any combination of assumptions H_a, H_b and H_c at the cost of introducing additional auxiliary reparameterizations that greatly reduce the computational burden (to a numerical optimization in β in the worst case scenarios). We note that while H_a and/or H_c can be tested on their own, H_b cannot since it remains tautological as long as β is not defined elsewhere in the model. Therefore, we shall test H_b either in combination with H_a or on its own with β being defined as the principal component of the y's.

In Table 8 we report p-values for a full model specification search covering twenty different submodels. In each box we report finite sample p-values for (up to) three LR test statistics under different null hypotheses: the final model (G), the one to the right (H) and the one below (V). These p-values are obtained by MC simulation: under the appropriate null hypothesis and keeping the x's *fixed*, we generate 1,000 fictitious samples of size 49 for (y, g), evaluate the relevant LR test statistics and compute the fraction of simulated test statistics which are larger than the one obtained for the actual sample. This presentation enables one to visualize a full sequential search from the least restricted model (upper/left) down to the final model (lower/right) along different paths. In any event, the p-value of our final model against the least restricted one is an amazing 0.491. This is especially remarkable in view of the fact that, not counting intercepts, the unrestricted model has 6 x 7 =42 coefficients in Π and ½(6 x 7) =21 coefficients in Σ for a total of 63 coefficients. In contrast, our final model only has (4 + 1) + 1 +1 = 7 coefficients in (Π, b, c), 10 coefficients in Σ and 1 variance v^2 for a grand total of 18 coefficients! In the words of Hendry and Richard (1989), our final model parsimoniously encompasses the unrestricted one, in spite of excellent fit of the

latter (no R^2 is less than 0.65 in the reduced form and a remarkable 0.92 in the log GNP per capita regression!).

Table 8 requires two additional comments. Firstly, the excellent fit of the models in row A do explain why some of the lowest p –values are found in row A/Vertical. In particular, the fully unconstrained OLS estimates of b in row A are generally fairly different from the estimates of β in rows B to D, but also much less accurate (there is just too much multicollinearity between the five measures of legality to get reliable estimates of their impact on GDP outside of a full system estimation). Secondly, and most importantly, the transplant effect shows up totally unambiguously from column (1), which is why it is immediately imposed from column (2) onward. In contrast, the role of legal families remains fairly ambiguous across columns (2) and (5). There always remain very few borderline significant coefficients here and there, not always the same from one specification to another. They do not tell a consistent story. They are not robust and might actually be picking up an occasional outlier. The only clear message is that the impact of legal families is always significantly smaller than that of transplant.

In view of the small sample size and of the fact that the restrictions imposed upon the model are highly non-linear, all standard deviations for our system estimates we also obtained from the MC simulations used for p-values. Table 9, which represents the system counterpart of Tables 6 and 7, reports the estimates of the coefficients of interest of our final model together with (MC) standard deviations (including for R^2's). The system results are quite similar to the OLS results in Tables 6 and 7. They are somewhat more accurate, in spite of the fact that the β's are no longer treated as given, because the system estimates take full advantage of all the cross-equation restrictions that are built into our final model. This similarity in results suggests that further investigations, e.g. under an extended data set sometime in the future, could usefully rely upon single equation least squares methods, using principal components for legality, though, most importantly, the full validation of such results does require system analysis (notwithstanding the fact that a system search such as the one summarized by Table 8 is far more informative than single equation searches. The final model estimated in Tables 6 and 7 and reestimated in Table 9 if the outcome of a full system search).

Finally, MC simulation enables us to cope with an additional problem which has not been mentioned anywhere until now, and results from the fact that the five legal variables are *truncated* at 1 (about 11% of the sample!). Though the legality aggregate $\beta'y$ is not as severely truncated—another good reason for using it—this finding begs the question of whether or not truncation might have (severely) biased our analysis. Several MC simulation runs under truncated distributions for the y's unambiguously indicate that this is not the case (fortunately because it really isn't feasible to estimate a five-dimensional truncated distribution from 49 data points!). Coefficient estimates are mildly biased especially in the legality reduced form equations, as to be expected, with no bias exceeding 10%. Similarly, some standard deviations are slightly upward biased. Most importantly, truncation has very little impact on the p-values reported in Table

9 and leaves all our key results fundamentally unaffected. (Variations of less than 10% in coefficient values are completely irrelevant in the context of our analysis.)

All together, we find that the full system analysis described in this section has brought unambiguously strong support to the conclusions reached earlier.

5.   Conclusions

We have shown that the way in which the law was initially transplanted is a more important determinant of legality than the supply of a particular legal family. Furthermore, the legal transplantation process has a large, albeit indirect, effect on economic development via its impact on legality. The policy implications of these findings have been discussed throughout the text, and will not be repeated here. What is important to note is that there are several open questions remaining. First, we have conducted our analysis using a sample of 49 countries. It is now critical to broaden the data set and check for the robustness of the transplant effect as well as the impact of legal families. As noted in section 5, we could employ our statistical techniques even if the data for the five legal proxies is incomplete. Secondly, as noted in the introduction, our model under-predicts the legality performance of transplant effect countries including Hong Kong, Taiwan, Singapore, Spain, and Portugal. Understanding just how these countries managed to reverse the transplant effect might provide lessons for the design of legal reform and is an area for future research.

References:

Baum, Harald, and Eiji Takahashi. 2000. "Commercial and Corporate Law in Japan: Legal and Economic Development after 1868". In Röhl, *A History of Law in Japan since 1868*. Leiden.

Berkowitz, Daniel, and Wei Li. 1999. "Tax Rights in Transition Economies: A Tragedy of the Commons". *Journal of Public Economics*:(in press).

Bernstein, Lisa. 1992. "Opting out of the Legal System: Extralegal Contractual Relations in the Diamond Industry". *Journal of Legal Studies* 21 (1):115-157.

Black, Bernard, Reinier Kraakman, and Anna Tarassova. 1999. Russian Privatization and Corporate Governance: What Went Wrong? Stanford: John M. Olin Program in Law and Economics.

Castles, Alex C. 1982. *An Australian Legal History*. Sydney: The Law Book Company Limited.

Coffee, John C., Jr. 1989. "The Mandatory/Enabling Balance in Corporate Law: An Essay on the Judicial Role". *Colombia Law Review* 89:1618-1691.

