SAME RULES, DIFFERENT ENFORCEMENT:

MARKET ABUSE IN EUROPE*

Douglas Cumming
York University - Schulich School of Business
4700 Keele Street
Toronto, Ontario M3J 1P3
Canada
http://ssrn.com/author=75390
douglas.cumming@gmail.com

Alexander Groh
EMLYON Business School
EMLYON Research Centre for Entrepreneurial Finance
23 Avenue Guy de Collongue
Ecully, 69132
France
http://ssrn.com/author=330804
GROH@em-lyon.com

Sofia Johan
York University - Schulich School of Business
4700 Keele Street
Toronto, Ontario M3J 1P3
Canada
http://ssrn.com/author=1570631
fzhan09@schulich.yorku.ca

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Abstract

We present and analyze enforcement data from the European Securities Market Authority over the period following European Union harmonized rule setting on securities market abuse. The data show significant differences in the intensity of enforcement across Europe. The empirical tests are highly consistent with the view that the intensity of enforcement is the most statistically robust and economically significant predictor of market abuse detections. In particular, the data identify three important arms of enforcement: the number of supervisors which enhances detection, formalized cooperation which facilitates surveillance, and imprisonment which facilitates deterrence. We discuss research, practitioner and policy implications for securities regulation across countries.

A trader to a broker on 18 September 2008:

"If you keep 6s [i.e. the six month JPY LIBOR rate] unchanged today ...

I will ... do one humongous deal with you ...

Like a 50,000 buck deal, whatever ...

I need you to keep it as low as possible ...

if you do that .... I'll pay you, you know, 50,000 dollars, 100,000 dollars...

whatever you want ... I'm a man of my word"[1]

1. Introduction

It is widely regarded that there are important differences in securities laws across countries (La Porta et al., 2006), just as there are important differences in the enforcement of securities laws across countries (Jackson and Roe, 2009). This empirical evidence shows that both the design and enforcement of securities laws have important implications for the success of market activities such as facilitating new listings and other capital raising activities. However, this disparate evidence on rule design versus rule enforcement highlights the fact that we do not know exactly how important the enforcement of securities laws is in the context of a legal environment which has the same set of market abuse rules.

Put differently, in past years what actually constituted market abuse in securities laws has been different across countries, thereby making analyses of what works in detecting market abuse rather intractable. But recently, European Union directives have given rise to harmonized market abuse definitions and rules (Cumming et al., 2011). The recent release of market abuse

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[1] Quote from the sentence of the The British Financial Services Authority addressed to UBS AG for manipulations of LIBOR benchmark rates: http://www.fsa.gov.uk/static/pubs/final/ubs.pdf

statistics and enforcement data from ESMA (2012) enables a unique setting in which to analyze the importance of enforcement in detecting market abuse cases. This paper represents a first look at such data.

Academic, practitioner and policy literature are extremely consistent in highlighting the importance of analyzing factors that lead to differential detection of market abuse. Frauds harm the integrity of financial markets and hence, an important principle of the mechanism for efficient allocation of financial resources (La Porta et al., 1997, 1998; Djankov et al., 2008; Horakova and Jordan, 2013). The 2008 to 2010 LIBOR manipulations, for example, established the biggest fraud activity in European financial markets until today. Record sanctions have been imposed and probably will continue to be charged in the ongoing process of settling all detected fraudulent acts. But despite the benefits of deterring enforcement, there are costs to deterring enforcement (Jackson and Roe, 2009). In this paper we make use of data to ascertain exactly the marginal benefit of expenditures on additional enforcement activity in respect of improved detection.

Our empirical analysis focuses on fraud in European financial markets. We utilize a unique data set provided by the European Security and Markets Authority (ESMA, 2012) on frauds detected between 2008 and 2010 by the national competent authorities. This data allows us to elaborate on the criteria that affect fraudulent acts and their detection across time and countries. The data reveal the following. First, increasing the resources of the supervision authorities strongly and consistently supports fraud detection. A 1-standard deviation increase in the number of supervisors (all of the persons who work in the national banking and insurance supervision authorities) is associated with an increase in detected cases by approximately 80% relative to the average number of cases across country-years. Second, differences in enforcement rules pertaining to surveillance give rise to large differences in fraudulent acts. In particular, a 1-standard deviation increase in formalized cooperation agreements across

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securities across countries is associated with a reduction in fraudulent cases by approximately 40%. Third, differences in enforcement rules pertaining to deterrence also give rise to large differences in fraud. The data indicate that a 1-standard deviation increase in minimum imprisonment is associated with a reduction in fraudulent cases by 38%.

In this paper we examine detected fraud, not actual (unobserved) fraud. There could be differences between detected fraud and actual unobserved fraud across countries due to, for example, differences in national culture. We do not find any robust cultural determinants of detected fraud across countries in our sample. Nevertheless, the data do indicate that countries with more capital market activity are more likely to detected market abuse infringement. Similarly, the data highlight that the legal quality in a country with respect to the protection of shareholders and lenders mitigates infringement activity. Also, the data suggest that enforcement authorities are more vigorous in detecting and reporting fraud when minimum pecuniary fines are higher.

There are a number of policy implications from our analyses. Legal enforcement of market abuse comes in three primary forms: direct expenditure on enforcement officers, the quality of surveillance through information sharing, and rules pertaining to deterrence. The ESMA data examined herein show each of these three mechanisms pertaining to enforcement is extremely important for detecting and deterring fraud. The data examined reveal effective mechanisms for politicians and regulators to fight fraud in financial markets and to increase investors' confidence in the existence of sound capital markets.

This paper is organized as follows. Section 2 describes the data. Empirical tests are presented in section 3. Robustness checks are provided in section 4. Concluding remarks and policy implications are discussed in the last section.

2. Data

Our primary data source is the ESMA (2012) report on the actual use of sanctioning powers under the Market Abuse Directive (MAD). The review panel of the Committee of European Securities Regulators launched a mapping procedure with regard to the actual use of sanctioning powers in the European Union member states in cases of market abuse. This mapping focused primarily on the actual use of sanctions concerning the two main offences of insider dealing and market manipulation. Article 14 of the MAD obliges the European Union member states to ensure that appropriate administrative measures can be taken or administrative sanctions be imposed against the persons responsible. Member states under the existing directive maintain the right (but do not have an obligation) to impose also criminal sanctions. However, there is no harmonization in this respect.

While the main focus has been on the use of administrative sanctioning powers, information was collected from national competent authorities on administrative sanctions and - to the extent possible - when possible or available on criminal sanctions. Information was obtained through a questionnaire among the national competent authorities covering data for a three-year period (i.e. 2008, 2009 and 2010). Table 1 lists the 28 countries and their national competent authorities which provided the data used in our analyses.

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Insert Table 1 here

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The ESMA notes that several aspects are important when using their report. Most importantly, the legal framework and powers available for the competent authorities to deal with market abuse differ among the European countries. These differences include the relationships between the competent authorities and judicial authorities in implementing the provisions of the MAD. Certain judicial authorities might be, in addition to courts, the

prosecutors in some countries. Moreover, the report relies on information provided by the national competent authorities but sanctions decisions by judicial authorities might not be easily available for them. Further, administrative and criminal procedures cover the whole chain of market abuse sanctioning. They start with the daily business of the competent authorities to observe and identify abnormal market moves, through the opening of an investigation, until the pronouncing of a sanction. This sanction may be reviewed or appealed, and it can take a substantial amount of time until the process is finally settled. All this information might not be directly available for the competent authority.

