Do (Successful) Stock Exchanges Support or Hinder Institutions in Transition Economies?

ABSTRACT

A stock exchange and the presence of functioning equity markets is part and parcel of an advanced market-based financial system. Previous research has also established that equity markets function more efficiently in the presence of supporting institutions such as property rights and rule of law. But how do these two aspects of the institutional environment interact? That is, does the performance of a stock exchange support the development of property rights, or can it actually hinder it? Examining monthly data for 21 transition economies over a shifting window from 1989-2012, I find support for the existence of an inverted U-shaped relationship between property rights and stock market performance. While a well-functioning stock market may help reinforce property rights through demonstration effects, a stock market that has become "too successful" may entrench interests and lead to property rights-eroding policies.

I.   Introduction and Contribution

The development of a stock market is often seen as a key element in the development of a modern and functioning financial sector; as Goldsmith (1969) notes, equity markets are (at least currently) the highest rung on the financial development ladder, as a country moves from self-financed growth to bank intermediation and finally equity markets (Demirgüç-Kunt and Levine 1996a). Furthermore, as an adjunct to the desirability of a stock exchange in its own right, evidence has shown the contribution of stock markets to economic efficiency (King and Levine 1993), economic growth in the short- and medium-term (Beck and Levine 2004), as well as over the long-term (Levine and Zervos 1996), and for both developed and developing economies (Agarwal and Mohtadi 2004; Christopoulos and Tsionas 2004).

However, additional research over the past decade (Beck and Levine 2008) has shown that financial sector development by itself is often not sufficient to propel economic development, but financial sector reforms need to occur in tandem with appropriate supporting institutions for optimal results. Among others, Gupta and Yuan (2009:4715) find that "[stock market] liberalization has a more uniform growth impact if accompanied by competition-enhancing reforms," while Hasan, Wachtel, and Zhou (2009) show that the joint development of a financial sector and property rights have led to real growth in various Chinese regions. Contributions from Claessens and Laeven (2003) have also isolated the importance of property rights in financial sector development and thus in the march towards growth, while Andrianaivo and Yartey (2009) focus on the interplay of creditor protection laws and the growth of the financial sector.

But this past work has shed little light on the deterministic interrelationships between institutional development and financial sector development, with the causal and feedback effects between the two being, as yet, a little-explored facet of the financial development/growth nexus (Miletkov and Wintoki 2012 is the lone notable exception). This omission has occurred even in the face of numerous paradoxes, anomalies, and non-linearities from reality regarding the co-existence of supporting institutions and robust financial sectors. As an example, as is well-evidenced, the mere establishment of a stock exchange does not necessarily need to correlate with strong property rights or judicial independence. In fact, in the specific example of the transition economies of Central and Eastern Europe (CEE) and the former Soviet Union (FSU), the exact opposite was true: established at the beginning of the transition process, often via exogenous initiative or support (foreign aid), most stock exchanges in the CEE and FSU countries began at a time when property rights were in flux or at very low levels.

Indeed, the transition economies of CEE and FSU present a very special case for testing the effects of stock markets on property rights. In more advanced countries, it is possible that companies and stock exchanges themselves can support policies that are detrimental to property rights enforcement if these same policies will guarantee the exchange itself or companies listed on the exchange monopolistic powers that they would not be able to obtain in the marketplace. These effects may occur even in an environment of adequate governance and against a backdrop of full-developed property rights stretching back hundreds of years. But how would this effect play out in a country that has only just begun the move towards a market economy, where property rights are still being defined and governance can be either highly volatile (see: Russia in the 1990s) or uncomfortably consistent with its Soviet days (Belarus, Kazakhstan, Kyrgyzstan in the 1990s)?

The purpose of this paper is thus to examine the research question if, once a stock market has been established, does its presence and, more crucially, its usage or success, reinforce the development of these institutions (in particular property rights)? This turns the nexus of financial development and growth on its head, by positing that (like Cecchetti and Kharroubi's (2012) finding of diminishing marginal returns of financial sector size), there may be a concave relationship between stock market development and its effect on property rights. That is, stock market development at early stages may help to push forward property rights protection and even executive constraints, but after a certain level of stock exchange development, entrenched interests erode these institutions. This approach has never been taken before in the literature in the context of transition economies, and thus this paper makes a novel contribution to both the financial development and institutional literature. Moreover, work that has been undertaken (Miletkov and Wintoki 2012) has been done at the annual level; given the state of flux in transition, this paper uses a unique monthly dataset to track stock market developments and their feed-through to institutions that are undergoing change.

The rest of the paper is structured as follows: the next section provides a brief literature overview on the relationship between financial sector development and property rights, while Section III presents my theoretical and empirical model. Section IV presents the results of the analytics, while Section V offers some brief conclusions.

II.   Literature Review

While a large number of papers have been published examining the determinants of stock market development in transition economies, far less work has been done comparatively on the effects of its performance on the very same institutions that reinforce its success. Indeed, a large literature has traced the effects of institutions (including property rights) on financial sector development, especially in relation to stock markets. Demirgüç-Kunt and Levine (1996b) find that countries with well-developed institutional systems tend to have large and liquid stock markets, while Durham (2002) notes that rule of law and institutions more broadly support financial development, which then in turn supports growth. In addition to the level of institutional development, de la Torre, Gozzi, and Schmulker (2007) also find that *changes* in institutions (i.e. market reforms) contribute to development, with reforms being followed by significant increases in market capitalization, trading, and use of a stock market for raising capital.

In regards to property rights more specifically, Claessens and Laeven (2003) have one of the most targeted works in this area, finding that property rights in general improves asset allocation in the financial sector, which then in turn leads to positive effects on growth in sectoral value. Beck and Levine (2008), on the other hand, offer a sweeping view of the differing effects of legal regimes on financial development, concluding that legal origins can account for differences in property rights regimes and thus the development of a country's financial sector. Andrianaivo and Yartey (2009) reinforce this prior work and find that one important facet of property rights, creditor protection, is a strong and highly significant factor in financial sector development in Africa. Moreover, the literature has also established the counterfactual, namely that the absence of property rights and especially policy uncertainty and political risk lead to smaller stock markets. Perotti and Van Oijen (2001) find that it is the resolution of political risk that leads to increased stock market investment, while LaPorta *et. al* (1997) find a correlation between low quality of law enforcement and smaller capital markets (as well as more concentrated ownership).

