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Does rule of law support the capital market?

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ABSTRACT

By using data for 45 countries, for a time span between 2009 and 2014, the present paper supports the thesis of a positive and significant correlation between the rule of law and capital market development. In order to achieve this goal, the *Rule of Law* variable reported by Worldwide Governance Indicators is considered. The relationship remains robust even if control variables such as other legal system variables, including protection of minority investors, enforcing contracts or strength of legal rights of borrowers and lenders as well as initial levels of market development, economic growth, market liquidity, domestic credit to private sector and foreign direct investments are considered.

1. Introduction

The concept of the rule of law, which refers basically to the *absolute supremacy of the ordinary law as opposed to arbitrary power on the part of the government, to the fact that all are equal before the law and to the fact that the rights of the individuals are secured by the remedies of private laws rather than by guarantees set in a formal way (*Dicey, 1960; Marshall, 1971; Wade & Bradley, 1985), is not a new one. The rule of law refers to the laws, regulations, government policies and programmes, and basic infrastructure and services that support the full functioning of a market-based economy (North, 1990). The rule of law determines the extent of protection and enforcement of legal rights of local companies and physical persons (Fogel, Hawk, Morck, & Yeung, 2006).

The rule of law was regarded as taking into account the linkage between law and economic development, through property rights and contract enforcement (Asoni, 2008; Coase, 1960; Williamson, 1971).

Newer literature sets a focus on the role of institutions (Acemoglu, Johnson, & Robinson, 2005) and shows that these institutions are significant for long-run economic performance. A broad literature has appeared about the connection between more robust property rights protection and better long-run economic performance (Asoni, 2008; Barro, 1997; Keefer, 2004). Institutions serve as the 'humanly devised constraints that shape human interactions' in order to reduce uncertainty in economic transactions by establishing an efficient,

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predictable and stable structure to exchange (North, 1990; Peng, 2010). Institutions are 'the rules of the game or humanly devised structures that provide incentives and constraints to economic players' (North, 1990), their role being to reduce uncertainty (Peng, 2010) and risks associated with political instability, social unrest, government policies and interference in business operations.

Shleifer and Vishny (1986) argue that centralised political institutions provide incentives for leaders to limit the extent of arbitrary behaviour on the part of lower-level officials. In the case of decentralised corruption, property rights are less secure (Mauro, 1995). When analysing the factors that can generate economic growth, the endogeneity of institutions is a sensitive issue. And the tendency to autocorrelation also complicates the problem of measuring the rule of law (Arndt & Oman, 2006).

One important element of international competitiveness and national economic growth is the formal institutional environment (government legislation, policies and programmes) (Peng, 2010).

In 1997, Barro, in order to measure the rule of law, argued that an overall index of the 'law and order tradition' provides the best measurement for 'overall maintenance of the rule of law'. He considers that the attractiveness of a country's investment climate is determined by the effectiveness of law enforcement and the state of other influences on the security of property rights. He also proves in his study that democracy does not have positive effects and might even be mildly adverse for growth.

A country with sound political institutions, a sound and strong judicial system, clear rules and citizens willing to accept the established institutions and laws is considered to have a strong rule of law (Oxley & Yeung, 2001). The rule of law contributes to the creation of a stable financial environment (Hausmann, Pritchett, & Rodrik, 2005) where property rights are protected (Haggard & Tiede, 2011) and investors feel trust in the transactional environment (Fogel et al., 2006).

If legal institutions matter, ownership concentration should be higher in countries with poor investor protection than in countries with strong protections for investors, mainly because minority shareholders are more prudent in countries with weak legal protection.

There is research trying to identify the impact of institutional quality on financial development (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1997, 1998). This research considers that legal origins are important in determining creditor rights and that the effectiveness of legal institutions has a strong impact on equity and credit market development. Nacuer, Ghazouani, and Omran (2007) found that macroeconomic instability has a negative and significant relationship with stock market capitalisation. Others have tried to explain the relation between liquidity in the stock market and the development of the stock market. Some consider that liquidity in the stock market is good for the development of the stock market (Levine & Zervos, 1998; Yartey, 2008), while others argue to the contrary (Shleifer & Vishny, 1986). Yartey (2008) explains that liquid markets facilitate the investors' access to their savings, boosting their confidence in stock market investment. Bencivenga, Smith, and Starr (1996) argue that liquidity affects the choice of investments because liquid markets allow the ownership of capital to be transferred at lower costs.

In the next part of the paper we develop a theoretical framework by taking into account and explaining the links between the financial markets' evolution, rule of law and different factors considered to be relevant (see for instance Revia (2013) for a similar approach). Among these, we refer to economic growth, market-related risk, institution development,

interactions with the banking system, etc. We also present the data sets that we used for testing our hypothesis. The final part of the paper is dedicated to presenting the results we have obtained and to drawing conclusions.

2. Theoretical framework

In the present paper, we base our theoretical framework on a simple model of development of financial markets. Such a model aims to capture the non-linear linkages between financial markets' status and a set of various factors which are related to: (1) the overall economic growth; (2) the market efficiency (as this is expressed in terms of the market's returns) and (3) the specific endogenous and exogenous risks.

First, we consider the non-uniform impact of economic growth on markets' developments. In the short term, fast growth processes might lead to deep structural changes for various economic sectors and hence might induce a functional instability at the market level. However, in the long run, markets are driven by overall economic performances and there are bi-univocal relationships between the evolutionary patterns of financial sectors and growth.

Second, a key intrinsic factor of market development is related to key return and risk variables: higher returns will attract more investors and hence can contribute to an increase in market liquidity. Meanwhile, 'excessive' returns can be seen as a reflection of various types of market inefficiency and imperfect market mechanisms. Similarly, a certain level of different intrinsic and extrinsic risks assumed by investors can be seen as 'part of the game'. But 'too high' levels of risks can induce greater preferences for speculative behaviours and can lead to moral hazards and adverse selection situations.