Additionally, the national competent authorities have different powers with respect to market abuse sanctioning. The major difference is that some of them have administrative and/or criminal proceedings at their disposal and can apply them directly to natural and legal persons while others don't have these powers and therefore only assist the judicial authorities. The practice also differs in terms of publication of administrative and criminal sanction decisions. Finally, in those member states where the competent authorities have direct sanctioning power, the exchange of information may be an obligation on both the competent and judicial authorities. In other cases, the competent authority has an obligation to keep the judicial authorities informed. While, still in others it is the judicial authorities that have such an obligation towards the national competent authority.

Since it is not always evident which authority finally has the sanctioning power on market abuse, we collect both, the number of natural or legal persons who are either directly sanctioned or discharged for insider dealing or market manipulation by the competent authorities and the cases that have been transferred to a judicial authority. Independently of which authority has the proceedings at its disposal all these offenses were detected by the competent authority. We use the numbers of direct sanctions and discharges by the competent authorities over the three years of observation (2008, 2009 and 2010) as our main dependent variable "Detected Offenses". For

the number of cases that have been submitted to a judicial authority we refer to as "Cases Transmitted".[2] Table 2 presents the dependent variables for the sample countries and over the observation period.

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Table 2 gives rise to some preliminary observations. Germany, as the largest European country has the highest number of detected offenses while Sweden, as a medium size country (in terms of GDP and population) in our sample has the most cases transmitted. In any way, not the size of the economy or population but of the financial market should affect the data because only the capital markets provide the "room for infringements". We would assume that the number of listed companies or the trading volume may have a direct impact on offenses as well as the number of staff that is dedicated to dealing with market abuse.

The Table also reveals that the Swedish competent authority has no option for administrative or criminal sanctions and has to direct all detected cases to the judicial authorities. This is similarly the case for Denmark. Nevertheless, the Danish competent authority cooperates very closely with its judicial authority. Most other competent authorities transfer some of their detected offenses to judicial authorities for prosecution. This might even be in addition to already having sanctioned or discharged them. Additionally, several natural or legal persons may be involved in a case which has been transferred to a judicial authority. Therefore, and to avoid any possibility of double counting of individual fraud incidents, we treat both variables separately and focus on the left hand side variable "Detected Offenses" while we use "Transmitted Cases" only for robustness checks.

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[2] Note: "Detected Offenses" is aggregated from the ESMA (2012) report, Tables F.3.2.A, F.3.2.B, F.3.2.C, F.3.2.D. The source for "Cases Transmitted" is Table G.8 of the same report.

As argued in the previous section, our main variable of interest should be affected by several socio-economic parameters. The most important factor for fraud detection in an international comparison is probably the resources of the competent authorities in terms of budget and staffing. Unfortunately, the ESMA report does not provide such information and it is likewise not publicly available. Therefore, we retrieve the number of total staff of banking and insurance supervisors and regulators for our sample countries from Horáková and Jordan (2013) as a proxy. The national competent authorities are usually direct subsidiaries of the banking and insurance regulators. Even if a large fraction of the staff of these institutions is not in charge of detecting insider transactions or market manipulation we expect at least a high correlation and similar ratios across countries between their overall staff and the number of employees dedicated to financial market supervision. Table 3 reports these numbers for the respective period.

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Beside this most important parameter for fraud detection, we collect several control variables for the size and for the capital market activity of our sample countries. Table 4 presents our control variables Population, GDP, and the Number of Listed Domestic Companies.[3]

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[3] Note: We ran numerous robustness checks with other indicators for capital market activity. Explicitly, we used trading activity, market capitalization, number of IPOs, and issued volumes in absolute figures and relative to GDP or population. The results are similar but do not yield the level of statistical significance as we subsequently present for the selected measure "Number of Listed Domestic Companies". Therefore, we do not add descriptions of alternative control variables for capital market activity. However, we present scatter plots for the selected control variable and for trading volume in the Appendix to this paper. In these plots we average the 2008, 2009 and 2010 figures and take the logs of the variables (with the exception of the countries with zero detected offenses) for a better representation. Further analyses and plots can be provided on request.

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We retrieve most of our independent variables from the ESMA report and enlarge the selection by two legal indicators which measure the quality of financial market relevant legislation. These indicators are the Shareholder Suits Index and the Legal Rights Index, both provided by World Bank. The calculation of the Shareholder Suits Index follows the methodology of Djankov et al. (2008) and measures on a scale from 0 to 10 how well minority investors are protected against misconduct of officers and directors of the firms they hold shares of. A high value means that minority shareholders are well protected against fraudulent acts of managers or directors of public firms. The Legal Rights Index addresses the protection of borrowers and lenders. It is not closely related to fraudulent acts but a widely used measure for corporate governance and investor protection. It also ranges between 0 and 10 with high values indicating good protection. We use it as an alternative to our preferred indicator Shareholder Suits Index.

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Table 5 presents the two legal indicators and five characteristics of the legislation and the operational mechanisms of the competent authorities in our sample countries (in the order of their appearance in the subsequent regression tables).

The Formalized Cooperation dummy variable indicates the countries in which the cooperation between the competent and the judicial authorities is formalized.[4] For example, legislation may provide a formal context and standardize the relationship between the

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[4] Source: ESMA (2012) report, Table D.8

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authorities. We assume that formalized cooperation increases the administrational efficiency to sanction the detected offenses. This might increase the awareness of market participants about the work of the supervising authorities and the sanctioning process and hence, reduce the preparedness to commit frauds.

Minimum Imprisonment.[5] The report does not provide exact information on the potential jail sentences but only the broad categories no jail time, up to 1 year, and between 2 and 5 years. Nevertheless, we learn from the report that the minimum length of imprisonment varies from 15 days for Slovenia to two years for Italy, while the maximum length ranges from 30 days for Greece to 15 years in Slovakia.[6] We assume that potential jail sentences pose a strong threat to market participants and hence, lower fraudulent acts.

Publication of Decision is a dummy which equals 1 if administrative or criminal sanction decisions are to be published by law.[7] The publication of charges can be considered a part of the whole sanctioning process because the information about breaches of law is provided to the general public. The affected individuals and institutions do not only suffer from their penalty but also from media attention and a loss of reputation. We expect that this effect dis-encourages potential offenders.

The dummy variable Cooperation also in Later Stages has a value of 1 if the cooperation between the competent and the judicial authority is envisaged to be extended to later stages of the procedure.[8] Cooperation among the two authorities may be desirable to ensure proper pursuing of market abuse. Such cooperation may not only exist to initiate legal procedures but also to provide support in a more or less defined framework until the case is settled. Several of the competent authorities do not only cooperate in the beginning of the process. They also

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[5] Source: ESMA (2012) report, Table G 29.2

[6] Note: For consistency, we always use the upper levels of these distinct groups in our analyses.

[7] Source: ESMA (2012) report, Table L.1

[8] Source: ESMA (2012) report, Table D.7

provide information and opinions, other kind of assistance, work together with the judicial authorities at later stages and might even impact the outcome of the proceedings.

The final dummy variable Limit on Fines expresses if the total amount of administrative and financial penalties imposed for the same offense is limited.[9] Unfortunately, the information is only provided by 9 competent authorities. We expect that limitations of penalties have a counterproductive effect on the intention to decrease the number of offenses. Table 6 lists, and describes all variables and their sources.

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Table 7 presents the descriptive statistics for our variables over 28 sample countries (9 for the Limit on Fines variable) and three years of observations.

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Table 8 shows the bivariate correlations among the independent variables.

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The correlation matrix reveals a low correlation among most paired variables. Nevertheless, the correlation between the two legal indicators is (not unexpectedly) elevated. Additionally, Limits on Fines might cause problems of multicollinearity in regression analyses. Therefore, we carefully develop horse races among the independent variables in the subsequent section.

