# Is There a Relationship Between Shareholder Protection and Stock Market Development?

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## Abstract

The paper uses recently created datasets measuring legal change over time in a sample of 28 developed and emerging economies to test whether the strengthening of shareholder rights in the course of the mid-1990s and 2000s promoted stock market development in those countries. It finds only weak and equivocal evidence of a positive effect of shareholder protection on market capitalisation, the value of stock trading, and the turnover ratio, and a negative impact on the number of listed companies. There is stronger evidence of reverse causality, in the sense of stock market development at country level generating changes in shareholder protection law. We conclude, firstly, that legal reforms were at least in part an endogenous response to stock market development and not simply a reaction to the generation of global standards; but, secondly, that the laws passed in response to the demand for shareholder empowerment did not consistently have the expected impact on financial markets, and may have had some negative and perverse results.

Keywords: corporate governance, shareholder protection, financial development, stock market development.

JEL Classifications: G33, G34, K22, O16

## 1. Introduction

At the core of the new institutional economics pioneered by Douglass North is the claim that the quality of legal and other institutions makes a difference to economic development and growth (North, 1990; North et al., 2009). In their cross-sectional studies of the relation between law and finance, Andrei Shleifer and his collaborators found evidence to support this claim, by demonstrating that a higher level of shareholder and creditor protection was correlated with increased financial development (La Porta et al. 1998, 2008; Djankov et al., 2008). This position has been extremely influential among researchers and policy-makers since the mid-1990s, thanks in part to its conjunction with a parallel literature claiming to show that financial development promotes economic growth (King and Levine, 1993; Levine, 1997; Beck et al 2000, 2003; Claessens and Laeven, 2003).

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During this time, strengthening shareholder and creditor rights as a precondition for financial market development became a mainstay of global policy initiatives, including the World Bank's *Doing Business* initiative, which dates from 2003 (World Bank, 2003), and the OECD's *Principles of Corporate Governance,* first published in 1999 and updated in 1999 and 2015 (OECD, 2015), as well as many national law reform programmes.

However, further empirical research has cast doubt on the claim that law matters for finance. Colonial duration, open trade and political factors such as a competitive party system and governmental stability have been identified as alternative factors driving institutional and economic divergence across countries and over time, resulting in uneven financial development (Acemoglu, Johnson and Robinson, 2001; Rajan and Zingales, 2003; Olsson, 2009; Roe and Siegel, 2011). In addition, it is increasingly recognised that, as law influences economic outcomes in multiple ways and with various feedback mechanisms, claims about the effect of legal rules are difficult to substantiate (Chong and Calderon, 2000). The experience of the UK and the US appears to show that causality worked in reverse, in the sense that it was the rise of an investor class and the expansion of equity markets in the course of the nineteenth century which led to a strengthening of legal backing for shareholder rights (Cheffins, 2001; Coffee, 2001). There is compelling evidence that, in the UK case, ownership dispersion preceded the enactment of shareholder-protective company legislation (Franks et al., 2009; Cheffins, 2008). Thus in this area, at least, North's hypothesis of the importance of legal-constitutional property rights for Britain's industrial growth is quite hard to square with the historical evidence showing that financial development preceded legal change.

In this study we update the story on the law-finance relation to the present day. Our focus is on the effects of the increase in legal protection for shareholder rights which has taken place around the world since the 1990s. We use newly available data on laws relating to shareholder protection to assess the impact on legal change on stock market development in 28 countries. We also use time-series economic techniques to investigate the existence of a reverse-causal relationship; in other words, the possibility that, as in nineteenth century Britain, it was changes in finance which drove legal reform.

The empirical legal origins literature beginning with La Porta et al. (1998) used mostly cross-sectional evidence on the state of the law as it stood in the late 1990s and the early 2000s. This was arguably not a strong empirical base from which to draw firm conclusions on the long-run relationship between legal change and financial development. Our approach, by contrast, is based on longitudinal measures of cross-national legal variation for a number of countries over a long time-span, 1990-2013. These data make it possible to assess the relationship between legal and economic variables using time-series and panel-data techniques. Thus our study breaks new grounds in two ways: firstly, in using novel "leximetric" techniques to measure legal change over time; and secondly in combining leximetric data with econometric analysis which models the relationship between law and the economy in a dynamic fashion.

The paper is structured as follows: Section 2 outlines the legal dataset we are using and explains the trends it demonstrates in shareholder protection over time. Section 3 explains the financial data and econometric methods and it presents our econometric findings on

the relationship between legal reforms and economic outcomes in the area of stock market development. Section 4 interprets these findings and Section 5 concludes.

## 2. Trends in shareholder protection over time: leximetric data and methodology

### 2.1 Approach to legal data coding

The legal data we rely on for our analysis is derived from a coding method which has come to be known as "leximetric" (Lele and Siems, 2007). This involves the construction of a synthetic or composite index from legal materials of various kinds, principally statutes, judicial decisions, and regulatory codes. While there is a growing literature applying leximetric coding techniques to corporate law following the initial, pioneering work of La Porta et al. (1998, 2008), an exploratory method such as this should not be taken at face value. In this section we set out the approach we adopted to code shareholder protection and seek to address potential criticisms of it.

Evidence for the content of laws governing shareholder protection is available in the form of statutory and other texts, which can be retrieved over extended periods of time, making it possible to build a longitudinal or historical picture of changes in the strength of weakness of the law over time. This is only one form of evidence of legal regulation, and it could be said that as it tells us nothing of the effect of the law beyond the text, it is of limited significance for empirical analysis. An alternative approach might be to conduct surveys of law firms and businesses, enabling data on the perceived effects of the law to be captured. This is what the World Bank has been doing since 2003. Its *Doing Business* reports use survey data for some of their categories, for example on the duration of trials and on entry procedures for start-up firms (World Bank, 2003 and subsequent years); other categories in the *Doing Business* indices use leximetric tools in the sense that we are describing. However, this still gives a comparatively short time series, and one which does not cover the period in the decade or so following the fall of the Berlin Wall in 1989, when institutions in post-Socialist countries, as well as emerging markets more generally, were undergoing rapid change.

One of the drawbacks of using surveys is that it is difficult to use them to construct historical data, as few if any survey respondents will be in a position to give an informed and reliable response to questions about the state of the law many years in the past. Thus we cannot straightforwardly conduct surveys today which provide good evidence on the operation of legal institutions in the 1990s. An alternative approach, which we use here, is to focus on *de jure* measures of legal regulation, for which abundant historical evidence exists. While using *de jure* measures opens up the problem of the gap between "law in the books" and "law in action", this can be addressed by other means, namely in the choice of econometric models used to test for presence of causal relations between legal and economic variables (on which, see section 3 below).

If we focus on legal texts, we soon find that the laws and regulations relating to shareholder protection are, in any given country, a complex amalgam of different normative sources; combining them into a measure or series of measures is not straightforward. It is generally agreed that the approach to building an index of this kind should respect the

conditions for what is termed "construct validity" (OECD, 2008; Strauss and Smith, 2009; Black et al., 2017).

The guiding assumption here is that the index is a *construct* or *proxy* for a feature of social (or, here, to be more precise, socio-legal) reality which cannot be directly observed. A first step is to clarify what is being measured, the *concept*. In our case it is "shareholder protection", that is, the extent to which laws and regulation protect the interests or rights of shareholders in their relations and dealings with directors, managers and controlling shareholders. The next step is to express this variable in quantitative terms. In order to ensure regularity in the translation of texts into a numerical form, individual indicators should be defined by reference to a *coding algorithm* or protocol which can be applied in a consistent way across the laws of different national systems. Then, once initial scores for the indicators have been arrived at, the *aggregation* of values to form a single score or series of scores should be done in a way which allows for a coherent *weighting* of the individual variables.

Clearly, there are judgments to be made at each stage of this process. The *Handbook on Constructing Composite Indicators* jointly published as a methodological guide by the OECD and European Commission is clear that "composite indicators are much like mathematical or computational models", and that 'as such, their construction owes more to the craftsmanship of the modeller than to universally accepted scientific rules for encoding' (OECD, 2008: 14). The issue is not whether a particular index is a completely accurate representation of an underlying reality; by definition, in the context we are considering, this is an unrealisable goal. The issue, rather, is whether the process by which an index was constructed is sufficiently convincing to be accepted by peers, and much of this turns, we suggest, on how transparent it is: in other words, how far the theoretical foundations and coding methodology underlying the index are clearly and convincingly described, and to what extent the data themselves and the sources underlying them are accessible to other researchers.