Coleman, James S:. 1990. *Foundations of Social Theory*. Cambridge, Mass: Harvard University Press.

David, Rene, and John E. Brierly. 1985. *Major Legal Systems in the Word Today*. London: Steven & Sons.

Ellickson, Robert C. 1991. *Order Without Law - How Neighbors Settle Disputes*. Cambridge, Ma: Harvard University Press.

Finer, S.E. 1997. *The History of Government From the Earliest Times*. Oxford: Oxford University Press.

Franks, Julian, and Oren Sussman. 1999. "Financial Innovations and Corporate Insolvency". *mimeo*.

Glendon, Mary Ann, Michael W. Gordon, and Christopher Osakwe. 1994. *Comparative Legal Traditions: Text, Material and Cases on the Civil and Common Law Traditions, with Special References to French, German, and English*. St. Paul, Minn.: West.

Grossmann, Herschel I., and Menseong Kim. 1995. "Swords or Plowshares? A Theory of the Security of Claims to Property". *Journal of Political Economy* 103 (December):1275-1288.

Hahm, Pyuong-choon. 1996a. "Korea's Initial Encounter with the Western Law 1866-1910". In Sang Hyun Song, *Korean Law in the Global Economy*. Seoul: Bak Young Sa Publishing Company.

Hahm, Pyong-choon. 1996b. "Korea's Initial Encounter with the Western Law, 1910-1948". In Sang Hyun Song, *Korean Law in the Global Economy*. Seoul: Bak Young Sa Publishing Company.

Haley, John Owen. 1991. *Authority Without Power*. New York, Oxford: Oxford University Press.

Hamilton, Gary G. 1998. "Culture and Organization in Taiwan's Market Economy". In Robert W. Hefner, *Market Cultures - Society and Morality in the New Asian Capitalism*. Boulder, Co.: Westview Press.

Hamilton, Gary G., and Robert C. Feenstra. 1997. "Varieties of Hierarchies and Markets". In Marco Orru, Nicole Woolsey Biggart and Gary G. Hamilton, *The Economic Organization of East Asian Capitalism*. Thousand Oaks, London, New Delhi: SAGE Publications.

Hendry, David F., and Jean-Francois Richard. 1989. "Recent Developments in the Theory of Encompassing". In Beranrd Cornet and Henry Tulkens, *Contributions to Operation Research and Economics*. Cambridge: MIT Press.

Hooker, M.B. 1975. *Legal Pluralism - An Introduction to Colonial and Neo-colonial Laws*. Oxford: Clarendon Press.

Hooker, M.B. 1978. *A Concise Legal History of South-East Asia*. Oxford: Clarendon Press.

Hooker, M. B. 1988. *Laws of South-East Asia - European Laws in South-East Asia*. I vols. Vol. II. Singapore: Butterworth.

Katz, Alan, ed. 1986. *Legal Traditions and Systems - An International Handbook*. New York, Westport, Conn., London: Greenwood Press.

Kirby, William. 1995. "China Unincorporated: Company Law and Business Enterprise in Twentieth-Century China". *The Journal of Asian Studies* 54 (1):43-63.

Knack, Stephen, and Philip Keefer. 1994. "Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures.". *Economics and Politics*.

Knapp, Viktor, ed. 1972. *National Reports*. Edited by Drobnig et al. Vol. 1, *International Encyclopedia of Comparative Law*. Tübingen: J.C.B. Mohr.

Kronman, Anthony T. 1985. "Contract Law and The State of Nature". *Journal of Law, Economics, & Organization* 1:5-32.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny. 1999. "The Quality of Government". *The Journal of Law, Economics & Organization* 15 (1):222-283.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny. 1997. "Legal Determinants of External Finance". *The Journal of Finance* LII (3):1131-1150.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny. 1998. "Law and Finance". *Journal of Political Economy* 106 (6):1113-1155.

Landes, David S. 1998. *The Wealth and Poverty of Nations*: W.W. Norton & Co.

Macaulay, Stewart. 1962. "Non-Contractual Relations in Business: A Preliminary Study". *American Sociological Review*:55-67.

Mann, Kristin, and Richard Robert. 1991. *Law in Colonial Africa*. Portsmouth, NH London, GB: Heinemann and James Currey.

Mauro, Paolo. 1995. "Corruption and Growth". *The Quartely Journal of Economics* CX (3):681-712.

Means, Robert Charles. 1980. *Underdevelopment and the Develpment of Law*. Chapel Hill: The University of North Carolina Press.

Milgrom, Paul R., Douglas C. North, and Barry W. Weingast. 1990. "The Role of Institutions in the Revival of Trade: The Law Merchant, Private Judges, and the Champagne Fairs.". *Economics and Politics.* 2 (1):1-23.

Mommsen, W.J., and J.A. de Moor. 1992. *European Expansion and Law*. Oxford, New York: St. Martin's Press.

Newman, Katherine S. 1983. *Law and Economic Organization: A Comparative Study of Preindustrial Societies*. Cambridge [Cambridgeshire]; New York: Cambridge University Press.

North, Douglass Cecil. 1981. *Structure and Change in Economic History*. 1st ed. ed. New York: Norton.

North, Douglass Cecil. 1990. *Institutions, Institutional Change, and Economic Performance*, *The Political Economy of Institutions and Decisions*. Cambridge; New York: Cambridge University Press.

North, Douglass C., and Barry R. Weingast. 1989. "Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century England". *The Journal of Economic History* XLIX (4):803-832.

Oda, Hiroshi. 1999. *Japanese Law*. 2 ed. London, Dublin, Edinburgh: Butterworths.

Pistor, Katharina , and Philip Wellons. 1999. *The Role of Law and Legal Institutions in Asian Economic Development*. Hong Kong: Oxford University Press.

Posner, Richard A. 1998. "Creating a Legal Framework for Economic Development". *The World Bank Research Observer* 13 (1):1-11.

Pound, Roscoe. 1911. "The Scope and Purpose of Sociological Jurisprudence". *Harvard Law Review* XXIV (8):591-619.

Roland, Gerard, and Thierry Verdier. 1999. "Law and Enforcement in Transition". *mimeo*.