While there it is comforting that there is ample empirical evidence for the proposition that good institutions support the development of the financial sector, as already noted, there is little work that examines if the interactions run the other way. That is not to say that there is not a long and flourishing literature on the determinants of property rights generally: work from Mijiyawa (2013) offers a comprehensive overview of the various schools of thought regarding the genesis of property rights, while recent work from Ayyagari, Demirgüç-Kunt, and Maksimovic (2013) examine the various schools of thought pertaining to property rights formation. However, targeted work regarding the financial sector and property rights is limited, indeed: a recent paper by Miletkov and Wintoki (2012) is the most comprehensive, as they examine a panel of 129 countries from 1965-2008 and find that financial development in general (as proxied by private credit) has a direct effect on property rights institutions in following years. This piece (following on from their 2009 paper on the joint determination of legal institutions and financial sector institutions, Miletkov and Wintoki 2009), has been one of the only applied empirical analyses of the financial sector determinants of institutions (rather than the other way around) that explicitly models this question.

Other recent work has gone somewhat in this vein, including Weymouth and Broz (2013), who include financial sector development (proxied by M3/GDP) as a determinant of property rights and find a significant relationship. Similarly, Bose, Murshid, and Rath (forthcoming) also examine the idea of financial sector development impacting property rights across a threshold level. Rathinam and Raja (2010) also find empirical support for feedback between financial sector development and institutional development specifically in India, suggesting that there also may be differences between emerging and developed markets in the extent of influence. However, none of these papers works to explain if there is a similar threshold at higher levels of financial development; that is, does the function of equity exchanges start to erode rights after a certain point?

III.   Model and Data

The Theoretical Basis
As noted in Miletkov and Wintoki (2012), the reasons why financial development more broadly may encourage property rights can be found in the framework popularized by Demsetz (1967) and North (1971). Demsetz (1967: 350) in particular notes that "the emergence of new property rights takes place in response to the desires of the interacting persons for adjustment to new benefit-cost possibilities." In regards to financial development, the creation of new property rights would be reinforced as actors see the benefits that come from increased financial intermediation; using Demsetz's focus on new "technologies," the advent of a stock market as a new technology for the financial sector would thus create benefits for those utilizing it, creating new property rights that would have positive externalities for the entire economy.

However, there may be a dark side to the increase in the power of the stock market, one that would negatively impact the development of property rights. In the first instance, and as noted in the introduction, there is no guarantee that a stock exchange would correlate with higher levels of property rights, especially if it is a) exogenously "imposed" and b) if it is little utilized. One can surmise that a stock exchange in the Demsetz framework, if it were purely a new technology that grew organically from existing financial sector developments, would indeed reinforce existing property rights. Under this scenario, the advance of an equity market is itself a result of prior property rights (that enabled basic levels of financial development), which would then increase as a result of the wonders of the new

technology; that is, new property rights would be necessary in order to protect the new technology, and thus they would develop in tandem with the growth of the stock exchange.

However, as I have noted, in the transition context, this was not the case: foreign aid from donors such as USAID and the World Bank led to the establishment of stock markets in countries such as Armenia that were well ahead of the even basic levels of financial development needed before a stock exchange would come into being. Much as Lenin leapfrogged Marx's proletarian advances by inventing the idea of a "revolutionary vanguard," foreign donor agencies hoped to leapfrog stages of financial sector development by installing a pre-fabricated stock exchange. While this may have created the *building* for a stock market, it did not create the *institution*; nor did it back-fill the organically-created property rights that would have been reinforced in a Demsetz framework by successive stages of financial sector development. If, in tandem with this reality, the stock exchange that was grafted onto a country was subsequently little-utilized, there was little hope of the expected advances in property rights materializing.

Beyond the transition-specific scenario of a "Potemkin stock market," there is another political economy/public choice reason why a stock exchange may not necessarily encourage property rights. In the words of Cecchetti and Kharroubi (2012:14), there may come "a point where further enlargement of the financial system can reduce real growth," and this idea of diminishing returns should also be thought of in reference to property rights, especially given the political environment in which equity markets work. Indeed, the financial sector is one of the most heavily-regulated sectors in any country (Mishkin 2010), and while there may be a positive effect on property rights at the beginning of a stock exchange's existence, eventually the "outsiders" of the stock exchange become "insiders" to the political process. This transformation into "insiders" would mean less of a likelihood to support broader-based property rights reforms and more of a focus on industry-specific reforms (which might benefit the equity markets but at the expense of other property rights). Perhaps inevitably, given the access to capital that a stock exchange creates, stock markets also attract the attention of politicians, and this symbiosis of protectionist leanings and political access could result in negative effects on property rights. In this case, Wall Street would no longer equate with Main Street.

The key issue in this conception of the relationship between stock markets and property rights, therefore, is the idea of diminishing marginal returns. But it is more than that: we should expect to see a stock market build support for and reinforce property rights at the beginning of its existence, but as it grows larger, more powerful, and more ossified, there is a real chance that it will detract from broader property rights as a whole. Thus, we can infer a concave-shaped relationship between higher stages of financial development and broader property rights.

The Empirical Model
Using a new database of monthly data for transition economies with stock exchanges over 1989-2012, I fashion an empirical model to test this proposition. Did transition economies, with no prior basis for property rights, see the development of the financial sector influence the development of those same property rights? The model utilized in this paper thus shows property rights in transition as a function of stock market development, political factors, and macroeconomic variables:

$$Y*_{it} = \alpha STOCK_{it} + \delta STOCK_{it}^2 + \beta INST_{it} + \gamma MACRO*_{it} + e_t$$

The Y variable in the above equation is "contract-intensive money," an objective indicator for property rights utilized in Clague *et. al (*1996) and Hartwell (2013) that is defined as the proportion of money held outside the formal banking sector (more formally, the ratio of M2 less money held outside the banking sector to all M2). Contract-intensive money is structured so that higher numbers indicate more money in the formal financial sector, and thus higher property rights. As an objective indicator of property rights, it is superior to standard subjective indicators in that it is a measure of "realized" property rights, rather than "potential" property rights (which other measures, such as the ICRG investor protection index or the Heritage Index of Economic Freedom, are); that is, while the indicator may capture more than merely property rights movements, it shows after the fact the effects on property rights rather than the legislative framework related to property rights (which may not translate into reality, especially in a transition context). Moreover, unlike subjective indicators, which can be discrete and slow-moving, the availability of monthly data for contract-intensive money shows a continuous and highly variable measure of even the smallest institutional changes.

"Stock" as shown above is the vector of stock market variables of interest for this paper, and includes three separate measures of stock market performance to see if a particular facet of a stock market matter most for influencing property rights. Is it:

- *How big the stock market is?* To test this, I use the growth in stock market capitalization as a percentage of GDP. Perhaps size doesn't matter, however, and instead it is
- *How successful the stock market is*? A large but failing stock exchange could also have a drag on property rights, so to control for success of the market, I utilize the change in stock returns over the period. It is also quite possible that a stock exchange's influence on property rights has nothing to do with size or success, perhaps instead it is
- *How volatile the stock market is*? While a volatile stock market may be a signal of other macroeconomic vulnerabilities, it is possible that the demonstration effect of equity volatility may negatively impact property rights throughout the real economy. I test for this utilizing the sum of daily squared returns, aggregated monthly to comport with the rest of the dataset.