The index we are using, the CBR Extended Shareholder Protection Index (Siems, 2008a and 2016), contains ten indicators or variables, which are set out, with their relevant coding algorithms, in Table 1. The indicators were not chosen at random. According to the OECD/European Commission *Handbook*, indicators should reflect a 'theoretical framework' which provides a "basis for the selection and combination of single indicators into a meaningful composite indicator under a fitness-for-purpose principle"; the individual variables should be "selected on the basis of their analytical soundness, measurability, country coverage, relevance to the phenomenon being measured and relationship to each other" (OECD, 2008: 15).

*Table 1. Variables on Shareholder Protection: Definition and Coding Algorithm*

| *Definition* | *Algorithm* |
|---|---|
| 1. Powers of the general meeting for de facto changes | If the sale of more than 50 % of the company's assets requires approval of the general meeting it equals 1; if the sale of more than 80 % of the assets requires approval it equals 0.5; otherwise 0. |
| 2. Agenda setting power | Equals 1 if shareholders who hold 1 % or less of the capital can put an item on the agenda; equals 0.75 if there is a hurdle of more than 1 % but not more than 3%; equals 0.5 if there is a hurdle of more than 3 % but not more than 5%; equals 0.25 if there is a hurdle of more than 5% but not more than 10 %; equals 0 otherwise. |
| 3. Anticipation of shareholder decision facilitated | Equals 1 if (1) postal voting is possible or (2) proxy solicitation with two-way voting proxy form has to be provided by the company (i.e. the directors or managers); equals 0.5 if (1) postal voting is possible if provided in the articles or allowed by the directors, or (2) the company has to provide a two-way proxy form but not proxy solicitation; equals 0 otherwise. |
| 4. Prohibition of multiple voting rights (super voting rights) | Equals 1 if there is a prohibition of multiple voting rights; equals 2/3 if only companies which already have multiple voting rights can keep them; equals 1/3 if state approval is necessary; equals 0 otherwise. |
| 5. Independent board members | Equals 1 if at least half of the board members must be independent; equals 0.5 if 25 % of them must be independent; equals 0 otherwise |
| 6. Feasibility of director's dismissal | Equals 0 if good reason is required for the dismissal of directors; equals 0.25 if directors can always be dismissed but are always compensated for dismissal without good reason; equals 0.5 if directors are not always compensated for dismissal without good reason but they could have concluded a non-fixed-term contract with the company; equals 0.75 if in cases of dismissal without good reason directors are only compensated if compensation is specifically contractually agreed; equals 1 if there are no special requirements for dismissal and no compensation has to be paid.<br>Note: If there is a statutory limit on the amount of compensation, this can lead to a higher score. |
| 7. Private enforcement of directors duties (derivative suit) | Equals 0 if this is typically excluded (e.g., because of strict subsidiarity requirement, hurdle which is at least 20 %); equals 0.5 if there are some restrictions (e.g., certain percentage of share capital; demand requirement); equals 1 if private enforcement of directors duties is readily possible. |
| 8. Shareholder action against resolutions of the general meeting | Equals 1 if every shareholder can file a claim against a resolution by the general meeting; equals 0.5 if there is a threshold of 10 % voting rights; equals 0 if this kind of shareholder action does not exist. |
| 9. Mandatory bid | Equals 1 if there is a mandatory public bid for the entirety of shares in case of purchase of 30% or 1/3 of the shares; equals 0.5 if the mandatory bid is triggered at a higher percentage (such as 40 or 50 %); further, it equals 0.5 if there is a mandatory bid but the bidder is only required to buy part of the shares; equals 0 if there is no mandatory bid at all. |

| | |
|---|---|
| 10. Disclosure of major share ownership | Equals 1 if shareholders who acquire at least 3 % of the company's capital have to disclose it; equals 0.75 if this concerns 5 % of the capital; equals 0.5 if this concerns 10 %; equals 0.25 if this concerns 25 %; equals 0 otherwise |

Source: CBR Leximetric Datasets, Shareholder Protection Index (Siems, 2016; initially developed in Siems, 2008a).

The ten indicators represent our best assessment of the core legal and regulatory elements of shareholder protection regimes across developed and developing countries in the closing years of the last century and the first decades of the present one (for further detail, see Siems, 2008a; Armour et al., 2009a; Buchanan et al., 2014; Katelouzou and Siems, 2015; Siems, 2016). The relevance and usefulness of CBR dataset have been acknowledged in the World Bank's *Doing Business Report* (World Bank 2015: 106-8), which has incorporated some of the variables from the CBR index into its own "Protecting Minority Shareholders" index, and there is a growing body of work applying the CBR dataset and related data sources in econometric analysis (Armour et al., 2009a; Van der Elst, 2010; Deakin et al., 2012; Belloc, 2013; Guillén and Capron, 2016).

The indicators include some variables which capture elements of shareholder protection laws of long standing but continuing significance (such as rules governing the conduct of general meeting, proportional voting, and derivative suits) and some which refer to areas of law and regulation which were relatively new or were increasing in importance for most countries across the period in question (such as rules on board structure and takeover bids). Many of them are contained in transnational standards which influenced country-level legal reforms in this period, in particular the OECD's *Principles of Corporate Governance* (Samanta, 2016; Siems and Alvarez-Malcotela, 2017).

The coding algorithm for each variable was intended to capture the differing degrees of protection provided by the law in question, using a common scale according to which a high value, closer to 1, indicated a greater degree of protection, and a lower value, closer to 0, a lesser degree of protection. Some of the algorithms express cardinal values, while others express ordinal ones. The approach taken was to use cardinal values where they were available, as this reduced the element of subjectivity in the coding. Not all of the rules and regulations which we considered to be of interest could be expressed in cardinal terms. Where this was the case, an ordinal scale was constructed, which was in each case more or less detailed, according to the complexity of the law or regulation in question, and the resulting range of possible states of the law across countries.

The aggregation of individual variables into a single composite measure is perhaps the most controversial and contested aspect of an index such as the one we are considering. In our view, there is no overriding objection to the combination of cardinal and ordinal values into a single composite score, nor to the mixing of indicators with different degrees of incremental variation, as long as each individual indicator is thought to be an accurate (or the best possible) measure of the particular aspect of legal reality which it is meant to be capturing. The use of an aggregate measure, rather than individual values, is in line

with research in corporate governance that expresses a preference for composites or '"undles" of variables in order to capture substitutes and complements across individual variables (Schnyder, 2012b; Aguilera et al., 2012). A further, practical consideration in favour of using aggregate scores is that the extent of variation across time in respect of the composite indicator is greater than that for any individual variable (see section 2.2). This informs the use of the aggregate measure in our regression analysis (section 3).

Nonetheless, an intractable issue with any composite index is that of weighting. If no weights at all are applied, there is, in effect, an implicitly equal weighting of each indicator. This may be unrealistic, as it is plausible to believe that certain variables will be more important than others for certain countries, or that the relative importance of variables will change over time. However, equal weighting may be a good default, in the absence of any systematic means of weighting different variables with regard to their assumed importance across countries and over time. Put slightly differently, in the absence of data which would enable weighting to be done in a coherent way, the default position of equal weighting may be the best available option.

An alternative approach is to develop a separate index for each country. Black et al. (2017) do this for their index of firm-level corporate governance practices in four emerging markets (Brazil, India, Korea and Turkey). Their approach makes sense in a context where there is enough evidence to suggest, prior to the stage of econometric testing, that the meaning of "good" governance differs across the countries in the sample. In the case of the dataset we are using, with a much larger sample of countries (nearing 30), the task of differentiating the index on a country-by-country basis would be more resource-intensive and would run the risk of introducing a further, undue element of subjectivity into the construction of the index.

It may be possible, instead, to arrive at a weighting scheme through principal component analysis. This technique identifies clusters or groups of variables which capture variances in the dataset as a whole, and may thereby make it possible to get clearer results when regressing the scores in the index against an outcome variable (OECD, 2008: 89-91; Fagernäs et al., 2008). In favour of PCA, the technique enables the data to speak for themselves, rather than on the basis of an a priori, subjective assignment of weights, of the kind which is unavoidable even with the default option of equal weighting. Against PCA, this type of analysis can produce groupings of variables which are statistical artefacts rather than expressions of any true underlying complementarities. For this reason, PCA does not always produce results which are clearer than those obtained from groupings of variables which reflect the theory which informed the construction of the dataset in the first place (as the analysis conducted by Black et al., 2017 demonstrates; see also Fagernäs et al., 2008).

The variables contained in the CBR index have been consciously chosen for their salience in contemporary corporate governance reforms and because, from the point of view of corporate governance theory, there are likely to be complementarities between different forms of shareholder protection (Siems, 2008a). As such, there is a good argument for combining them into a single, composite score, which, in the absence of any compelling case to the contrary, can be expressed on the default basis of equal weighting of each variable.