Formally, the evolution of a variable reflecting market development (such as market capitalisation) can be depicted as:

$$m_t = \alpha_0 - \alpha_1 y_t + \alpha_2 y_t^2 + \alpha_3 \eta_t - \alpha_4 R_t + \alpha_5 x_t + \varepsilon_t^M,$$
$$\varepsilon_t^M \sim N\left(c; \sigma_\varepsilon^2\right) \tag{1}$$

Here m stands for (logarithm of) market capitalisation during the current period t, α_0 is long-run trends in market development, y is the economic growth, η is a measure of market returns, R is the global trading risk, x is a matrix containing the dynamics of other relevant determinants of market development and ε^M is exogenous shock information (supposed to follow a normal distribution).

Bencivenga et al. (1996) argue that stock market liquidity contributes to growth. Also, Obstfeld (1994) shows that internationally integrated stock markets help investors use international risk sharing and contributes to an increased rate of economic growth. Still, not all authors have similar opinions. Devereux and Smith (1994), for example, consider that international risk sharing does not contribute to generating economic growth, but on the contrary it can reduce saving rates and decrease economic growth. Levine and Zervos (1998) establish a connection between stock market development and economic growth by using pooled cross-country time series regressions and the conglomerate index of overall stock market development created by Demirguc-Kunt and Levine (2008). They show that stock market development is positively correlated with measures of financial intermediary development and also with economic growth.

Hence, the literature reveals three channels between stock market development and economic growth: liquidity, diversification and a corporate market.

In addition, La Porta et al. (1997, 1998) documented empirically that legal rules protecting investors depend upon the legal traditions. They show that the laws of common law countries are more protective of outside investors than the laws of civil law.

Hence:

$$R_t = \beta_0 + \beta_1 \Psi_t - \beta_2 L_t + \varepsilon_t^R,$$
$$\varepsilon_t^R \sim N\left(c; \sigma_{\varepsilon^R}^2\right)$$

(2)

Here L is an index of institutions and public policies status and effectiveness aiming to capture the institutional features of the social and economic environment.

It should be noticed that relation (2) implies a full spectrum of risk-averse behaviours. Hence, the implicit hypothesis here is that the market is formed by agents with heterogeneous risk profiles. It also implies that various cases of 'irrational' / 'bounded rational' behaviours are occurring under the impact of individual and social mechanisms.

Substituting (2) in (1) yields:

$$m_t = \alpha_0 - \alpha_1 y_t + \alpha_2 y_t^2 + \alpha_3 \eta_t + \alpha_4 \left[\beta_2 L_t - \left(\beta_0 + \beta_1 \Psi_t\right)\right] +$$
$$+\alpha_5 x_t + \varepsilon_t,$$
$$\varepsilon_t = \varepsilon_t^M + \varepsilon_t^R$$

(3)

The model can be extended by accounting for the interactions between financial markets and the banking system. More exactly, it can be argued that investors acting in financial systems with larger (deeper and more efficient) banks can benefit from a reduction in the costs of risk absorption while the markets as a whole benefit from some 'reputation bonuses'. At the same time, larger financial markets allow banks to benefit from more efficient instruments of risk management and to better screen their borrowers. However, an easier access to bank loans and a better design of the rights of borrowers and lenders will attenuate the need of non-financial agents to bypass the lending from credit institutions by issuing financial instruments of debt, and hence will be rather less supportive of the development of financial markets and will inhibit the incentives for initial public offerings.

As Fama and Diamond show (Diamond, 1991; 1997; Fama, 1985), granting and renewing bank loans provides positive signals to outside investors. James (1987) finds that bank loan agreements convey positive information to investors. Still, Lummer and McConnell (1989) identify a difference between the impact of new credits being granted versus the renewal of old ones, and show that the information useful for capital markets arises more from the monitoring of already existing credits. Bank lending also reduces the cost for firms seeking to access capital markets (Datta, Datta, & Patel, 1999). Yasuda (2005) proves that bank relationships are valuable for junk-debt and first-time issuers, and Drucker and Puri (2007) show that commercial bank credit reduces underwriting fees and gross spreads of equity offerings.

Banks that operate in systems with deeper and more efficient capital markets have lower costs of risk absorption and reputation signalling than banks operating in smaller capital markets.

Thus:

$$R_t = \beta_0 + \beta_1 \Psi_t - \beta_2 L_t - \beta_3 b_t + \varepsilon_t^R,$$
$$\varepsilon_t^R \sim N\left(c; \sigma_{\varepsilon^R}^2\right) \tag{4}$$

Here b is a variable describing the importance of banking sector for the financial intermediation processes (such as the domestic credit provided to private sector by banks).

Jointly considering (2) and (4):

$$m_t = \alpha_0 - \alpha_1 y_t + \alpha_2 y_t^2 + \alpha_3 \eta_t + \alpha_4 \left[\beta_2 L_t - \left(\beta_0 + \beta_1 \Psi_t\right)\right] +$$
$$+ \alpha_4 \beta_3 b_t + \alpha_5 x_t - \alpha_6 a_t + \varepsilon_t,$$
$$\varepsilon_t = \varepsilon_t^M + \varepsilon_t^R \tag{5}$$

Here, a stands for an index measuring the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending.

Also, a financial market located in an open economy will be significantly influenced by globalisation processes and the related financial flows (together with the exogenous corresponding risks).

As financial globalisation can lead to large benefits, particularly to the development of the financial system, the relation between international capital flows and economic growth has been studied by different authors, on different samples of countries and for different time periods, leading to very different conclusions.

