EXCHANGE TRADING RULES*

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

Sofia Johan
University of Tilburg
AFM Senior Research Fellow
Tilburg Law and Economics Centre (TILEC)
Postbus 90153
5000 LE Tilburg
The Netherlands
http://ssrn.com/author=370203
S.A.Johan@uvt.nl

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Abstract

This paper examines stock exchange trading rules for market manipulation, insider trading and broker agency conduct across countries and over time for 42 stock exchanges around the world. Some stock exchanges have extremely detailed rules which explicitly prohibit specific manipulative practices, while others use less precise and broadly framed rules. We create new indices for market manipulation, insider trading and broker-agency conduct based on the specific provisions in the exchange trading rules of each stock exchange. We show differences in exchange trading rules over time and across markets significantly affect trading activity.

Keywords: Market Manipulation, Insider Trading, Broker Agency Conduct, Law and Finance

JEL Codes: G12, G14, G18, K22

1. Introduction

Stock exchanges around the world invest considerable manpower, technological effort and financial resources to curb market manipulation and promote market efficiency and integrity (Aitken and Siow, 2003; Avgouleas, 2005; Comerton-Forde and Rydge, 2006). It is widely regarded that securities laws (La Porta *et al*., 1998, 2006) and market microstructure (Harris *et al*., 2008) play an important role in the development of stock markets around the world. Despite these important developments in the literature, there has been a dearth of attention paid to differences across exchanges in respect of the treatment of market manipulative practices within their trading rules.

The paper documents international differences in trading rules for stock or equity exchanges. We study differences in regulation across 42 exchanges as well as across time for the 2006-2008 period. We empirically consider whether exchange trading rules matter for trading activity. For the purposes of this paper "trading rules" refer to the rules and regulations regulating the activities within a stock market and the conduct of participants, namely the exchange and the members of the stock exchange who agree to be bound by such rules and regulations.

We create new indices for trading rules pertaining to market manipulation, insider trading and broker agency conflict for 42 stock exchanges worldwide for developed and emerging markets. For the purposes of this paper, market manipulation refers to trading practices that distort prices and enable market manipulators to profit at the expense of other market participants. Insider trading refers to acting on material non-public information. Broker agency conflict refers to actions that brokers may take while acting as the agent of a client which benefit the broker (or some other affiliated party) at the expense of the client or the market more generally. Some stock markets such as NASDAQ have extremely detailed rules which explicitly prohibit specific manipulative practices and broker agency conflict, as well as rules that are designed to curtail the presence of insider trading. For example, NASDAQ rules provide detailed provisions regarding wash trades, pre-arranged trading, fictitious orders, giving up priority, churning, frontrunning, and a variety of other types of practices (all of which are defined herein) which would constitute market manipulation. Other exchanges are less precise and have broadly framed rules regarding what constitutes market manipulation and/or broker agency conflict.

Obviously, exchanges have to update their rules periodically to keep up with market development. Most notably for European exchanges, in November 2007 the Directive on Markets in Financial Instruments (MiFID) became effective thereby giving rise to the need for significantly more detailed rules for the European exchanges. Whilst some European exchanges such as the London Stock Exchange already had in place trading rules that are analogous to the new rules in MiFID, others such as the Austrian exchange had significantly less detailed rules prior to MiFID.

In view of the significant differences in the way trading rules regulate market manipulation, insider trading and broker agency conflict across countries and over time, it is worth considering whether these differences matter. The most natural issue to consider is whether the rules influence investors' decision to trade on a specific exchange. To this end, in addition to documenting the differences in trading rules for 42 exchanges around the world to develop new indices of market surveillance, in this paper we consider whether differences in trading velocity across exchanges are attributable to differences in rules. We control for a number of plausible factors that would affect trading activity based on prior work, including international differences in securities regulation (La Porta *et al*., 2006) among other things.

We consider two competing hypotheses. On one hand, one may argue that vague regulations create inefficiency as investors and/or traders are not clear as to which activities are acceptable and which ones are in breach of the spirit of the rules. Detail in rules therefore may give rise to greater investor confidence, greater dissemination of knowledge about prohibited conduct, as well as facilitate invigilation of such rules which in turn would reinforce investor confidence in the marketplace. Conversely, one may argue that detailed regulations create inefficiency as investors and/or traders are able to take advantage of inevitable loopholes. By studying these issues in the context of stock exchanges, this paper contributes to the general question in the literature of the value of broadly framed legal rules versus specific rules in regulating any aspect of markets and society (see, e.g., Ferguson and Peters, 2003, for recent work in law and economics and Stevenson, 2006, for a recent legal analysis).

We use as a guide the members of The World Federation of Exchanges (http://www.world-exchanges.org), and focus on stock exchanges in this paper. The data presented in this paper show a strongly positive and robust effect of trading rules on trading velocity. We show this effect with panel data that varies across time and countries by considering

a variety of robustness checks including, but not limited to, fixed effects modeling, autoregressive specifications, and difference-in-differences tests. We show this effect is robust to controls for economic, legal and institutional differences across exchanges that might have been correlated with country differences in drafting trading rules. Further, this effect is robust to the possibility of endogeneity in that exchanges with more active trading are inspired to implement more detailed trading rules. The statistical tests and robustness checks are described in detail in this paper. The strong evidence in favor of specific rules facilitating trading activity is due to the fact that exchanges which specifically prohibit certain acts in the marketplace enhance investor confidence. As well, exchanges with specific rules also have residual 'catch all' clauses that explicitly outline the spirit of the rules and regulations and prohibit a vaguely defined 'any other type of manipulative activity' such that (arguably) there is scant scope for potential loopholes.

A few recent papers are closely related to our own. La Porta *et al.* (2006) show securities law, particularly in relation to IPOs and enforcement, matters for facilitating stock market development for 49 exchanges around the world. Aitken and Siow (2003) provide a ranking of exchanges based on efficiency and integrity. Cumming and Johan (2008) provide survey evidence that surveillance technology and information sharing facilitate market integrity. Hail and Leuz (2006), Daske *et al.* (2007) and Lampert *et al.* (2007) show stronger securities laws and accounting rules and stricter enforcement mechanisms lower firms' cost of capital. The findings in these papers are consistent with a broader literature on the importance of securities regulation and market surveillance for market efficiency and integrity.[1]

This paper provides a novel source of information for understanding sources of international differences in stock exchanges. We show stock exchange trading rules that specify in detail rules pertaining to market manipulation facilitate trading activity. The implication is that an exchange's trading rules are an important source of international differences in stock markets. This information is very transparent and readily visible for use in future research. An index of exchange trading rules is explicitly provided herein.