## 2.2 Leximetric results and interpretation

For the analysis presented in this paper we used the CBR shareholder protection index to code for the laws of thirty countries over the period between 1990 and 2013. The countries represented are a range of developed systems (Belgium, Canada, Cyprus, France, Germany, Italy, Japan, Netherlands, Spain, Sweden, Switzerland, UK, USA), developing countries (Argentina, Brazil, Chile, India, Malaysia, Mexico, Pakistan, South Africa, Turkey), and transition systems (China, Czech Republic, Estonia, Latvia, Lithuania, Poland, Russia, Slovenia). The dataset we constructed is publicly available and downloadable from the University of Cambridge's data repository (Siems, 2016).

The period between 1990 and 2013 was chosen in order to identify a period of time in respect of which all systems were undergoing a general move to liberalise their economies, as part of which legal reforms aimed at improving corporate governance rules were on the agenda. This period is also of interest as it includes events such as the transition to a market economy and the accession to the EU in some countries, as well the 'dotcom bubble' and the global financial crisis.

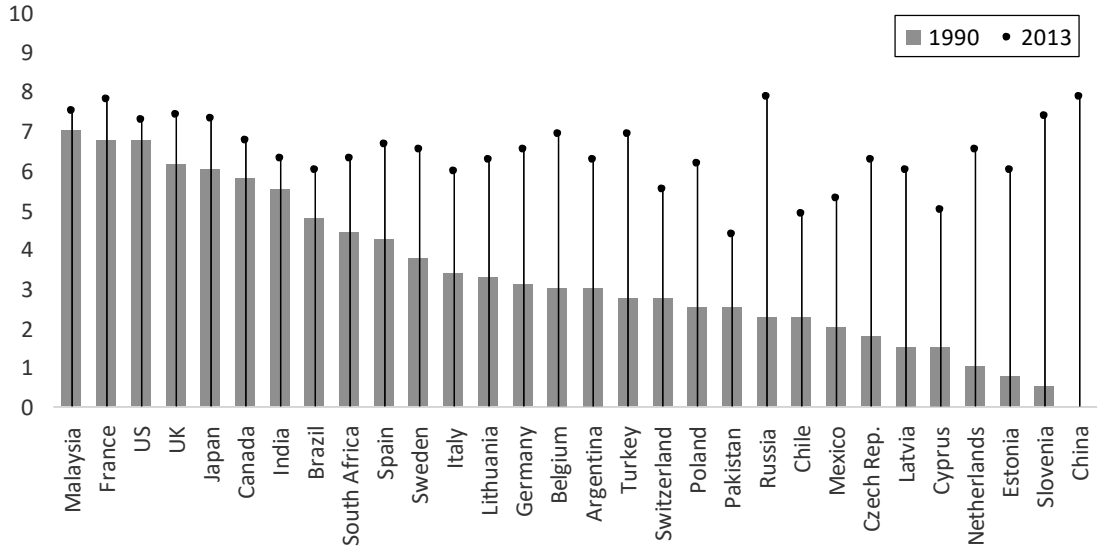


*Figure 1: Shareholder Protection in 30 countries, 1990 and 2013. Source: Katelouzou and Siems (2015).*

A comparison between 1990 and 2013 in Figure 1 shows that, without exception, all countries have increased the level of shareholder protection. The trend is especially clear for certain emerging markets, such as China and Russia. This result is in line with quantitative findings using similar indices. The corresponding 60-variable CBR dataset has been coded for longer time-frames (usually 1970-2005), although for a more limited number of countries: France, Germany, India, the UK and the US (Lele and Siems 2007, Armour et al., 2009b), Australia (Anderson et al., 2012a, 2012b), Malaysia (Chen, 2013),

Belgium and Italy (Van der Elst, 2010).[1] Other studies reach corresponding findings with alternative datasets measuring aspects of shareholder protection and corporate law (Pistor, 2000; Hyytinen et al., 2003; Martynova and Renneboog, 2011; Masouros, 2013; Samanta, 2016). Research mapping the global spread of corporate governance codes under the influence of transnational standard-setting bodies including the World Bank and OECD (Aguilera et al., 2013) also points to a similar picture, and is relevant here since the CBR indices not only code the positive law but also take into account alternative forms of regulation, such as corporate governance codes as well as listing rules and case law (see Lele and Siems, 2007; Siems, 2008a; Siems, 2016).

Figure 2 presents the same data by reference to changes over time in the scores for each individual indicator, averaged across all countries. This chart shows that the variables which showed the most rapid and continuous rate of increase were those relating to the presence of independent directors on boards and the mandatory bid rule in takeover bids (variables 5 and 9 respectively). The adoption of shareholder-protective rules in these two areas of corporate governance is a sign of the growing influence of a norm of 'shareholder primacy' associated with Anglo-American corporate law and practice (Hansmann and Kraakman, 2001).

The trend towards shareholder-protective corporate governance reforms around the world is also confirmed in more detailed country-specific research that aims to explain these trends. For example, Schnyder (2011, 2012a) presents an in-depth discussion of how ownership structures have influenced corporate governance reforms in the Netherlands, Sweden and Switzerland, and Klages (2013) discusses the evolution of corporate governance reforms in Germany.

A modified position is that of Gilson (2001) who suggests that functional convergence is likelier than formal convergence: while the underlying problems are similar, there are too many obstacles in the way of formal harmonisation – where "functional" means that a comparable result is produced, with, say, incompetent directors being removed, but along different statutory paths. However, such line of reasoning can also be challenged by taking the historical comparative perspective. It can be shown that many rules, such as those on independent directors, audit committees and derivative actions, have been popular legal transplants in recent decades (Siems, 2008b: 134, 195, 222). Such formal convergence also explains the trend of Figure 1.

[1] Guillén and Capron (2016) use the 10-variable CBR index to generate a dataset of over 70 countries, and arrive at a similar result to ours on trends in shareholder protection. Although their dataset is based on the coding algorithm developed in the CBR research, their findings cannot be verified, as the underlying legal data used to generate their codings have not been published. For methodological discussion of the processes for validating findings from synthetic legal indexes, including the importance of publishing the raw data and coding algorithms underlying leximetric research, see Spamann, 2015, and Verkerke and Freyens, 2017.

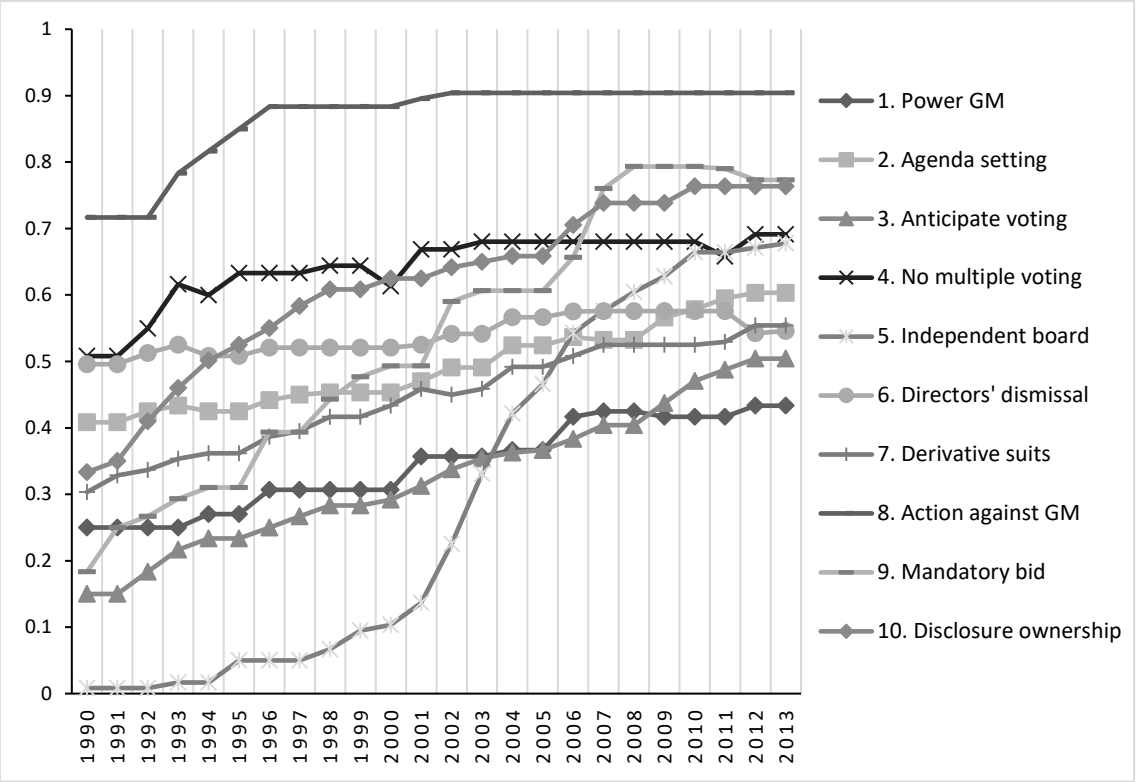


*Figure 2: Shareholder Protection in 30 Countries, 1990-2013, Scores for Individual Variables (see Table 1). Source: Katelouzou and Siems (2015).*

In terms of the direction of convergence, our data, as we have seen, offer some support for the claim of Hansmann and Kraakman (2001) that the Anglo-American model of corporate law, with shareholder primacy as the main guiding principle, has become increasingly influential, at least at the level of the formal law. Relatedly, Cioffi (2010) and Barker (2010) highlight the prevalence of shareholder-orientated law reforms under both left-wing and right-wing governments. Thus, the argument is that – in contrast to previous work by Roe (1997) – protecting shareholders has also become an issue of concern for the social democratic left, for example, with the aims of appealing to new voting blocks, to enable better monitoring of companies following financial scandals, and possibly also to accommodate changes to pension systems which in many countries "turn workers into capitalists" (Gelter, 2014; McGaughey, 2016; Roe and Coan, 2017).