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[9] Source: ESMA (2012) report, Table D.10

3. Regression Analyses

We set up horse races among the independent variables and start with OLS regressions. However, one might argue that staffing the competent authority is driven by politicians and contingent on perceived fraud activity in a particular country. The higher is the perception of fraud the higher the number of staff which politicians might allocate to the national supervision authorities. This simultaneity might bias our OLS estimates. Furthermore, staffing of the supervision authorities might follow a general pattern or a ratio of administrative employees in the various member states. Larger countries, in terms of their economy or their population employ more administrative staff. Therefore, we have another reason to conjecture that our key independent variable to explain fraud detection "Number of Supervisors" might not be exogenous. To cope with potential endogeneity, we run several additional regressions where we instrument "Number of Supervisors" by GDP and population. We also cluster standard errors by country and use a GMM estimate to eventually increase the quality of our parameter estimates. In a final step, we consider the panel structure of our data and use Random Effects Instrumented Variable Regressions.

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Table 9 presents the first four OLS regressions. Model (A) regresses "Detected Offenses" on the "Number of Supervisors" without control variables and additional regressors. Model (B) controls for capital market activity (using the number of listed companies). Models (C) and (D) add regressors and model (D) also includes time fixed effects for the years 2009 and 2010. The regressions highlight the following (see also Figures 1-5 for graphical depictions of the data). First, increasing the resources of the supervision authorities strongly and consistently supports fraud detection. A 1-standard deviation increase in the number of supervisors is associated with

an increase in detected cases by approximately 80% relative to the average number of cases across country-years. Second, differences in enforcement rules pertaining to surveillance give rise to large differences in fraudulent acts.[10] In particular, a 1-standard deviation increase in formalized cooperation agreements across securities across countries is associated with a reduction in fraudulent cases by approximately 40%. Third, differences in enforcement rules pertaining to deterrence also give rise to large differences in fraud. The data indicate that a 1-standard deviation increase in minimum imprisonment is associated with a reduction in fraudulent cases by 38%.

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Insert Table 10 and Figures 1-5 here

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The OLS regressions continue as presented in Table 10 where models (E) and (F) add the two indicators for investor protection separately, and model (G) sets up a horse race among them. Model (H) adds the dummy for the institutionalized cooperation between the competent authority and the judicial authority also in later stages of a prosecution and the dummy if there is a limit on fines. Unfortunately, the latter variable is available for only 9 countries over three years. This explains the reduction in observations but also, surprisingly, a strong increase in the coefficient of determination of regression (H). For the narrowed sample of countries where the information on limits of fines is provided, the results become even stronger than in the previous regressions. One can argue that several outliers are dropped in the reduced sample. All OLS regressions have relatively high coefficients of determination at increasing levels from (A) to (H). The independent variables have expected signs and the economic magnitude for some of them is notable. From Model (G), thus considering the complete sample, we interpret that an increase of staff of the supervision authority by 100 persons improves fraud detection by 3.6

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[10] Related evidence shows that surveillance is more effective with information sharing (Cumming and Johan, 2008).

cases per year.[11] If there is a formalized cooperation and if the sanction decisions are published, then the dissuasive effects reduce the number of detected offenses by almost 10 cases each year, all else equal (i.e. especially controlling for the number of staff of the competent authority). Likewise, an increase by 1 point in the Shareholder Suits Index decreases detected infringements by almost 4 cases per year (all else equal). Raising the threat of imprisonment by one year lowers detected frauds by 6 cases per year. From Model (H) we learn that additionally, formalized cooperation between the competent and the judicial authority in later stages obviously increases the efficiency of the processes and dissuades potential offenders. In contrary, limiting the punishment has a negative effect on fraud prevention. We realize that, controlling for all other factors, the amount of detected frauds increases in countries with limits on fines. This must be due to additional infringements compared to those countries with unlimited fines.

In a next step, we elaborate on the assumed endogeneity of our key explanatory variable "Number of Supervisors". The endogenous variable might cause our point estimates to be biased. We argued above that staffing the competent authorities is a political decision which might be proportional to country size. Comparatively, the size of an economy should not affect frauds in financial markets. We would like to recall that there are several rather small European countries in terms of their economy or population with a large capital market activity. The opposite is also true: Some large countries have less developed financial markets. We test this hypothesis by an augmented regression. First, we regress the number of supervisors on a country's GDP and its population to identify if the two variables are appropriate instruments for staffing of the competent authorities. We predict the residuals and then regress our dependent

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[11] The standard deviation of the "Number of Supervisors" is 753 persons (Table 6). Therefore, adding 100 people to the supervisory staff is less than one seventh of the variable's standard deviation. We note again that only a smaller fraction of the staff counted by the number of supervisors is directly dedicated to market abuse supervision.

variable "Detected Offenses" on "Number of Supervisors" and the predicted residuals. If the usual test statistics are met and if the regressors are significant, then our key variable of interest is correlated with the error term in the regressions presented above, and therefore endogenous.

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Table 11 presents the augmented regressions to test for endogeneity and to verify the proposed instruments at the same time. The first steps of the augmented regressions AR (A) and (B) reveal that GDP and Population highly correlate with the instrumented variable and therefore serve as appropriate instruments. The second steps of both regressions confirm the endogeneity of the number of supervisors revealing the significant impact of the residuals on the dependent variable. AR (B) further proofs that the financial market activity is not a predictor for the staff of the supervisory institutions. We assume that this is caused by a bureaucratic tendency to create administrational jobs relative to country size rather than relative to the actual size of the financial market.

Table 12 therefore completes our set of regressions by instrumenting the number of supervisors with its appropriate instruments.

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The first model is a two stage least square regression, instrumenting the number of supervisors in the first step (which is not presented) and then adding the additional relevant regressors in the second (which is presented). A Hausman (1978) test strongly rejects the hypothesis that the parameter estimates of this IV regression and of OLS (E) are equal and a Sargan (1958) test confirms that the selected instruments are appropriately uncorrelated with

the disturbance process. Therefore, we should prefer the IV approaches compared to OLS. Nevertheless, the results discussed so far remain in principle. Some of them, e.g. the number of supervisors, become statistically and economically even stronger. The importance of others slightly decreases in particular regressions. The second IV model allows that observations within the individual countries may be correlated and calculates cluster-robust estimates. Consequently, the standard errors of the point estimates increase compared to the previous model and thus, rejecting the null-hypothesis for the legal quality indicator is impossible. The third model controls for the possibility of a violation of the assumption of i.i.d. errors and determines GMM estimates. The results remain qualitatively unchanged. In the fourth and fifth model, we account for the panel structure of our data and apply instrumented random effects regressions to allow for potentially serially correlated error terms. It could be possible that fraud detection follows a certain pattern over time, eventually driven by new technology. Equivalent to OLS (H), the point estimates in model 5 result from a reduced sample of only 27 observations. The random effects models do not provide major new insights. However, the indicator for the publication of the sanction decision is not a significant driver of the number of detected frauds in the fourth model while this is analogue for the Shareholder Suits Index in model 5.

Summarizing, we note that even if we control for endogeneity and the panel structure of our data, the initial OLS results are qualitatively unchanged but receive additional support by the other econometric approaches that we apply.

4. Robustness Checks

We recall that our dependent variable is a count variable. It takes small values in many observations, including zero infringements. The fact that for some countries "Detected Offenses" has a value of zero rules out using its logarithm in our analyses. Count variables are

non-negative and typically follow a Poisson Distribution. Therefore, a Maximum Likelihood Estimate might be a preferable regression model. We run Poisson Regressions in a robustness check and present the results in Tables 13 and 14.