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[1] See, e.g., Aggarwal (2001), Aggarwal and Wu (2003), Allen and Gale (1992), Allen and Gorton (1992), Carson (2003), Clayton *et al.* (2006), Comerton-Forde and Rydge (2006), Comerton-Forde and Tang (2005), Daouk *et al.* (2005), DeMarzo *et al.* (2005), Gerard and Nanda (1993), Harris (2006), Harris (2002), Hillion and Suominen (2004), Jarrow (1992, 1994), Karmel (2000), Kumar and Seppi (1992), La Porta *et al.* (1997, 1998, 1999, 2002, 2006), Mahoney (1999), Merrick *et al.* (2005), Ni *et al.* (2005), O'Hara and Mendiola (2003), Pirrong (1995a,b, 1999, 2004), Pistor *et al.* (2003), Pistor and Wu (2003, 2005), Prichard (2003), Reiffen and Robe (2007), Romano (1993, 2001, 2002) and Vitale (2000).

This paper is organized as follows. Section 2 describes stock exchange trading rules and the creation of an index for exchange surveillance. The data are introduced in section 3. Section 4 presents multivariate analyses of the relation between the exchange surveillance index and trading activity. Concluding remarks follow in the last section.

2. The Variables

In this section, we explain forms of market manipulation, insider trading and broker-agency conduct and build indices for stock exchange trading rules. Rules can be broken down into one of three types: rules designed to mitigate insider trading, rules designed to limit market manipulation and rules designed to limit broker-agent conflicts. Each are described immediately below.

2.1. Insider trading

Insider trading refers to a market participant or market participants acting on material non-public information. While rules prohibiting insider trading in general are commonplace around the world, specific regulations governing market participants in respect of insider trading differ significantly across exchanges.

Insider trading can take many different forms, two of which involve brokers using the information of a client order: client precedence and frontrunning. Client precedence refers to brokers violating the time priority of client orders. A client precedence rule is violated during insider trading when a broker initiates a trade on his own account shortly ahead of the execution of a client order, with the client's trade being executed at a worse price. Frontrunning likewise refers to brokers trading ahead of client orders. In the case of frontrunning on market for a large client order, a broker trades shortly prior to a client order with the expectation that the client order will move the price. Frontrunning may also involve brokers that, after receiving a client order, take the opposite position of a client order on market without the client's knowledge and then immediately thereafter the same broker crosses with the same client off-market at a profit.

Other forms of insider trading can involve the use of material non-public information about the company being traded. Trading rules can mitigate the presence of this form of insider trading through rules which prohibit trading ahead of the public release of research reports

created by brokerages and separation of research and trading departments of brokerages (commonly referred to as 'Chinese Walls'). As well, rules which limit affiliation between exchange members and member companies, or between members and their investment company securities, mitigate the flow of information which might be material and non-public. Rules may also provide details with respect to the nature of communication between brokerages and the public to regulate how the flow of material non-public information is released to the public. Further, trading rules sometimes limit brokerage ownership, the extent to which brokerages may influence or reward employees of others, or ban anti-intimidation and/or coordination activities (e.g., to stop people from reporting illegal activities), and these restrictions can have the effect of limiting the flow of material non-public information.[2]

2.2. Market Manipulation

Market manipulation rules encompass rules pertaining to price manipulation, volume manipulation, spoofing, and disclosure manipulation.

2.2.1. Price Manipulation

Price manipulation can take many forms, such as the entering of purchase orders at successively higher prices by the same broker (or colluding brokers) to create the appearance of active interest in a security. Ramping/gouging refers to pump and dump schemes whereby exchange participants generate a significant increase in price and volume of a security and then carry out a quick flip whereby the securities are then sold (often to retail customers) at the higher prices.

Three different price manipulations refer to a specific time period: opening, closing and end of month/quarter/year. The opening session may be subject to particular types of manipulation subject to the rules for entering bids and asks in the pre-opening session. Similarly, end-of-day trades may be geared towards manipulating the closing market price of the security, and exchanges often specifically prohibit this type of act. Financial recordkeeping among

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[2] In some countries the probability of detection of insider trading is low and the fines are also low. We considered separate variables for insider trading laws around the world (Beny, 2007), among others, but those variables did not materially impact the results presented here regarding the market manipulation index and trading velocity.

companies provide incentives to manipulate share prices around the end of month/quarter/year depending on the governance specific to the company.

Price manipulation may also take the form of market setting whereby brokers cross order at the short-term high or low to affect the volume weighted average price, or to set the price in one market for the purpose of a cross in another market.

Another direct form of price manipulation involves pre-arranged trading. Pre-arranged trades involve colluding parties simultaneously entering orders at an identical price and volume. Because pre-arranged trades avoid the order queue, they can be carried out with the effect of influencing the price of a security.

Price manipulation may take the form of corners or squeezes in cross-market activity. Corners and squeezes involve shortages in one market that can affect the price of a cross-market security. This type of manipulation is known as domination and control. A corner involves securing control of the bid/demand-side of both the derivative and the underlying asset, and the dominant position can be exploited to manipulate the price of the derivative and/or the asset. A squeeze involves taking advantage of a shortage in an asset by controlling the demand-side and exploiting market congestion during such shortages in a way as to create artificial prices. Another related form of manipulation includes mini-manipulations whereby there is trading in the underlying security of an option in order to manipulate its price so that the options will become in-the-money (Merrick *et al.*, 2005).

2.2.2. Volume Manipulation

Two forms of volume manipulation include churning and wash trades. Churning refers to excessive trading of a stock, to achieve the effect of inflating volume of the stock thereby giving rise to false impression of investor sentiment for the stock. Given the effect of churning is to manipulate markets, churning falls within the market manipulation index. Note that the motivation underlying churning, however, in some cases involves traders and/or brokers seeking to generate large commissions from clients. In the case of churning of house accounts, the motivation is purely to manipulate markets. Regardless, in either case the effect is to manipulate markets and as such churning is part of the market manipulation index.

