

## **‘LAW AND FINANCE’ REVISITED**

by

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Abstract: The Antidirector Rights Index has been used as a measure of shareholder protection in over 100 articles. A thorough reexamination of the legal data, however, leads to corrections for 33 of 46 countries. The correlation of corrected and original values is only .53. Consequently, many empirical results established with the original index may not be replicable with corrected values. For example, the corrected index does not bear out widely influential claims that shareholder protection is higher in common than in civil law countries, or that shareholder protection predicts market size, ownership dispersion, or resilience to financial crises. At least some of these results cannot be salvaged with other indices either. In particular, no other index provides evidence for the postulated link between shareholder protection and ownership dispersion.

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In their seminal article “Law and Finance” (1998), La Porta, Lopez-de-Silanes, Shleifer (LLS) and Vishny (LLSV) introduced a now famous index of six shareholder protection rules in 49 countries, the “Anti-Director Rights Index” (“original ADRI”).<sup>1</sup> Widely influential results for the original ADRI indicated that common law countries provide stronger investor protection than civil law countries (LLSV 1998), and that stronger investor protection is associated with greater ownership dispersion in listed firms (LLSV 1998; LLS 1999) and larger capital markets (LLSV 1997). Subsequently, well over 100 published empirical papers used the original ADRI.<sup>2</sup> Even though alternative indices are

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<sup>1</sup> LLSV (1998, table 1) define the ADRI as the sum of:

“Proxy by mail allowed”: Equals one if the company law or commercial code allows shareholders to mail their proxy vote to the firm, and zero otherwise.

Shares not blocked before meeting: Equals one if the company law or commercial code does not allow firms to require that shareholders deposit their shares prior to a general shareholders meeting, thus preventing them from selling those shares for a number of days, and zero otherwise.

Cumulative voting or proportional representation: Equals one if the company law or commercial code allows shareholders to cast all their votes for one candidate standing for election to the board of directors (cumulative voting) or if the company law or commercial code allows a mechanism of proportional representation in the board by which minority interests may name a proportional number of directors to the board, and zero otherwise.

Oppressed minorities mechanism: Equals one if the company law or commercial code grants minority shareholders either a judicial venue to challenge the decisions of management or of the assembly or the right to step out of the company by requiring the company to purchase their shares when they object to certain fundamental changes, such as mergers, asset dispositions, and changes in the articles of incorporation. The variable equals zero otherwise. Minority shareholders are defined as those shareholders who own 10% of share capital or less.

Preemptive rights to new issues: Equals one when the company law or commercial code grants shareholders the first opportunity to buy new issues of stock, and this right can be waived only by a shareholders’ vote; equals zero otherwise.

Percentage of share capital to call an extraordinary shareholders’ meeting: The minimum percentage of ownership of share capital that entitles a shareholder to call for an extraordinary shareholders’ meeting ... is less than or equal to 10 percent (the sample median).”

<sup>2</sup> This number is based on a review of the over 600 papers citing LLSV (1998) according to the Social Science Citation Index as of October 10, 2008, in the subject categories “economics” and “business, finance”. For example, the ADRI has been used as the main variable, or one of the main variables, to establish connections between legal investor protection and firm valuation (LLSV 2002; Pinkowitz, Stulz, and Williamson 2006), stock price informativeness (Morck, Yeung, and Yu 2000), efficient capital allocation (Wurgler 2000), voting premia (Nenova 2003), firm-level corporate governance mechanisms (Durnev and Kim 2005), earnings management (Leuz, Nanda, and Wysocki 2003), cash holdings (Kalcheva and Lins 2007), dividend policy (LLSV 2000), and the depth of financial crises (Johnson et al. 2000), as well as to test the bonding hypothesis for cross-listing decisions (Doidge 2004; Reese and Weisbach 2002). Beyond corporate finance, it has also been used, inter alia, as an instrument to show the real effects of financial integration (Imbs 2006; Bekaert, Harvey, and Lundblad 2005) and the relationship between risk sharing and industrial specialization (Kalemli-Ozcan, Sørensen, and Yosha 2003).

now available from LLS (2006) and Djankov and LLS (DLLS) (2008), the original ADRI continues to be used.<sup>3</sup>

The quantification of legal rules in the ADRI was a pathbreaking innovation that inspired a vast literature (surveyed in LLS 2008). As a pioneering study, however, LLSV (1998) inevitably employed a method much less refined than mature studies such as Djankov, Hart, McLiesh, and Shleifer (2008). In particular, index components were ambiguously defined, lawyers were not involved in collecting the data, and the data sources were not documented in detail. The ambiguities in the definitions also made it difficult to evaluate claims by some legal scholars that individual values were inaccurate<sup>4</sup> and hence to judge the overall reliability of the original ADRI and the credibility of the results derived with it.

To investigate these claims systematically, and to obtain a more reliable ADRI, this paper re-collects the legal data for 46<sup>5</sup> countries with a substantially improved method described in Section I.<sup>6</sup> It pursues all plausible interpretations of ambiguous definitions. Regardless of which interpretations are used, the corrected data deviate substantially from the original ADRI. Since the most sensible interpretations also generate the highest correlation with the original ADRI and the most similar regression results, the discussion focuses on this most sensible variant, henceforth referred to as “corrected ADRI” and further discussed in Section II and the Appendix.

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<sup>3</sup> See most recently, e.g., Bris and Cabolis (2008); Dahya, Dimitrov, and McConnell (2008); Fogel, Morck, and Yeung (2008); Giannetti and Koskinen (2008); Huang (2008); John, Litov, and Yeung (2008); Marosi and Massoud (2008).

<sup>4</sup> See, e.g., Hansmann and Kraakman (2004, 61n117) (US); Braendle (2006) and Vagts (2002, 600) (Germany and US); Berndt (2002) (Germany and UK); Cools (2005) (Belgium, France, US); and Enriques (2002, 779n43) (Italy).

<sup>5</sup> Indonesia, Sri Lanka, and Zimbabwe are not in this paper’s sample because no suitable corresponding lawyer willing to reply to this paper’s questionnaire could be found there (cf. Section I below).