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Insert Tables 13 and 14 here

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The regressions presented in Tables 13 and 14 repeat OLS (A) to (H) from Tables 9 and 10 considering the Poisson Distribution of the regressand. The analyses clearly support our line of argumentation. Taking account for the characteristic of a non-normally distributed dependent variable substantially decreases the standard errors of the regression parameters. All of our revealed drivers of detected infringements become significant at a 1% level.

In a subsequent robustness check, we use the cases transmitted to the judicial authorities as alternative dependent variable. We realize that the observations of transmitted cases for Sweden might be flawed relative to its size of the economy or population and also with respect to any measure of its capital market activity. We emphasize that Sweden transmitted in 2008 five times the number of detected frauds of Germany and 15 times the number of France to its judicial authority. On the other side, the Swedish competent authority has no autonomy to proceed and sanction infringements independently and is required to transfer all cases. Denmark and Poland also stand out with their numbers of transmitted cases. However, ESMA (2012) notes that these numbers rather reflect the diversity existing in the national legal systems for the transmission of information to the judicial authorities. For example, in some countries every observation of potential misconduct might trigger a transmission of the case while in others the competent authorities might collect sufficient proof first, prior to transferring the observation of an incident. In any case, we consider Sweden an outlier with respect to its number of transmitted cases. Without Sweden, the variance of the variable becomes rather

small. Additionally, it takes zero values for many observations. Hence, the detection of significant covariates is less likely for the alternative dependent variable. This presumption is revealed in the results presented in Table 15.

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Table 15 shows the results of three robustness checks. We rerun OLS (G) and (H) from Table 10 and the instrumented random effects regression (B) from Table 11, dropping Sweden from the sample and using the alternative dependent variable. As presumed, several covariates can no longer be considered significant. However, reducing the sample via the inclusion of the variables on the cooperation at later stages and for measuring fines yields significance again for the parameters we already discussed above.

We conclude that our results hold with respect to non-normality of the dependent variable and under the consideration of differences in the legalities related to the transfer of incidences to the judicial authorities.

5. Conclusions

In this paper we presented and analyzed enforcement data from the European Securities Market Authority. Prior to the European Union's harmonized rule setting on securities market abuse, there was no consistent definition of what actually constituted market abuse across countries. In this new era of harmonized market abuse definitions and rules across countries, it is possible to ascertain factors that materially affect market abuse across countries.

The empirical tests are highly consistent with the view that the intensity of enforcement is the most statistically robust and economically significant predictor of market abuse detections. In particular, the data identify three important arms of enforcement. First, the

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number of supervisors is an important mechanism to facilitate detection of market abuse. The data indicate that this direct expenditure on supervisors is most statistically and economically tied to detecting market abuse. Second, formalized cooperation is an important tool through which securities market authorities can effectively engage in surveillance of market abuse. Finally, the data highlight the important of imprisonment (not fines) to deter would-be market manipulators.

As additional years of data become available, further research could examine the stability of our findings in different market conditions. Further research could also examine case-specific data, as they become available, in respect of the severity and types of market abuse. These and related studies would shed further light on international differences in securities fraud and appropriate mechanisms to detect and deter such market manipulation.

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Table 1. Summary of Countries in the Data and Securities Market Authority

EU Member State	National Competent Authority
Austria	Financial Market Authority
Belgium	Financial Services and Markets Authority
Bulgaria	Financial Supervision Commission
Cyprus	Cyprus Securities and Exchanges Commission
Czech Republic	Czech National Bank
Denmark	Finanstilsynet Finanstilsynet
Estonia	Estonian Financial Supervision Authority
Finland	Finanssivalvonta
France	Autorité des Marchés Financiers
Germany	Bundesanstalt für Finanzdienstleistungsaufsicht
Greece	Capital Market Commission
Hungary	Hungarian Financial Supervisory Authority
Iceland	Financial Supervisory Authority
Ireland	Central Bank of Ireland
Italy	Commissione Nazionale per le Società e la Borsa
Latvia	Financial and Capital Markets Commission
Lithuania	Lietuvos Bankas
Luxembourg	Commission de Surveillance du Secteur Financier
Netherlands	Autoriteit Financiële Markten
Norway	Finanstilsynet
Poland	Polish Financial Supervision Authority
Portugal	Comissão do Mercado de Valores Mobiliários
Romania	Romanian National Securities Commission
Slovakia	National Bank of Slovakia
Slovenia	Securities Market Agency
Spain	Comision Nacional del Mercado de Valores
Sweden	Finansinspektionen
United Kingdom	Financial Services Authority

The Table lists the European Union Member States and the national Competent Authorities considered in our analyses. Malta which is also included in the ESMA survey has been dropped from our sample due to the lack of availability of the required other data series that we use in the course of our analyses.

Table 2. Market Abuse Cases Across Countries

Country:	Detected Offenses			Cases Transmitted		
	2008	2009	2010	2008	2009	2010
Austria	22	23	36	1	4	1
Belgium	7	9	9	1	6	2
Bulgaria	5	9	9	0	0	0
Cyprus	5	11	10	0	1	3
Czech Republic	0	3	5	1	0	1
Denmark	32	22	9	34	35	66
Estonia	20	21	25	1	4	1
Finland	4	20	7	5	0	2
France	100	85	66	20	16	16
Germany	128	98	140	59	88	72
Greece	27	81	65	2	1	10
Hungary	18	6	11	1	0	0
Iceland	0	0	1	0	13	6
Ireland	0	0	0	0	0	0
Italy	6	23	23	6	7	8
Latvia	1	0	1	1	2	2
Lithuania	8	14	1	0	2	0
Luxembourg	2	3	13	0	0	3
Netherlands	5	5	13	11	4	3
Norway	14	17	12	6	7	5
Poland	27	12	16	24	26	12
Portugal	5	15	12	4	3	4
Romania	4	1	4	0	2	2
Slovakia	1	1	0	0	0	0
Slovenia	0	3	9	1	2	2
Spain	6	2	19	1	0	10
Sweden	0	0	0	304	262	249
United Kingdom	7	10	21	0	0	0
Total	454	494	537	483	485	480

This Table presents the main variables of interest "Detected Offenses" and "Transmitted Cases" (Data source is the ESMA Report: Actual use of sanctioning powers under MAD)

Table 3. Number of Supervisors Across Countries

	Number of Supervisors		
Country:	2008	2009	2010
Austria	219	275	282
Belgium	205	220	235
Bulgaria	330	330	301
Cyprus	104	109.5	118
Czech Republic	229	233	240
Denmark	200	212	220
Estonia	68	69	69
Finland	219	211	209
France	1525	1533	1553
Germany	2666	2829	3023
Greece	302	306	322
Hungary	478	461	475
Iceland	67	73	83
Ireland	398	453	507
Italy	1956	1981	1981
Latvia	104	107	109
Lithuania	69	71	71
Luxembourg	305	322	363
Netherlands	820	822	824
Norway	235	246	260.5
Poland	827	891	898
Portugal	585	635	659.5
Romania	795	791	779
Slovakia	185	185	184
Slovenia	140	142	140
Spain	1234	1211	1235
Sweden	224	232	240
United Kingdom	2650	2700	2750
Total	17139	17650	18130

This Table presents the instrumented variable "Number of Supervisors" (Data source is Martina Horáková: How Countries Supervise Their Banks, Insurers, and Securities Markets, Central Banking Publications, London 2012)