As just noted, there is a theoretical basis for a concave relationship between stock market performance and property rights; thus, a quadratic term of the stock market variables is also included to ascertain if there is a concave or convex association.

Given the interrelation between political and economic institutions in transition (Hartwell 2013), I also include a measure of political institutions in this specification, namely the ICRG's monthly indicator of "democratic accountability." This measure, coded from 0 to 6, is an indicator of how responsive a government is to its people, with higher numbers indicating more responsiveness or democracy. I anticipate that democracy should have a positive effect on property rights in transition (Mijiyawa 2013), although, as Barro (1996) and Hartwell (2013) show, this is not necessarily always the case.

Finally, a series of macroeconomic variables will be included to control for the macroeconomic determinants of policy rights in transition.[1] These controls are derived from theory and the literature (see Garcia and Liu 1999) and include:

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[1] An important exogenous variable often utilized as a determinant of property rights in the extant literature is legal origin (see, for example, La Porta *et. al* 1998 and Beck, Demirgüç-Kunt, and Levine 2003). However, given the special case of transition economies, this variable lends no real value, as the "legal origin" for all countries pre-

- *Economic Growth:* Measured here by the monthly change in the country's industrial production index, it is theorized that growth and property rights for a virtuous cycle, where growth encourages stronger property rights and property rights, as shown by many others, leads to growth.
- *Inflation:* Periods of hyperinflation or even sustained bouts of inflation signal government mismanagement and are a good proxy for general macroeconomic instability. It is expected that higher levels of inflation correlate with lower levels of property rights.
- *Growth in M2:* While inflation may be a proxy for broader macroeconomic trends and instabilities, the change in M2 itself is a control to show the government's stance on monetary policy. While inflation and M2 are in reality two sides of the same coin, changes in M2 represent a government's approach to sound money, a key basis for secure property rights. Again, I anticipate that large changes in M2 correlate with lower property rights.
- *Interest rate spread:* A measure of financial instability, high interest rate spreads can indicate a poorly functioning financial sector or even financial sector risk perceptions (Kliesen, Owyang, and Vermann 2012). Moreover, interest rate spreads can also proxy in this model for financial crises, where spreads rise after a crisis (Mishkin and White 2003) and would be expected to negatively impact property rights.

To alleviate simultaneity issues and lessen issues of endogeneity, all macroeconomic and institutional variables are lagged one period. Data is taken from various sources, including the IMF's International Financial Statistics, Bloomberg (for stock market data), Datastream, and the websites of various central banks and national statistical offices.

Estimation will be made using a simple within groups (fixed-effects) specification. The reason for the choice of an FE specification is due simply to the exigencies of the dataset I utilize, and in particular the "moderate N, large T" nature of the panel. In regards to panel data such as this, the within-group estimator bias is severely weakened as the time series grows larger, with simulations showing that the bias is negligible at time frames as low as t=50 (Santos and Barrios 2011). Given that we have time series for some countries extending out so that t=216 (as for the Czech Republic), any residual bias will be statistically insignificant. Moreover, as a robustness test and to correct further this within group-bias, I will also use Driscoll and Kraay (1998) standard errors to account for heteroskedasticity, autocorrelation, and correlations between groups (as the Driscoll and Kraay errors are also designed specifically for "large T" datasets such as this one).[2] As a final hedge against the possibility of common shocks in property rights across countries (such as the Russian crisis of 1998-99), time dummies will also be included in the regressions (as utilized in, among others, Marchionne and Frattiani 2013).

The choice of the FE estimator was also conditioned on its suitability versus other available estimators in establishing the data relationships noted above. In particular, econometric testing was carried out on various types of long-run cointegration, to determine if dynamic panel data methods such as the mean-group (MG) and pooled mean-group (PMG) estimators of Pesaran and Smith (1995) and Pesaran, Shin, and Smith (1999) were necessary; diagnostics using the Westerlund (2007) series of panel cointegration tests revealed no long-run cointegration effects and thus less reason for an MG or PMG specification.

1991 is Soviet law; reaching back to the 1920s would appear to be a stretch for defining a relationship between pre-Soviet/communist legal systems and the development of property rights in the 1990s.

[2] More simply put, the Driscoll and Kraay errors are robust to general forms of cross-sectional and temporal dependence.

Moreover, the other issue often present in 'large T' data is nonstationarity (see Blackburne and Frank 2007), which was tested for in our dataset using the Im-Pesaran-Shin (2003) test. The null hypothesis of a unit root was conclusively rejected in each case, once again arguing for the suitability of the fixed-effects estimator here.[3]

Finally, the last key element in choice of a dynamic panel fixed-effects mechanism regards the possible heterogeneity of slopes in longer time-series, which certainly may be at play here in the longest of our monthly series. This heterogeneity is another form of specific cross-section dependence that may not be captured by the Driscoll-Kraay errors, and as such would cast doubt on our estimation results (and call for another dynamic estimator such as Pesaran's (2006) Common Correlated Effects Mean Group (CCE) estimator. A test for this cross-section dependence has been suggested by Pesaran (2004); however, it is generally suitable only for small and moderate T versus large N models (i.e. most common macroeconomic models). As an alternative, and better suited to my data, a Breusch-Pagan (1980) LM test of independence is designed for large T datasets, and the application of the test here does indeed show spatial correlation amongst the countries. Luckily, as noted by Hoechle (2007), the non-parametric covariance matrix estimation procedure of Driscoll-Kraay adjusted standard errors is designed precisely to correct for this dependence.[4]

IV.   Results

Regression Results
The results of the Driscoll-Kraay corrected fixed effects estimator is shown in Table 1 for each metric of stock market performance – given that the property rights indicator is shown as a percentage, the coefficients shown (if multiplied by 100) show the percent change in property rights from one unit change of the independent variable. Column 1 shows that the first measure of stock market development, the size of the stock market, appears to reinforce property rights, albeit slowly; a 1% change in the growth rate of a stock market's capitalization will only add approximately 0.002% to a country's property rights. The quadratic term suggests that stock market capitalization for the entire sample follows a non-linear yet increasing pattern: increasing stock market size results in an unmitigated positive effect, with a net accelerating effect greater than a linear increase alone. This reality would seem to comport with the experience of transition economies, as many stock markets were originally utilized only by those who could afford them, i.e. patrons of the old regime or oligarchs who made their money during the transition. While their original investment in equities might not have had an appreciable effect on property rights, after others were pulled into the equity market would there have been a broader-based movement for reform. This result shows that perhaps broader participation in the