<sup>6</sup> The Appendix also presents re-collected legal data for the “one share – one vote” and “mandatory dividend” variables from LLSV (1998), and a prior version of this paper (Spamann 2006) revisited regression results for these variables. Regression results from LLSV (1997) establishing a connection between “one share – one vote” rules and stock market size cannot be replicated with corrected data. Likewise, there is no positive correlation between the corrected “mandatory dividend” variable and ownership concentration, contrary to the finding in LLSV (1998) (and also this paper, since the regressions of Table 2 use the original “mandatory dividend” data from LLSV (1998)). Since the literature has rarely used these two additional variables, however, they are omitted here to save space.

Section II illustrates the shortcomings of the original ADRI with examples of individual data points, and compares aggregate data for the corrected and the original ADRI. Out of 46 countries, 33 had to be corrected. The correlation between the corrected and the original ADRI is only .53. These substantial corrections have a number of important consequences for widely influential findings based on the original ADRI:

First, the corrected ADRI does not differ systematically between common and civil law countries. One of LLSV's (1998) two key findings had been that common law countries offer greater legal investor protection than civil law countries. The corrected data do not bear this out.

Second, regression results from LLSV (1997, 1998) linking the ADRI to equity market outcomes cannot be replicated with the corrected data. The second key finding of LLSV (1997, 1998) had been that greater investor protection is associated with lower ownership concentration and larger equity markets. Again, the corrected data do not bear this out (Section IV.A and B).

Third, the above suggests that many of the numerous other results obtained with the original ADRI may not hold up with corrected data. By way of example, Section IV.C and D attempts to replicate the main results of the two most cited papers using the original ADRI other than those by LLSV. The corrected ADRI provides no evidence for the famous claim of Johnson et al. (2000) that poor investor protection exacerbated the Asian financial crisis of 1997. By contrast, Wurgler's (2000) finding that better investor protection is associated with more efficient capital allocation is qualitatively similar with the corrected ADRI.<sup>7</sup>

Do other, more recently developed indices yield different results, perhaps more in line with those of the original ADRI? The indices of securities law from LLS (2006), the anti-self-dealing index from DLLS (2008), and the revised ADRI from DLLS (2008) do suggest that common law countries provide better investor protection than civil law countries. But, as Section IV shows, none of these indices can revive the results linking

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<sup>7</sup> According to Google Scholar, these papers had been cited 506 and 595 times, respectively, as of 10/09/2008. The next most frequently cited paper using the ADRI was Nenova (2003) with 501 citations.

poor investor protection to ownership concentration (LLSV 1998, LLS 1999) and the Asian financial crisis (Johnson et al. 2000). These results seem to have been artifacts of coding error in the original ADRI. Clearly, alternative measures of investor protection will not necessarily support the same conclusions as the original ADRI.

To the extent that different indices do produce divergent results, interpreting the divergences requires judgment on the conceptual validity and empirical reliability of the respective indices. In particular, Section III argues that the corrected ADRI from this paper should be preferred to the revised ADRI that DLLS (2008) created in response to an early manuscript of this paper (Spamann 2005). These indices differ substantially because DLLS (2008) modified the content of the revised index in important ways. The main modifications, however, are either difficult to justify conceptually or not defined precisely enough to allow replication.

Prior studies have generally taken the accuracy of the legal data from LLSV (1998) as given. To the extent the ADRI has been criticized, commentators questioned the validity of individual index components (e.g., Coffee 2001; Vagts 2002) and the selection among them for inclusion into the ADRI (Graff 2008). Moreover, of the numerous challenges to LLSV's theory of a causal chain running from legal origin to legal institutions to financial outcomes (e.g., Rajan and Zingales 2003; Berkowitz, Pistor, and Richard 2003a/b; Roe 2002, 2006), some have focused precisely on linking the ADRI as dependent variable to explanatory variables other than legal origin (Pagano and Volpin 2005a; Licht, Goldschmidt, and Schwartz 2005). Legal scholars have reviewed the ADRI data in at most three countries (Cools 2005).

## **I. IMPROVED DATA COLLECTION, CODING, AND DOCUMENTATION**

The present paper improves the data generation method of LLSV (1998) in three important ways.

First, raw legal data were collected from primary materials<sup>8</sup> with the help of leading local lawyers. The lawyers responded to a questionnaire and often many rounds of clarifying questions. (Since a suitable correspondent could not be found for Indonesia, Sri Lanka, and Zimbabwe, these countries were excluded from the sample.) All the information was centrally verified with the country's primary materials where these were available in English, French, German, or Spanish, and otherwise with translations into one of these languages.<sup>9</sup> By contrast, LLSV (1998) did not involve lawyers in the data collection process, and obtained the data primarily from secondary sources such as Price Waterhouse's Doing Business reports for various countries (LLSV 1996, data appendix).

Second, all these data are documented in a 197-page online Appendix with references compliant with standards of the legal literature. By contrast, LLSV (1998) provides no documentation of the law underlying the coding of its index. Table 1 of the article merely lists "company law or commercial code" as the source of the data. Indeed, of the four country-rule points discussed in the main text, two are inaccurate.<sup>10</sup>

Third, consistent coding was ensured by a 15-page coding protocol detailed enough to deal with the many fine details of law. It is reproduced in the Appendix. Such a coding protocol is essential for replication, and it is therefore a standard requirement in the social sciences (Epstein and Martin 2005). By contrast, LLSV (1998) only provided the index component definitions reproduced in footnote 1 of the present article. These definitions contained a fair number of ambiguities, the most important of which was the treatment of corporate charter provisions, i.e., whether the definitions meant to capture

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<sup>8</sup> In this context, the term "primary materials" signifies materials used by, and written for, legal practitioners in the relevant country, such as statutes and precedents, but also legal commentary and treatises. In legal discourse, the latter are often termed "secondary legal materials".

<sup>9</sup> It was also cross-checked against two other attempts to code the ADRI (Oxford Analytica 2005; Pagano and Volpin 2005b), and a high quality, multi-jurisdiction legal study of the shareholder voting process (Baums and Wymeersch 1999), which features prominently in the ADRI.