Wash trading means the same client reference is on both sides of a trade. There is no beneficial change in ownership. Wash trades have the affect of creating a misleading appearance of an active interest in a stock. Wash trades may indirectly affect price, but most directly affect volume in a misleading way. As such, wash trades are categorized as part of volume manipulation.

2.2.3. SpoofingManipulation

There are a variety of different ways to manipulate markets in the context of 'spoofing/painting the tape', which involves anything to give the improper impression of activity or price movement in a security. Some trading rules have very general statements of prohibition towards actions that give rise to a false appearance of trading or price movement. Other exchanges more explicitly indicate ways in which false appearance might be created, which includes fictitious orders, giving up priority, layering of bids/asks and switches. Fictitious orders involve entering orders on one side of the market, then completing orders on the other side of the market and deleting the original order after the trade occurs on the other side of the market. Giving up priority refers to deleting orders on one side of the market as they approach priority and then entering the order again on the same side of the market. Layering of bids/asks refers to traders or brokers that stagger orders from the same client reference at different price and volume levels to give the misleading impression of greater interest in the security from a more diverse set of exchange participants. Switches involve deleting orders on one side of the market as they approach priority and then entering the order again on the opposite side of the market. These distinctions are somewhat subtle but nevertheless these different scenarios are explained in detail in some exchange trading rules.

2.2.4. False Disclosure Rules

Distinct from insider trading rules, some rulebooks include information pertaining to false disclosure. For instance, market participants might actively distribute false or misleading information which have the effect of distorting the marketplace. Alternatively, there may be a failure to disclose information such as the mandatory disclosure of ownership interests when they reach threshold level. This latter form of manipulation is commonly known as parking or warehousing.

Overall, we refer to trading rules pertaining to price manipulation, volume manipulation, spoofing, and false disclosure as the market manipulation rules. Below, we aggregate these rules to form separate indices for price manipulation, volume manipulation, spoofing, and false disclosure, which we refer to as sub-component indices, as well as the sum total of these indices for market manipulation to form the Market Manipulation Rules Index, one of the three primary legal indices we are creating in this paper. These indices are considered separately from insider trading rules and broker agency conflict rules, which form the other two primary indices.

2.3. Broker Agency Conduct

Brokers act on behalf of clients, and may do so in ways that are against client interests. One example of this type of principal agent problem includes the failure to obtain the best price for a client (commonly known as a trade through obligation[3]), charging excessive fees, or acting in ways that are generally detrimental to client interests by investing in securities that do not match the risk/return profile of the client (sometimes referred to as the 'know-your-client rule'). As well, brokers may use the exchange's name improperly in marketing their services, or carry out other forms of improper or unethical sales and marketing efforts. For broker-agency conflict rules, we use information explicitly indicated in the rules of the exchange, and not guidelines from professional associations such as the Chartered Financial Analysts ethics guidelines and the like.

2.4. Indices of Exchange Trading Rules

Table 1 outlines the different types of manipulation described in stock exchange trading rules. The trading rules for a stock exchange are almost always found on the exchange webpage, and they are drafted with varying degrees of specificity as they outline the exchange membership requirements, listing requirements, trading rules and regulations, especially trading practices which are prohibited.

[Insert Table 1 About Here]

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[3]   In the U.S., this obligation was released under Regulation NMS and published in the federal register in June 2005.

Each of the different rules for insider trading, market manipulation and broker-agency conflict described in the exchanges' trading rules are weighted equally in the indices used in this paper.[4] The insider trading index is comprised of 10 items. Market manipulation encompassed a total of 14 items, which includes price manipulation (7 items), volume manipulation (2 items), spoofing (3 items), and false disclosure (2 items). Broker-agency conflict comprises 5 items. It is possible that certain rules are relatively more important; however, we do not have enough degrees of freedom to treat each rule separately. Plausible adjustments to different weightings do not materially change the empirical results reported below.

Below we test the proposition that explicit rules pertaining to market manipulation as well as broker agency conflict enhance investor confidence, mitigate abuse and thereby facilitate trading activity. In other words, the central hypothesis considered herein is that vague exchange trading rules do not provide adequate guidance and information for investors and/or traders are not sufficiently clear as to which activities are unacceptable, and as such investors and traders are less likely to trade in the market for fear that that it is more likely to be manipulated. The competing hypothesis is that detailed regulations give rise to loopholes that investors and traders can take advantage of, thereby creating inefficiencies and lowering trading activity. The next sections of the paper test these competing hypotheses. Details in the data and summary statistics are provided in the next section.

3. Data and Summary Statistics

Table 2 provides summary statistics of variables collected for this paper. The data comprise 42 stock exchanges from countries around the world, including Argentina, Australia, Austria, Bermuda, Brazil, Canada, China (Shanghai and Shenzhen), Chile, Colombia, Egypt, France, Germany, Greece, Hong Kong, India (Bombay and the National Stock Exchange of India), Indonesia, Ireland, Israel, Italy, Japan, Jordon, Korea, Malaysia, Mexico, New Zealand, Norway, Peru, Philippines, OMX (Sweden, Finland, Denmark), Singapore, Slovenia, Spain, Sri Lanka, Switzerland, Taiwan, Thailand, Turkey, the United Arab Emirates, the UK and the US (NASDAQ and NYSE).

[Insert Table 2 About Here]

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[4] The equal weighting is consistent with the approach used in most law and finance studies, such as those by La Porta *et al*. (1998, 2006).

There are three primary legal indices introduced herein: the Insider Trading Rules Index, Market Manipulation Rules Index and Broker Agency Conflict Rules Index. There are four sub-components of the Market Manipulation Rules Index: the Price Manipulation Rules Index, Volume Manipulation Rules Index, Spoofing Rules Index and False Disclosure Rules Index. These indices are summarized in Table 2 for the year 2008. As discussed above in section 2, the indices are created by summing up the number of specific provisions in the exchange trading rules in each country.[5] The Insider Trading Rules Index varies from a low value of 0 (for a number of exchanges listed in Table 2) to 10 (for NASDAQ). The Market Manipulation Rules Index varies from a low value of 0 (for Chile, Peru, Philippines, Turkey) to 13 (for London, NYSE, Euronext Paris, and Slovenia). The Broker Agency Conflict Rules Index varies from a low value of 0 (for a number of exchanges listed in Table 2) to 5 (for NASDAQ).