Ross, Richard J. 1998. "The Commoning of the Common Law: The Renaissance Debate over Printing English Law, 1520-1640". *University of Pennsylvania Law Review* 146 (2):323-461.

Sachs, Jeffrey D., and Andrew Warner. 1995. Natural Resource Abundance and Economic Growth. Cambridge: National Bureau of Economic Research.

Shleifer, Andrei, and Robert J. Vishny. 1993. "Corruption". *Quarterly Journal of Economics* CIX:599-618.

Skaperdas, Stergios. 1999. "Cooperation, Conflict, and Poser in the Absence of Property Rights". *American Economic Review* 82 (September):720-739.

Smith, Adam. 1976. *The Wealth of Nations*. Chicago: University of Chicago Press.

Stein, Peter. 1999. *Roman Law in European History*. Cambridge: Cambridge University Press.

Sunstein, Cass R. 1996. "Social Norms and Social Roles". *Colombia Law Review* 96:903-968.

Wang, Tay-sheng. 1997. Legal Reform in Taiwan under Japanese Colonial Rule (1895-1945), Law School, University of Washington, Ann Arbor, Mich.

Watson, Alan. 1974. *Legal Transplants: An Approach to Comparative Law*. Edinburgh: Scottish Academic Press; London: distributed by Chatto and Windus.

Williamson, Oliver E. 1985. *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*. New York: Free Press; London: Collier Macmillan.

Yadin, U. 1962. "Reception and Rejection of English Law in Israel". *International and Comparative Law Quarterly* 20 (January):59-72.

Zweigert, Konrad, and Hein Kötz. 1998. *Introduction to Comparative Law*. 3 ed. Oxford: Clarendon Press.

Figure 1: Economic Development and Legality
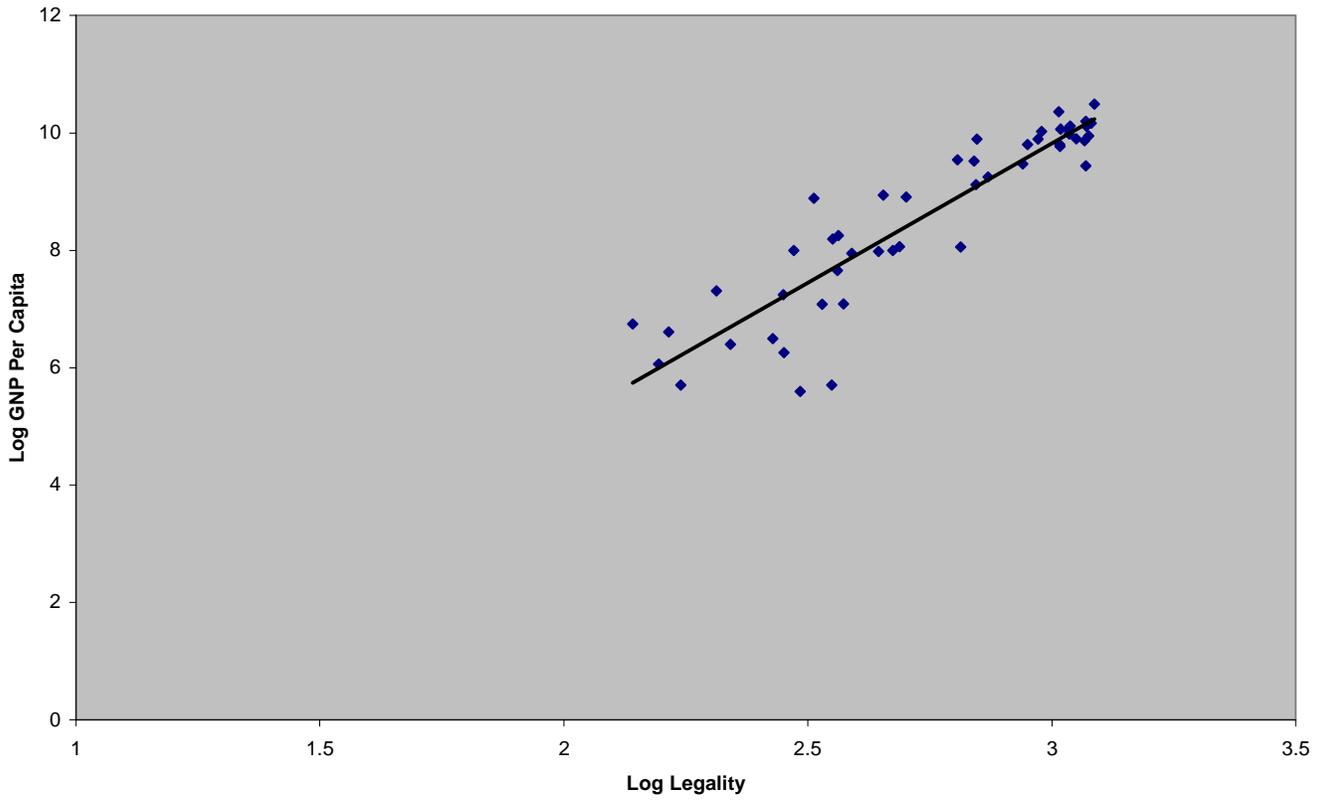
Box 1 **Definitions of Terms and Concepts**	
Legal Family	Formal legal systems the major features of which can be traced to a common source. The four major legal families in the world that are commonly distinguished are the English common law, the French, the German, and the Scandinavian legal families.
Origin	Country that developed its formal legal system internally.
Transplant	Country that received major features of its legal system from another country.
Direct transplant	Country that received its formal legal system from an origin country.
Indirect transplant	Country that received its formal legal system from another transplant.
Voluntary transplant	Country that made an active decision to copy the formal legal system of another country.
Involuntary transplant	Country on which the formal legal system of another country was imposed.
Transplant with adaptation	A transplant that introduces changes into the law to take account of local conditions, including preexisting law.
Transplant with familiarity	A transplant with a significant share of the population that is familiar with the transplanted legal concepts as a result of a shared history or sizeable immigrant population.
Receptive transplant	A transplant with adaptation and/or familiarity.
Unreceptive transplant	A transplant without adaptation and/or familiarity.