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[3] Additionally, a diagnostic check utilizing a Prais-Winsten correction for panel-corrected standard errors on the regression results to come revealed similar standard errors, but differing coefficients, meaning that the errors were larger proportionally in regards to coefficients in the P-W model. Thus, the spatial correction must be utilized in order to provide less-biased estimates.
[4] A further argument against FE has been made by Wolf (2009), who notes that fixed effects estimators are inefficient in the presence of slowly-moving variables, which an institution such as property rights surely must be. However, the choice of "contract-intensive money" as a dependent variable alleviates this concern, as it shows variability on a month to month basis that is much more accurate than in an annual, aggregated subjective indicator.

stock market, or rather, the size of the stock market as a whole, has a reinforcing effect on property rights.[5]

Turning to stock market returns (Column 2), we see a result more in line with the hypothesis offered above: stock market performance, measured by the overall stock market index of a country, in and of itself appears to have a positive but insignificant relationship with property rights, but the quadratic term for stock market performance shows a powerful concave relationship (fitted values are shown in Figure 1), with a long tail in favor of smaller and incremental changes in stock market returns. This interesting relationship may have an interpretation in regards to the concept of "sustainability," in that larger gains in the stock market may be viewed widely as outliers, and thus have little impact on property rights (that is, incredible gains are seen as akin to lottery winnings, rather than a reflection of underlying institutional fundamentals). On the other hand, incremental gains could reinforce incremental institutional changes via a feedback effect. This interpretation may also be given plausibility in the context of the theory noted above, in that political insiders may have the wherewithal to accrue truly spectacular gains, often coming at the expense of broader property rights (as in Russia and Kazakhstan). Under this scenario, political insiders may be using the stock exchange for their own benefit (Lieberman and Veimetra 1996, Perotti and Gelfer 2001), and thus retarding general property rights development, while at the other end of the scale, smaller businesses and investors are the ones that really build the momentum for property rights via small yet increasing success.

Finally, the term for volatility (Column 3) also behaves as anticipated, with financial market turmoil having an unequivocal negative effect on property rights in transition. An interesting result comes about from including a quadratic term for volatility, however; as noted above, we would have expected some level of volatility to be good for property rights, as learning curve effects worked their way through the system and the "right kind" of investor moved into equities. According to the initial hypothesis, after the initial levels of "good" volatility, we would expect to see further and protracted bouts of instability to impact property rights negatively.

Somewhat surprisingly, the results of Column 3 show exactly the opposite effect: volatility has a strong negative effect at first, turning into a positive effect on property rights at higher levels of volatility. A possible explanation for this observation also has political economy roots, in that immediate and low (but increasing) levels of volatility can turn a populace or a leader against market-based reforms, thus harming property rights (an effect seen most strongly in the experience of privatization in Central and Eastern Europe and the former Soviet Union, see Hayo 1997 and Fidrumc 1999 on the actualization of this perception). This explanation follows from the political science literature, which postulates that financial and other market-based reforms are conditioned on political will (see, for example, Quinn and Inclan 1997); if volatility continues in a politically weak atmosphere, it is entirely plausible that the continued presence of volatility will not only halt financial liberalization but other market reforms as well, thus having deleterious consequences for continued property rights development.[6]

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[5] An anonymous referee suggested that the issue of survivorship bias may be present in the data; however, if it were an issue, it is plausible to hypothesize that it would show up here most strongly: that is, companies that survived would be larger and more successful, thus contributing to high market capitalization, which, in theory, should lead to lower levels of property rights in general. However, given that the result here is exactly the opposite, I conclude that other factors than survivorship bias, as noted in the text, are at play.
[6] Li and Smith (2002) show empirically the importance of government strength for the decision for financial liberalization.

On the other end of the spectrum, extreme levels of volatility may also be seen as independent of market reforms, especially if they are linked with exogenous events such as the Russia crisis of 1998-99 and the ongoing global financial crisis. In this scenario, the highest levels of volatility may induce more property rights protection as a hedge against uncertainty coming from abroad (that is, getting the fundamentals right at home may be a natural reaction to strengthen against further externally-inspired volatility). Alternately, the exigencies of our objective property rights indicator may explain for this discrepancy, as volatility in the equity markets at higher levels may induce the populace to hold their money in banks rather than in more "risky" investments such as equities; this effect was postulated theoretically by Sandmo (1970) in a model of savings in an uncertain environment, and shown empirically by Barrett and Slovin (1988) for the US and Cheng (2012) for Taiwan (as well as shown anecdotally by Stewart (2011) for Australia).

Robustness tests

While these results are clear-cut and responsive to a number of static panel data methods not reported, are they sensitive to the choice of the model?[7] To test this, I utilize additional controls not used in the previous specification. In the first instance, investment could also be a large determinant of property rights. While a large literature has established the somewhat self-evident link between secure property rights and, for example, a firms' decision to invest (Besley and Ghatak 2010), there is little work looking at the effect running the other way. If we establish that at least some investment is going to occur even in an environment of low property rights, due to differing risk appetites of market participants, can this exogenous investment encourage greater property rights protection? Theoretically, it would appear that it would, as firms would agitate politically for protection of their investments *ex ante*; similarly, politicians would also see a bigger pie for taxation if investments were increased, and thus could be induced for greater property rights protection. Accounting for this possible effect, I include the growth of fixed capital formation in Columns 1-3 of Table 2 as a robustness test.[8] The results show that growth of investment has a positive but almost entirely insignificant effect on property rights; perhaps more importantly, the effects of stock market size, performance, or volatility remain unchanged.

Another indicator that has thus far been neglected is the extent of external financial liberalization in a country. While the existence of a stock market presupposes a level of financial liberalization already in existence, the attitude of the government of Belarus, Kazakhstan, and Poland to international finance nonetheless remain widely disparate. Given this reality, I include an additional control to account for extent of international financial liberalization, the widely used Chinn-Ito (2008) index of financial openness, which is constructed as the first standardized principal component of four separate variables taken from the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER). To control for the effect of the process of liberalization on property rights, the period difference in Chinn-Ito index is included in the series of regressions shown in Columns 4-6 of Table 2. As the results show, increases in liberalization enter as positively correlated with property rights for all stock market proxies

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[7] Diagnostics utilized a fixed-effects estimation, a feasible GLS estimation correcting for heteroskedasticity and autocorrelation, and, as noted above, a Prais-Winsten regression correcting for panel-specific standard errors and autocorrelation. In no case did the relationships, nor the significance, change. The Driscoll-Kraay estimator is shown as, again, it corrected the exigencies of the dataset the best.

[8] The availability of fixed capital formation data on a monthly basis was limited, and most countries only had the data available on a quarterly basis. Thus, the Chow-Lin (1971) linear interpolation method was utilized on the data to retain the more available monthly data on institutions and stock market development.

(and significant for stock returns and volatility), but this move to liberalization does not alter the basic results for the effects of stock market performance.