As indicated in Table 1, various law and finance indices from La Porta *et al.* (1998, 2006) are used in the empirical analyses herein, including efficiency of the judiciary, anti-director rights, and liability standards. These variables are defined in Table 1.[6] Other legal indices were considered, but it did not impact the empirical tests reported below and is therefore excluded for conciseness.[7]

For the purposes of our empirical analyses, trading velocity is defined as the domestic share turnover per domestic market capitalization, (see Table 1). Trading velocity is used for our analyses as we believe it is a useful benchmark of how frequently shares trade hands and is a comparable measure of trading activity across exchanges regardless of the size of the exchange. We use the monthly trading velocity values for February 2006 – October 2008, the period considered by this study, for a total of 1363 observations. Monthly trading velocity data is

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[5]   The Insider Trading Rules and Market Manipulation Rules Indices also consider securities regulation provisions where they are specific about the regulations pertaining to trading on stock exchanges. The Broker Agency Conflict Rules Index does not consider professional association rules, such as that of the Chartered Financial Analysts Code of Professional Conduct. The reason for this exclusion is that the exchange members are not obligated to be a part of these different professional associations in order to trade on the exchange.

[6]   Where these variables are not defined for a particular country we consider, we used the average value of the legal origin family for that particular country. As a robustness check in the empirical tests provided below, we excluded these countries from the data and found the results did not materially change.

[7]   See, e.g., *supra* note 2 and accompanying text. Extra details and empirical tests with additional indices are available upon request.

available from the World Federation of Exchanges starting in February 2006.[8] The central focus of the empirical analysis herein is to relate the trading rules to trading velocity on each exchange.

Table 3 indicates summary statistics for all of the country-years in the data. The average monthly velocity in the sample is 95.1%, while the median is 70.9%. The range is 3.4% to 409.3%. One standard deviation in velocity is 75.1%. Table 3 also provides summary statistics for the legal indices and MSCI and GDP per capita.

[Insert Table 3 About Here]

Table 4 provides comparison of means and medians tests of volume in relation to different cutoff values of the legal indices. Panel A reports differences in means and medians for the full sample of all country-years in the data. The data indicate velocity is significantly higher for higher values of the Insider Trading Rules Index. Average [median] velocity is 106.5% [81.4%] for exchanges with 2 or more insider trading rules, and 74.2% [60.0%] for exchanges with values of 0 or 1 for the Insider Trading Rules Index. Similar results are observed for differences for the Market Manipulation Rules Index. Average [median] velocity is 117.3% [93.0%] for exchanges with 6 or more market manipulation rules, and 80.7% [53.0%] for exchanges with 5 or fewer market manipulation rules. These differences in means and medians are statistically significant at the 1% level of significance. Likewise, the subcomponents of the Market Manipulation Rules Index each for price manipulation, volume manipulation, spoofing, and false disclosure show statistically significant differences at the 1% level. By contrast, there are no significant differences for the Broker Agency Conflict Index either in terms of means or medians. Nevertheless, the La Porta *et al*. (2006) investor protection index does show significant differences at the 1% level for values of 3 or more versus values of 2 or less. This latter result indicates the trading rules indices in this paper may be correlated with other legal differences across countries, and hence in our empirical assessment of trading rules on trading velocity below we control for other legal and economic differences across countries.

[Insert Table 4 About Here]

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[8]   Monthly trading velocity statistics are only available in 2008 for Jordon, and hence for that exchange (only), we consider 2008 values.

Panel B of Table 4 considers differences in the indices for the subset of European exchanges for which MiFID applies. The results are broadly consistent with those reported in Panel A, with a few exceptions. The mean value velocity for the Market Manipulation Rules Index is not significantly different, as are the mean values for price, volume and spoofing. Nevertheless, the differences in medians for these indices are statistically significant.

Panel C of Table 4 compares the pre- and post-MiFID time periods (pre-November 2007 and post November 2007) for both the exchanges affected by MiFID ("MiFID exchanges") and exchanges not affected by MiFID ("non-MiFID exchanges") in the data. The data indicate that for the MiFID exchanges both average and median velocity was significantly higher after MiFID (average of 126.7% and median of 137.3%) than before MiFID (average of 113.7% and 127.6%). For the non-MiFID exchanges, average velocity was not statistically different pre- and post November 2007 (averages were 83.2% and 89.5%, respectively), but medians were significantly higher post-MiFID than pre-MiFID (medians were 67.9% and 56.3%, respectively), and these differences are significant at the 5% level. Taken together, these statistics are suggestive of a material effect of MiFID, and this effect is more robust for MiFID exchanges than non-MiFID exchanges. However, the suggestive evidence of greater velocity in the post-MiFID period indicates the need to assess difference-in-differences tests in the econometric tests. As well, the differences over time suggest a need to control for market factors in assessing the determinants of trading velocity.

Table 5 presents a correlation matrix for the main variables used in the multivariate tests provided in the next section. As predicted, there is a strong positive correlation between trading velocity and the Insider Trading Rules Index (0.40), the Market Manipulation Rules Index (0.37), and the price, volume, spoofing and false disclosure indices, as well as the Broker-Agency Conflict Indices, all of which are statistically significant at the 1% level. GDP per capita is likewise highly positively correlated with trading velocity (0.39), as would be expected. The next section explores these relations further in a multivariate context and with consideration to collinearity and causality issues, among other things.[9]

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[9] Cumming and Johan (2008) show that the specific types of activities that surveillance authorities engage in, such as information sharing for cross-market surveillance and generating alerts to monitor trading activity, facilitates market integrity across 25 exchanges around the world. Unlike Cumming and Johan (2008) that considers ex post surveillance and enforcement in relation to market integrity, here we consider ex ante rulemaking regarding market manipulation, insider trading and broker agency conflict. We control for public versus private enforcement based on the indices in La Porta *et al.* (1998, 2006) but we do not delve into the specific details of the practice of surveillance considered in the anonymous survey

[Insert Table 5 About Here]

4. Multivariate Analyses

This section considers, in a multivariate context, which legal factors are most closely associated with cross-sectional differences in trading velocity, while controlling for other economic and institutional determinants of trading activity. The first set of regression results is reported in Table 6. Table 6 considers each exchange-month over February 2006 – October 2008 as a separate observation (1363 observations), with consideration to differences in rules over time as well as difference-in-differences regressions and country dummy variables as well as country fixed-effects. Further, we consider autoregressive AR(1) models to account for the possibility the velocity is correlated from one month to the next on the different exchanges, and show results with and without the AR(1) correction.