Financial globalisation can increase the availability of funds and also the financial infrastructure, reducing the problem of asymmetric information. Therefore, financial globalisation can decrease adverse selection and moral hazard, and offers borrowers and lenders a more transparent, competitive, and efficient financial system.

Financial globalisation carries some risks too, risks that are more likely to appear in the short run, when countries open up. If the right financial infrastructure does not exist, liberalisation and capital inflows can destroy the financial system and segmentation can appear. So, to avoid these risks, markets need to be properly regulated and supervised.

Meanwhile, globalisation can also impact some national policies and institutions: participation in international institutions and mechanisms, and integration into international real and capital flows might require several adjustments for national legislative and policy structures. Consequently, one can distinguish between features of national institutions that are locally determined (L^l) and impacted by international factors (L^f).

$$R_t = \beta_0 + \beta_1 \Psi_t - \beta_2 \left(\omega_1 L_t^l + \omega_2 L_t^f\right) - \beta_3 b_t + \beta_4 o_t + \varepsilon_t^R + \varepsilon_t^f,$$
$$\varepsilon_t^R \sim N\left(c; \sigma_{\varepsilon^R}^2\right), \varepsilon_t^f \sim N\left(c; \sigma_{\varepsilon^f}^2\right) \tag{6}$$

$$m_t = \alpha_0 - \alpha_1 y_t + \alpha_2 y_t^2 + \alpha_3 \eta_t +$$
$$+ \alpha_4 \left[\beta_2 \left(\omega_1 L_t^l + \omega_2 L_t^f\right)_t - \left(\beta_0 + \beta_1 \Psi_t\right)\right] +$$
$$+ \alpha_4 \beta_3 b_t + \alpha_5 x_t - \alpha_6 a_t + \left(\alpha_7 - \beta_4\right) o_t + \varepsilon_t,$$
$$\varepsilon_t = \varepsilon_t^M + \varepsilon_t^R + \varepsilon_t^f \tag{7}$$

Here o is a measure for the degree of openness (as this is reflected, for instance, by net foreign investments inflows).

Finally, if the market is in steady-state (*), then the returns are mainly driven by fundamentals related to economic performances of financial assets issuers as well as by the stability and predictability of the institutional framework:

$$\eta_t^* = -\varphi_1 y_t^* + \varphi_2 y_t^{*2} + \varphi_3 \left[\beta_2 \left(\omega_1 L_t^l + \omega_2 L_t^f \right)_t - \left(\beta_0 + \beta_1 \Psi_t \right) \right] \qquad (8)$$

$$m_t^* = \alpha_0 - \left(\alpha_1 + \alpha_3 \varphi_1 \right) y_t^* + \left(\alpha_2 + \alpha_3 \varphi_2 \right) y_t^{*2} +$$
$$+ \left(\alpha_3 \varphi_3 + \alpha_4 \right) \left[\beta_2 \left(\omega_1 L_t^l + \omega_2 L_t^f \right)_t - \left(\beta_0 + \beta_1 \Psi_t \right) \right] + \qquad (9)$$
$$+ \alpha_4 \beta_3 b_t^* + \alpha_5 x_t^* - \alpha_6 a_t^* + \left(\alpha_7 - \beta_4 \right) o_t^*$$

Relation (9) synthesises our framework: an increase in the quality of the institutional framework can lead to an improvement in the overall market conditions and can support its overall development. Such impact is modulated by the corresponding elasticities of market-to-specific risks and of risks-to-quality of public policies and institutions. The following assumptions are directly linked to this framework:

H1: There is a non-linear relationship between financial markets development and economic growth;

H2: There is a positive impact of market efficiency on market development;

H3: A sound and well-developed banking sector can sustain a positive dynamic of financial markets. Meanwhile, an expanded access to credit will be rather non-supportive for markets growth;

H4: Better public institutions and policies, in general, and an efficient and ethical legal system, in particular, can support the development of financial markets. Risk reduction is one of the main transmission channels for the impact of institutions on financial sector development. The transparency, predictability and stability of institutions and legislation are others critical channels.

H5: Globalisation exercises a dual impact on local financial markets. On one hand, it directly impacts their development via the net capital inflows. One other hand, political and economic globalisation re-shape the local institutions and policies with effects that are translated at the level of the entire economy (including the financial sector).

We further search for empirical evidence to support these assumptions.

3. International data

Data represent 10-year averages and cover a time span between 2009 and 2014 of all available information for a sample of 45 countries (Argentina, Australia, Austria, Brazil, Bulgaria, Canada, Chile, Colombia, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Iceland, India, Ireland, Italy, Japan, Latvia, Lithuania, Macedonia, Mexico, Netherlands, New Zealand, Norway, Peru, Philippines, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, South Africa, Spain,

Sweden, Switzerland, Turkey, Ukraine, and United States). The 10-year averages are designed to reflect the long-run tendencies in variables rather that short-run fluctuations, and to isolate the fluctuations induced by current business cycles. In other words, we presume that there is a certain hysteresis effect at the level of the impact exercised by the rule of law on market capitalisation as the investors are taking more into account the multi-periodic characteristics of the legal system and less the current adjustments in this system.

In order to describe the status of the legal system we use the *Rule of Law* index from the World Bank Institute's (World Bank, 2014) Worldwide Governance Indicators (W.G.I.) project.

The data sources used in the computation of this index reflect the perceptions of a very diverse group of respondents (individuals, domestic companies, country analysts, major multilateral development agencies, and various nongovernmental organisations as well as commercial business information providers). Despite the potential for criticism related to their 'subjective' nature, the choice of such an assessment method based on subjective judgements can be defended based on an argument provided by Mimicopoulos and Kyj (2007:13): 'despite possibly ambiguous perceptions of citizens or experts, subjective data provides information when objective data may not be relevant or available'.