Table 4. Capital Market Activity Across Countries

Country:	Population [million]			GDP [billion USD]			Number of Listed Domestic Companies		
	2008	2009	2010	2008	2009	2010	2008	2009	2010
Austria	8.3	8.4	8.4	414	384	379	102	98	86
Belgium	10.7	10.8	10.8	507	474	472	167	166	161
Bulgaria	7.6	7.5	7.4	52	49	48	399	398	390
Cyprus	1.1	1.1	1.1	25	23	23	135	128	123
Czech Republic	10.4	10.4	10.5	225	196	198	18	16	16
Denmark	5.5	5.5	5.5	344	311	312	216	217	206
Estonia	1.3	1.3	1.3	24	19	19	18	16	15
Finland	5.3	5.3	5.4	272	239	237	126	125	123
France	62.1	62.5	62.8	2829	2620	2566	966	941	901
Germany	82.2	82	81.8	3620	3300	3306	638	601	571
Greece	11.2	11.3	11.3	341	322	301	300	296	287
Hungary	10	10	10	154	127	129	41	43	48
Iceland	0.3	0.3	0.3	17	12	13	14	9	7
Ireland	4.4	4.5	4.5	262	224	207	58	55	50
Italy	59.6	60	60.3	2305	2112	2057	294	291	291
Latvia	2.2	2.1	2.1	33	26	24	35	33	33
Lithuania	3.4	3.3	3.3	47	37	37	41	40	39
Luxembourg	0.5	0.5	0.5	55	50	53	34	34	33
Netherlands	16.4	16.5	16.6	870	797	780	110	121	113
Norway	4.7	4.8	4.9	454	375	417	209	190	195
Poland	38.1	38.1	38.2	529	431	470	349	354	569
Portugal	10.6	10.6	10.6	252	234	229	49	48	47
Romania	21.5	21.5	21.5	204	164	164	1824	1824	1383
Slovakia	5.4	5.4	5.4	98	87	87	125	107	90
Slovenia	2	2	2	55	49	47	84	76	71
Spain	45.3	45.8	46	1592	1456	1389	3536	3435	3310
Sweden	9.2	9.3	9.3	486	406	463	341	333	331
United Kingdom	61.2	61.6	62	2641	2186	2265	2584	2179	2056
Total	500.5	502.4	503.8	18708	16710	16690	12813	12174	11545

The Table presents the 2008, 2009 and 2010 observations for the instruments population and GDP, and for the control variable number of listed companies.

Table 5. Securities Enforcement Across Countries

Country	Formalized Cooperation (D)	Minimum Imprisonment [months]	Publication of Decision (D)	Shareholder Suits Index (max 2008-10)	Legal Rights Index (max 2008-10)	Coop. also in Later Stages (D)	Limit on Fines (D)
Austria	0	0	0	5	5.0	0	
Belgium	0	0-12	1	7	7.0	1	1
Bulgaria	0	0	0	7	6.0	0	
Cyprus	0	0	0	7	5.0	1	0
Czech Republic	0	0-12	1	8	5.0	0	
Denmark	0	0-12	0	7	6.3	1	
Estonia	1	0	0	6	5.7	1	
Finland	0	0	1	7	5.7	1	
France	0	0	1	5	5.3	1	1
Germany	1	0-12	0	5	5.0	1	
Greece	0	0	0	5	3.3	1	
Hungary	0	0	1	7	4.3	0	0
Iceland	1	0	0	6	5.3	0	
Ireland	1	0	1	9	8.3	1	
Italy	1	24-60	1	7	6.0	0	0
Latvia	0	0	0	8	5.7	0	
Lithuania	0	0	1	6	5.0	0	
Luxembourg	0	0-12	0	3	4.3	0	
Netherlands	1	0	1	6	4.3	0	
Norway	1	0	1	7	6.7	0	
Poland	1	0-12	0	9	6.0	0	0
Portugal	1	0	1	7	6.0	1	1
Romania	1	0-12	1	4	6.0	1	
Slovakia	1	0-12	1	7	4.7	0	1
Slovenia	0	0-12	0	8	6.7	0	
Spain	0	0-12	1	4	5.0	1	
Sweden	1	0-12	0	7	6.3	0	
United Kingdom	1	0	1	7	8.0	1	0

Illustration of the independent variables which describe the operational mechanisms of the competence authorities and the legal quality with respect to

Table 6. Descriptions and Sources of all Variables

Variable	Description	Source
Detected Offenses	Number of natural or legal persons who are either sanctioned or discharged for insider dealing or market manipulation by the competent authorities	ESMA (2012) report, Tables F.3.2.A, F.3.2.B, F.3.2.C, and F.3.2.D.
Cases Transmitted	Number of cases transmitted	ESMA (20120) report, Table G.8
Number of Supervisors	Number of total staff of banking and insurance supervisors and regulators	Horáková and Jordan (2013)
Population	A country's population	Euromonitor International
GDP	A country' Gross Domestic Product	Euromonitor International
Number of Listed Domestic Companies	The number of listed companies at all stock exchanges of a country	Worldbank
Formalized Cooperation	Dummy variable which indicates the countries where the cooperation between the competent and the judicial authorities is formalized	ESMA (2012) report, Table D.8
Minimum Imprisonment	Measures the minimum length of possible jail time for market abuse	ESMA (2012) report, Table G 29.2
Publication of Decision	Dummy which indicates if administrative or criminal sanction decisions are to be published by law	ESMA (2012) report, Table L.1
Shareholder Suits Index	Indicates between 0 and 10 how well minority shareholders are protected against misconduct of officers and directors of public companies	Worldbank
Legal Rights Index	Measures investor protection between 0 and 10 with respect to borrowing and lending	Worldbank
Coop. also in Later Stages	Dummy variable which indicates if the cooperation between the competent and the judicial authority is envisaged to be extended to later stages of the procedure	ESMA (2012) report, Table D.7
Limit on Fines	Dummy variable which indicates if the total amount of administrative and financial penalties imposed for the same offense is limited	ESMA (2012) report, Table D.10

Table 7. Summary Statistics

Variable	Mean	Median	Std.Dev.	Min.	Max.	Obs.
Detected Offenses	17.7	9	27.9	0	140	84
Cases Transmitted	17.2	2	52.0	0	304	84
Number of Supervisors	630.0	292	752.8	67	3,023	84
Formalized Cooperation (D)	0.5	0	0.5	0	1	84
Minimum Imprisonment [months]	6.9	0	11.8	0	60	84
Publication of Decision (D)	0.5	1	0.5	0	1	84
Shareholder Suits Index	6.5	7	1.4	3	9	84
Legal Rights Index	5.6	5.7	1.1	3.3	8.3	84
Coop. also in Later Stages (D)	0.5	0	0.5	0	1	84
Limit on Fines (D)	0.4	0	0.5	0	1	27
Number of Listed Companies	434.9	126	774.6	7	3,536	84
GDP [billion USD]	620.3	246	905.1	12	3,620	84
Population [mn]	17.9	8.8	22.7	0.3	82.2	84

Table 8. Correlation Matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1)	Number of Supervisors	1.00						
(2)	Formalized Cooperation (D)	0.35	1.00					
(3)	Minimum Imprisonment [months]	0.34	0.19	1.00				
(4)	Publication of Decision (D)	0.22	0.15	0.10	1.00			
(5)	Shareholder Suits Index	-0.19	0.15	0.01	0.05	1.00		
(6)	Legal Rights Index	0.17	0.32	0.06	0.19	0.53	1.00	
(7)	Coop. also in Later Stages (D)	0.30	-0.01	-0.18	0.15	-0.20	0.23	1.00
(8)	Limit on Fines (D)	-0.34	-0.10	-0.23	0.48	-0.47	-0.05	0.35