	Table 1: Origins		
Country	Legal formation period	Formal law source	Legal family
Austria	1811-1862	Austria enacts a comprehensive civil code in 1811. It is an idiosyncratic codification based on the Roman/Germanic tradition. The 1862 general German commercial code reflects existing business practice as well as French influence.	German
Denmark	1815-1905	Early codification of customary law. Series of statutory enactments during the 19th century. Legal borrowing is limited primarily to other Scandinavian countries.	Scandinavian
Finland	1809-1917	Legal development throughout 19th century slowed down due to annexation by Russia. After declaration of independence in 1917 legal reforms based primarily on Scandinavian models.	Scandinavian
France	1804-1811	Promulgation of the five Napoleonic Codes, including the Code civil, the Code of Civil Procedure, the Code of Commerce, the Code of Criminal Procedure, and the Penal Code. Codes consolidate legislation enacted prior to the revolution and codify business practice.	French
Germany	1862-1900	Extensive codification after unification in 1871. Most influential is the 1896 civil code based on Roman legal principles with some references to Germanic law. Earlier enactment of commercial code (1862) codifies existing business practice.	German
Norway	1814-1915	Until 1814 part of Denmark. Statutory enactments during the 19th century based draw on common legal heritage and enactments in neighboring Scandinavian countries.	Scandinavian
Sweden	1734-1905	Codification of customary law in 1734 (some Roman and canon law influences). In the 19th century parts of the code are replaced with new statutes.	Scandinavian
Switzerland	1881-1907	Codification of commercial and civil law. In comparison to Germany less influence of Roman law. Codification of Swiss business practice, with some borrowing from French and Austrian laws that had earlier been enacted in parts of the country	German
United Kingdom	1485-1832	The development of English common law begins with the Norman conquest in 1066. Local customary law completely replaced since mid 15th century. Increasing importance of statutory law since the 19th century, but case law continues to dominate.	English
United States	1774-1820	In 1774, the first continental congress passes resolution that Americans are entitled to the common law and statutes that existed at the time of English colonization. Since independence development of a body of formal law that is independent of the legal system that is operating in England.	English

Table 2a
Law on the Books
Categorical Means for Legal Families
(Standard Deviations in Parentheses)

Category	Observations[a]	Shareholder Rights	Creditor Rights
English	18/19	4.00 (.970)	3.11 (1.231)
French	21/19	2.33 (1.197)	1.58 (1.346)
German	6/6	2.33 (1.033)	2.33 (.816)
Scandinavian	4/4	3.00 (.816)	2.00 (.816)
Sample Average	49/47	3.00 (1.307)	2.30 (1.366)

Differences in Means
(P-values for the hypothesis that these differences equal zero are in parentheses)[b]

English-French	1.67 (.000)*	1.53 (.001)*
English-German	1.67 (.008)*	.78 (.101)***
English-Scandinavian	1.00 (.085)***	1.11 (.065)***
French-German	0.00 (1.000)	-.75 (.119)
French-Scandinavian	-.67 (.220)	-.42 (.438)
German-Scandinavian	-.67 (.291)	.33 (.548)

[a]Shareholder rights are on the left-hand side; creditor rights are on the right-hand side.
[b]A two-sided two-sample t test with unequal variances is performed.
*Significant at the 1 percent level.
**Significant at the 5 percent level.
*** Significant at the 10 percent level.

Table 2b
Law on the Books
Categorical Means for Origins and Transplants
(Standard Deviations in Parentheses)

Category	Observations*	Shareholder Rights	Creditor Rights
Origin	10/10	3.00 (1.333)	2.00 (1.247)
Transplant	39/37	3.00 (1.318)	2.38 (1.401)
Transplant Types:			
Receptive— Direct	9/9	3.00 (1.658)	2.13 (1.000)
Receptive— Indirect	2/2	4.5 (.707)	1.50 (.707)
Unreceptive— Direct	17/16	3.29 (1.263)	3.19 (1.109)
Unreceptive— Indirect	11/10	2.27 (.786)	1.60 (1.647)
Sample Average	49/47	3.00 (1.307)	2.30 (1.366)

Differences in Means
(P-values for the hypothesis that these differences equal zero are in parentheses)[b]

Origin-Transplant	0.00 (1.000)	-.38 (.420)
Origin-(Receptive-Direct)	0.00 (1.000)	0.000 (1.000)
Origin-(Receptive-Indirect)	-1.50 (.1128)	.50 (.499)
Origin-(Unreceptive-Direct)	-.29 (.579)	-1.19 (0.024)**
Origin-(Unreceptive-Indirect)	.73 (.155)	.40 (.549)
(Receptive-Direct)-(Receptive-Indirect)	-1.50 (.112)	.50 (.492)
(Receptive-Direct)-(Unreceptive-Direct)	-0.29 (.649)	-1.19 (.013)*
(Receptive-Direct)-(Unreceptive-Indirect)	0.73 (.252)	0.40 (.527)
(Receptive-Indirect)-(Unreceptive-Direct)	1.21 (.184)	-1.69 (.119)
(Receptive-Indirect)-(Unreceptive-Indirect)	2.23 (.090)***	-.10 (.897)
(Unreceptive-Direct)-(Unreceptive-Indirect)	1.02* (0.014)	1.59 (.018)**

[a]Shareholder rights are on the left-hand side; creditor rights are on the right-hand side.
[b]A two-sided two-sample t test with unequal variances is performed.
*Significant at the 1 percent level.
**Significant at the 5 percent level.
***Significant at the 10 percent level.