The data are aggregated based on *unobserved components* models. The aggregate measure is reported in standard normal units, ranging from around –2.5 to 2.5 with a zero mean and a unit standard deviation in each period (see Kaufmann et al. (2007, 2010) and Kaufmann and Kraay (2008) for more details).

Since our explanatory framework is rather on the supply side for borrowed financial resources by reflecting the investors' point of view, we chose market capitalisation as the dependent variable instead of other possible descriptors of market development (such as number of listed companies, portfolio investments, taxonomy of traded financial assets, and so one). However, beside market capitalisation, we preliminary check for other two measures: number of domestic listed companies and market turnover (see Demirguc-Kunt and Levine(1996) for the relevance of such market development measures).

These data are collected from World Bank' World Development Indicators database (World Bank, 2015). From the same source, several other explanatory variables suggested by the involved conceptual framework are considered: G.N.I. per capita (formerly G.N.P. per capita), the gross national income, converted to U.S. dollars using the World Bank Atlas method, divided by the midyear population; stocks traded, total value (% of G.D.P.) as a measure of market liquidity; domestic credit to private sector by banks (% of G.D.P.) as a measure of banking sector development and foreign direct investment, net inflows (% of G.D.P.). We also control for the initial levels of market development (values for 2000). In addition, we consider three other institutional variables. First, we involve the *Strength of Legal Rights* from World Bank's *Doing Business* project (http://www.doingbusiness.org/). We expect higher values of this index to inhibit market capitalisation based on the substitution in financing sources argument for banking sector and financial markets. Second, we involve another component of the *Doing Business* framework, namely the *Protecting Minority Investors* index: better protection of minority investors' rights should support market development. Finally, we consider the *Enforcing Contracts* index, also from the *Doing Business* analysis: a more efficient system of enforcing contracts and resolving commercial disputes can be expected to contribute to market enhancement.

All three indexes are considered in terms of their 'distance to frontier' score. The 'frontier' represents the best performance observed on each of the indicators across all economies in the *Doing Business* sample since 2005. The country score shows how far, on average, an economy is at a point in time from the best performance achieved by any economy on each *Doing Business* indicator since 2005 or the third year in which data for the indicator were collected. The measure is normalised to range between 0 and 100, with 100 representing the frontier. Thus, higher score implies that a country is 'closer to the frontier'.

In order to ensure the comparability of the results, all the variables are rescaled accordingly to:

$$X_{i,t}^{rescaled} = \frac{X_{i,t} - \bar{X}}{\sigma_X^2} \qquad (10)$$

Here $\bar{X}, \sigma_X^2$ stands for averages and variances across countries and time for the considered variable X.

Because of the involvement of this rescaling method, the estimated coefficients will not directly reflect the amplitude of corresponding effects. However, it allows a better judgement of the relative explanatory power of each individual variable.

Summary statistics of market capitalisation of listed companies (% of G.D.P.), and the *Rule of Law* index are reported in Table 1. The non-normal values of the distribution parameters and the standard deviations suggest important cross-section heterogeneity of data. Hence, the estimation methodology should account for such heterogeneity and for the potential induced biases.

Figure 1 displays the scatter plot between market capitalisation and the status of the legal system. This figure suggests that there might be a direct link between these variables. However, a more detailed analysis is required. The next section will consider such analysis.

4. Results and comments

We ran a preliminary analysis in order to highlight the potential impact exercised by rule of law on different descriptors of market development. In order to check for potential endogeneity, in these estimates we employed an instrumental variables approach, namely the (System) Generalised Method of Moments (G.M.M.). The results are reported on Table 2. These results indicate that *Rule of Law* index positively and statistically significantly at 1% (5%) impacts all market development measures. However, the amplitude of associated coefficients suggests that the largest impact corresponds to the one exercised on market

Table 1. Summary statistics for market capitalisation and *Rule of Law* index (rescaled values).

	Market capitalisation of listed companies (%G.D.P.)	*Rule of Law* index
Mean	0.000	0.705
Median	−0.332	0.856
Maximum	3.668	1.949
Minimum	−1.194	−1.752
Std. Dev.	1.000	0.935
Skewness	1.514	−0.505
Kurtosis	5.466	2.400
Jarque-Bera	171.568	15.543
Observations	270	270

Source: Authors.
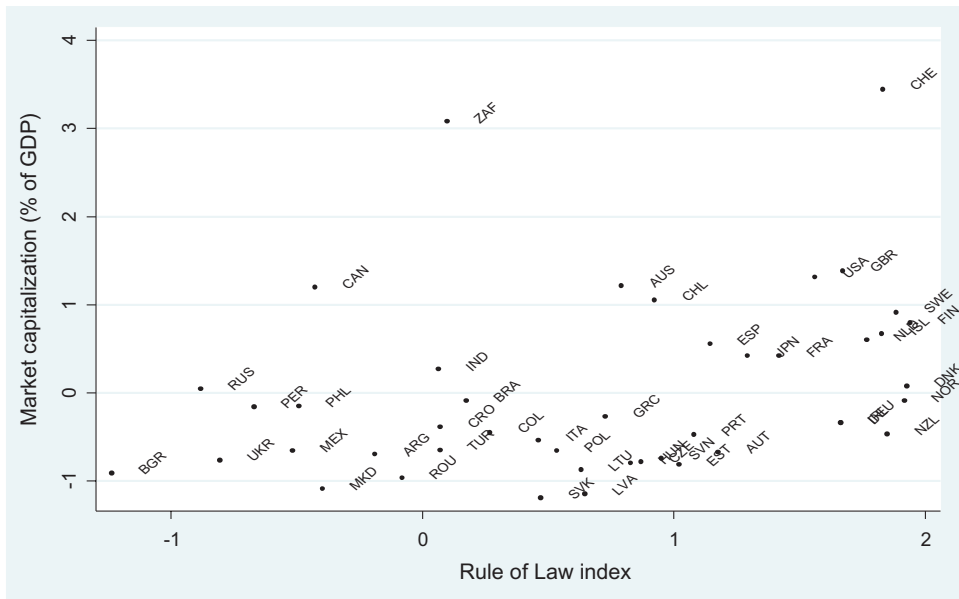
Figure 1. Market capitalisation and *Rule of Law* index (rescaled values; 2009–2014 averages). Source: Authors.

turnover, followed by market capitalisation, while for number of domestic listed companies the amplitude is lower (and less significant). Since we are interested in market growth rather than in market performance, we further focused our analysis on market capitalisation.