After discussing the results in Table 6, we consider each exchange separately as a unique observation, for a total of 42 observations. Also, we consider the possibility of reverse causality between exchange trading rules as a response to trading velocity in that exchanges with more active traders need to write more detailed laws.

[Insert Table 6 About Here]

Table 6 presents 15 different regression models that explain cross-sectional differences in trading velocity across the exchanges listed in Table 2. The explanatory variables include country dummy variables in Models 1-10 (we suppress one country to avoid collinearity, as well as consider country fixed effects in Model 4). Models 11-15 consider GDP per capita instead of country dummy variables. The legal explanatory variables include the Investor Protection Index (La Porta *et al*., 2006), as well as the Insider Trading Rules Index, the Market Manipulation Rules Index and the Broker Agency Conflict Rules Index introduced in this paper (each defined above and listed n Tables 1 and 2), as well as the Efficiency of the Judiciary Index (La Porta *et al*., 1998). The fifteen different models are presented to highlight robustness to the inclusion of

data in Cumming and Johan (2008) for all of the 42 exchanges we consider in this paper. Where extra surveillance activity and information sharing details were available, they did not materially affect the central inferences drawn in this paper regarding rule specificity.

different explanatory variables. Overall, Table 6 shows the most statistically robust and economically significant determinants of trading velocity are the Insider Trading Rules Index, the Market Manipulation Rules Index, the Investor Protection Index, the MSCI index, and GDP per capita.

Models (1) and (2) show difference-in-differences regressions with and without an AR(1) specification, respectively. The results show that MiFID increases trading velocity in Europe by at least 5.2% (Model (1)) and possibly by as much as 12.1% (Model (2)). The evidence is robust to country-dummy variables for each exchange to pick up other exchange-specific factors that could influence velocity. These findings are consistent with the patterns observed in the data as presented in Table 4 Panel C. As well, the results are robust to controls for changes in economic conditions over time in the MSCI index. The data indicate trading velocity is higher when markets are in decline.

Models (3) and (4) show trading velocity is 3.7% and 1.7% higher, respectively, when there is an increase in the Insider Trading Rules Index by 1. Model (3) differs from Model (4) in that Model (4) uses exchange fixed effects while Model (3) uses exchange dummies for all exchanges but one to avoid perfect collinearity. Model (5) shows trading velocity is 0.5% higher for an improvement by 1 in the Market Manipulation Rules Index. Models (6)-(9) show the effect for the subcomponents of the Market Manipulation Rules Index. The results are strongest for the Volume Manipulation Rules Index in Model (7) at 3.7%, and lowest for the False Disclosure Rules Index in Model (9) at 5.2%. It is unreliable to include all of these indices simultaneously in the same regression as they are highly correlated (Table 5). All of these indices are statistically significant at at least the 5% level in Models (5)-(9).

Model (10) shows that the Broker-Agency Conflict Rules Index is not statistically significant. One likely explanation for this result is that traders and/or brokers are bound by professional associations that vary from country-to-country and span different countries, and there are different associations and affiliations within each country.[10] Importantly, this finding highlights that fact that the significance of the Insider Trading Rules Index and Market Manipulation Rules Index is not merely a spurious indication that detailed rule drafters are more

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[10] A second explanation is that brokers play less of a role as a financial intermediary offering advice in some countries, such as China. We considered this possibility by excluding China and found the results to be very similar.

likely to reside in certain countries, as details regarding broker agency conflict are not statistically related to trading velocity.

Models (11)-(15) show the results without country dummy variables and with GDP per capita and other legal variables to control for institutional and economic differences across countries. The results show a greater economic significance for the Insider Trading Rules Index and Market Manipulation Rules Index. The Insider Trading Rules Index is statistically significant at the 1% level in each of Models (11)-(15) and an increase in the index by 1 increases velocity by 14.3% (Model 13) to 17.7% (Model 11). The Market Manipulation Rules Index is significant at the 10% level in Model (14) and 5% level in Model (13) but statistically insignificant in Model (12). This latter result is most likely attributable to the correlation with the other included variables in these models. Broker Agency Conflict Index is significant in Model (13) but not Model 14. The La Porta *et al.* (2006) Investor Protection Index is positive and significant in Models (14) and (15). The efficiency of the judiciary is negative and significant in Model (15), but that result is attributable to the correlation with the other variables; that is, more parsimonious specifications give rise to the insignificance of the judiciary variable.

In sum, Table 6 indicates with a variety of specifications with exchange dummy variables, exchange fixed effects, AR(1) specifications, among other things, that trading rules facilitate trading velocity across exchanges and over time. Insider trading rules and market manipulation rules are important for facilitating trading activity. Broker-agency conduct rules do not appear to be related to trading velocity. Other legal factors that facilitate investor protection (La Porta *et al.*, 1998, 2006) facilitate trading velocity. As well, economic factors measured in terms of GDP per capita and MSCI returns do affect to trading activity.

Endogeneity of legal rules vis-à-vis trading velocity is not considered in Table 6, but is considered in Table 7. While it is not a simple matter to amend stock exchange trading rules (approval must come at many levels, including the exchange board and securities regulators), it is nevertheless possible that rules are amended in response to trading activity. Table 7 reports the results for average trading velocity for the months November 2007 – October 2008. Each exchange is considered as a separate observation without regards to differences over time (42 observations).[11]

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[11] This approach Table 7 is consistent with the specifications in La Porta *et al*. (2006).