A number of other forces may have led to this convergence. Adopting an interdisciplinary perspective on legal change, Siems (2008b) finds that the increased use of modern forms of communication, approximations in economic policy, company and shareholder structures, and the liberalisation of capital markets all account for growing legal similarities across national systems. Dignam and Galanis (2009) pursue a similar line of research and conclude that it was mainly the process of economic globalisation, led by capital and product market liberalisation, that led to changes in national-level corporate governance regimes in this period. But this does not imply that these reforms may, then, not also have an effect on financial development at country level. The following empirical analysis aims

to address this question of a possible reciprocal relationship between shareholder protection and stock market development.

## 3. The financial impact of legal and regulatory changes: econometric analysis

### 3.1 Financial and legal data: a first look

As just explained, the legal dataset we are using covers 30 countries over the period 1990 to 2013. Long-term stock market data are not fully available for all years and countries. Thus, in order to have a balanced panel, we choose a time span of 1996-2012 for 28 countries (the two countries omitted on the grounds of unavailability of data are Estonia and Lithuania).

As indicators of stock market development we use the following four variables, drawn from the World Bank's World Development Indicators (World Bank, 2017):

- market capitalisation of listed companies as a % of GDP, MKAPY. Market capitalization is the share price times the number of shares outstanding;

- stocks traded as a % of GDP, VSTKY. This variable refers to the total value of shares traded during the period. It complements the market capitalization ratio by showing whether market size is matched by trading;

- turnover ratio: the total value of shares traded during the one year period divided by the average market capitalization for the period, TURNOVER;

- listed domestic companies per million of population, LISTPOPM. Listed domestic companies are the domestically incorporated companies listed on the country's stock exchanges at the end of the year. This indicator does not include investment companies, mutual funds, or other collective investment vehicles.

Figure 3 presents the trends in each of these financial variables over time alongside the changes in the scores for the shareholder protection index over the same period. On the face of it, any link between them is likely to be tenuous, as the shareholder protection scores show a steady rise while the values for the financial indicators indicate a high degree of fluctuation over time, with large falls after the collapse of the dotcom bubble in the early 2000s and again in the aftermath of the global financial crisis in 2008. However, this does not rule out the possibility of a secular trend linking the legal and financial variables over the period as a whole once the short-term effects of the dotcom bubble and the financial crisis are netted out.

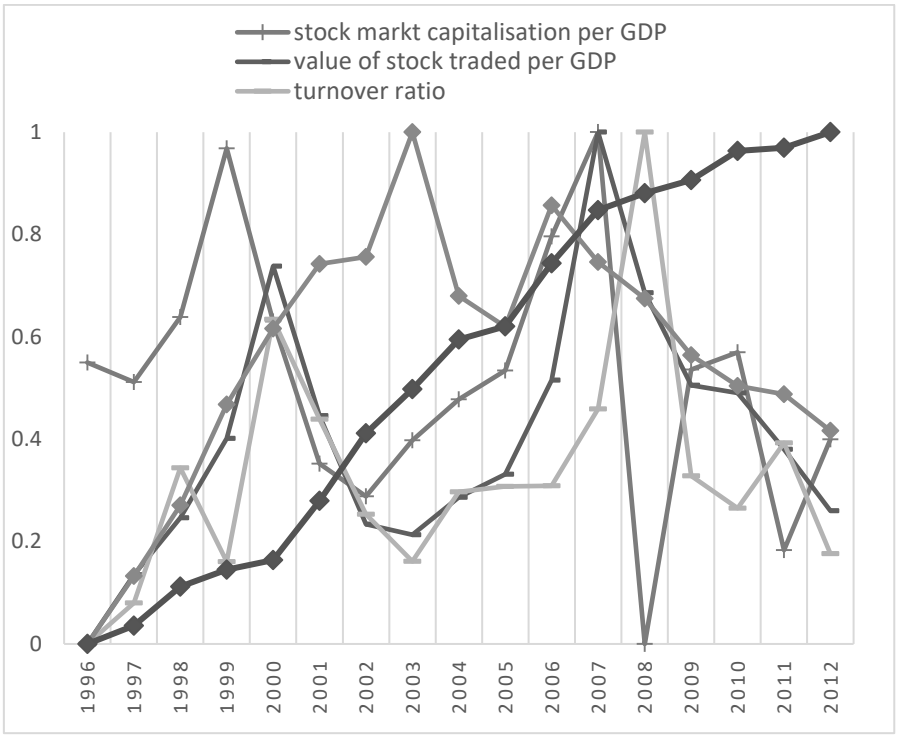


*Figure 3. Trends in stock market development and shareholder protection, 28 countries, 1996-2013. Sources: World Development Indicators (stock market capitalisation) and Siems et al. 2016 in CBR Leximetric Datasets (shareholder protection), all scaled from 0 to 1 based on the lowest and highest values.*

Revealingly, Figure 4, which plots changes in market capitalisation against the *rate and direction of change* in the shareholder protection index, suggests that there may indeed be some plausibility in the idea of a law-finance link, as the two trends are now more closely matched, although also with strongly divergent trends in the early 2000s (with stock market capitalisation in decline but shareholder protection increasing). The corresponding figures (Figures 5 and 6) for the rate of change in shareholder protection and stocks traded as percentage of GDP, as well as for the turnover ratio, are very similar. The closest correlation of trends, displayed in Figure 7, seems to concern the evolution of the number of listed firms and the rate of change in shareholder protection. However, in each case a simple comparison of the time trends does not clearly suggest that one preceded the other in a consistent way across the period, thus making it difficult to discern any clear basis for imputing a causal relationship between them.

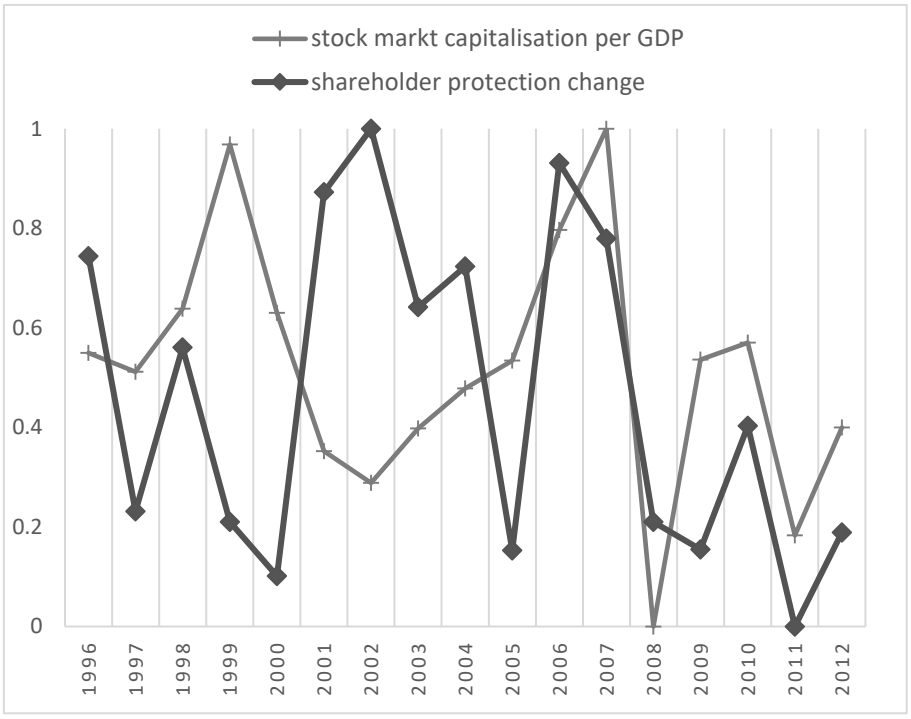


*Figure 4. Trends in stock market capitalisation and change in shareholder protection, 28 countries, 1996-2013. Sources: see Figure 3.*