We considered a multi-level analytical framework with a two-level model and a three-level one. Multi-level models are particularly appropriate for research designs in which participants' data are organised at more than one level (i.e., nested data) (Tabachnick & Fidell, 2012). In the second step, the estimation outcomes from the first step are regressed through the group levels (see, for instance, Raudenbush & Bryk, 2002; Verbeke & Molenberghs, 2000; Rabe-Hesketh & Skrondal, 2012, for more details on such models).

Based on findings from a stream of literature (such as in La Porta et al. (1997), according to which civil law countries protect investors the least and common law countries the most), the first hierarchical linear model considered the effect of the inclusion of a country in a certain legal family on market capitalisation. Using the classification from the University of Ottawa (2012), we divided the countries in the sample according to the law system each of them uses. A dummy variable ranging the countries from "1" (*Sha'ria* law-based) to "4" (civil law-based) was constructed and the countries nested accordingly. Muslim law systems are legal systems based on the *Sha'ria* and tend to be dominated by laws related to personal status. Common law systems are technically based on English Common law concepts and legal organisational methods that put first case-law as opposed to legislation. Usually, even though the forms of such systems are very different in different countries and they usually have an abundance of codes, legislation and non-jurisprudential normative instruments, Common law jurisprudence remains the fundamental law. Civil law system countries have drawn their rules from Roman law and are characterised by written laws. Such countries have opted for a systematic codification of their general law, or if they do not systematically codify their laws they still adopt enough elements of Roman law. In the case of countries

Table 2. Rule of law and financial markets development (System G.M.M.; full sample).

	Dependent: Market capitalisation	Dependent: Listed domestic companies, total	Dependent: Stocks traded, turnover ratio (%)
	(1)	(2)	(3)
Rule of Law index	0.478***	0.021**	0.664***
	(0.012)	(0.012)	(0.021)
Hansen test of over-identified restrictions:	chi2(25) = 5.99	chi2(25) = 4.41	chi2(25) = 5.96
(Robust, but weakened by many instruments.)	(*p* = 1.000)	(*p* = 1.000)	(*p* = 1.000)
(H0: over-identifying restrictions are valid)			
Number of instruments:	26	26	26
Difference-in-Hansen tests of exogeneity of instrument subsets:			
I.G.M.M. instruments for levels			
Hansen test excluding group:	chi2(21) = 5.94	chi2(21) = 4.92	chi2(21) = 4.57
	(*p* = 0.999)	(*p* = 1.000)	(*p* = 1.000)
Difference (null H = exogenous):	chi2(4) = 0.005	chi2(4) = −0.50	chi2(4) = 1.40
	(*p* = 1.000)	(*p* = 1.000)	(*p* = 0.845)
II. G.M.M. (L.Market capitalisation L.Rule of law L.GNI per capita L.GNI per capita squared, collapse lag(1 .))			
Hansen test excluding group:	chi2(5) = 5.76	chi2(5) = 2.42	chi2(5) = 4.62
	(*p* = 0.330)	(*p* = 0.778)	(*p* = 0.464)
Difference (null H = exogenous):	chi2(20) = 0.23	chi2(20) = 1.99	chi2(20) = 1.35
	(*p* = 1.000)	(*p* = 1.000)	(*p* = 1.000)
III. iv(yr2009 yr2010 yr2011 yr2012 yr2013 yr2014)			
Hansen test excluding group:	chi2(19) = 3.75	chi2(19) = 3.55	chi2(19) = 3.95
	(*p* = 1.000)	(*p* = 1.000)	(*p* = 1.000)
Difference (null H = exogenous):	chi2(6) = 2.23	chi2(6) = 0.86	chi2(6) = 2.02
	(*p* = 0.897)	(*p* = 0.990)	(*p* = 0.918)

***/**/* -1%, 5%, 10% significance levels.

Notes: Time dummies for all years are used as instrumental variables in level equation. All instruments are collapsed based on Roodman's (2009) procedure implemented in STATA module xtabond2: one instrument for each variable and lag distance is used, rather than one for each time period, variable, and lag distance. All available lags of the specified variables in levels dated *t*-1 or earlier as instruments for the transformed equation are used as well as the contemporaneous first differences as instruments in the levels equation. Forward orthogonal deviations transform are considered instead of differencing. G.N.I. per capita and G.N.I. per capita squared are supplementary used as G.M.M.-style instruments.

Source: Authors.

with mixed legal systems (also named 'composite' or 'hybrid' systems), two or more systems are applied interactively or cumulatively, or there is a juxtaposition of systems due to an unclear definition of the fields of application. The results from applying the model are reported in Table 3. The significance of the *Rule of Law* index decreased from 1% to 5%, while the level of the associated effects remains comparable with previous estimates. As it concerns the other variables, the most notable change occurs for *Strength of legal rights* index, which is no longer significant within this model. Still, a relative importance similar to previous estimates is maintained for all the other variables.

In a second hierarchical linear model, countries were further nested accordingly to their overall economic freedom as reflected by the Heritage Foundation *Index of Economic Freedom*.