<sup>10</sup> LLSV (1998, 1128) accurately report that the percentage of shares required to call an extraordinary shareholder meeting was then 3% in Japan, and 33% in Mexico. By contrast, the discussion of Delaware law with respect to this issue misunderstands Delaware law as not specifying a percentage (1998, 1128n6), whereas in reality Delaware simply does not provide this right at all. On proxy voting in Japan (LLSV 1998, 1127), see the discussion in the coding protocol in the Appendix.

mandatory, default, or even only optional investor protection rules.<sup>11</sup> The definitions also failed to specify which exceptions or limitations to a protective rule would be acceptable before the rule would be coded as not present.

The coding protocol develops alternative variants of the index components to exhaust all plausible interpretations of their original definitions. The Appendix reports corrected index values for various permutations of different component variants. However, since the most sensible interpretations are also those that yield the highest correlation with the original ADRI, and that produce regression results closest to those reported in LLSV (1997, 1998), the quantitative part of this paper only reports values and results for these most sensible interpretations – the “corrected ADRI”.

The process described in the preceding paragraphs is the most thorough attempt to obtain reliable legal data in the literature to date. While the involvement of local lawyers has become standard in papers following LLSV (1998), only one paper provides a data documentation (LLS 2006), and none provides a coding protocol. This includes the two other papers that have revisited the ADRI data (Pagano and Volpin 2005a/b; DLLS 2008). Besides, the purpose of Pagano and Volpin (2005a/b) was to extend the ADRI through time (1993-2001) rather than to verify its accuracy, and the methodology was designed to fit the former but not the latter task.<sup>12</sup> The revision of the ADRI in DLLS (2008) will be discussed in Section III below.

## **II. COMPARISON OF CORRECTED AND ORIGINAL DATA**

The corrected data differ substantially from the original. The first Subsection provides some individual illustrations. The second presents the numbers.

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<sup>11</sup> LLSV (1998, 1121) hints that what matters are default rules, but as the discussion will show, the original ADRI data did not adhere to this line.

<sup>12</sup> Local “legal experts and business practitioners” received a questionnaire with a table showing the definitions of the ADRI components from LLSV (1998) in the first column, the values assigned in LLSV (1998) for 1993 and the particular country in the second column, and blank cells in the third column, headed: “What is the answer to this question today in [country name]? If it differs from that in the previous column, when was the law changed and how?” In response, the survey respondents spontaneously noted 8 errors in the original ADRI data (Pagano and Volpin 2005b), but this is much less than shown in Table 1 below. Most likely, when confronted with the original values, each survey respondent interpreted the definitions in a way that accommodated the original values of his/her country.

## A. Examples

In many cases, the coding in LLSV (1998), when considered separately for individual countries, could have fit some reading of the ambiguous definitions, but it was inconsistent across countries. For example, neither Finland nor the US<sup>13</sup> provide cumulative voting (a form of proportional board representation) as a default rule, although both allow corporate charter provisions to this effect; however, Finland was coded as 0 and the US as 1 for this index component in LLSV (1998).<sup>14</sup> Likewise, neither the Philippines nor the US allow 10% shareholders to call an extraordinary meeting as a default rule, although both allow corporate charter provisions to this effect; however, the Philippines was coded as 0 and the US as 1 for this index component.<sup>15</sup> Similarly, Austria and Germany have almost literally identical provisions providing existing shareholders mandatory preemptive rights in new share issues subject to some exceptions, yet Austria was coded as 1 and Germany as 0 for this index component.<sup>16</sup> In all of these examples, a coding of either 0 or 1 for both countries could have been justified, but not the differential treatment. Many analogous cases exist.

Some coding inconsistencies are obscured by the fact that prevailing corporate practice may differ between two countries even though they regulate this aspect of corporate life identically. Of course, an individual retail investor would not care if certain arrangements are merely common practice, or actually mandated by law. But for an index designed to test the influence of law on such arrangements and, by extension, financial outcomes, this distinction is crucial. It is particularly relevant with respect to charter provisions requiring blocking of shares for a couple of days in order to vote at a shareholder meeting. In practice, such provisions used to be common in, e.g., Germany, but not in the US. However, such provisions were legal in both countries, and neither

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<sup>13</sup> The relevant rules for the US are federal securities law and the corporate law of Delaware, where more than half of all US publicly traded corporations is incorporated (LLSV 1998, 1119).

<sup>14</sup> See Finnish Companies Act chs. 8:1.2, 9:13.2; Delaware General Corporation Law § 214.

<sup>15</sup> See Philippine Corporation Code § 50; Delaware General Corporation Law § 211(d).

<sup>16</sup> Compare German Share Corporation Act § 186 with Austrian Share Corporation Act § 153.

country provided share blocking as a default.<sup>17</sup> The coding as 0 and 1, respectively, is therefore inconsistent.<sup>18</sup>

Values that do not fit any reasonable interpretation of the definition occur mainly with respect to the oppressed minority index component. This component requires that 10% shareholders have the right to either an appraisal or a judicial review “when they object to fundamental changes, such as mergers, asset dispositions, and changes in the articles of incorporation”. All 46 countries in the sample except Mexico and Pakistan grant such rights. However, only 24 are coded as such in LLSV (1998). To be sure, the effectiveness of these rights varies greatly from country to country. But the component definition does not draw any distinctions based on effectiveness, nor would there be an easy way to do so given the multidimensionality of “effectiveness” (e.g., plaintiffs may be favored in one country with respect to costs, and in another with respect to the standard of review).<sup>19</sup>

## **B. Data**

As mentioned above, the most sensible ways to resolve the ambiguities illustrated in the previous Subsection and the Appendix also generate the highest correlation with the original ADRI and the most similar regression results. In particular, counting default rules seems advisable because for most issues, few public firms diverge from the default arrangements in practice (Listokin 2006; Bergman and Nicolaievsky 2007). The coding protocol in the Appendix explains further details of the composition of this most plausible index, which refers to the law in force on 1/1/1997.<sup>20</sup> This index, called the

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<sup>17</sup> Cf. German Share Corporation Act § 123 (as in force until 2005); Delaware General Corporation Law § 102(b)(1).

<sup>18</sup> Moreover, the Appendix documents that LLSV (1998) values for other countries do not match practice either.