Table 9: OLS regressions, dependent variable is detected offenses

	OLS (A) β (SE)	OLS(B) β (SE)	OLS (C) β (SE)	OLS (D) β (SE)
Number of Supervisors	0.0208*** (0.00338)	0.0272*** (0.00384)	0.0323*** (0.00394)	0.0363*** (0.00386)
Formalized Cooperation (D)			-16.26*** (4.964)	-14.04*** (4.630)
Minimum Imprisonment (months)				-0.568*** (0.193)
Publication of Decision (D)				-12.43*** (4.450)
Constant	4.564 (3.306)	5.500* (3.163)	10.82*** (3.401)	17.00*** (4.698)
Control for:				
Capital Market Activity	no	yes	yes	yes
Year Fixed Effects	no	no	no	yes
N	84	84	84	84
adj. R^2 in %	30.79	37.26	43.98	52.03
Root MSE	23.18	22.07	20.86	19.30

Standard errors in parentheses
* $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table 10: OLS regressions, dependent variable is detected offenses

	OLS (E) β (SE)	OLS(F) β (SE)	OLS (G) β (SE)	OLS (H) β (SE)
Number of Supervisors	0.0355*** (0.00358)	0.0360*** (0.00363)	0.0356*** (0.00356)	0.0589*** (0.00717)
Formalized Cooperation (D)	-11.35** (4.349)	-9.739** (4.542)	-9.892** (4.446)	-34.61*** (6.214)
Minimum Imprisonment (months)	-0.552*** (0.179)	-0.571*** (0.182)	-0.558*** (0.178)	-0.676*** (0.162)
Publication of Decision (D)	-9.970** (4.174)	-10.66** (4.217)	-9.768** (4.151)	-49.33*** (6.232)
Shareholder Suits Index	-5.650*** (1.529)		-3.993** (1.930)	-6.030 (3.675)
Legal Rights Index		-6.550*** (1.975)	-3.418 (2.456)	
Coop. also in Later Stages (D)				-27.81*** (5.125)
Limit on Fines (D)				51.81*** (6.682)
Constant	53.24*** (10.73)	50.57*** (11.04)	60.13*** (11.76)	78.95** (28.82)
Control for:				
Capital Market Activity	yes	yes	yes	yes
Year Fixed Effects	yes	yes	yes	yes
N	84	84	84	27
adj. R^2 in %	58.87	57.61	59.38	88.39
Root MSE	17.87	18.14	17.76	8.419

Standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table 11: Augmented regressions to test for endogeneity and to verify instruments

	AR (A), Step 1: Dependent Variable is Number of Supervisors β (SE)	AR (A), Step 2: Dependent Variable is Detected Offenses β (SE)	AR (B), Step 1: Dependent Variable is Number of Supervisors β (SE)	AR (B), Step 2: Dependent Variable is Detected Offenses β (SE)
GDP	0.000181** (0.0000909)		0.000197** (0.0000941)	
Population	24.80*** (3.631)		23.70*** (3.992)	
Number of Listed Companies			0.0264 (0.0392)	
Number of Supervisors		0.0252*** (0.00312)		0.0250*** (0.00317)
Residuals		-0.0526*** (0.0108)		-0.0499*** (0.0110)
Constant	72.74** (31.31)	1.789 (2.981)	71.40** (31.48)	1.947 (3.026)
N	84	84	84	84
adj. R^2 in %	91.42	45.81	91.36	44.14
Prob > F	0.000	0.000	0.000	0.000
Root MSE	220.6	20.51	221.3	20.83

Standard errors in parentheses
* $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table 12: IV regressions, dependent variable is detected offenses; number of supervisors is instrumented by GDP and population

	2SLS	2SLS Clust. SEs (by Country)	GMM IV Estimate	Random Effects IV Regression (A)	Random Effects IV Regression (B)
	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
Number of Supervisors	0.0437*** (0.00396)	0.0437*** (0.00705)	0.0440*** (0.00462)	0.0435*** (0.00639)	0.0591*** (0.00720)
Formalized Cooperation (D)	-14.92*** (4.543)	-14.92** (6.062)	-14.81*** (3.616)	-14.88** (7.396)	-34.69*** (6.221)
Minimum Imprisonment (months)	-0.685*** (0.187)	-0.685** (0.319)	-0.697*** (0.183)	-0.683** (0.304)	-0.679*** (0.162)
Publication of Decision (D)	-10.21** (4.321)	-10.21* (4.988)	-10.03*** (3.097)	-10.56 (7.016)	-49.37*** (6.234)
Shareholder Suits Index	-5.435*** (1.583)	-5.435 (3.608)	-5.359*** (1.996)	-5.262** (2.566)	-5.982 (3.680)
Coop. also in Later Stages (D)					-27.84*** (5.125)
Limit on Fines (D)					51.91*** (6.691)
Constant	51.28*** (11.11)	51.28* (27.52)	50.76*** (15.53)	50.06*** (17.46)	78.60*** (28.85)
Control for:					
Capital Market Activity	yes	yes	yes	yes	yes
Year Fixed Effects	yes	yes	yes	yes	yes
N	84	84	84	84	27
adj. R^2 in %	55.94	55.94	55.72		
Root MSE	18.50	18.50	17.52		
Number of Groups				28	9
R^2 in % overall				62.41	92.85
Wald - χ^2				57.68	207.7
Prob. > χ^2				0.000	0.000

Standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table 13: Robustness checks (A), Poisson regressions, dependent variable is detected offenses

	PR (A) β (SE)	PR (B) β (SE)	PR (C) β (SE)	PR (D) β (SE)
Number of Supervisors	0.000748*** (0.0000239)	0.000913*** (0.0000274)	0.00134*** (0.0000392)	0.00133*** (0.0000400)
Formalized Cooperation (D)			-1.320*** (0.0775)	-1.170*** (0.0784)
Minimum Imprisonment (months)				-0.0196*** (0.00282)
Publication of Decision (D)				-0.408*** (0.0595)
Constant	2.185*** (0.0403)	2.249*** (0.0401)	2.502*** (0.0406)	2.775*** (0.0598)
Control for:				
Capital Market Activity	no	yes	yes	yes
Year Fixed Effects	no	no	no	yes
N	84	84	84	84
Pseudo R^2 in %	30.55	35.29	47.73	52.61
Prob. > χ^2	0.000	0.000	0.000	0.000

Standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table 14: Robustness checks (B), Poisson regressions, dependent variable is detected offenses

	PR (E) β (SE)	PR (F) β (SE)	PR (G) β (SE)	PR (H) β (SE)
Number of Supervisors	0.00118*** (0.0000400)	0.00122*** (0.0000388)	0.00117*** (0.0000398)	0.00283*** (0.000249)
Formalized Cooperation (D)	-0.899*** (0.0793)	-0.872*** (0.0811)	-0.822*** (0.0808)	-1.318*** (0.130)
Minimum Imprisonment (months)	-0.0200*** (0.00290)	-0.0185*** (0.00285)	-0.0190*** (0.00288)	-0.0329*** (0.00619)
Publication of Decision (D)	-0.247*** (0.0630)	-0.277*** (0.0601)	-0.227*** (0.0624)	-1.696*** (0.186)
Shareholder Suits Index	-0.215*** (0.0222)		-0.107*** (0.0287)	
Legal Rights Index		-0.326*** (0.0304)	-0.239*** (0.0386)	
Coop. also in Later Stages (D)				-0.539*** (0.190)
Limit on Fines (D)				1.314*** (0.166)
Constant	4.043*** (0.139)	4.328*** (0.153)	4.550*** (0.165)	2.975*** (0.165)
Control for:				
Capital Market Activity	yes	yes	yes	yes
Year Fixed Effects	yes	yes	yes	yes
N	84	84	84	27
Pseudo R^2 in %	56.05	56.95	57.46	75.26
Prob. > χ^2	0.000	0.000	0.000	0.000

Standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table 15: Robustness checks (C), dependent variable is transmitted cases, number of supervisors is instrumented by GDP and population in the third regression, Sweden has been dropped from the sample

	Repetition of OLS (G)	Repetition of OLS (H)	Repetition of Random Effects IV Regression (B)
	β (SE)	β (SE)	β (SE)
Number of Supervisors	0.0155*** (0.00266)	0.0239*** (0.00244)	0.0242*** (0.00246)
Formalized Cooperation (D)	-1.055 (3.286)	-13.49*** (2.118)	-13.58*** (2.120)
Minimum Imprisonment (months)	-0.0399 (0.131)	-0.208*** (0.0551)	-0.211*** (0.0552)
Publication of Decision (D)	-11.53*** (3.125)	-21.79*** (2.124)	-21.83*** (2.125)
Shareholder Suits Index	-0.584 (1.108)	-4.936*** (1.253)	-4.992*** (1.254)
Coop. also in Later Stages (D)		-10.79*** (1.746)	-10.81*** (1.747)
Limit on Fines (D)		23.77*** (2.277)	23.88*** (2.281)
Constant	10.62 (7.771)	-22.06** (9.821)	-22.47** (9.833)
Control for:			
Capital Market Activity	yes	yes	yes
Year Fixed Effects	yes	yes	yes
N	81	27	27
adj. R^2 in %	37.92	86.64	
Root MSE	12.92	2.869	
Number of Groups			9
R^2 in % overall			91.78
Wald - χ^2			179.4
Prob. > χ^2			0.000

Standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

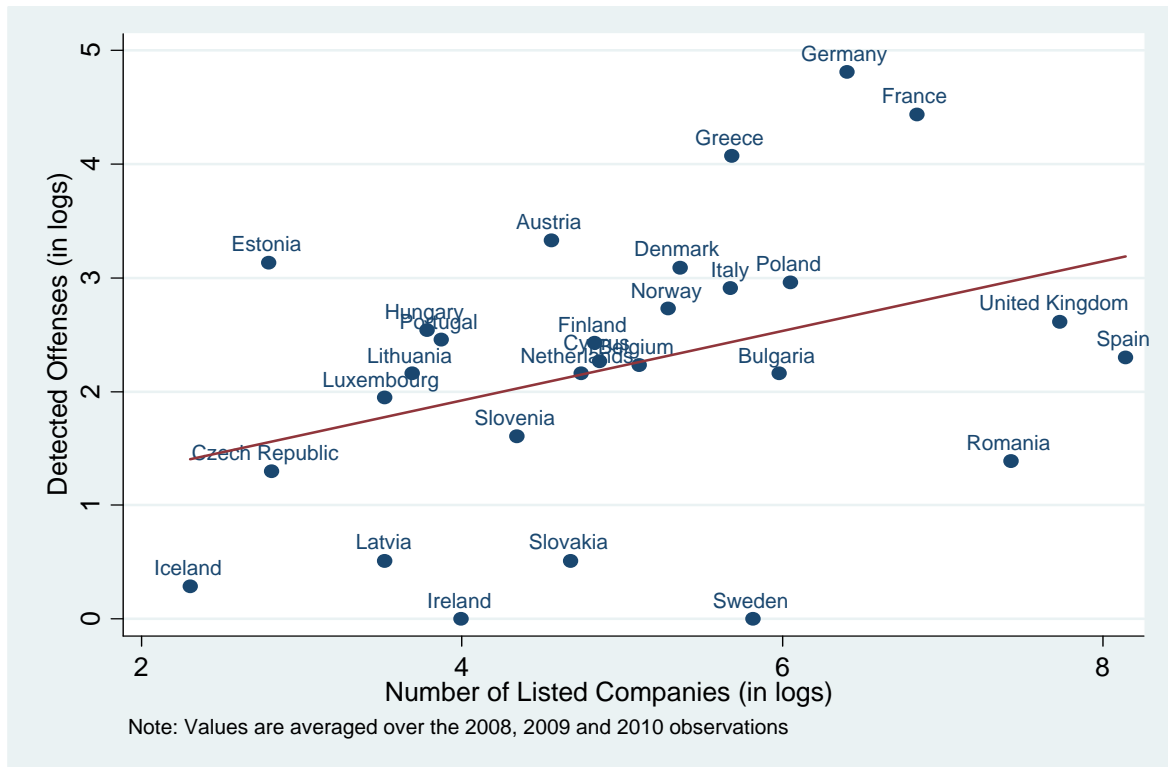**Figure 1. Detected Market Abuse Cases and Capital Market Activity (Number of Listed Firms)**

Note: Values are averaged over the 2008, 2009 and 2010 observations

Figure 2. Detected Market Abuse Cases and Capital Market Activity (Billion Stocks Traded)

Note: Values are averaged over the 2008, 2009 and 2010 observations
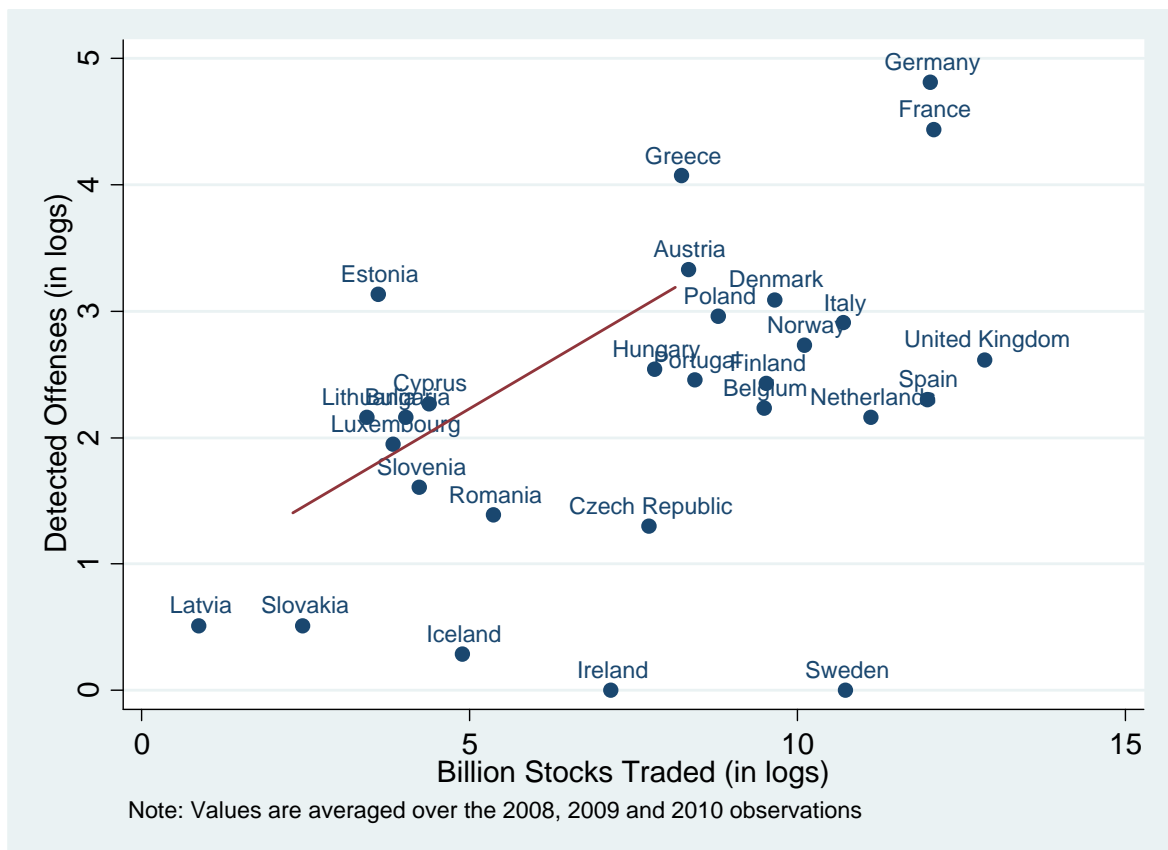
Figure 3. Detected Market Abuse Cases and Intensity of Enforcement