Table 3: Receptive and Unreceptive Transplants						
Country		Initial Transmission and Receptivity of Law				
	Transplanting Period	Transmission		Receptivity		Transplant Type
		Voluntary	Involuntary	Adaptation	Familiarity	
Australia	1808-1873	0	1	0	1	receptive
Belgium	1810-1887	1	0	0	1	receptive
Canada	1810-1830	0	1	0	1	receptive
Ireland	1769-1801	0	1	0	1	receptive
Israel	1858-1945	0	1	1	0	receptive
Italy	1805-1870	1	0	1	1	receptive
Japan	1868-1899	1	0	1	0	receptive
Netherlands	1810-1838	1	0	1	1	receptive
New Zealand	1840-1900	0	1	0	1	receptive
Argentina	1862-1880	1	0	1	1	receptive
Chile	1854-1880	1	0	1	0	receptive
Brazil	1808-1865	1	0	0	0	unreceptive
Colombia	1821-1853	1	0	0	0	unreceptive
Ecuador	1831-1881	1	0	0	0	unreceptive
Egypt	1798-1840	1	0	0	0	unreceptive
Greece	1821-1878	1	0	0	0	unreceptive
Hong Kong	1844-1898	0	1	0	0	unreceptive
India	1858-1888	0	1	0	0	unreceptive
Indonesia	1815-1870	0	1	0	0	unreceptive
Jordan	1850-1918	1	0	0	0	unreceptive
Kenya	1895-1918	0	1	0	0	unreceptive
Malaysia	1867-1937	0	1	0	0	unreceptive
Mexico	1821-1889	1	0	0	0	unreceptive
Nigeria	1863-1915	0	1	0	0	unreceptive
Pakistan	1858-1888	0	1	0	0	unreceptive
Peru	1811-1853	1	0	0	0	unreceptive
Philippines	1889-1898	0	1	0	0	unreceptive
Portugal	1808-1867	1	0	0	0	unreceptive
Singapore	1858-1895	0	1	0	0	unreceptive
South Africa	1815-1865	0	1	0	0	unreceptive
South Korea	1912-1945	0	1	0	0	unreceptive
Spain	1808-1829	1	0	0	0	unreceptive
Sri Lanka	1796-1861	0	1	0	0	unreceptive
Taiwan	1895-1945	0	1	0	0	unreceptive
Thailand	1908-1935	1	0	0	0	unreceptive
Turkey	1850-1927	1	0	0	0	unreceptive
Uruguay	1878-1900	1	0	0	0	unreceptive
Venezuela	1811-1873	1	0	0	0	unreceptive
Zimbabwe	1888-1923	0	1	0	0	unreceptive

		Table 4: Transplants	
Country	Transplanting period	Country/countries that transplant the Law	Legal family
		Receptive-direct transplants	
Australia	1808-1873	English common law (origin) is the main source of law. Australia was considered a "settled colony", where the settlers took the law of England with them. Major migration by free settlers from England in early 19th century.	English
Belgium	1810-1887	French law (origin) is the main source of law. French law is introduced in 1810 during Napoleonic wars. Independence of low countries in 1815, but codes remain in place. Independent Belgium (since 1830) enacts national codification based on French model.	French
Canada	1810-1830	English common law (origin) is the main source of law. Trading companies and settlers from England and the United States import English law.	English
Ireland	1769-1801	English common law (origin) is the main source of law. English law was introduced in Ireland after the Norman conquest. By the mid 17the century it had replaced the native Irish law.	English
Israel	1858-1945	English common law (origin) is the main source of law. Modern codes based on French model introduced in the Ottoman empire in second half of 19th century. Since 1922 British mandate; migration from Europe. Ottoman law still binding, but basic principles of English common law (excluding statutory law) introduced.	French/English[16]
Italy	1805-1870	French law (origin) is main source of law. French rule since 1796; in 1805 Napoleon becomes King of Italy and introduces French codes. National codification only after Italy is unified, but individual states enact codes based on French law.	French
Japan	1868-1899	German law (origin) is main source of law. Under foreign pressure, the Meji restoration launches the formalization of the Japanese legal system based on foreign models. Earlier drafts of the commercial code are based on French law. For the final versions of the civil and commercial law, German law is most influential.	German
Netherlands	1810-1838	French law (origin) is the main source of law. French codes are introduced in 1810 during annexation by France. After 1815 the laws remain in force on a preliminary basis and are replaced in 1838 by Dutch codification based on French law.	French
New Zealand	1840-1900	English common law (origin) is the main source of law. In 1840 Britain officially takes possession of the country. Legal transplant through migration.	English

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[16] La Porta et al. (1998) code Israel as belonging to the English common law family.

Table 4: Transplants (continued)			
Receptive-indirect Transplants			
Argentina	1862-1880	Spanish, Portuguese, Brazilian, Dutch (transplants) and French law (origin) are important sources of law. Argentina asserts autonomy in 1810 and declares independence in 1816. 1862 extensive legal reforms, including the enactment of civil, commercial, civil procedure laws.	French
Chile	1854-1880	Spanish (transplant), French (origin) law and legal practice are major sources of the law. Independence from Spanish rule in 1811. Legal reforms in the second half of the 19th century, including the enactment of a commercial code in 1854.	French
Unreceptive-direct transplants			
Egypt	1798-1840	French law (origin) is main source of law. Under French occupation from 1796-1807 courts are established, but legal reform remains incomplete. During the 19th century French law is applied to cases involving foreign parties. Textbooks and translations of French law into Arabic serve as primarily sources of this law.	French
Greece	1821-1878	French law (origin) is main source of law. After independence, Byzantine law is introduced in 1821. Translations of French codes in the 19th century influences commercial law. Statutory enactments during 19th century draw primarily on French, but also on German and Austrian law.	French
Hong Kong	1844-1898	English common law (origin) is main source of law. Ordinance of 1844 declares law of England applicable to colony except where local circumstances render this inappropriate.	French
India	1858-1888	English common law (origin) is the main source of law. Establishment of British Raj in 1858. Jurisdiction of English law over local population gradually expanded. In 1862 all existing courts in India are replaced with English courts.	English
Jordan	1850-1918	French law (origin) is main source of law. As part of the Ottoman empire, Jordan received French law in the mid 19th century.	French
Kenya	1895-1918	English common law (origin) is main source of law. Since 1895 British protectorate. The laws in force in England at that date are made applicable in the colony, and codifications of common law that were earlier used in India are introduced.	English