<sup>19</sup> The anti-self-dealing index of DLLS (2008), particularly the ex post subindex, is an attempt to capture some of these issues. The complexity of this index just underlines the point, however, that a binary indicator could hardly be expected to capture the relevant aspects.

<sup>20</sup> The original ADRI seems to refer to the law in force around 1993-94 (LLSV 1998, 1119n2). Given the very low rate of change evidenced in Table 1 and Pagano and Volpin (2005a/b), a difference of a couple of years is almost certainly immaterial.

corrected ADRI, appears in Table 1 next to the original ADRI, and is used in all the regressions below.

Still, the correlation between the corrected and the original ADRI is only .53.<sup>21</sup> Of the 46 observations in the sample, 33 had to be corrected – 25 of the 30 civil law observations, and 8 of the 16 common law observations. For example, the US score goes down from the sample maximum of 5 to the sample minimum of 2.<sup>22</sup>

[Table 1 about here]

The corrections eliminate or even invert the differences between legal origins reported in LLSV (1998). According to LLSV (1998), the mean common law ADRI was statistically significantly higher than the mean of the civil law group as a whole and each of its three sub-families (French, German, Scandinavian), and this holds true with the original ADRI even after omitting the three countries for which corrected data is lacking (not reported). By contrast, with the corrected ADRI, the German family has the highest mean, followed by the Scandinavian family. The French family still has the lowest mean, but the difference to the other families' means is not statistically significant. In particular, the *p*-value for a two-sided *t*-test of the equivalence of common and French civil law means is .12.

Again, this is the outcome for the most sensible interpretations, which also turn out to be most closely correlated with, and to generate results most similar to, the original ADRI. Other plausible readings of the definitions from LLSV (1998) would have yielded even greater discrepancies between the original and the corrected data, and even weaker results for legal origin. For example, if the index had been defined so as to preserve the US score of 5, the correlation of corrected and original values would have been .28, and common and civil law means would have been virtually identical (4.38 and 4.37,

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<sup>21</sup> Correlation coefficients for individual components range from .22 for “oppressed minority mechanism” to .98 for “percentage of shares to call a meeting” (see the Appendix).

<sup>22</sup> Two of the corrections are discussed in the preceding Subsection. The third correction is for “proxy by mail”. Since LLSV (1998, 1120) expressly excluded stock exchange rules, NYSE and NASDAQ stock exchange rules requiring US-listed corporations to provide shareholders with two-way proxy forms do not count. SEC Rule 14a-4(b) requiring corporations to use two-way proxy forms *if* they solicit proxies is not sufficient under the most-correlated index component definition (if it were, other countries like the Philippines would have to be corrected, cf. § 9.2 of the old Philippine SEC proxy rules).

respectively). The Appendix reports data for various definitions. The following Sections only refer to those of Table 1.

### **III.A NEW INDEX: THE REVISED ADRI (DLLS 2008)**

In response to an early manuscript of this paper (Spamann 2005), DLLS (2008) revised the ADRI. As shown in Table 1, the revised ADRI from DLLS (2008) differs substantially both from the original ADRI from LLSV (1998) ( $\rho=.60$ ) and the corrected ADRI from this paper ( $\rho=.67$ ). The most striking difference to the corrected ADRI of the present paper is that the revised ADRI is on average significantly higher in common than civil law countries.

This difference is not due to either the passage of time or, with few exceptions, disagreement regarding the coding. To assess the importance of time, column 3 of Table 1 presents an index defined as the original ADRI with the clarifications of this paper, but based on the law in force in 2005; this index is hardly any closer to the revised ADRI of DLLS (2008) ( $\rho=.69$ ). Regarding coding, there are very few remaining discrepancies because DLLS (2008) adopted most of the corrections, including clarifications of some definitions, suggested in (Spamann 2005, 2006).<sup>23</sup>

Rather, what drives the difference between the revised and the corrected ADRI is that, unlike the present paper, DLLS (2008) not only clarified but also substantially modified some of the index components. DLLS (2008, 433) explicitly takes into account stock exchange rules, whereas LLSV (1998, 1120) explicitly excluded them. Most importantly, the “shares not blocked” and “oppressed minority” index components were

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<sup>23</sup> While the revised index as presented in DLLS (2006) still contained a number of coding mistakes, which were documented in Spamann (2006), the published version of the paper (2008) eliminated most of them. Given the modifications discussed in the main text, there appear to be only 8 inaccurate country-rule points in DLLS (2008), two of which concern the same country and cancel out. Of the remaining six, five exacerbate the difference between civil and common law in the data of DLLS (2008). See the Appendix for a discussion of all 8 deviations.

redefined in ways that strongly affect the coding but seem to diminish the validity and reliability of the index.<sup>24</sup>

The modified “shares not blocked” component is set to zero only if the country’s law *explicitly* allows “share blocking”; if the permission is merely implicit, as in a blanket grant of charter freedom, the component is set to one.<sup>25</sup> The most obvious and most severe problem with such a coding rule is that it counts nomenclature, rather than actual legal rules that plausibly shape corporate activity.<sup>26</sup>

The modified “oppressed minority” component asks whether minority shareholders can challenge resolutions of the board and/or shareholders if they are “unfair, prejudicial, oppressive, or abusive”. But without further guidance on how to interpret these broad terms – and there is none in DLLS (2008) – it is impossible to decide whether a country fulfills this criterion or not. The history of English corporate law, from which these terms originate, demonstrates that they admit drastically different interpretations (Davies 2008; Spamann 2006), including some so narrow as to render them practically irrelevant for public companies (Boyle 2002, 102). Since DLLS (2008) provides neither a coding protocol nor a data documentation, replication is impossible.

For these reasons, the corrected ADRI of this paper appears to be a superior index than the revised ADRI of DLLS (2008). In any event, as the next Section demonstrates, it turns out that many of the empirical results obtained with the original ADRI cannot be replicated with either of the two new ADRI measures, or for that matter with any other measure of investor protection now available.

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<sup>24</sup> DLLS (2008) also adopt an interpretation of the old “proxy by mail” index component from Spamann (2005, 2006) which the latter had introduced to rationalize the US coding in LLSV (1998), even though it strained the understanding of the definition in LLSV (1998).