On the other hand, perhaps the growth in private credit to GDP could be a reason, rather than stock market performance, for the solidity of property rights. In this formulation, it is the overall amount of money that the private sector is earning (and the depth of the financial sector), rather than its movement into equities, that would help to enforce property rights protection. Credit has been used in many papers as a proxy for financial development in general (see Claessens and Laeven 2003, among others), including in the Miletkov and Wintoki (2012) paper that is a spiritual precursor to this current examination; in these published papers, credit is found to be positively correlated with institutional development.[9] To test this approach, the regressions are re-run including the lag of private credit to GDP as an explanator. As shown in Columns 7-9 of Table 2, the inclusion of the growth of private credit to GDP is an insignificant determinant of property rights, and it does not change the influence of stock market performance except in the case of volatility (where it turns it insignificant); indeed, inclusion of credit reinforces the effects of the stock market in the case of stock market capitalization and returns, although this may be a consequence of the lower number of observations due to data availability on credit in transition.[10]

Following on from these results, perhaps broader political trends are influencing the effect of stock markets on property rights development. As part of our theoretical discussion, I noted that one of the channels that stock markets could negatively influence property rights development was through public choice effects; namely that equity market participants would seek to safeguard their own investments at the expense of broader property rights via political lobbying and the enactment of policies that privilege the stock market over general property protections. This channel can only work, however, if the government of a country actually has the power to enact and enforce policies to advantage stock markets over the rest of the economy. Perhaps, in the face of strict constitutional limits or a balanced political system that constrains the executive, we would see less influence of the stock market on property rights than in other systems.

To test this proposition, I include in Table 2 an indicator of initial executive constraints; taken from the Polity IV database, "executive constraints" measures the de facto independence of the chief executive *vis a vis* other branches of government (with higher numbers corresponding to higher constraints). The executive constraint measure utilized here is the constraint coding from the year prior to the stock market starting operations, on the theory that the beginning level of executive constraints will influence the path of the stock market and how the stock market's players can influence policy. Table 2 shows that this intuition is indeed correct, and that the higher the level of executive constraints prior to a stock market's creation is very highly correlated with property rights no matter which measure of equity markets is included; in fact, initial executive constraints can account for as much as a 15% change in property rights per level of constraints (a change in one level of the executive constraints indicator prior to the inception of a stock market would yield improved property rights of up to 15%). However, the effect of the stock market remains even after controlling for the initial level of executive constraints although the effect of the size of the stock market is rendered insignificant. Simply stated, the initial level of executive constraints matters intensely for property rights development, but it appears that

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[9] In the aforementioned Miletkov and Wintoki (2012) paper, the authors find that the extent of private credit at time *t* is a key determinant of the quality of property rights institutions at time *t+5*.

[10] The same could be said about the effects on volatility, which reduced the total observations by approximately 500.

there is no such thing as an entirely-constrained executive; thus, stock markets still seems to have a diminishing positive effect on property rights in the longer-term.

Finally, while there has been work done criticizing the use of institutional indicators as continuous variables (when in most cases they are discrete, as noted in Billmeier and Massa (2009)), this is not the case in the presence of our objective indicator for property rights as used above. However, there is a chance that different levels of property rights are affected differently by stock market performance, and as another robustness check I separate the sample into "low" and "high" property rights countries. Given the dispersion of countries in terms of their "contract-intensive money" indicators, I have chosen the mean as the cut-off between "high" and "low" property rights; thus, countries with a property rights indicator of 0.8 or higher are "high" while those of 0.79 and lower and "low" property rights countries. The results of this analysis are shown in Table 3. For the "high" property rights countries, the results are broadly in line with the full sample, apart from a loss of significance for stock market size and volatility. Indeed, the interesting fact here is the correlation of democracy, in the presence of a large stock market, with property rights. Conversely, there are some interesting effects for the "low" property rights countries, which see stock market size, performance, or volatility having little effects on property rights in transition; instead, growth appears to be the biggest determinant of property rights (i.e. if an economy is growing, it is easier to sustain property reforms), while, unlike their more secure brethren, democracy is a continuously negative influence on property rights development (and highly significant in the case of stock market size). This result is broadly in line with Hartwell (2013), who found that legislative development in transition economies, if outpacing property rights reform, led to suboptimal economic outcomes as redistribution began before the economy's reallocation of resources was complete. This also appears to be the case at play here.

V.   Conclusions

The existence of a stock exchange may be a prerequisite for a country to reach an advanced stage of financial development, but the performance of the exchange after a certain point may actually harm the development of other necessary institutions. This paper has examined the impact of stock exchanges in the transition countries of Central and Eastern Europe and the former Soviet Union on the development of property rights, and found that different facets of a stock market do indeed impact property rights differently. Using specific econometric methods to account for the idiosyncrasies of the data, it appears that larger stock markets create momentum for continued property rights improvement, but only solidly (and not spectacularly) performing stock exchanges can help to push property rights along. Volatility is a negative factor in relation to property rights in general, but very high levels of volatility may be seen as exogenously given and thus have little deleterious effects on property rights development. These results were robust to several specifications and sensitivity analyses.

The implications of this research are tough to discern at first, given as how they concern a somewhat backward-looking analysis in a specialized environment; as noted throughout this paper, the special case of the transition economies and their exogenously-inspired stock exchanges was what made them precisely so interesting as a subject for studying institutional interaction. However, the lessons learned from this analysis do suggest some important implications in the political economy sphere, especially regarding the interaction of institutions in flux. In the first instance, policies that encourage more successful stock markets (in terms of market capitalization) can help build support for market players needed for property rights to take hold in a transition environment. This lesson is key for other countries

that are perhaps are earlier stages of development or that have undertaken only halting reforms in the past.

Secondly, and somewhat connected with this first point, is that, while the influence of broader democratic accountability is unclear from our analysis (shifting significance and signs depending upon the specification), it appears that a much narrower type of democracy may help to sustain property rights. In particular, it is perhaps broader participation in the stock exchange (not explicitly modeled here but implied via the return model) that can lead to sustainable property rights changes. As noted above, users of stock markets may become entrenched and more powerful relative to other aspects of the economy, and thus may agitate for policies that advantage their "in" group at the expense of "out" groups. Oftentimes, these policies affect broader property rights, even as they may improve security in the financial sector. From a political economy standpoint, thus, broader participation would vitiate the role of "insiders" versus "outsiders," as more people would be insiders, with diverse viewpoints and aims. Again, this idea is implicit in the examination of stock market returns, as incredibly high returns (which could not be expected to accrue to the entire market indefinitely) seem to correlate with lower property rights, perhaps showing capture of the stock exchange by a few connected insiders. While much more work is needed in this vein, it seems that slow and steady gains help to build support for property rights rather than shooting star stock exchanges, and the way to obtain these more consistent gains is by diversification of market players.