Table 4: Transplants (continued)			
Unreceptive-direct transplants			
Malaysia	1867-1937	English common law (origin) is main source of law. in 1867, London's colonial office assumes direct control over "Straits Settlements". English law applied primarily to criminal and commercial (not family, inheritance) matters.	English
Nigeria	1863-1915	English common law (origin) is main source of law. Cession of Lagos in 1863 and establishment of British rule. Courts with jurisdiction over British subjects established. Codified common law introduced, including 1912 companies ordinance.	English
Pakistan	1858-1888	English common law (origin) is main source of law. Establishment of British Raj (including India, Pakistan, and Bangladesh). See comments for India.	English
Portugal	1808-1867	French law (origin) is main source of law. First introduction of the French codes in 1808 during the Napoleonic invasion. New civil code promulgated in 1867, new Commercial Code in 1888.	French
Singapore	1858-1895	English common law (origin) is main source of law. In 1819 Singapore is founded as part of the Strait Settlements. English law applies to settlers and local population in criminal and commercial matters.	English
South Africa	1815 -1865	England (origin) and Roman-Dutch common law are the main sources of law. British takeover of former Dutch colony in 1815. English law applied to court organization, judicial procedure, and administration.	English[17]
Spain	1808-1829	French law (origin) is main source of law. Introduction of the French codes in 1808 during the Napoleonic invasion. New civil code based on French model introduced in 1829; law on joint stock companies in 1848, and a revised code of civil procedure in 1881.	French
Sri Lanka	1796-1861	English common law (origin) is the main source of law. British take over former Dutch colony. Roman-Dutch law continues to apply, but the establishment of common law courts after 1801 fosters the development of English common law.	English
Thailand	1908-1935	French law (origin) is main source of law. Only country in SE Asia that escaped colonization. Set of codes produced under King Chulalongkorn with the help of French and Belgian advisors.	French (English ?)[18]

[17] Because of the influence of Roman-Dutch law, South Africa is sometimes classified as a mixed jurisdiction. In mixed jurisdictions, common law was introduced after earlier transplants had established a civil law systems. Other mixed jurisdictions include Israel, the Philippines, and Sri Lanka.
[18] Note that La Porta et al. (1998) code Thailand as belonging to the English legal family.

Table 4: Transplants (continued)			
Unreceptive-direct transplants			
Turkey	1850-1927	French (origin) and subsequently Swiss law (origin) are the main sources of law. The Ottoman empire introduces legislation based on French law in mid 19th century. Under Kemal Atatürk Turkey copies Swiss codes.	French/German[19]
Zimbabwe	1888-1923	English common law (origin) is main source of law. In 1888 charter issued by and English law made applicable by decree.	English
Unreceptive-indirect transplants			
Brazil	1808-1865	Spanish (transplant) and French (origin) law are main sources of law. 1822 Brazil achieves independence from Portugal. Imperial Portuguese law remains in force. Legal modernization in mid 19th century.	French
Colombia	1821-1853	Spanish law (transplant) is main source of law. Major codification enacted in mid 19th century based on Spanish models of 1829. Subsequent revisions based on Chilean law.	French
Ecuador	1831-1881	Spanish (transplant) and Venezuelan l(transplant) laws are main sources of law. Since 1830 independent state. In 1831, the Spanish code is made directly applicable in Ecuador. The 1882 commercial code is based on the Venezuelan codification. Procedural law governed by Spanish law.	French
Indonesia	1815-1870	Dutch law (transplant) is main source of law. Local (adat) law applies to indigenous population. Dutch law governs colonial population.	French
Mexico	1821-1889	Spanish (transplant) and French (origin) law are main sources of the law. Spanish imperial laws remain in force until replaced by new codifications. 1854 commercial code based on Spanish and French models; 1889 revision also incorporates elements of Italian law. Civil procedure modeled on Spanish law. 1870 comprehensive civil code based on various models.	French
Peru	1811–1853	Spanish law (transplant) is main source of law. Legal reforms in mid 19th century copy Spanish codes of 1829.	French
Philippines	1889-1898	Spanish law (transplant) is main source of law. Spanish colony since 1565. Codifications in the late 19 hundreds are based Spanish codes of 1829. Amendments and introduction of new procedural rules when sovereignty over the Philippines is transferred to the US in 1898, but character of legal system remains unchanged.	French

[19] LLSV 1998 code Turkey as French, because of the Ottoman heritage.

Table 4: Transplants (continued)			
Unreceptive-indirect transplants			
South Korea	1912-1945	Japanese law (transplant) is main source of law. Korea is colonized by Japan in 1912 and Japanese codes of the Meji restoration are enacted.	German
Taiwan	1895-1945	Japanese law (transplant) is main source of law. The island of Taiwan becomes Japanese colony and Japanese codes of the Meji restoration are introduced.	German
Uruguay	1878-1900	The law of Argentina (transplant) is main source of law. Modernization of legal system since 1865; codes are based on Argentinean and Bolivian law models.	French
Venezuela	1811-1873	Chilean law (transplant) is main source of law. Venezuela becomes independent in 1811. Spanish imperial laws remain in force. In 1862 civil and commercial codes enacted based on Chilean model.	French

Sources: Baum and Takahashi (2000); Castles (1982); David (1985); Glendon, Gordon, and Osakwe (1994); Hahm (1996); Hooker (1978); Hooker (1988); (Knapp (1972) (various country reports); Katz (1986); Means (1980); Merryman, Clark, and Haley (1994); Mommsen and Moor (1992); Oda (1999); Pistor and Wellons (1999);Wang (1997)Yadin (1962); Zweigert and Kötz (1998).

Table 5
Ordinary Least Square Regressions
Determinants of Legality and Economic Development