Note: Values are averaged over the 2008, 2009 and 2010 observations
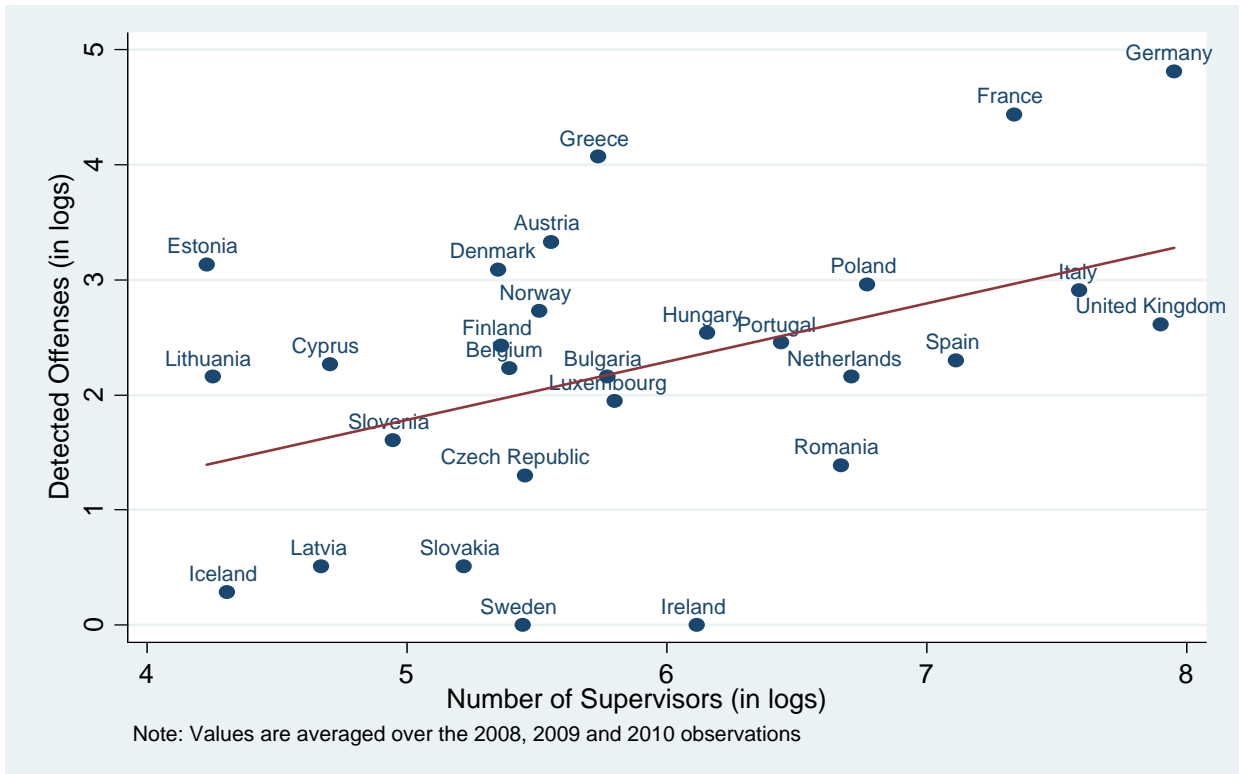
Figure 4. Detected Market Abuse Cases and Legal Rights Index

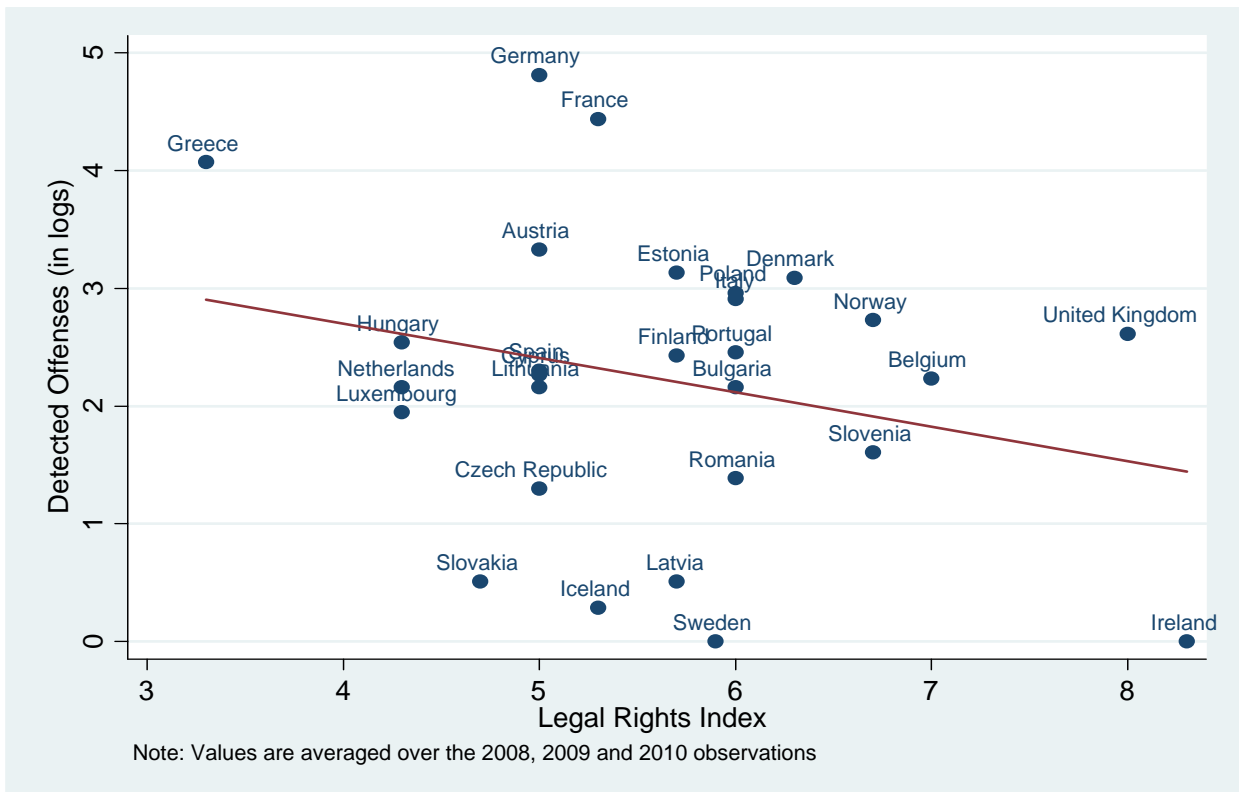Note: Values are averaged over the 2008, 2009 and 2010 observations

Figure 5. Detected Market Abuse Cases and Shareholder Suits Index

Note: Values are averaged over the 2008, 2009 and 2010 observations