[Insert Table 7 About Here]

Instrumental variable estimates are reported in Table 7. Instrumental variables are important to consider for the legal indices because it may be the case that countries with higher trading velocity are more inclined to write better trading rules. We use the Efficiency of the Judiciary as an index, and control for GDP per capita and English Legal Origin. This instrumental variable estimate is exactly as in La Porta *et al.* (2006) and applied in the same context (the difference in this paper is in relation to the new indices developed herein). The Efficiency of the Judiciary Index is an intuitive index as it is likely correlated with rule formation and rule detail, but there is no direct link between the efficiency of the judiciary and trading velocity. In addition, in this paper we also use the Repudiation Index. A high value of the Repudiation Index means that the country is a low risk high integrity governmental system that affords greater transparency for rule enforcement. In countries that score low values for the Repudiation Index, vagueness or ambiguity in legal standards is seem to be preferred and such governmental authorities are thereby more likely to approve less well defined trading rules for their country's stock exchange(s). The Repudiation Index is therefore an intuitively appealing index because we expect it to be directly related to level of detail in stock exchange trading rules. We would not expect the Repudiation Index to be related to trading velocity through any direct causal link.

Models (16) – (18) report the first step regressions for the potentially endogenous variables, and Models (19) – (22) report four alternative specifications of the second step regressions. The specifications in Table 7 use instrumental variables that are extremely similar to that in La Porta *et al*. (2006) for their analysis of IPOs. The potentially endogenous variables include the Insider Trading Rules Index, Market Manipulation Rules Index and the Investor Protection Index. Thereafter in Models (23) - (25) we report results without the use of instruments to show robustness.

The Model (16) – (18) regressions for the first step instrumental variable regressions are for the most part intuitive. The Repudiation Index is negatively related to the Market Manipulation Rules Index in Model (16). We would expect stock exchanges in countries with high values for the Repudiation Index to have more detailed trading rules, as discussed immediately above. The coefficient for the Efficiency of the Judiciary Index is positive and significant in Model (17), which indicates that countries with higher scores for the efficiency of

the judiciary invest in writing detailed rules as such rules will be enforced. The regression results in Table 7 Model (18) show the Investor Protection Index is higher in countries with higher GDP per capita and in English legal origin countries, consistent with La Porta *et al*. (2006).

The second step regressions presented in Table 7 Models (19) – (22) show the Market Manipulation Rules Index is positive and statistically significant at the 1% level. The economic significance is greater than that in Table 6: each additional rule is associated with greater trading velocity by 16.7% (Model 19) and up to 25.9% (Model 21). The adjusted R^2 values in Table 7 for the second step regressions range from 31% (Models 20 and 21) to 41% (Model 19). The Insider Trading Rules Index, however, is not significant in the second step regressions (Model 21). Nevertheless, the Insider Trading Rules Index is significant in Model (24) without the use of instrumental variables, and shows an increase in the index by 1 increases velocity by 14.3%. The Market Manipulation Rules Index is significant at the 10% level in Models (23) and (25) (but not Model (24)), and show an increase in the number of rules by one is associated with an increase in velocity by 5%.

In sum, the instrumental variable estimates provide strong support for the proposition that rule specificity facilitates trading activity, and this relation is not undermined by reverse causality issues, particularly for the Market Manipulation Rules Index. To show the effect graphically, Figures 1 and 2 present partial regression plots for the Insider Trading Rules Index and Market Manipulation Rules Index, respectively (analogous to regression Model 25 in Table 7). The picture quite clearly highlights the strong positive relation between Insider Trading Rules Index, the Market Manipulation Rules Index and trading velocity. Without considering time series variation, joint significance of these indices depends on the specification of the econometric model (as shown with the different models presented in Table 7). Considering variations in rules over time, such as in regression Models 13 and 14 in Table 6, we demonstrated showed joint simultaneous significance of the Insider Trading Rules Index and the Market Manipulation Index while controlling for other factors such as the La Porta *et al.* (2006) Investor Protection Index as well as variables for market conditions. Overall, the data strongly support the proposition that rule specificity is very strongly positively correlated with trading activity, and matches observed differences in practice.

[Insert Figures 1 and 2 About Here]

5. Conclusions

This paper contributes to the literature on international differences in stock exchanges by examining the effect of trading rules on trading velocity. Building on prior work on mandatory disclosure and delegation between private versus public enforcement of securities laws (La Porta *et al*., 2006; Hail and Leuz, 2006) and surveillance technology and information sharing in ex post enforcement (Cumming and Johan, 2008), this paper considers the interaction between rule specificity in stock exchange trading rules and stock exchange trading activity.

This paper employs a sample of 42 exchanges around the world and finds stock exchange trading activity is most closely related to trading rules specificity regarding insider trading and market manipulation, but not statistically related to rules pertaining to broker-agency conflict. This finding is intuitive as insider trading and market manipulation rules provide clarity regarding prohibited manipulative trading practices in a market and are of direct and central importance to the conduct of market participants. By contrast, broker agency conflict rules are typically subject to extraneous rules from governing bodies and professional associations for brokers (such as the Chartered Financial Analysts Institute). The connection between trading activity and insider trading and market manipulation rules is robust to concerns about endogeneity, difference-in-differences specifications, and alternative control variables. The results indicate trading rules are an important source of information to consider for explaining differences in trading activity among stock exchanges around the world. Future work could look to the exchange trading rules as a source of international differences in stock exchanges, market efficiency and market integrity.