As Stocker (2005: 583) finds, 'Results show that the rate of increase in economic freedom is directly related to equity returns and that an investment strategy based on economic freedom earned attractive investment returns'. Similar results are supported for Middle

Table 3. Market capitalisation and Rule of Law, 2009–2014, various estimations.

	Hierarchical Linear Modelling (Two-level)	Hierarchical Linear Modelling (Three-level)	Hierarchical Linear Modelling (Four-level)	System G.M.M.	System G.M.M.	System G.M.M.
	(1)	(2)	(3)	(4)	(5)	(6)
Market capitalisation (% of G.D.P.)- initial levels (2000)	0.534***	0.558***	0.541***	0.258	−0.343	−0.157
	(0.042)	(0.044)	(0.049)	(0.185)	(0.396)	(0.365)
Rule of Law index	0.143**	0.177***	0.206***	0.581***	0.281*	0.178*
	(0.057)	(0.057)	(0.055)	(0.195)	(0.161)	(0.103)
Protecting Minority Investors index	0.042	0.056**	0.054**	0.215***	0.112	0.219
	(0.031)	(0.026)	(0.028)	(0.061)	(0.199)	(0.159)
Enforcing Contracts index	0.094***	0.090***	0.092***	−0.003	0.404***	0.369***
	(0.029)	(0.029)	(0.029)	(0.142)	(0.099)	(0.081)
Strength of legal rights index (0=weak to 12=strong)	−0.049	−0.085***	−0.090***	−0.246***	−0.451***	−0.402***
	(0.030)	(0.027)	(0.027)	(0.086)	(0.037)	(0.072)
G.N.I. per capita, Atlas method	−0.621***	−0.724***	−0.7000***	−0.756***	−0.642***	−0.276***
	(0.072)	(0.065)	(0.067)	(0.087)	(0.130)	(0.104)
G.N.I. per capita, Atlas method squared	0.231***	0.277***	0.239***	0.271***	0.121***	0.037***
	(0.027)	(0.023)	(0.024)	(0.006)	(0.012)	(0.013)
Foreign direct investment, net inflows (% of G.D.P.)	−0.054***	−0.073***	−0.054**	−0.060*	−0.065	−0.078
	(0.024)	(0.024)	(0.024)	(0.033)	(0.071)	(0.051)
Domestic credit to private sector by banks (% of G.D.P.)	0.364***	0.361***	0.326***	0.326***	0.295**	0.220***
	(0.037)	(0.038)	(0.038)	(0.091)	(0.136)	(0.079)
Stocks traded, total value (% of G.D.P.)	0.361***	0.378***	0.427***	0.274	0.680**	0.353
	(0.046)	(0.046)	(0.048)	(0.177)	(0.329)	(0.273)
Geographical dummy (Europe)	−0.531***	−0.418***	−0.467***	−0.388***	−0.192***	−0.164***
	(0.068)	(0.040)	(0.049)	(0.013)	(0.052)	(0.034)
Time dummy for 2009	−0.010	−0.014	−0.014	−0.017	−0.107***	−0.041***
	(0.061)	(0.060)	(0.057)	(0.031)	(0.019)	(0.003)
Time dummy for 2010	−0.003	0.008	0.003	−0.010	−0.065***	−0.025***
	(0.060)	(0.060)	(0.056)	(0.021)	(0.009)	(0.005)
Market capitalisation * dummy for high-income countries					0.780***	0.717***
					(0.182)	(0.160)
Market capitalisation * dummy for low to middle-income countries						0.775***
						(0.136)
R-squared						
Root MSE						
Common AR(1) parameter (ρ)						
Random-effects parameters						
-Standard deviation(Residual)	0.039	0.047	0.060			
	(0.042)	(0.022)	(0.032)			

(*Continued*)

Table 3. (*Continued*).

	Hierarchical Linear Modelling (Two-level)	Hierarchical Linear Modelling (Three-level)	Hierarchical Linear Modelling (Four-level)	System G.M.M.	System G.M.M.	System G.M.M.
Log restricted-likelihood	−110.959	−110.100	−98.043			
L.R. test vs. linear regression:	3.55 (p=0.030)	5.27 (p=0.072)	29.38 (p=0.000)			
Hansen test of over-identified restrictions: (Robust, but weakened by many instruments.) (H0: over-identifying restrictions are valid)				chi2(51) = 0.00 (p = 1.000)	chi2(50) = 0.00 (p = 1.000)	chi2(50) = 0.00 (p = 1.000)
Number of instruments:				64	64	64
Difference-in-Hansen tests of exogeneity of instrument subsets:						
I.GMM instruments for levels						
Hansen test excluding group:				chi2(41) = 0.00 (p = 1.000)	chi2(40) = 0.00 (p = 1.000)	chi2(39) = 0.00 (p = 1.000)
Difference (null H = exogenous):				chi2(10) = 0.00 (p = 1.000)	chi2(10) = 0.00 (p = 1.000)	chi2(10) = 0.00 (p = 1.000)
II.iv(yr2009 yr2010 yr2011 yr2012 yr2013 yr2014)						
Hansen test excluding group:				chi2(45) = 0.00 (p = 1.000)	chi2(44) = 0.00 (p = 1.000)	chi2(43) = 0.00 (p = 1.000)
Difference (null H = exogenous):				chi2(6) = 0.00 (p = 1.000)	chi2(6) = 0.00 (p = 1.000)	chi2(6) = 0.00 (p = 1.000)

***/**/* - 1%, 5%, 10% significance levels.

Notes: Dependent variable: Market capitalisation (% G.D.P.).For Prais–Winsten regression correlated panels corrected standard errors (P.C.S.E.s) are considered; in order to compute the autocorrelation parameter, the autocorrelation of residuals is considered. Errors are considered to be panel-level heteroscedastic and correlated across panels.