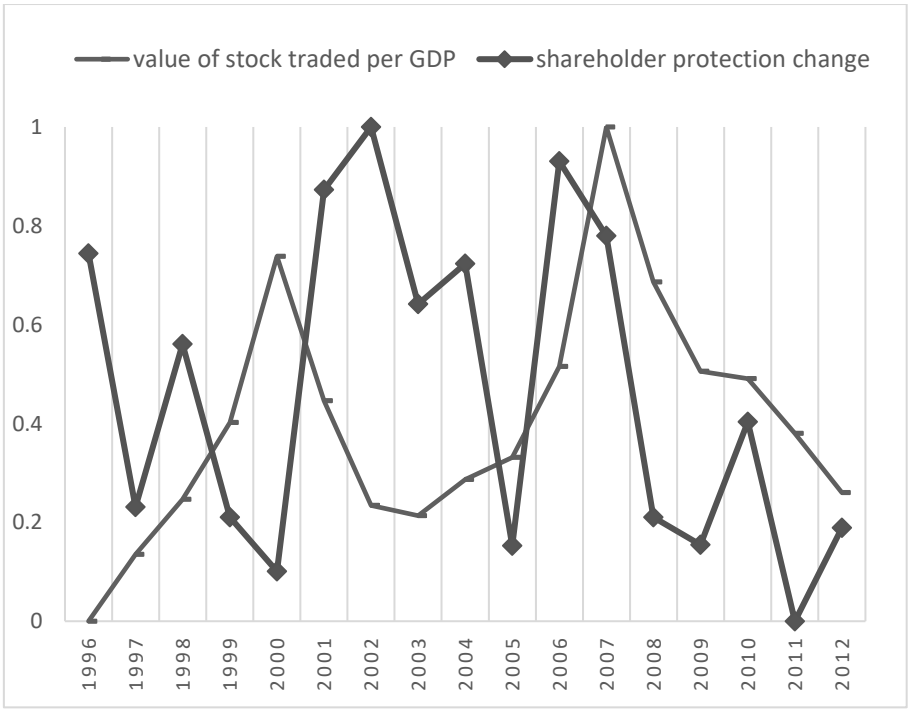


*Figure 5. Trends in the value of stock traded and change in shareholder protection, 28 countries, 1996-2013. Sources: see Figure 3.*

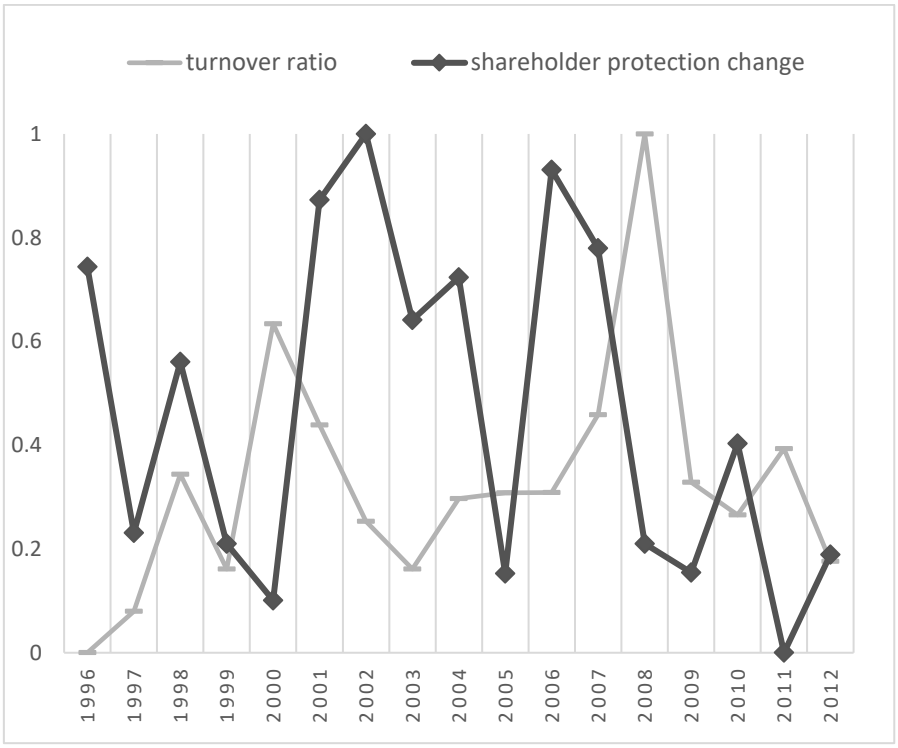


*Figure 6. Trends in the turnover ratio and change in shareholder protection, 28 countries, 1996-2013. Sources: see Figure 3.*

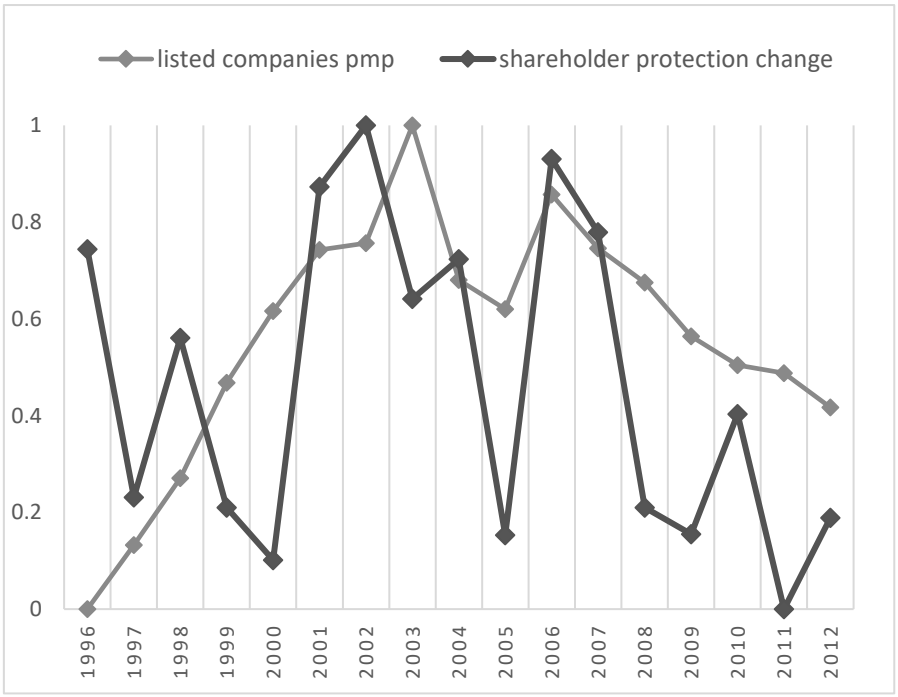


*Figure 7. Trends in number of listed companies per million of population and change in shareholder protection, 28 countries, 1996-2013. Sources: see Figure 3.*

### 3.2 Examining the law-finance relation in closer detail: Granger causality tests

To examine more systematically whether stock market development caused, or was caused by, changes in law, we use panel VAR (Vector-Autoregressive) and VEC (Vector Error Correction) Granger causality tests (on which, see Granger, 1969; Engle and Granger, 1987). In this approach, if the addition of lagged values of an independent variable to a regression alters its relationship with an outcome variable, it is conventional to talk of causality flowing from one to the other. Strictly speaking the Granger causality test identifies precedence rather than causation but it can be taken as a sign that causal relations may be present and it may thereby help to indicate the direction of a causal relationship.

We fit a regression where X (alternative stock market variables taken one at a time) is a function of its own past values and of past values of the control variable Y (real GDP growth rate ) and Z (the shareholder protection index):

$$X_{it} = \alpha + \sum_{j=1}^{p} \lambda_j X_{i,t-j} + \sum_{k=1}^{p} \psi_k Y_{i,t-k} + \sum_{l=1}^{p} \pi_l Z_{i,t-l} + \varepsilon_{it} \quad (1)$$

This provides a test of whether a change in the shareholder protection index "Granger causes" a change in the stock market variable. To see if the converse applies, we can reconstitute the regression with shareholder protection as the outcome variable and the stock market as the causal one.