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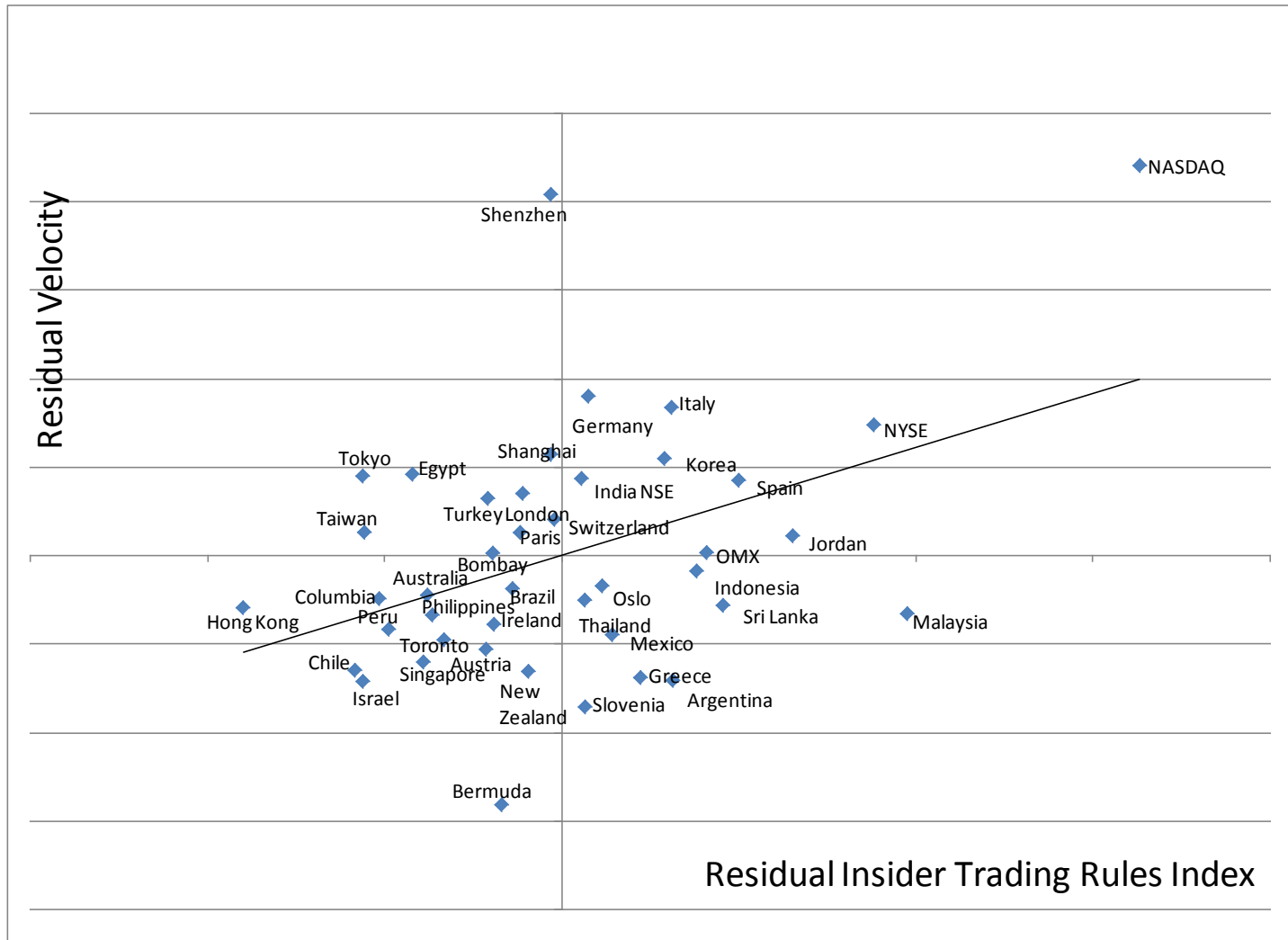
Figure 1. Partial Regression Plot of Velocity and Insider Trading Rules Index. This figure presents a partial regression plot of velocity and the Insider Trading Rules Index. The independent variables include the investor protection index (La Porta et al., 2006), the Efficiency of the Judiciary (La Porta et al., 1998), the log of MSCI and the log of GDP per capita. The coefficient is equal to 0.152, (robust) t-statistic 2.437 and adjusted R^2 is 0.157.
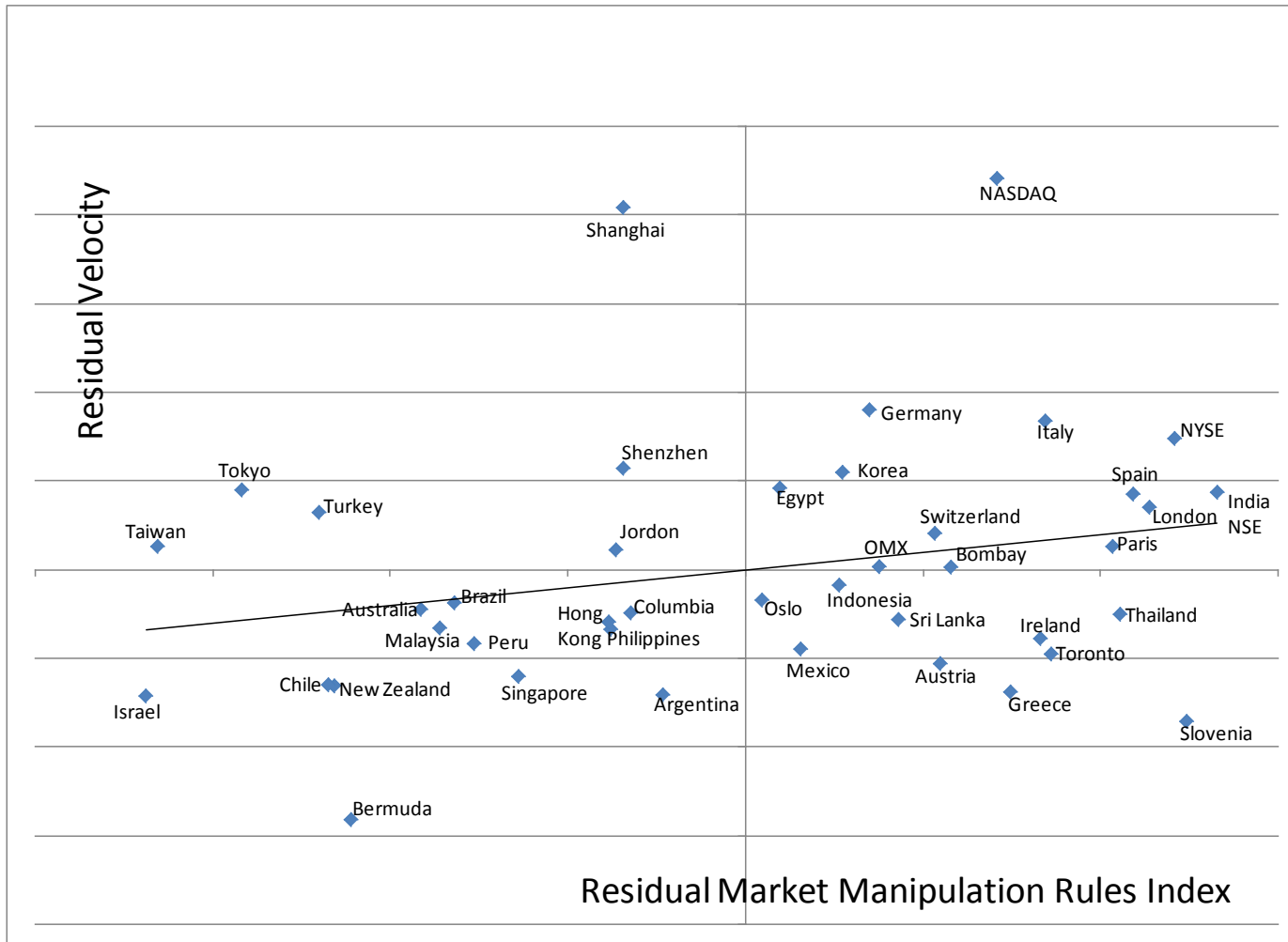
Figure 2. Partial Regression Plot of Velocity and Market Manipulation Trading Rules Index. This figure presents a partial regression plot of velocity and the Market Manipulation Trading Rules Index. The independent variables include the investor protection index (La Porta et al., 2006), the Efficiency of the Judiciary (La Porta et al., 1998), the log of MSCI and the log of GDP per capita. The coefficient is equal to 0.050, (robust) t-statistic 1.812 and adjusted R^2 is 0.039.