<sup>25</sup> This was explicitly part of the component definition in DLLS (2006, table XI). While the final paper (DLLS 2008, table 9) does not address the question anymore, the data indicate that the content is unchanged – otherwise, countries like Germany (0) and the US (1) would be incorrectly coded (see n. 17 above and accompanying text).

<sup>26</sup> Spamann (2006) discusses additional problems with this index component.

## IV. REVISITING REGRESSION RESULTS

### A. Investor Protection and Ownership Concentration

Besides the link between investor protection and legal origins, the main empirical result of “Law and Finance” (LLSV 1998) was that investor protection is negatively related to ownership concentration in publicly traded companies across countries. LLS (1999) confirmed this result with more detailed ownership concentration data for a smaller sample of countries. However, these results appear to have been artifacts of coding error in the original ADRI. Neither of them can be replicated with the corrected data, or with any of the other shareholder protection indices now available.

[Table 2 about here]

Table 2 revisits the key regression from “Law and Finance” (LLSV 1998), which links ownership concentration to investor protection as measured by the ADRI. Model 1 is an exact replication using the data of LLSV (1998, 1999), which was available for 39 observations.<sup>27</sup> Model 2 adds two observations for which data on ownership concentration (Uruguay) or the creditor rights index (Venezuela) is now available.<sup>28</sup> In both specifications, the point estimate for the original ADRI is negative and significantly different from zero at the 5% level, as reported in LLSV (1998). However, these results do not hold with the corrected or the revised ADRI. For the revised ADRI, the point estimate is almost exactly zero in the larger sample (model 6), and still far from statistically significant in the smaller one (model 5). For the corrected ADRI, the estimate is similar to the original one in the smaller sample (model 3), but drops by almost half and turns insignificant ( $p=.30$ ) in the larger one (model 4). Unreported parallel regressions with the anti-self-dealing index of DLLS (2008) yield similar non-results ( $p=.32$  even in the smaller sample). Note that DLLS (2008, table 6 panel C)

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<sup>27</sup> Gini data is missing in LLSV (1999), and come from World Bank (1997, 2001, 2006) and (for Taiwan) Deininger and Squire (1996).

<sup>28</sup> These additional data are from LLS (2006) and Djankov, McLiesh, and Shleifer (2007), respectively. Accounting data is missing for the other 8 countries for which the original ADRI was collected by LLSV (1998). Models 2, 4, and 6 use the improved creditor rights index from Djankov, McLiesh, and Shleifer (2007) for all countries; however, the results are very similar if one uses the original creditor rights index from LLSV (1998) for all countries except Venezuela.

already reported no significant relationship between the anti-self-dealing index and ownership concentration in a different empirical model, controlling only for log GDP per capita and the time to collect on a bounced check.<sup>29</sup>

[Table 3 about here]

Table 3 revisits the *t*-tests from LLS (1999), which compare the percentage of widely held firms in countries with high and low investor protection, as defined by ADRI scores above, or less or equal to, the median. Countries with high scores on the original ADRI (greater than 3) have significantly higher ownership dispersion than low score countries by any of the dispersion measures presented in LLS (1999) (panel A). But there is no difference, at least no statistically significant one, between countries with high and low scores on the corrected or the revised ADRI (panels B and C). Nor is there a statistically significant difference between countries with high and low scores on the anti-self-dealing index (not reported).

Given the results reported in this Subsection, there is no longer any cross-country evidence supporting the main hypothesis of “Law and Finance” (LLSV 1998) that investor protection is crucial for ownership dispersion.<sup>30</sup> This should provide new impetus to claims that the link between legal investor protection and ownership dispersion is ambiguous in theory (Roe 2002, ch. 24.7), and that, historically, ownership diffused in conditions of low legal investor protection (e.g., Cheffins 2008).

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<sup>29</sup> DLLS (2008, table 6 panels A and B) showed a significant correlation with ownership concentration only for the ex post, but not the ex ante, control of self-dealing. The anti-self-dealing index aggregates these two subindices. The seemingly statistically significant correlation of the anti-self-dealing index with ownership concentration reported in LLS (2008, table 1 panel B model 3) is due to omitted variable bias, since that regression does not control for other institutional factors such as the quality of courts, as in DLLS (2008), or the quality of accounting, as in LLSV (1998); if either of these were included in the regression, the result for the anti-self-dealing index would be far from statistically significant.

Of the indices of securities disclosure and liability from LLS (2006), only the latter is significantly negatively correlated with ownership concentration in regressions as in Table 2 ( $p=.07$  and  $p=.03$  in the small and large sample, respectively). However, the theoretical case for this connection is weak, and the prior empirical literature has not linked securities law and ownership dispersion.

<sup>30</sup> In addition, Holderness (forthcoming; 2008) argues that the commonly used ownership concentration data do not adequately account for varying firm sizes in different countries, and that results linking ownership concentration even to existing measures of investor protection at the country level suffer from aggregation and omitted variable bias.

## **B. Investor Protection and Capital Market Size**

The third major result of the early “Law and Finance” literature was that the original ADRI strongly correlated with stock market size (LLSV 1997). Again, this relationship breaks down with the corrected ADRI.<sup>31</sup> In re-runs of regressions from LLSV (1997), the coefficients for the corrected ADRI reported in panel B of Table 4 are not only statistically indistinguishable from zero, but even negative in three of the six regressions.

[Table 4 about here]

Except for using the corrected ADRI, the regression specifications and data underlying Table 4 are identical to those in LLSV (1997). The one difference is that Indonesia, Sri Lanka, and Zimbabwe are omitted from all the regressions because corrected ADRI data is not available for them. This omission does not drive the results. As reported in panel A of Table 4, the results for the original ADRI are qualitatively similar to those reported in LLSV (1997).

Unlike the ownership concentration results reported in the last Subsection, the regression results for stock market size do depend on the choice of investor protection measure. Regression results for the revised ADRI are approximately the same as for the original ADRI, showing a positive correlation of investor protection and stock market size (Table 4 panel C). Moreover, LLS (2006) and DLLS (2008) report numerous results showing that measures of securities regulation and the anti-self-dealing index are strongly positively correlated with stock market size. One possible interpretation is that disclosure enforced by securities law, and protection against “tunneling” provided by anti-self-dealing rules, matter for, or are encouraged by, stock market development, but not shareholder rights against the board, which is what the ADRI primarily measures.