Independent Variables	Dependent Variables						
	Efficiency of Judiciary System	Rule of Law	Corruption	Risk of Expropriation	Risk of Contract Repudiation	Legality	Log GNP Per Capita
Receptive— Direct	.054 (.7953)	-0.70 (1.0007)	-0.43 (.8093)	.019 (.5581)	.086 (.6413)	-.002 (1.3949)	.099 (.5572)
Receptive— Indirect	-2.078*** (1.2407)	-3.012*** (1.5612)	-2.966** (1.2625)	-2.766* (.8706)	-2.970* (1.0004)	-6.132* (2.1761)	-1.467*** (.8692)
Unreceptive— Direct	-2.440* (.7616)	-3.403* (.9580)	-2.820* (.7748)	-2.209* (.5343)	-2.187* (.6139)	-5.918* (1.3354)	-2.046* (.5334)
Unreceptive— Indirect	-2.941* (.7916)	-4.382* (.9961)	-3.950* (.8055)	-2.600* (.5555)	-2.553* (.6383)	-7.518* (1.3354)	-2.282* (.5546)
French	-.926*** (.5410)	.633 (.6807)	-.173 (.5505)	.213 (.3796)	.105 (.4362)	.056 (.9488)	.541 (.3790)
German	-.116 (.7793)	1.589 (.9805)	.553 (.7930)	1.051*** (.5468)	1.582** (.6284)	2.144 (1.3668)	1.207** (.5460)
Scandinavian	.371 (1.0117)	1.437 (1.2730)	1.201 (1.0295)	.398 (.7100)	.718 (.8158)	1.993 (1.7744)	.687 (.7088)
Intercept	9.629* (.7234)	8.563* (.9103)	8.800* (.7361)	9.257* (.5076)	8.720* (.5833)	19.584* (1.2688)	9.399* (.5068)
Adjusted R^2	.5242	.5417	.6049	.6092	.5919	.6702	.5601
F Test: French = 0, German = 0, Scandinavian = 0	1.25	.97	.67	1.28	2.40	1.08	1.72
Probability > F	.3044	.4153	.5782	.2937	.0818	.3685	.1770
F Test: Receptive-Indirect=0, Unreceptive-Direct=0, Unreceptive-Indirect=0	4.99	6.78	8.13	8.13	6.12	10.22	6.57
Probability > F	.0048	.0008	.0002	.0002	.0015	.0000	.0010
F Test: Receptive-Indirect= Unreceptive-Direct= Unreceptive-Indirect= Transplant effect	.49	.98	1.59	.48	.48	1.07	.60
Probability > F	.6186	.3850	.2164	.6216	.6207	.3520	.5559

NOTE: Standard errors are reported in the parentheses. The origin dummy and English dummy variables are normalized at zero.
*Significant at the 1 percent level. **Significant at the 5 percent level. *** Significant at the 10 percent level.

Table 6 Reduced Form for Legality and Economic Development

Explanatory Variables	Dependent Variables			
	Legality		Log of GNP Per Capita	
Transplant effect	-6.589* (.8038)	-6.603* (.7838)	-2.284* (.3060)	-2.388* (.2918)
French			.435 (.3110)	
German	1.702 (1.1146)		.958** (.4501)	
Scandinavian	1.862 (1.4060)			
French & German				.572* (.2537)
German & Scandinavian		1.759*** (.9476)		
Intercept	19.716* (.6971)	19.725* (.6829)	9.665* (.2574)	9.717* (.12537)
Adjusted R^2	.6805	.6874	.5776	.5756
F Test: French = German			1.22	
Probability > F			.2745	
F Test: German = Scandinavian	.01			
Probability > F	.9211			
F Test: Against Specification in Table 5		.52		.68
Probability > F		.7582		.6438

Table 7: Regressions for Legality and Economic Development

	Dependent Variables			
	Log of GNP Per Capita		Legality	
Transplant effect	-.077 (.2893)		-1.970* (.6706)	-2.087* (.6649)
French & German	.657* (.1664)	.651* (.1598)	-1.519* (.4337)	-1.473* (.4333)
German & Scandinavian	-.020 (.2302)		.654 (.5746)	
Legality	.323* (.0342)	.329* (.0186)		
Log of GNP Per Capita			2.074* (.2191)	2.129* (.2144)
Intercept	3.072* (.6994)	2.926* (.3365)	.175 (2.1243)	-.118 (2.1155)
Adjusted R^2	.8610	.8668	.8934	.8927

Note: Standard errors are reported in the parentheses. A Transplant effect includes receptive—direct transplants and both unreceptive transplants.
*Significant at the 1 percent level.
**Significant at the 5 percent level.
*** Significant at the 10 percent level

Table 8: Model specification search; p-values

	(1)	(2)	(3)	(4)	(5)
(A)	G: 0.491 V: 0.054 H: 0.824	G: 0.201 V: 0.106 H: 0.868	G: 0.112 V:0.122 H: 0.211	G: 0.146 V:0.123 H: 0.296	G: 0.157 V:0.120
(B)	G: 0.766 V:0.443 H: 0.941	G: 0.354 V:0.097 H: 0.983	G: 0.200 V:0.098 H: 0.213	G: 0.306 V:0.142 H: 0.294	G: 0.339 V:0.200
(C)	G: 0.927 V:0.614 H: 0.711	G: 0.880 V:0.442 H: 0.983	G: 0.641 V:0.438 H: 0.286	G: 0.672 V:0.557 H: 0.726	G: 0.565 V:0.565
(D)	G: 0.917 V:0.579	G: 0.987 V:0.980	G: 0.796 V:0.540	G: 0.896 V:0.896	Final Model

p – values

G: against final model (lower/right corner);

V: against model immediately below:

H: against model immediately to the right;

Rows: rank restrictions;

A: No rank restrictions;

B: No rank restrictions; $b'y$ in (9.2) proportional to principal component;

C: H_a and H_b;

D: H_a, H_b and H_c

Columns: exclusion restrictions

1: All x's in (9.1) and (9.2):

2: French, German, Scandinavian, transplant effect in (9.1) and (9.2);

3: same for (9.1); only French + German in (9.2);

4: same for (9.2); German, Scandinavian, transplant effect in (9.1);

5: same for (9.2); German + Scandinavian, transplant effect in (9.1);

Table 9: Full Information Results

Part 1	Reduced Form		Regressions	
	Legality	lngnp/cap	Legality	lngnp/cap
Transplant	-6.617 (0.763)	-2.176 (0.281)	-2.158 (0.530)	---
French + German	---	0.6636 (0.1524)	-1.360 (0.333)	0.6636 (0.1524)
German + Scan.	1.742 (0.928)	0.5729 (0.3080)	0.5691 (0.3365)	---
Legality	---	---	---	0.8786 (0.0301)
Engrp/cap	---	---	2.052 (0.205)	---
Intercept	19.73 (0.69)	9.423 (0.251)	0.4023 (1.935)	2.934 (0.338)
R^2	0.7151 (0.0572)	0.6259 (0.0580)	0.9091 (0.0193)	0.8986 (0.0301)

Note: Columns (1) and (4) are directly estimated. Columns (2) and (3) are derived from identities (11) and (12).