Finally, and as no surprise, policies that help to dampen volatility should also help to increase property rights, at least at low- to moderate-levels of volatility. In the transition or emerging market context this could mean political stability, ordered political succession, or, as our robustness check showed, a constrained executive with less power to create turmoil in the markets. Additional work will help to narrow down the sources of instability that can translate to financial volatility, and thus an impact on property rights.

As this paper has been a first attempt to show that relationship between various facets of a stock market and property rights, this examination is by no means comprehensive. Indeed, while a novel contribution, this paper hopefully lays the basis for extensive future work in the area of the financial sector's effects on institutions, in both transition and emerging markets. Future work can concentrate on the possible endogeneity of financial sector institutions, or model explicitly how financial sector institutions interact with other market institutions. And, as noted above, a more comprehensive political economy lens can be applied to this work to isolate the effects of participation in the stock market, the explicit role of insiders in stock exchange outcomes, and other political and public choice evidence for the development of property rights in specific countries. The possibilities for extensions to this work appear legion.

ACKNOWLEDGEMENTS

REFERENCES

Agarwal, S., and Mohtadi, H. (2004). Financial markets and the financing choice of firms: Evidence from developing countries. *Global Finance Journal*, 15(1), pp. 57–70.

Andrianaivo, M., and Yartey, C.A. (2009). Understanding the Growth of African Financial Markets. IMF Working Paper 09/182.

Angrist, J., and Krueger, A.B. (2001). Instrumental Variables and the Search for Identification: From Supply and Demand to Natural Experiments. *Journal of Economic Perspectives*, 15(4), pp. 69-85.

Arellano, M. and Bover, O. (1995). Another Look at the Instrumental Variable Estimation of Error-Components Models. *Journal of Econometrics*, 68, pp. 29-52.

Ayyagari, M., Demirgüç-Kunt, A., and Maksimovic, V. (2013). What Determines Protection of Property Rights? An Analysis of Direct and Indirect Effects. *Journal of Financial Econometrics*, 11(4): 610-649.

Barrett, W.B., and Slovin, M.B. (1988). Economic Volatility and the Demand for Consumer Durables. *Applied Economics*, 20(6), pp. 731-738.

Barro, R. J. (1996). Democracy and growth. *Journal of economic growth*, 1(1), pp. 1-27.

Beck, T., Demirgüç-Kunt, A., and Levine, R. (2003). Law and finance: why does legal origin matter? *Journal of Comparative Economics*, 31(4), pp. 653-675.

Beck, T., & Levine, R. (2004). Stock markets, banks, and growth: Panel evidence. *Journal of Banking & Finance,* 28(3), pp. 423–442.

        (2008). *Legal institutions and financial development*. Heidelberg: Springer Berlin, pp. 251-278.

Besley, T. and Ghatak, M. (2010). Property rights and economic development. In: D. Rodrik and M. Rosenzweig, (eds.), *Handbook of Development Economics*. North Holland: Elsevier, pp.4525-4595.

Billmeier, A., and Massa, I. (2009). What drives stock market development in emerging market – institutions, remittances, or natural resources? *Emerging Markets Review*, 10(1), pp. 23-35.

Blundell, R., and Bond, S. (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics*, 87, pp. 115-143.

Bose, N., Murshid, A.P., and Rath, C. (forthcoming). Finance and Property Rights: Exploring Other Directions. *Journal of Money, Credit, and Banking*.

Breusch T. & Pagan, A. (1980). The Lagrange Multiplier Test and its Applications to Model Specification in Econometrics. *Review of Economic Studies*, 47, pp. 239-53.

Cecchetti, S.G., and Kharroubi, E. (2012). Reassessing the impact of finance on growth. BIS Working Papers 381, Bank for International Settlements.

Cheng, S. (2012). Substitution or complementary effects between banking and stock markets: Evidence from financial openness in Taiwan. *Journal of International Financial Markets, Institutions & Money*, 22(3), pp. 508-520.

Chinn, M. D. and Ito, H. (2008). A New Measure of Financial Openness. *Journal of Comparative Policy Analysis,* 10, pp. 309 – 322.

Chow, G.C., and Lin, A. (1971). Best linear unbiased interpolation, distribution, and extrapolation of time series by related series. *Review of Economics and Statistics*, 53(4), pp. 372-375.

Christopoulos, D.K., and Tsionas, E.G. (2004). Financial development and economic growth: evidence from panel unit root and cointegration tests. *Journal of Development Economics*, 73, pp. 55-74.

Claessens, S. and Laeven, L. (2003). Financial Development, Property Rights, and Growth. *Journal of Finance*, 58(6), pp. 2401-2436.

Clague, C., Keefer, P., Knack, S., & Olson, M. (1996). Property and contract rights in autocracies and democracies. *Journal of Economic Growth*, 1(2), pp. 243-276.

De la Torre, A., Gozzi, J.C., and Schmukler, S.L. (2007). Stock market development under globalization: Whither the gains from reforms? *Journal of Banking & Finance*, 31(6), pp. 1731-1754.

Demirgüç-Kunt, A., and Levine, R. (1996a). Stock Markets, Corporate Finance, and Economic Growth. *World Bank Economic Observer*, 10(2), pp. 223-239.

(1996b). Stock Market Development and Financial Intermediaries: Stylized Facts. *The World Bank Economic Review*, 10 (2), pp. 291-321.

Demsetz, H. (1967). Toward a theory of property rights. *American Economic Review*, 57(2), pp. 347–359.

Driscoll, J. C., and Kraay, A.C. (1998). Consistent covariance matrix estimation with spatially dependent panel data. *Review of Economics and Statistics,* 80, pp. 549-560.

Durham, J.B. (2002). The effects of stock market development on growth and private investment in lower-income countries. *Emerging Markets Review*, 3, pp. 211-232.

Fidrmuc, J. (2000). Political support for reforms: Economics of voting in transition countries. *European Economic Review*, 44(8), pp. 1491-1513.

Fidrmuc, J., & Danišková, K. (2011). Inflation Convergence and the New Keynesian Phillips Curve in the Czech Republic. *Czech Economic Review*, 5(2), 99-115.

Fratianni, M., and Marchionne, F. (2013). The fading stock market response to announcements of bank bailouts. *Journal of Financial Stability*, 9(1), pp. 69-89.

Garcia, V.F., and Liu, L. (1999). Macroeconomic Determinants of Stock Market Development. *Journal of Applied Economics*, 2(1), pp. 29-59.

Goldsmith, R (1969). *Financial structure and development*, Yale University Press: New Haven.

Gupta, N., and Yuan, K. (2009). On the Growth Effect of Stock Market Liberalizations. *Review of Financial Studies*, 22(11), pp. 4715-4752.

Hartwell, C.A. (2013). *Institutional Barriers in the Transition to Market: Examining Performance and Divergence in Transition Economies*. Basingstoke: Palgrave Macmillan.