## **C. Investor Protection and the Asian Financial Crisis**

As an example of the effect that correcting the legal data may have on the many other results derived with the ADRI, consider Johnson et al. (2000). This paper famously

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<sup>31</sup> The Appendix also presents a corrected “one share – one vote” variable, and Spamann (2006) shows that regression results in LLSV (1997) linking the original “one share – one vote” variable to equity market size cannot be replicated with the corrected variable.

found that emerging markets with low ADRI values suffered significantly deeper exchange rate depreciations during the Asian financial crisis of 1997. Model 1 of Table 5 replicates this result using the same specification and data as Johnson et al. (2000).<sup>32</sup> However, in the otherwise identical regressions of Models 2 and 3, the point estimate is zero for the corrected ADRI, and even negative for the revised ADRI.<sup>33</sup>

[Table 5 about here]

To be sure, Johnson et al. (2000) also showed significant regression results for a survey measure of corporate governance collected in the spring of 1998. But as that paper notes, this measure – and, one should add, any other measure referencing rules or perceptions after 1997 – could already have been affected by the crisis, and is therefore inappropriate for these tests. (Table 5 reports the results for the revised ADRI merely for the sake of transparency.)<sup>34</sup> By contrast, the corrected ADRI counts rules in force as of January 1, 1997, and is therefore ideal for these regressions. The corrected ADRI, however, provides no evidence for the claimed connection between corporate governance and the Asian financial crisis.

#### **D. Investor Protection and the Allocation of Capital**

Some results derived with the original ADRI do survive. For example, the link between efficient capital allocation and investor rights documented in Wurgler (2000) is generally as strong with the corrected or the revised ADRI as with the original ADRI.

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<sup>32</sup> Johnson et al. (2000) also ran these regressions without the other controls, and with interactions of the ADRI and rule of law, judicial efficiency, or corruption instead of the ADRI. The corrected and the revised ADRI do not yield significant results in these specifications either (unreported). The one exception is that the interaction of the corrected ADRI with judicial efficiency does yield a significantly positive coefficient. However, this is driven entirely by the correlation of the interaction term with judicial efficiency. If the interacted variables are also included separately in the regression, neither the ADRI nor the interaction term has any relationship to exchange rate depreciation.

<sup>33</sup> Since a corrected ADRI value for Indonesia is unavailable, these regressions use the original ADRI value for Indonesia instead. If anything, this will bias the results for the corrected ADRI upwards because the original ADRI value for Indonesia is the sample minimum for both the original and the corrected ADRI, and Indonesia had the worst exchange rate depreciation. Omitting Indonesia entirely yields even weaker results for all ADRI variants.

<sup>34</sup> Unreported regressions show no relationship between depth of the crisis and the anti-self-dealing index of DLLS (2008).

[Table 6 about here]

Table 6 shows coefficients and standard errors for the “rights” variable in regressions imitating those of Wurgler (2000). “Rights” is the sum of the creditor rights index from LLSV (1998) and the original, corrected, or revised ADRI, respectively. The regressions underlying panel A are identical to those of Wurgler (2000) except that Indonesia, Sri Lanka, and Zimbabwe are omitted in order to match the sample available for the corrected ADRI; this translates into three lost observations in models 1 and 3 and one lost observation (Indonesia) in models 2 and 4. Notwithstanding the reduced sample, the results are essentially the same as in Wurgler (2000).

In panels B and C, the original ADRI has been replaced by the corrected or the revised ADRI, respectively, in creating the rights variable. For both variants, the correlation with the elasticity of manufacturing investment to value added is stronger and more robust than for the original ADRI. Inversely, the correlation with the elasticity differential between growing and declining years is weaker and less robust.

### **E. Other results**

The preceding Subsections were merely examples of the broader implication of this paper: Many of the well over 100 other published empirical results derived with the original ADRI could have been artifacts of coding error in that index, just as the results for ownership concentration and the Asian financial crisis revisited above. Unless they are successfully replicated with the corrected ADRI or other suitable indices, they need to be viewed with great skepticism.

## **V. CONCLUSION**

This paper has shown that a more reliably measured ADRI diverges substantially from the one presented in LLSV (1998), which has been extensively used in the literature. The correlation between the corrected and the original ADRI is only .53. The corrections have profound effects on many famous empirical results derived with the ADRI. Once corrected, the ADRI provides no evidence that common law countries have better investor protection, or that investor protection is positively correlated with ownership

dispersion, larger equity markets, or resilience to the Asian financial crisis. Numerous other results not revisited in this paper are likely to be affected as well.

At least some of the affected results cannot be resurrected with other indices of investor protection. For example, the preceding Section showed that none of the existing indices is meaningfully correlated with ownership dispersion or resilience to the Asian financial crisis. If the results do differ in function of the index used, as for the link between investor protection and equity market size, theory should determine which result is more credible, and this may involve a judgment on the relative validity and reliability of the indices. In this regard, Section 3 of this paper argued that the corrected ADRI from this paper should be preferred to the revised ADRI of DLLS (2008).

On a methodological level, this paper tells a cautionary tale. Collecting comparative legal data is a difficult task that benefits from local legal expertise, and painstaking documentation and protocols. The difficulties were underappreciated in LLSV (1998), and led to the inaccuracies of the original ADRI documented in the present paper. Similarly, the creditor rights index of LLSV (1998) was corrected for 13 out of 47 countries in Djankov, McLiesh, and Shleifer (2007), and the correlation between original and new (1995) values is only .73. However, a wave of papers now quantifies law in various fields with a greatly improved methodology. This important innovation will endure as the legacy of “Law and Finance”, even if the original ADRI and some results derived with it may not.