In the Hierarchical Linear Modelling, the structure of the covariance matrix for the random effects is specified so that it allows for all variances and co-variances to be distinct (*unstructured*). The L.R. test is a comparison of the fitted mixed model to standard regression with no group-level random effects. This L.R. test assesses whether all random-effects parameters of the mixed model are simultaneously zero. L.R. is a conservative test; rejection of the null hypothesis based on the reported level would imply rejection on the basis of the actual level. For the two-level model, countries are 'nested' (the random effects shared within lower-level subgroups are unique to the upper-level groups) in four groups based on their inclusion in a legislative family (as captured by a dummy variable taking the following values:1-'Muslim', 2-'Mixt legislative system', 3-'Common law', 4-'Civil law'). For the three-level model, these four groups are further nested accordingly to the overall economic freedom of the countries as this is reflected by *Index of Economic Freedom* from Heritage Foundation (http://www.heritage.org/index/) overall score. For the four-level model, countries are nested at the final level by the *Post-Materialist index 12-item* (Inglehart, 1990, 1997; Inglehart & Abramson, 1999). The index data are collected from WVS, (2009).

For the System G.M.M., time dummies for all years are used as instrumental variables in level equation. All instruments are collapsed based on Roodman's (2009) procedure implemented in STATA module xtabond2: one instrument for each variable and lag distance is used, rather than one for each time period, variable, and lag distance. All available lags of the specified variables in levels dated t-1 or earlier as instruments for the transformed equation are used as well as the contemporaneous first differences as instruments in the levels equation. Forward orthogonal deviations transform are considered instead of differencing.

Source: Authors.

East and North Africa (M.E.N.A.) countries by Smimou and Karabegovic (2010). This study highlights that changes in economic freedom have a positive impact on equity market returns that cannot be explained by business-cycle control variables related to expected returns or by other controls. Hence, we consider a three-level hierarchical linear model with two nested levels of countries clustering: level two reflecting the legal family and level three describing the degree of economic freedom. Fitting a three-level model requires the specification of two random-effects equations: first, one for level three and then one for level two. The outcomes are reported in Table 3. In this model, all the main explanatory variables appear to be statistically significant at 1%. The relative importance of *Rule of Law* index for market capitalisation is comparable with the ordinary least squares estimates, while the other institutional dimensions reflected by *Protecting Minority Investors* index, *Enforcing Contracts* index and *Strength of legal rights* index maintain more or less the same levels of associated influences. Finally, for the last model, we noted that several studies suggest that growth and institutions (including rule of law) form a coherent nexus modelled by post-materialist values. Thus, we considered a final level for nesting the countries accordingly to their post-materialism levels as reflected by the 12-items index proposed by Inglehart (1990, 1997); Inglehart and Abramson (1999). In Table 3, the four-level model displays a substantial increase in the relative importance of rule of law from previous estimates, but no major changes for the other variables (with the exception of foreign direct investments, which are now significant only at 5%).

For all multi-level models the 'U-shaped' effect of economic growth on market development is clearly evidenced, as well as the corresponding effects induced by banking sector contribution to financing the economy. Market liquidity remains a major factor in explaining its development, while foreign direct investment appears to inhibit the dynamic of market capitalisation.

Up to this point, the findings support a positive impact of overall rule of law on market capitalisation. However, the estimates may be biased by reverse causality issues. Indeed, one can notice that in our specifications there might be at least two sources of reverse causality: the link between the status of the financial sector and the macroeconomic environment, and the endogenous impacted institutions.

Hence, an instrumental approach aiming to correct for potential endogeneity should be considered.

From various instrumental approaches, we considered the G.M.M. method (Hall, 2005). This method involves some moment or orthogonality conditions and allows for heteroskedasticity in errors. It provides a rich and flexible framework to deal with endogeneity and is particularly suitable for 'small T / large N' (many panels and few periods) cases, as in our data set. We used the system estimator version of G.M.M. This uses lagged differences as instruments for a level equation in addition to the moment conditions of lagged levels as instruments for a differenced equation (Blundell & Bond, 1998; Blundell, Bond, & Windmeijer, 2000).

One critical aspect concerning the implementation of this method is related to the choice of the number of instruments: poor performances of estimators of instrumental variables may arise due to the fact that their biases increase with the number of moment conditions (Newey & Smith, 2004). As Roodman (2009: 128) notes, 'instrument proliferation can over fit endogenous variables and fail to expunge their endogenous components'. Thus, a reduction of the number of instruments can contribute to an increase in the robustness of the

results. With this aim, the instruments are collapsed by applying the procedure described by Roodman (2009) and implemented in the STATA *xtabond2* module. This procedure leads to a reduction in the number of instrument used from 154 possible instruments to only 64 effectively considered.

The results from Table 3 show that the involvements of System G.M.M. leads to a substantial increase (almost three times) in the effects induced by *Rule of Law* index on market capitalisation, while these effects remain positive and significant at 1%. Since the values of the *Difference-in-Hansen* tests for exogeneity of instrument subsets support the choice of instruments, this outcome can be viewed as reflecting the existence of reverse causality: the causality might flow not only from the architecture and de facto status of legal systems to the market capitalisation, but also from this descriptor of financial market development to the features of the institutional framework. Interestingly, in System G.M.M., *Enforcing Contracts* index completely lost its significance and the corresponding coefficient displayed a 'wrong' sign: the efficiency of the judicial system to solve commercial disputes is overwritten by the broader descriptor of social agents abiding by societal norms and rules. Meanwhile, the *Protecting Minority Investors* index becomes significant at 1% and the coefficient increases more than four times. Also, the market liquidity is no longer significant. Nevertheless, other previous findings are preserved by this instrumental variables method. In particular, there are no major changes compared with previous estimates for the 'U-shaped' impact of growth on market capitalisation as well as for the importance of banking sector.