Part 2	Beta Coefficients			
Efficiency of Legal System	Rule of Law	Corruption	Risk of Expropriation	Risk of Contract Repudiation
0.3766 (0.0431)	0.5735 (0.0287)	0.5037 (0.0252)	0.3682 (0.0183)	0.3874 (0.0232)

Country	Efficiency of Judiciary System	Rule of Law	Corruption	Risk of Expropriation	Risk of Contract Repudiation	Legality*	GNP Per Capita (U.S. $)
Australia	10.00	10.00	8.52	9.27	8.71	20.44	17500
Canada	9.25	10.00	10.00	9.67	8.96	21.13	19970
Hong Kong	10.00	8.22	8.52	8.29	8.82	19.11	18060
India	8.00	4.17	4.58	7.75	6.11	12.80	300
Ireland	8.75	7.80	8.52	9.67	8.96	18.92	13000
Israel	10.00	4.82	8.33	8.25	7.54	16.54	13920
Kenya	5.75	5.42	4.82	5.98	5.66	12.00	270
Malaysia	9.00	6.78	7.38	7.95	7.43	16.67	3140
New Zealand	10.00	10.00	10.00	9.69	9.29	21.55	12600
Nigeria	7.25	2.73	3.03	5.33	4.36	9.39	300
Pakistan	5.00	3.03	2.98	5.62	4.87	8.98	430
Singapore	10.00	8.57	8.22	9.30	8.86	19.53	19850
South Africa	6.00	4.42	8.92	6.88	7.27	14.51	2980
Sri Lanka	7.00	1.90	5.00	6.05	5.25	10.40	600
Thailand	3.25	6.25	5.18	7.42	7.57	12.94	2110
United Kingdom	10.00	8.57	9.10	9.71	9.63	20.41	18060
United States	10.00	10.00	8.63	9.98	9.00	20.85	24740
Zimbabwe	7.50	3.68	5.42	5.61	5.04	11.59	520
Argentina	6.00	5.35	6.02	5.91	4.91	12.34	7220
Belgium	9.50	10.00	8.82	9.63	9.48	20.82	21650
Brazil	5.75	6.32	6.32	7.62	6.30	14.09	2930
Chile	7.25	7.02	5.30	7.50	6.80	14.70	3170
Colombia	7.25	2.08	5.00	6.95	7.01	11.58	1400
Ecuador	6.25	6.67	5.18	6.57	5.18	13.11	1200
Egypt	6.50	4.17	3.87	6.30	6.05	11.34	660
France	8.00	8.98	9.05	9.65	9.19	19.67	22490
Greece	7.00	6.18	7.27	7.12	6.62	14.91	7390
Indonesia	2.50	3.98	2.15	7.16	6.09	9.16	740
Italy	6.75	8.33	6.13	9.35	9.17	17.23	19840
Jordan	8.66	4.35	5.48	6.07	4.86	12.54	1190
Mexico	6.00	5.35	4.77	7.29	6.55	12.82	3610
Netherlands	10.00	10.00	10.00	9.98	9.35	21.67	20950
Peru	6.75	2.50	4.70	5.54	4.68	10.10	1490
Philippines	4.75	2.73	2.92	5.22	4.80	8.51	850
Portugal	5.50	8.68	7.38	8.90	8.57	17.20	9130
Spain	6.25	7.80	7.38	9.52	8.40	17.13	13590
Turkey	4.00	5.18	5.18	7.00	5.95	11.84	2970
Uruguay	6.50	5.00	5.00	6.58	7.29	12.96	3830
Venezuela	6.50	6.37	4.70	6.89	6.30	13.33	2840
Austria	9.50	10.00	8.57	9.69	9.60	20.76	23510
Germany	9.00	9.23	8.93	9.90	9.77	20.44	23560
Japan	10.00	8.98	8.52	9.67	9.69	20.36	31490
South Korea	6.00	0.00	5.30	8.31	8.59	14.23	7660
Switzerland	10.00	10.00	10.00	9.98	9.98	21.91	35760
Taiwan	6.75	8.52	6.85	9.12	9.16	17.62	10425
Denmark	10.00	10.00	10.00	9.67	9.31	21.55	26730
Finland	10.00	10.00	10.00	9.67	9.15	21.49	19300
Norway	10.00	10.00	10.00	9.88	9.71	21.78	25970
Sweden	10.00	10.00	10.00	9.40	9.58	21.56	24740

*Legality is derived from a principal components analysis of the covariance matrix from the five observed legality variables. Because the first component accounts for 84.6% of the variance, we use its eigenvector as weights:

Legality = .381* (Efficiency of the Judiciary) + .5778* (Rule of Law) + .5031* (Corruption) + .3468* (Risk of Expropriation) + .3842* (Risk of Contract Repudiation)

Summary Statistics	Efficiency of Judiciary System	Rule of Law	Corruption	Risk of Expropriation	Risk of Contract Repudiation	Legality	GNP Per Capita (U.S. $)
Appendix Table 2: Legality and Economic Development							
Average	7.67	6.74	6.90	8.05	7.58	16.05	11156
Median	7.25	6.78	7.27	8.25	7.57	16.54	7660
Standard Deviation	2.05	2.80	2.29	1.59	1.79	4.32	10190
Minimum	2.50	0.00	2.15	5.22	4.36	8.51	270
Maximum	10.00	10.00	10.00	9.98	9.98	21.91	35760
Correlation Coefficients							
Efficiency of Judiciary	1.000						
Rule of Law	0.643	1.000					
Corruption	0.793	0.848	1.000				
Risk of Expropriation	0.656	0.910	0.845	1.000			
Contract Repudiation	0.635	0.880	0.841	0.961	1.000		
Legality	0.803	0.950	0.949	0.944	0.930	1.000	
GNP Per Capita	0.738	0.853	0.839	0.871	0.871	0.906	1.000

Analysis of Covariance Matrix for the Five Legality Proxies	
Eigenvalues	.1829, .0204, .0062, .0057, .00095
Share of Variance Captured in Maximum Eigenvalue*	84.6%
Condition of the Covariance Matrix**	192.5

*This is maximum eigenvalue divided by the sum of all five eigenvalues.

**This is maximum eigenvalue divided by the minimum eigenvalue.