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**Table 1 – ADRI values**

Country	Legal Origin	Original ADRI (LLSV 1998)	Corrected ADRI		Revised ADRI (DLLS 2008)
			1997 values	(2005 values)	
Argentina	French	4	3	3	2
Australia	Common	4	4	4	4
Austria	German	2	4	4	2.5
Belgium	French	0	2	2	3
Brazil	French	3	5	5	5
Canada	Common	5	4	4	4
Chile	French	5	5	5	4
Colombia	French	3	4	4	3
Denmark	Scandinavian	2	4	4	4
Ecuador	French	2	2	2	2
Egypt	French	2	4	4	3
Finland	Scandinavian	3	4	4	3.5
France	French	3	5	5	3.5
Germany	German	1	4	4	3.5
Greece	French	2	3	3	2
Hong Kong	Common	5	4	4	5
India	Common	5	4	4	5
Indonesia	French	2	2	2	4
Ireland	Common	4	4	4	5
Israel	Common	3	3	4	4
Italy	French	1	2	4	2
Japan	German	4	5	5	4.5
Jordan	French	1	3	3	1
Kenya	Common	3	3	3	2
Malaysia	Common	4	4	4	5
Mexico	French	1	2	3	3
Netherlands	French	2	4	4	2.5
New Zealand	Common	4	5	5	4
Nigeria	Common	3	4	4	4
Norway	Scandinavian	4	4	4	3.5
Pakistan	Common	5	5	5	4
Peru	French	3	4	5	4.5
Philippines	French	3	4	5	4
Portugal	French	3	3	4	2.5
Singapore	Common	4	4	4	5
South Africa	Common	5	5	5	5
South Korea	German	2	4	6	4.5
Spain	French	4	5	6	5
Sri Lanka	Common	3	3	3	4
Sweden	Scandinavian	3	4	4	3.5
Switzerland	German	2	3	3	3
Taiwan	German	3	5	5	3
Thailand	Common	2	4	4	4
Turkey	French	2	4	4	3
UK	Common	5	4	5	5
USA	Common	5	2	2	3
Uruguay	French	2	2	2	1
Venezuela	French	1	2	2	1
Zimbabwe	Common	3	3	3	4
mean	Common	4.00	<b>3.94</b>	4.06	4.22
	French	2.33	<b>3.40</b>	3.75	2.90
	German	2.33	<b>4.17</b>	4.50	3.50
	Scandinavian	3.00	<b>4.00</b>	4.00	3.63
	Civil	2.42	<b>3.63</b>	3.93	3.11
<i>t</i> -statistic	Civil	5.00	<b>1.03</b>	0.41	3.73
Common vs.	French	4.72	<b>1.61</b>	0.90	3.90
	German	3.59	<b>-0.62</b>	-1.08	1.88
	Scandinavian	1.91	<b>-0.16</b>	0.16	1.44
correlations	original ADRI	1.00			
	corrected ADRI	0.53	1.00		
	(corrected ADRI, 2005)	0.41	0.86	1.00	
	revised ADRI	0.60	0.67	0.69	1.00

**Table 2 – Ownership concentration (LLSV 1998)**

	Dependent variable: Ownership concentration					
	(1)	(2)	(3)	(4)	(5)	(6)
Original ADRI (LLSV 1998)	-0.038** (0.015)	-0.037** (0.015)				
Corrected ADRI			-0.039** (0.019)	-0.022 (0.021)		
Revised ADRI (DLS 2008)					-0.018 (0.027)	0.001 (0.021)
Creditor Rights (LLSV 1998)	0.012 (0.017)		0.022 (0.017)		0.020 (0.018)	
Revised Creditor Rights (1994) (Djankov, McLiesh, and Shleifer 2007)		-0.023 (0.017)		-0.012 (0.018)		-0.016 (0.019)
Legal reserve	-0.211** (0.077)	-0.237** (0.086)	-0.233*** (0.080)	-0.248** (0.103)	-0.246** (0.092)	-0.264** (0.100)
One share – one vote	-0.030 (0.041)	-0.019 (0.041)	-0.042 (0.042)	-0.034 (0.043)	-0.038 (0.051)	-0.040 (0.048)
Mandatory dividend	0.194 (0.119)	0.227* (0.124)	0.234* (0.124)	0.248* (0.138)	0.194 (0.154)	0.227 (0.159)
Accounting	-0.003* (0.002)	-0.003* (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.003 (0.002)
French legal origin	0.060 (0.077)	-0.010 (0.065)	0.152** (0.070)	0.077 (0.061)	0.134* (0.070)	0.071 (0.056)
Scandinavian legal origin	-0.032 (0.056)	-0.096* (0.050)	0.016 (0.061)	-0.051 (0.063)	-0.000 (0.062)	-0.061 (0.060)
German legal origin	-0.015 (0.071)	-0.040 (0.069)	0.104 (0.076)	0.057 (0.081)	0.065 (0.073)	0.041 (0.079)
Rule of law	-0.011 (0.012)	-0.015 (0.011)	-0.008 (0.014)	-0.013 (0.013)	-0.014 (0.014)	-0.016 (0.013)
Gini	0.003 (0.002)	0.001 (0.002)	0.002 (0.002)	-0.000 (0.002)	0.002 (0.003)	-0.001 (0.002)
Log (GNP per capita)	0.038 (0.025)	0.044* (0.022)	0.026 (0.023)	0.034 (0.023)	0.036 (0.024)	0.044* (0.022)
Log (GNP)	-0.042*** (0.012)	-0.051*** (0.013)	-0.051*** (0.015)	-0.057*** (0.016)	-0.046*** (0.015)	-0.058*** (0.017)
Constant	0.897*** (0.289)	1.168*** (0.232)	1.006*** (0.303)	1.199*** (0.236)	0.871*** (0.312)	1.128*** (0.245)
Observations	39	41	39	41	39	41
R <sup>2</sup>	0.735	0.748	0.709	0.701	0.670	0.686

Model 1 is an exact replication of LLSV (1998). Models 3 and 5 substitute the corrected ADRI from this paper and the revised ADRI from DLS (2008), respectively, for the original ADRI from LLSV (1998). Models 2, 4, and 6 include additional ownership concentration data for Uruguay from LLS (2006), and substitute the revised Creditor Rights Index (1994) from Djankov, McLiesh, and Shleifer (2007) for the original Creditor Rights Index from LLSV (1998), which adds Venezuela to the sample.