Hasan, I., Wachtel, P., and Zhou, M. (2009). Institutional development, financial deepening and economic growth: Evidence from China. *Journal of Banking & Finance*, 33(1), pp. 157-170.

Hayo, B. (1997). Eastern European Public Opinion on Economic Issues. *American Journal of Economics and Sociology*, 56(1), pp. 85-102.

Hoechle, D. (2007). Robust standard errors for panel regressions with cross–sectional dependence. *Stata Journal* , 7(3), pp. 281-312.

Im, K. S., Pesaran, M.H., and Y. Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, 115, pp. 53-74.

King, R.G., and Levine, R. (1993). Finance and Growth: Schumpeter Might Be Right. *Quarterly Journal of Economics* , 108(3), pp. 717-737.

Kliesen, K.L., Owyang, M.T., and Vermann, E.K. (2012). Disentangling Diverse Measures: A Survey of Financial Stress Indexes. *Federal Reserve Bank of St. Louis Review*, 94(5), pp. 369-397.

La Porta R., Lopez-de-Silanes, F., and Shleifer, A. (1997). Legal Determinants of External Finance. *Journal of Finance*, 52, pp. 113–150.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., and Vishny, R.W. (1998). Law and Finance. *Journal of Political Economy*, 106, pp. 1113-1155.

Levine, R., and Zervos, S. (1996). Stock Market Development and Long-Run Growth, *World Bank Economic Observer*, 10(2), pp. 323-339.

Li, Q., and Smith, D. (2002). Testing alternative models of capital control liberalization. *Policy Studies Review,* 19(1), pp. 28-52

Lieberman, I.W., and Veimetra, R. (1996). The Rush for State Shares in the "Klondyke" of Wild East Capitalism: Loans-for-Shares Transactions in Russia. *George Washington Journal of International Law and Economics*, 29(3), 737-768.

Mijiyawa, A.G. (2013). Determinants of property rights institutions: survey of literature and new evidence. *Economics of Governance,* 14(2), pp. 127-183.

Miletkov, M., and Wintoki, M.B. (2009). Legal institutions, democracy and financial sector development. *Advances in Financial Economics*, 13, pp. 171-196.

(2012). Financial development and the evolution of property rights and legal institutions. *Emerging Markets Review,* 13(4), pp. 650–673.

Mishkin, F.S. (2010). *The Economics of Money, Banking, and Financial Markets.* Prentice Hall: New York.

Mishkin, F.S., and White, E.N. (2003). Stock Market Bubbles: When Does Intervention Work? *Milken Institute Review*, 2, pp. 44-52.

Murray, M,P. (2006). Avoiding Invalid Instruments and Coping with Weak Instruments. *Journal of Economic Perspectives*, 20(4), pp. 111-132.

North, D.C. (1971). *Institutional Change and American Economic Growth*. Cambridge University Press: New York.

Panetta, F. (2002). The Stability of the Relation between the Stock Market and Macroeconomic Forces. *Economic Notes*, 31(3), pp. 417-450.

Perotti, E. C., and Van Oijen, P. (2001). Privatization, Political Risk and Stock Market Development in Emerging Economies. *Journal of International Money and Finance*, 20(1), pp. 43–69.

Perotti, E. C., and Gelfer, S. (2001). Red barons or robber barons? Governance and investment in Russian financial–industrial groups. *European Economic Review*, 45(9), pp. 1601-1617.

Pesaran, M. H. (2004). General diagnostic tests for cross section dependence in panels. Working paper, University of Cambridge, Cambridge, United Kingdom.

(2006). Estimation and inference in large heterogeneous panels with a multifactor error structure. *Econometrica*, 74(4), pp. 967-1012.

Pesaran, M. H., and Smith, R.P. (1995). Estimating long-run relationships from dynamic heterogeneous panels. *Journal of Econometrics*, 68, pp. 79-113.

Pesaran, M. H., Shin, Y., and Smith, R.P. (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association*, 94, pp. 621-634.

Quinn, D.P., and Inclan, C. (1997). The origins of financial openness: a study of current and capital account liberalization. *American Journal of Political Science*, 41(3), pp. 814-845.

Rathinam, F.X., and Raja, A.V. (2010). Law, regulation and institutions for financial development: evidence from India. *Emerging Markets Review*, 11(2), pp. 106–118.

Roodman, D. (2009a). A Note on the Theme of Too Many Instruments. *Oxford Bulletin of Economics and Statistics*, 71(1), pp. 135-158.

(2009b). How to do xtabond2: An Introduction to Difference and System GMM in Stata. *Stata Journal*, 9(1), pp. 86-136.

Sandmo, A. (1970). The effect of uncertainty on savings decisions. *Review of Economic Studies,* 37(3), pp. 353-60.

Santos, L.A., and Barrios, E.B. (2011). Small Sample Estimation in Dynamic Panel Data Models: A Simulation Study. *American Open Journal of Statistics*, 1(1), 58-73.

Skrabic, B. ,and Arneric, J. (2011). Banking sector development in CEE countries: panel data approach. *International Journal of Sustainable Economy*, 3(3), pp. 281-293.

Stewart, T. (2011). Market volatility creates 'flight to cash'. *Money Management*, 25(31),p. 11.

Višić, J., and Perić, Š. (2011). The determinants of value of incoming cross-border mergers & acquisitions in European transition countries. *Communist and Post-Communist Studies*, 44(3), pp. 173–182.

Westerlund, J. (2007). Testing for error correction in panel data. *Oxford Bulletin of Economics and Statistics*, 69, pp. 709–748.

Weymouth, S., and Broz, J.L (2013). Government Partisanship and Property Rights: Cross-Country Firm-Level Evidence. *Economics and Politics,* 25(2), pp. 229-256.

Wolf, C. (2009). Does Ownership Matter? The Performance and Efficiency of State Oil v. Private Oil (1987-2006). *Energy Policy*, 37(7), pp. 2642-2652.

Yogo, M. (2004). Estimating the Elasticity of Intertemporal Substitution When Instruments Are Weak. *Review of Economics and Statistics*, 86(3), pp. 797–810.