We use as a control variable the real growth rate of GDP (GGDP). This can be expected to net out the country-specific effects of time-trend and cyclical fluctuations on stock market variables. In earlier research using the CBR dataset (Sarkar, 2013; Deakin et al., 2014), the log of real GDP was used as a control; for international comparability, values were converted into a common measure using purchasing power parity exchange rates. Using this approach, currency exchange market complications and the arbitrariness involved in finding a common basket of commodities may, however, obscure the true picture of country-wise time-trends and cyclical fluctuations. Furthermore, for some countries these PPP-GDP data are not available. For these reasons, GGDP is a better control variable for our current sample. The data on GDP growth are also sourced from the World Bank's World Development Indicators.

In fitting the above equation, we need to test whether the coefficients of the lags of Z are jointly significant (that is, different from zero) using the Wald-test statistic (having a chi-square distribution). The null hypothesis is that $\pi_1=\pi_2 =\ldots =\pi_p = 0$. If the Wald test statistic (distributed as a chi-square) calculated on the basis of this null hypothesis is very high (higher than the relevant critical value of the chi-square distribution), we can say that Z causes X (rejecting the null hypothesis of no causality), as the past values of Z influence the current value of X.

Instead of fitting the equations in level terms we can fit the equation in first-difference terms ($\Delta X$, $\Delta Y$ and $\Delta Z$) and their various lags. Replicating the VAR test in terms of first-difference we can get a VEC causality test.

For the choice of lag (that is, how many past years are to be included in the causality test), we use a number of criteria including the sequential modified LR test statistic (LRM), the final prediction error (FPE), the Akaike information criterion (AIC), the Schwarz information criterion (SC), and the Hannan-Quinn information criterion (HQ). Different criteria tend to suggest different lag lengths. We have taken the maximum of the alternative lag lengths chosen by these criteria as the order of the VAR causality tests. Subtracting one from the order of the VAR test we get the order of the VEC test.

We can see from Table 2A that the Granger causality tests disclose no statistically significant impact of changes in shareholder protection laws on stock market development indicators. However, Table 2B reports a significant causal influence of the volume of shares traded and the turnover ratio on the SPI. This implies that while there might be causal relations running in both directions between legal and financial variables, the stronger influence is that running from the economy to the legal system.

### 3.3 Distinguishing between short-term and long-term relationships: dynamic panel data analysis

Granger causality tests aim to clarify the predominant direction of causality between two variables, but do not provide much other information on the nature of the relationship between them. A complementary approach which allows for a richer analysis of interactions between variables over time is the dynamic panel data analysis proposed by Pesaran et al (1999). In particular, this makes it possible for us to take a closer look at what may be going on in cases where legal change triggers a financial response of some kind.

Conventional panel data analysis of the law-finance relation (for example, La Porta et al., 1998; Guillén and Capron, 2016) in effect treats the relationship between legal change and economic outcomes as instantaneous, which is an unrealistic basis for analysis. By contrast, the models proposed by Pesaran et al. (1999) make it possible to model the impact of legal change in a more dynamic way which captures lags and feedback effects. In particular this approach makes it possible to model the impact of a regulatory change in terms of an initial short-term relationship, followed by an adjustment path which generates a long run relationship. This captures in a formal way the intuition that legal change will often generate an effect after a lag or delay of some kind, as well as the possibility that short-run and long-run outcomes may differ in both direction and magnitude, as firms adjust to and absorb the impact of a regulatory "shock" (for further discussion of these effects, see Deakin et al., 2014).

*Table 2. Causal Relationships between Shareholder Protection and Stock Market Development Indicators for the Panel of 28 Countries, 1996-2012: Panel VAR and VEC Granger Causality Tests*

*Table 2A: Influence of Shareholder Protection on Stock Market Development*

(i) Panel VAR Causality Tests

| Independent variable | Dependent variable | Test statistic: Chi-square | Lag chosen | Probability |
|---|---|---|---|---|
| SPI | MKAPY | 0.697993 | 3 | 0.8737 |
| SPI | VSTKY | 1.088249 | 3 | 0.7799 |
| SPI | TURNOVER | 5.931291 | 4 | 0.2043 |
| SPI | LISTPOPM | 2.358729 | 3 | 0.5014 |

(ii) Panel VEC Causality Tests

| Independent variable | Dependent variable | Test statistic: Chi-square | Lag chosen | Probability |
|---|---|---|---|---|
| SPI | MKAPY | 0.117426 | 2 | 0.9430 |
| SPI | VSTKY | 0.514655 | 2 | 0.7731 |
| SPI | TURNOVER | 5.642451 | 3 | 0.1304 |
| SPI | LISTPOPM | 1.635842 | 2 | 0.4413 |

*Table 2B: Influence of Stock Market Development on Shareholder Protection*

(i) Panel VAR Causality Tests

| Independent variable | Dependent variable | Test statistic: Chi-square | Lag chosen | Probability |
|---|---|---|---|---|
| MKAPY | SPI | 3.432790 | 3 | 0.3296 |
| VSTKY | SPI | 7.935319** | 3 | 0.0474 |
| TURNOVER | SPI | 11.77230** | 4 | 0.0191 |
| LISTPOPM | SPI | 1.097397 | 3 | 0.7777 |

(ii) Panel VEC Causality Tests

| Independent variable | Dependent variable | Test statistic: Chi-square | Lag chosen | Probability |
|---|---|---|---|---|
| MKAPY | SPI | 2.519774 | 2 | 0.2837 |
| VSTKY | SPI | 9.751199*** | 2 | 0.0076 |
| TURNOVER | SPI | 10.68342** | 3 | 0.0136 |
| LISTPOPM | SPI | 1.635842 | 2 | 0.4413 |

Notes:

The null hypothesis of no causality is rejected at the 5 % level (**) and 1% level (***).

Sources: MKAPY (stock market capitalisation as a % of GDP), VSTKY (value of stock trading as a % of GDP), TURNOVER (turnover ratio, or ratio of stock trading over stock market capitalisation) and LISTPOPM (listed companies per million of population) are derived from the World Bank's *World Development Indicators*. SPI (shareholder protection index) is derived from the CBR Leximetric Datasets (Siems, 2016).

Pesaran et al. (1999) suggest three alternative models which make different assumptions about the way in which unobservable cross-national differences mediate the reception of a common event affecting a group of countries. At one extreme there is the dynamic fixed effect model (DFE). Here, intercepts vary across the countries, but all other parameters and error variances are constrained to be the same. One way of thinking about this model, in the context we are considering, is that it assumes that a legal change impacts on financial variables in the same way across different countries, country-level heterogeneities notwithstanding.

At the other extreme, in the mean group (MG) model, separate equations for each country are estimated and used to calculate the mean of the estimates. In this approach the underlying assumption is that the legal change impacts on finance in a different way in each country.

The intermediate alternative is the pooled mean group (PMG) estimator, which allows intercepts, short-run coefficients and error variances to differ freely across the countries, while constraining the long run coefficients to be the same (in other words, $\psi_i = \psi$ and $\pi_i = \pi$ for all i while $\theta_i$ may differ from group to group). The PMG model is the most interesting and intuitively appealing of the three because it tests the claim that while the initial effects of a global regulatory "shock" are likely to differ from one system to the next, thanks to country-level heterogeneities, over time there may be a degree of convergence as economies respond in a similar way to a changed institutional environment.

Each model presupposes a long-term relationship of some kind among the variables. Thus a first step is to carry out tests of panel cointegration. These indicate that there are indeed long-term relationships (Table 3).

*Table 3: Tests of Cointegration among the stock market development indicators, real GDP growth rate and Shareholder Protection Index: Selected Number of Cointegrating Relations by Model*

*Table 3A: Stock Market Development Indicator: MKAP*

| Data Trend: | None | None | Linear | Linear | Quadratic |
|---|---|---|---|---|---|
| Test Type | No Intercept No Trend | Intercept No Trend | Intercept No Trend | Intercept Trend | Intercept Trend |
| Trace | 3 | 3 | 3 | 2 | 3 |
| Max-Eigen-value | 3 | 3 | 3 | 2 | 3 |

*Table 3B: Stock Market Development Indicator: VSTKY*

| Data Trend: | None | None | Linear | Linear | Quadratic |
|---|---|---|---|---|---|
| Test Type | No Intercept No Trend | Intercept No Trend | Intercept No Trend | Intercept Trend | Intercept Trend |
| Trace | 3 | 3 | 3 | 3 | 3 |
| Max-Eigen-value | 3 | 3 | 3 | 3 | 3 |

*Table 3C: Stock Market Development Indicator: TURNOVER*

| Data Trend: | None | None | Linear | Linear | Quadratic |
|---|---|---|---|---|---|
| Test Type | No Intercept No Trend | Intercept No Trend | Intercept No Trend | Intercept Trend | Intercept Trend |
| Trace | 3 | 3 | 3 | 3 | 3 |
| Max-Eigen-value | 3 | 3 | 3 | 3 | 3 |