All other variables are taken from and defined in LLSV (1998, 1999), except the Gini coefficients (Taiwan data from Deininger and Squire 1996, and other data from World Bank 1997, 2001, 2006, taking the measurement closest to 1994).

OLS regressions; robust standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 3 – Fraction of public firms without controlling shareholder (LLS 1999)**

		Large publicly traded firms		Medium-sized publicly traded firms	
		10% cutoff	20% cutoff	10% cutoff	20% cutoff
		Panel A			
Original ADRI (LLSV 1998)	mean if ADRI high	.34	.48	.17	.38
	mean if ADRI low	.16	.27	.06	.13
	<i>t</i> -statistic for difference	1.92	1.95	1.84	2.86
		Panel B			
Corrected ADRI	mean if ADRI high	.25	.54	.05	.24
	mean if ADRI low	.24	.33	.12	.22
	<i>t</i> -statistic for difference	.08	1.32	-.79	-.16
		Panel C			
Revised ADRI (DLS 2008)	mean if ADRI high	.36	.53	.13	.32
	mean if ADRI low	.20	.31	.10	.21
	<i>t</i> -statistic for difference	1.52	1.83	.41	.99

A country's ADRI is high if it is greater than the median, which is 3, 4, and 4 for the original ADRI from LLSV (1998), the corrected ADRI from this paper, and the revised ADRI from DLS (2008), respectively. A firm does not have a controlling shareholder if no shareholder holds, directly or indirectly, at least 10 or 20%, respectively of the voting rights in the firm; these data are from, and further explained in, LLS 1999.

**Table 4 – Equity market size (LLSV 1997)**

Dependent variable	External market cap / GNP		Listed firms per capita		IPOs per capita	
	(1)	(2)	(3)	(4)	(5)	(6)
Legal origin dummies	No	Yes	No	Yes	No	Yes
Panel A						
Original ADRI (LLSV 1998)	0.13*** (0.04)	0.09** (0.05)	6.34** (2.72)	1.09 (3.35)	0.59*** (0.16)	0.24 (0.18)
Panel B						
Corrected ADRI	0.07 (0.06)	0.06 (0.06)	1.43 (4.21)	-0.19 (3.92)	-0.01 (0.27)	-0.12 (0.22)
Panel C						
Revised ADRI (DLS 2008)	0.18*** (0.05)	0.14** (0.06)	9.14*** (3.29)	4.82 (3.81)	0.56** (0.21)	0.07 (0.23)
<i>N</i>	42	42	46	46	39	39

Each cell corresponds to a separate regression, showing only the coefficient and standard error for the ADRI variable. All regressions control for GDP growth (average 1970-1993), log(GNP 1994), and rule of law. The regression specifications are identical to those in LLSV (1997), except for the use of the corrected ADRI from this paper and the revised ADRI from DLS (2008) in Panels B and C, respectively, and the omission of Indonesia, Sri Lanka, and Zimbabwe from the sample.

All other variables are taken from and defined in LLSV (1997, 1999).

OLS regressions, standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 5 – Asian financial crisis (Johnson et al. 2000)**

	Dependent variable: exchange rate purchasing power 01/1999 (end 12/1996 = 1)		
	(1)	(2)	(3)
Original ADRI (LLSV 1998)	0.054* (0.031)		
Corrected ADRI <sup>‡</sup>		0.000 (0.047)	
Revised ADRI (DLS 2008)			-0.016 (0.039)
East Asia dummy	-0.133 (0.092)	-0.143 (0.101)	-0.129 (0.106)
Reserves	0.003 (0.002)	0.003 (0.002)	0.003 (0.002)
Constant	0.558*** (0.108)	0.715*** (0.168)	0.767*** (0.141)
$R^2$	0.291	0.153	0.162
$N$	20	20	20

Model 1 is an exact replication of Johnson et al. (2000). Models 2 and 3 substitute the corrected ADRI from this paper and the revised ADRI from DLS (2008), respectively, for the original ADRI from LLSV (1998).

The East Asia dummy is equal to one for Hong Kong, Indonesia, South Korea, Malaysia, Philippines, Singapore, Thailand, and Taiwan. Reserves are central bank reserves in billions of dollars at the end of 1996. Data for reserves and exchange rate depreciation are from Johnson et al. (2000).

<sup>‡</sup>For Indonesia, the value used is that of the original ADRI (2).

OLS regressions; standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 6 – Capital allocation (Wurgler 2000)**

Dependent variable	$\eta$		$\eta^- - \eta^+$	
	(1)	(2)	(3)	(4)
Control variables		FinDev, GDP, SYNCH, SOE	FinDev	FinDev, GDP, SYNCH, SOE
		Panel A		
Original ADRI + Creditor Rights (LLSV 1998)	0.059*** (0.016)	-0.034 (0.024)	0.115*** (0.028)	0.122*** (0.038)
		Panel B		
Corrected ADRI + Creditor Rights	0.084*** (0.015)	0.033 (0.025)	0.073** (0.028)	0.056 (0.044)
		Panel C		
Revised ADRI + Creditor Rights (DLS 2008)	0.081*** (0.017)	0.022 (0.028)	0.081*** (0.028)	0.059 (0.041)
$N$	38	21	37	21

Each cell corresponds to a separate regression, showing only the coefficient and standard error for the sum of the ADRI and the creditor rights index (“rights”). All regressions include a constant. The regression specifications are identical to those of models 3 and 6-8 of table 5 in Wurgler (2000), except for the use of the corrected ADRI from this paper and the revised ADRI from DLS (2008) in Panels B and C, respectively, and the omission of Indonesia, Sri Lanka, and Zimbabwe from the sample.

$\eta^{(-/+)}$  is the elasticity of manufacturing investment to value added (in declining/growing industry-years) from Wurgler (2000). FinDev is a measure of financial development defined in and taken from Wurgler (2000). GDP is log(per capita GDP 1960) from Wurgler (2000). SYNCH is the percentage of stocks moving in step from Morck, Yeung, and Yu (2000, table 2). SOE is state-owned enterprises’ share of non-agricultural economic activity from the World Bank (1995, table A.2). The creditor rights index is from LLSV (1998).

OLS regressions; robust standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$