We further note that our data set includes countries with heterogeneous levels of overall economic development. Such heterogeneity is potentially able to shape the transmission channels for the impact of rule of law on markets in specific ways. In order to illustrate this idea, we add as an explanatory variable the interactions between market capitalisation and a dummy for high-income countries classified based on their income per capita. The most striking result is that the significance of *Rule of Law* index declines to 10% while the amplitude of impact is almost two times lower compared with the previous System G.M.M. estimation. Since high-income countries are usually characterised by strong and effective legal systems, this variable is less able to discriminate in terms of market development. However, the enforcement of contracts now counts, with a positive and significant at 1% impact. From other variables, market liquidity appears as in other estimation methods to exercise a positive and significant impact on market capitalisation, while foreign direct investment no longer seems to influence this. Also, the time dummies for 2009 and 2010 now exhibit a negative and significant impact on markets: when the model accounts for the high-income countries group, the recent period of financial and real turmoil shown to inhibit market development.

When the same exercise is repeated by adding the interactions between market capitalisation and a dummy for low to middle-income countries, rule of law does not gain significance: at the opposite sides of the development spectrum (and for different reasons), rule of law appears to be less able to explain the status of financial markets.

From the controls, economic growth preserves its non-linear impact while the 'net' amplitude of this is somewhat smaller compared with other estimations. Meanwhile, market liquidity fully loses its significance, while the relative importance of the banking sector as explanatory slightly decreases.

5. Conclusions

This paper aims to find conceptual support and some empirical findings for the link between the quality and effectiveness of institutions and financial market development. We advance a threefold contribution to this topic. First, we develop a model in which markets are driven in a non-linear way by economic growth as well as by various components of the legal framework. More exactly, such a model is designed to reflect the non-linear linkages between the evolutionary paths of financial markets and various determinants to its complex dynamics: (1) the overall economic growth; (2) the market efficiency (as this is expressed in terms of market returns), and (3) the specific endogenous and exogenous risks. In this set of determinants investors' risk profiles play a critical role. Hence, risk reduction is viewed as an important channel through which strong, accountable, transparent and efficient institutions support financial markets. Although each of these determinants is addressed in the framework of different approaches by the current literature, to our best knowledge, there is no model designed to advance a unified approach to include all the determinants together.

Second, we provide some empirical evidence for a data set of 45 countries and for a time span between 2009 and 2014. A relatively coherent picture emerges from these findings. First, it appears that the rule of law exercises a positive and significant impact on market capitalisation which is robust across various estimation methods and across different model specifications. But the relationship between the status of the legal system and market capitalisation is influenced by various factors, such as the type of legal family, economic freedom, cultural and behavioural variables (such as the spread of post-materialistic views) or overall economic development, and is weaker for countries placed at the extremes of the development spectrum. Also, the causality runs in both directions: from institutions to financial markets as well as from markets to the endogenous component of the legal framework. One can note that only limited attention is paid by current literature to the potential endogeneity of the institutional framework in respect to capital market development. Hence, if the analysis of the causality running from institutions to the markets can be placed in the broad framework of neo-institutionalism approaches, the reverse causality running from capital markets toward institutional development can be seen as a relatively new topic. From the descriptors of particular features of the legal system, enforcing contracts and the protection of borrowers' and lenders' rights are fairly robust, while effects induced by the protection of minority investors appears to be less clear. Second, growth impacts the evolution of financial markets in a non-linear fashion. Once again, such impact is robust across estimation methods and specifications. Third, the development of banking sector unambiguously supports market capitalisation. Meanwhile, the ease and safety of access to loans provided by banks inhibits market growth. There seems to be a rather bivalent relation of support and competition between the segments of financial sector. Even though the issues related to the choice between various types of financing resources is a long-standing point debated in the literature, such a bivalent link between capital markets and the capital system is less highlighted, since usually the research is mainly focused on the individual impact exercised by bank operations on capital markets. Fourth, in all estimates foreign direct investment appears to inhibit local financial markets. Since we did not explicitly control for the geographical orientation of these investments, we only can presume that for countries with weaker financial systems a substantial capital inflow related to these cannot be fully 'sterilised', and hence can contribute to an increase in internal financial

instability (along with the effects of various exogenous shocks from international markets that translate various types of risk to local ones).Third, we derive several policy implications from our findings. First, sound institutions and an adequate design of the legal framework (particularly, the protection of property rights and of minority investors, enforcement of contracts, and proper financial regulations) can boost the development of financial markets. But, especially in earlier stages of market evolution, the effectiveness of rule of law cannot substitute good public growth-oriented policies to support the business environment and a sustainable path of economic growth. This result sounds a cautionary note for the policy makers, namely that the adoption of a sound regulatory framework might not be enough to support the early stages of capital market development. Second, the micro-structures of the markets appear to be equally important as their macro legal, institutional and functional framework. Hence, efficient instruments are required to improve the efficiency of allocation mechanisms and to increase liquidity. This outcome points toward some intrinsic limitations of any approach that deals exclusively with either instruments and neglects their necessary interactions. Third, the protection of minority investors may not be enough to support development of markets, and a broader improvement in the quality of governance at the level of financial instruments issuers may be mandatory to support the evolution of financial markets. Fourth, countries should be able not only to take advantages from globalisation processes but should also alleviate the exogenous risks associated with such processes.

Of course, our proposed analysis is a limited one. More research should be done both at conceptual level (to better highlight the various involved linkages between institutions and market development) as well as at an empirical level (by extending the data set and considering more potential explanatory variables). But we consider that this analysis provides some support for the thesis that institutions matter for the sound dynamics of financial markets. However, one of the most interesting contributions of the proposed research is the idea that the opposite also holds true: exogenous development of capital markets might lead to an improvement of the regulatory framework and, broadly speaking, to a better institutional quality.

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Disclosure statement

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