*Table 3D: Stock Market Development Indicator:* LISTPOPM

| Data Trend: | None | None | Linear | Linear | Quadratic |
|---|---|---|---|---|---|
| Test Type | No Intercept No Trend | Intercept No Trend | Intercept No Trend | Intercept Trend | Intercept Trend |
| Trace | 2 | 2 | 2 | 2 | 2 |
| Max-Eigen-value | 2 | 2 | 2 | 2 | 2 |

Sources: see Table 2

We next consider the nature of the long-run relationships in question. Where X indicates stock market development, Y is the real growth rate of GDP, and Z is the shareholder protection index, SPI, we have the following initial relationship between the variables, where i (=1,2,3..) represents countries, t (=1,2,… ) represents periods (years), $\psi_i$ and $\pi_i$ are the long-run parameters, and $\eta_{it}$ is the error term.

$$X_{it} = \psi_i Y_{it} + \pi_i Z_{it} + \eta_{it} \quad (2)$$

Following Pesaran et al. (1999), we then use the following error correction representation:

$$\Delta X_{it} = \theta_i \left(\eta_{it-1}\right) + \sum_{j=1}^{p-1} \lambda_{ij} \Delta X_{i,t-j} + \sum_{k=0}^{q-1} \psi_{ik} \Delta Y_{i,t-k} + \sum_{l=0}^{r-1} \pi_{il} \Delta Z_{i,t-l} + \mu_i + \phi_{it} \quad (3)$$

where $\Delta$ is the difference operator, $\theta_i$ is the country-specific error-correcting speed of adjustment term, $\lambda_{ij}$, $\psi_{ik}$ and $\pi_{il}$ are the coefficients of the lagged variables, $\mu_t$ is the country fixed effect and $\phi_{it}$ is the disturbances term. The existence of a meaningful long-run relationship with a stable adjustment dynamics requires $\theta_i < 0$.

We use the STATA model developed by Blackburne and Frank (2007) to estimate the three alternative models developed by Pesaran et al. (MG, PMG and DFE). The lag structure (p, q, r) is determined with the help of the Lag Exclusion Wald Test for each variable separately (within the maximum lags chosen in the relevant panel VEC causality tests). A series of Hausman tests (MG vs. PMG, DFE vs. MG and DFE vs. PMG) are then carried out to identify the most appropriate model in each case.

Table 4 reports the results of our dynamic panel data analysis. They show no significant positive impact of shareholder protection law on stock market development for two out of the three models (the DFE and MG models). In the case of the PMG model, on the other hand, they show a significant, positive long-term impact of shareholder protection on three of the stock market variables (market capitalisation, value of shares traded, and turnover ratio), and a negative one in the case of the fourth (number of listed companies). This negative impact of SPI on listed firms is also observed in the DFE model.

The Hausman test suggests that the PMG model is the most reliable one only in the case of the finding that shareholder protection impacts negatively on the number of listed companies. In the case of market capitalisation, the Hausman test is unable to identify an appropriate model. In the case of shares traded and the turnover ratio, the DFE model is chosen; this indicates a negative, although non-significant, impact of shareholder protection on stock market development.

*Table 4: Short-run and Long-run Impact of Shareholder Protection Index on Stock Market Development Indicators, 1996-2012: Dynamic Panel Models*

*Table 4A. Dependent variable: stock market capitalisation (MKAPY)*

| Independent and control variables | PMG Model | MG Model | DFE Model |
|---|---|---|---|
| Long-term Relationship | | | |
| GGDP | 11.227*** | 12.326*** | 3.07*** |
| SPI | 1.841*** | 7.374 | -1.907 |
| Short-term relationship | | | |
| $\theta$ | -.981*** | -1.799*** | -.655*** |
| $\Delta MKAPY_{t-1}$ | -.136 | .241 | -.009 |
| $\Delta MKAPY_{t-2}$ | -.116 | .156 | -.04 |
| $\Delta GGDP_{t}$ | -5.45*** | -12.137*** | -.87 |
| $\Delta GGDP_{t-1}$ | -4.762*** | -9.165*** | -1.412*** |
| $\Delta GGDP_{t-2}$ | -.854 | -3.888 | -.182 |
| $\Delta SPI_{t}$ | 3.452 | 7.304 | 2.792 |
| $\Delta SPI_{t-2}$ | 11.807 | 5.256 | -.899 |
| $\mu$ | 41.119 | 24.159 | 48.602*** |
| Chosen Model | | | |

*Table 4B. Dependent variable: value of stock market trading (VSTKY)*

| Independent and control variables | PMG Model | MG Model | DFE Model | |
|---|---|---|---|---|
| Long-term relationship | | 6.866 | | 8.545*** |
| GGDP | 1.453*** | 6.866 | 8.545*** | |
| SPI | 2.485*** | 7.016 | -.318 | |
| Short-term relationship | | | | |
| $\theta$ | -.302*** | -.684*** | -.45*** | |
| $\Delta GGDP_{t}$ | 3.333* | -8.715** | -1.792** | |
| $\Delta GGDP_{t-1}$ | 1.949** | -4.479** | -1.169* | |
| $\Delta GGDP_{t-2}$ | 1.364 | -3.11* | -.828 | |
| $\Delta SPI_{t}$ | 14.537 | .541 | 2.319 | |
| $\Delta SPI_{t-2}$ | -8.239 | -10.769 | -1.261 | |
| $\mu$ | 17.182** | 124.034* | 17.292 | |
| Chosen Model | | | DFE | |

*Table 4C. Dependent variable: turnover ratio (TURNOVER)*

| Independent and control variables | PMG Model | MG Model | DFE Model | |
|---|---|---|---|---|
| Long-term relationship | | | 6.866 | 8.545*** |
| GGDP | 4.188*** | 38.836 | 5.229 | |
| SPI | 9.872*** | 106.097 | -9.145 | |
| Short-term Relationship | | | | |
| $\theta$ | -.477*** | -.751*** | -.352*** | |
| $\Delta TURNOVER_{t-1}$ | .283 | .992 | .021 | |
| $\Delta TURNOVER_{t-2}$ | -.272 | -.272 | .189** | |
| $\Delta GGDP_{t}$ | 1.323 | 6.521 | -.147 | |
| $\Delta GGDP_{t-1}$ | -6.291 | 1.13 | -.635 | |
| $\Delta GGDP_{t-2}$ | .461 | -1.958 | -.824 | |
| $\Delta GGDP_{t-3}$ | 1.838 | 5.296 | -.46 | |
| $\Delta SPI_{t}$ | -9.988 | 37.747* | 5.129 | |
| $\Delta SPI_{t-2}$ | 17.657 | 24.274* | 7.322 | |
| $\mu$ | 4.298 | 229.352* | 41.223** | |
| Chosen Model | | | DFE | |

*Table 4D. Dependent variable: listed companies (LISTPOPM)*

| Independent and control variables | PMG Model | MG Model | DFE Model |
|---|---|---|---|
| Long-term Relationship | | | |
| GGDP | .33*** | .852 | .673 |
| SPI | -1.14*** | -3.068 | -3.102** |
| Short-term Relationship | | | |
| $\theta$ | -.253*** | -.444*** | -.299*** |
| $\Delta GGDP_{t}$ | .048 | .013 | -.109 |
| $\Delta GGDP_{t-1}$ | -.198 | -.231 | -.107 |
| $\Delta GGDP_{t-2}$ | -.072 | -.139 | -.058 |
| $\Delta SPI_{t}$ | -.1999 | .401 | -.143 |
| $\mu$ | 8.343*** | 19.445*** | 11.863*** |
| Chosen Model | PMG | | |

Notes

Significances are reported at the 10% level (*), 5 % level (**) and 1% level (***).

The most appropriate model is chosen on the basis of a series of Hausman tests. In Table 4A the Hausman test could not identify a most appropriate model.

Sources: see Table 2.

These results therefore disclose some evidence of a positive effect of shareholder rights on stock market capitalisation, value of shares traded and the turnover ratio. The results would have been clearer if the Hausman test had identified the PMG model as the most statistically appropriate one in each case, but all the same they point to the possibility that legal reforms are having a common, convergent impact across countries over time. The PMG result is clearest in the case of the negative impact of shareholder protection on the number of listed firms. This result can be interpreted as evidence of managers de-listing firms in response to laws and regulations empowering shareholders (see Armour et al., 2009a). It can also be read as implying that increases in shareholder rights have a non-linear relationship with corporate governance outcomes; beyond a certain point, empowering shareholders no longer generates gains in terms of reduced agency costs, but adds to the costs of regulatory compliance and inhibits effective management (Deakin et al., 2012; Katelouzou and Siems, 2015).