Table 1 - Results of Driscoll-Kraay Standard-Error Fixed Effects Regressions

	1	2	3
Stock Market Variables			
Growth of Stock Market Capitalization	0.02		
	2.16*		
Stock Market Capitalization^2	0.02		
	10.26**		
Change in Stock Market Returns		0.004	
		0.83	
Stock Market Returns^2		-0.64	
		3.83**	
Volatility			-0.0001
			3.54**
Volatility^2			0.0001
			2.91*
Institutional and Macro Variables			
Lag Democracy	-0.02	0.002	0.001
	4.55**	*0.54*	*0.41*
Lag M2/GDP	-0.0009	-0.0002	-0.0001
	2.57*	*3.39***	*2.01**
Lag Interest Rate Spread	-0.002	0.0001	-0.001
	0.34	*0.18*	*1.25*
Lag Industrial Production	0.001	-0.001	-0.001
	6.61**	*5.36***	*4.94***
Lag Inflation	-0.004	-0.0003	-0.0001
	2.95*	*1.26*	*0.03*
C	0.89	1.60	0.87
	50.76**	*7.41***	*48.66***
n	1269	2038	2016
R-squared	0.39	0.23	0.20
Time Dummies?	yes	yes	yes

Note: absolute values of t-stats are under the coefficients, with * signifying significance at the 10% level and ** at the 1% level. Results obtained using xtscc, fe in Stata 13.

Figure 1 – Fitted Values of Quadratic Stock Changes and Property Rights

Table 2 - Robustness Checks

	1	2	3	4	5	6	7	8	9	10	11	12
	D-K	D-K	D-K	D-K	D-K	D-K	D-K	D-K	D-K	D-K	D-K	D-K
Stock Market Variables												
Growth of Stock Market Capitalization	0.02			0.03			0.02			0.02		
	2.19*			2.08*			2.83*			1.76		
Stock Market Capitalization^2	0.02			0.02			0.02			0.02		
	10.30**			9.50**			15.26**			8.86**		
Change in Stock Market Returns		0.003			0.003			0.004			0.001	
		0.67			0.70			0.80			0.26	
Stock Market Returns^2		-0.59			-0.51			-0.51			-0.43	
		3.78**			3.64**			3.38**			3.18**	
Volatility			-0.0001			-0.001			0.001			-0.0001
			3.56**			3.43**			0.79			3.54**
Volatility^2			0.00006			0.001			-0.0001			0.0001
			2.87*			2.82*			1.03			2.91*
Institutional and Macro Variables												
Lag Democracy	-0.02	0.002	0.001	-0.02	0.002	0.002	-0.02	-0.003	0.25	-0.02	0.001	0.001
	4.56**	0.48	0.44	4.51**	0.50	0.50	4.13**	1.53	4.39**	5.05**	0.40	0.41
Difference in Financial Liberalization				0.001	0.13	0.01						
				0.19	2.63*	2.09*						
Change in Private Credit to GDP							-0.0001	-0.0001	0.002			
							0.58	0.32	0.08			
Initial Level of Executive Constraints										0.15	0.15	0.14
										57.04**	52.47**	48.66**
Lag M2/GDP	-0.0009	-0.00001	-0.00001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	0.0002	-0.00001	-0.0001	-0.00001
	2.46*	3.15**	1.93*	2.53*	3.14**	2.02*	3.41**	2.78*	2.27*	2.56*	3.03**	2.01*
Lag Interest Rate Spread	-0.0002	0.0001	-0.001	-0.002	-0.002	-0.001	0.0004	-0.001	-0.12	-0.001	-0.0001	-0.001
	0.33	0.12	1.23	0.37	0.24	1.40	1.19	1.48	8.87**	1.04	0.66	1.25
Growth of Fixed Capital Formation	0.0001	0.0001	0.00001									

	0.51	*0.24*	*0.51*									
Lag Industrial Production	0.001	-0.001	-0.001	-0.001	-0.001	-0.001	0.0001	-0.002	0.002	0.001	-0.001	-0.001
	6.34**	*5.86***	*5.04***	*6.54***	*6.33***	*5.15***	*0.16*	*1.29*	*0.41*	*6.35***	*6.51***	*4.94***
Lag Inflation	-0.0004	-0.0002	-0.001	-0.001	-0.001	0.0001	-0.0005	-0.0001	-0.02	-0.0005	-0.001	-0.00001
	2.97*	*0.92*	*1.23*	*2.90**	*0.48*	*0.05*	*3.82***	*0.32*	*3.73***	*2.86**	*0.56*	*0.03*
C	0.89	0.89	0.88	0.89	1.42	0.87	0.92	0.83	4.80			
	51.21**	*48.54***	*49.29***	*44.98***	*7.97***	*56.22***	*46.17***	*40.88***	*10.89***			
n	1266	2010	2013	1259	1939	1934	1031	1558	1579	1236	1963	2016
R-squared	0.39	0.22	0.20	0.39	0.26	0.20	0.65	0.32	0.81	0.37	0.25	0.20
Time Dummies?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Note: absolute values of t-stats are under the coefficients, with * signifying significance at the 10% level and ** at the 1% level. Results obtained using xtscc, fe in Stata 13.

Table 3 - High versus Low Property Rights Countries

	High Property Rights			Low Property Rights		
	1	**2**	**3**	**4**	**5**	**6**
Stock Market Variables						
Growth of Stock Market Capitalization	0.001			-0.01		
	0.13			*1.02*		
Stock Market Capitalization^2	-0.003			-0.01		
	1.18			*2.40*￼*		
Change in Stock Market Returns		0.01			-0.001	
		2.45￼*			*0.25*	
Stock Market Returns^2		-0.51			0.05	
		1.88￼*			*0.31*	
Volatility			-0.0001			-0.00002
			1.21			*1.24*
Volatility^2			0.00003			0.00002
			1.03			*1.77*
Institutional and Macro Variables						
Lag Democracy	0.02	0.0001	-0.003	-0.03	-0.003	-0.004
	*3.41**￼*	*0.05*	*1.17*	*4.74**￼*	*1.03*	*1.29*
Lag M2/GDP	-0.001	-0.0001	0.00	0.0001	0.0002	0.0002
	1.60	*4.14**￼*	*1.54*	*0.16*	*0.53*	*0.51*
Lag Interest Rate Spread	0.004	0.01	0.01	0.00	0.00	0.001
	*4.63**￼*	*8.20**￼*	*6.74**￼*	*2.20*￼*	*1.39*	*1.64*
Lag Industrial Production	0.001	0.0003	0.00	0.00	0.001	0.001
	*12.38**￼*	*2.27*￼*	*3.07**￼*	*1.53*	*4.54**￼*	*4.56**￼*
Lag Inflation	-0.002	-0.003	0.00	0.0004	0.0004	0.0004
	*4.66**￼*	*7.83**￼*	*1.74*	*0.04*	*2.98*￼*	*2.99*￼*
C	0.70	0.84	0.87	0.85	0.53	0.44
	*23.84**￼*	*59.62**￼*	*64.87**￼*	*10.53**￼*	*10.57**￼*	*11.98**￼*
n	940	1282	1272	329	756	744
R-squared	0.47	0.37	0.33	0.94	0.76	0.77
Time Dummies?	yes	yes	yes	yes	yes	yes

*Note: absolute values of t-stats are under the coefficients, with * signifying significance at the 10% level and ** at the 1% level. Results obtained using xtscc, fe in Stata 13.*