## 4. Interpretation

Our results have implications for the understanding of the process by which global trends in corporate governance regulations are translated into financial outcomes at country level. We can see, firstly, that the adoption of national laws empowering shareholders was not simply a response to the emergence, in the 1990s and 2000s, of a new global standard. On the contrary, our Granger causality results suggest that demand for such laws was, at least in part, endogenous to financial development at country level.

Granger causality tests are an indication of the historical precedence of one variable over another; in our study, they show that increases in the value of stock trading and in the turnover ratio preceded the legal strengthening of shareholder rights. This is consistent with the view that changes in corporate law are a response to prior developments in the scale and structure of financial markets, which country-specific research on the history of stock market development has previously argued to be the case (Cheffins, 2001; Coffee, 2001; Franks, Mayer and Rossi, 2009).

It is not clear from our analysis which particular mechanisms might be driving adjustments in the law. The historical research just cited points to the rise of an investor class in the course of the nineteenth century as one factor (among others) strengthening legal backing for shareholder rights. It has also been argued that more recent law reforms in the US and India, for example, favouring the interests of shareholders and other investors, can be related to the influence of lobbying (Armour and Lele, 2009; Rock, 2013). However, other research has explored the possibility that lobbying does not necessarily lead to legal change, since law making may often be insulated from private participation. This line of work suggests that there is much variation between countries on the relevance of lobbying (Milhaupt and Pistor, 2008: 176; Cioffi and Höpner, 2006).

It is also possible that countries adopt pro-shareholder corporate laws as part of a wider strategy of seeking foreign direct investment, and that they are more likely to do so when subject to structural adjustment reforms of the kind initiated by the IMF. In addition, the presence of particular types of investment fund in a country, such as sovereign wealth funds or hedge funds, may serve as to put pressures on governments to initiate pro-shareholder legal reforms. We do not have systematic data for all countries and years within

the range of our current study to be able to identify these effects, but collating data of this kind with a view to carrying out such an analysis would be an appropriate focus for future research.

While taking into account the likely influence of economic and financial changes on the legal system, we should not neglect the possibility that corporate law changes can, in turn, trigger or stimulate financial development. Our Granger causality analysis does not rule out the possibility of law influencing finance, even if it does suggest that the effects of the economy on the legal system may be stronger.

Focusing on the possibility that law does affect finance, our dynamic panel data analysis provides some (weak) evidence of a positive impact of shareholder protection on stock market values and trading, and some (stronger) evidence of negative effect on the number of listed companies. It would seem then that there has been a connection between legal and regulatory reforms, on the one hand, and stock market development, on the other, over the period of our study, but that the relationship is complex and not altogether consistent in its effects upon financial indicators.

We see that increased shareholder protection may, over time, have the effect of increasing share values as measured by stock market capitalisation, and of deepening stock market activity as measured by the volume of shares traded and the turnover ratio. This is evidence in favour of the view that shareholder protection encourages investor participation in equity markets by reducing managerial agency costs. If so, shareholder protection should lead to a reduction in the cost of capital, although we cannot infer that result directly from our study. We should also recognise that many factors may affect stock market liquidity, including herding and similar effects associated with "bubbles", and that our analysis does not make it possible to disaggregate the effects of the law alongside other factors. The link we find between shareholder protection and the volume of shares traded, on the one hand, and the turnover ratio, on the other, may be a better measure of the tangible influence of legal changes on the scale and depth of stock market activity. With additional data we might be in a better position to see if a legal change initiates an increase in IPOs and rights issues. This is a matter for future research.

The existence of a negative relationship between shareholder protection and the number of listed companies might seem at odds with some of the other results. It could indicate that increased legal protections for shareholders induce excessive compliance costs for companies, deterring listings and artificially increasing the cost of equity capital for firms. On the other hand, the introduction of more stringent corporate governance requirements for listed firms could be seen as encouraging smaller and less efficient firms to de-list. A further possibility is that smaller and less efficient firms are more vulnerable to takeover (and hence to de-listing) in a context where larger and more efficient ones can more easily access finance. Country-level studies of the kind carried out by Franks et al. (2009) for the UK could be a way to analyse in a more fine-grained way the possibly conflicting or mutually-offsetting effects of shareholder protection on patterns of listing and de-listing.

The inherent limitations of our analysis should be acknowledged. We have presented results from a panel data analysis in which many country-level effects cannot be directly observed. The panel data models we have used make different assumptions about the

nature of unobserved cross-country heterogeneity. Making assumptions of this kind is unavoidable in a panel-data analysis which has the merit of identifying trends across a range of countries. The alternative approach would be to study individual national systems more closely in order to reveal more of the country-specific effects which we cannot observe in the panel data study. Single country studies or paired comparisons may not be able to produce generalisable findings in the same way that panel studies can, but they may be able to throw more light on the institutional and other factors which mediate the effects of legal and regulatory change at country level. Ideally, panel data approaches and more detailed country studies should be used in conjunction with each other (Buchanan et al., 2014). The present paper suggests that more work can be done on studying country-specific effects of the kind which might be driving our finding of the equivocal and possibly even counter-productive impact of laws and policies aimed at empowering shareholders.

## 5. Conclusion

In this paper we have presented new evidence on the relationship between changes to laws and regulations affecting corporate governance, on the one hand, and changes in the structure and scale of financial markets, on the other. Our leximetric evidence on the extent of legal changes affecting shareholder rights shows a high degree of convergence across developed and developing countries in the 1990s and 2000s, with middle income countries, in particular Russia and China, taking the lead in adopting pro-shareholder reforms. Our econometric evidence suggests that while this trend was global in nature, it was not simply a response to the generation of new international standards during the period of the study. On the contrary, analysis using Granger causality techniques suggests that financial development, in the form of increasing stock market values and a higher value of stock trading, preceded legal changes.

However, our dynamic panel data analysis suggests that evidence for the converse effect – namely, the positive impact of legal changes on financial development – is weak and equivocal. We used the pooled mean group regression model to estimate whether a short-term regulatory "shock" generates a stable adjustment path to a long-term relationship of some kind. Using this approach, we find some evidence of a positive long-term effect of increases in shareholder protection on stock market capitalisation, the value of shares traded, and the turnover ratio. However, Hausman tests do not consistently identify the pooled mean group regression as the most appropriate model when compared to models incorporating different assumptions on the likely nature of any consistent or generalisable cross-national effect, some of which point to a negative impact of shareholder protection on stock market values and trading volumes. For this reason, the positive results we get from the pooled mean group regression must be regarded as provisional until better evidence becomes available. Where we do get an unequivocal result, it shows that a tightening of shareholder protection led to a reduction in the number of listed companies, which suggests that managers, when faced with stricter controls, responded by taking companies private.

The belief that corporate law reform would lead to financial development in emerging markets has been a core part of the policy of the international financial institutions since the mid-1990s. It is becoming clear, however, that this belief is only partially borne out

by the evidence. The emerging picture is, on the one hand, that of the endogenous development of corporate law in response to trends in financial markets, but, on the other, of a transmission mechanism linking legal reform to economic outcomes which is incomplete at best.

Our results do not in themselves cast doubt on the importance of North's insights on the relevance of property rights for economic growth, but they do suggest that it may be misleading to think of the relationship between legal change and financial development as a straightforwardly linear one. Legal reforms are likely to be stimulated by endogenous demand for property rights protection, rather than operating as a wholly exogenous force, shaping economic outcomes. Thus, in principle, a coevolutionary framework for understanding the law-finance relation, which allows for reciprocal causation and dynamic interactions between the legal and financial systems (Aoki, 2007, 2010; Buchanan et al., 2014), would seem to be called for. At the same time, as we have seen here, the weight of evidence is that there is a strong influence running from finance to law, so that any such reciprocity is asymmetric. This cautions against the view that legal reforms will generally translate in a straightforward way into improved financial outcomes.

This "asymmetric' understanding of the law-finance relation has implications for the design of transnational corporate governance standards, such as those promoted by the World Bank and the OECD. Where changes to the laws of a given country are triggered by external factors such as the influence of international standard-setting bodies, the presence of endogenous demand, coupled with complementary institutions at country-level, will make a difference to the effectiveness of the law in practice and hence to financial outcomes.

It is likely that we are seeing, in our panel data analysis, only a weak and partial impact of law on financial development, because of the diversity of country-specific factors which mitigate or counteract the influence of legal reforms. Thus our results suggest that more work needs to be done on understanding the institutional conditions needed for legal reforms to be translated into financial development at country level. They point up the need for empirical analyses which are sensitive to country-level effects which are not easily observable in large panels. In addition they may serve as a cautionary message to policy makers on the limits of what can be achieved through transnational harmonisation initiatives.

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