Table 1. Definition of Variables

This table defines the variables, including the trading rule indices. Variables used in subsequent tables are highlighted in bold font.

| Variable Name	Definition
Insider Trading Rules	
Frontrunning	A dummy variable equal to one if the trading rules explicitly prohibit a broker's House or employee account from buying/selling in a period shortly prior to significant buying/selling by a client.
Client Precedence	A dummy variable equal to one if the trading rules explicitly prohibit a broker from violating the time priority of client orders.
Trading Ahead of Research Reports	A dummy variable equal to one if the trading rules explicitly prohibit brokers with proprietary access to research reports from trading ahead of the release of the research report.
Separations of Research and Trading	A dummy variable equal to one if the trading rules specify that research departments and trading departments mush have a 'Chinese wall' separating these departments.
Broker Ownership Limit	A dummy variable equal to one if the trading rules specify maximum ownership limits for brokerages and/or employees with respect to any given security.
Restrictions on Affiliation	A dummy variable equal to one if the trading rules specify limits or restrictions on affiliation between exchange members and member companies.
Restrictions on Communications	A dummy variable equal to one if the trading rules specify limits or restrictions on brokerages' communications with the public.
Investment Company Securities	A dummy variable equal to one if the trading rules specify restrictions or bans on the trading of members' own or affiliated investment company securities.
Influencing or Rewarding Employees of Others	A dummy variable equal to one if the trading rules specify bans on any means of influencing or rewarding employees of other members or member companies.
Anti-Intimidation/ Coordination	A dummy variable equal to one if the trading rules specify bans on any form of intimidation of or coordination with other members or member companies.
Insider Trading Rules Index	Sum of dummy variables for Frontrunning, Client Precedence, Trading Ahead of Research Reports, Separation of Research and Trading, Broker Ownership Limit, Restrictions on Affiliation, Restrictions on Communications, Investment Company Securities, Influencing or Rewarding the Employees of Others, and Anti-Intimidation / Coordination.
Price Manipulation Rules	
Marking the Open	A dummy variable equal to one if the trading rules explicitly prohibit the placing of purchase orders at slightly higher prices/sale orders at lower prices to drive up/suppress the price of the securities when the market opens.
Marking the Close	A dummy variable equal to one if the trading rules explicitly prohibit the buying or selling securities at the close of the market in an effort to alter the closing price of the security.
Misleading End of Month/Quarter/Year Trades	A dummy variable equal to one if the trading rules explicitly prohibit transactions executed at a particular date to establish gains or losses or conceal portfolio losses or true positions in connection with end of the month/quarter/year.
Intraday Ramping/ Gouging	A dummy variable equal to one if the trading rules explicitly prohibit the execution of a series of trades over a short time period which generates a price movement over that period which is unusual given the trading history of the security.
Market Setting	A dummy variable equal to one if the trading rules explicitly prohibit market setting by crossing at the short term high or low. For example, this could be done to set the VWAP (volume weighted average price) or cross market (setting the price in one market to justify crossing in the follow-on market).
Pre-Arranged Trades	A dummy variable equal to one if the trading rules explicitly prohibit a pre-arranged trades whereby within an extremely short time period the client broker and another broker enter a bid and ask for the same volume and price which generates a trade between the two brokers for the whole of the volume. The volume of the order must be significant given the trading history of the security.
Domination and Control	A dummy variable equal to one if the trading rules explicitly prohibit a broker/client from generating significantly greater price changes in a security, possibly for corners (securing control of the bid/demand-side of both the derivative and the underlying asset, and the dominant position can be exploited to manipulate the price of the derivative and/or the asset), squeezes (taking advantage of a shortage in an asset by controlling the demand-side and exploiting market congestion during such shortages in a way as to create artificial prices), and mini-manipulations (trading in the underlying security of an option in order to manipulate its price so that the options will become in-the-money).
Price Manipulation Rules Index	Sum of dummy variables for Marking the Open, Marking the Close, Misleading End of Month/Quarter/Year Trades, Intraday Ramping / Gouging, Market Setting, Pre-arranged Trades, and Domination and Control.
Volume Manipulation Rules	
Churning	A dummy variable equal to one if the trading rules explicitly prohibit excessive buying and selling of stocks by a trader such as a broker in order to generate large commission fees (in the case of churning client accounts) and/or the appearance of significant volume (in the case of churning house accounts and/or churning client accounts)
Wash Trade	A dummy variable equal to one if the trading rules explicitly prohibit the same client reference is on both sides of a trade.
Volume Manipulation Rules Index	Sum of dummy variables for Churning and Wash Trade.

Table 1. (Continued)

Variable Name	Definition
<u>Spoofing Rules</u>	
Giving up Priority	A dummy variable equal to one if the trading rules explicitly prohibit broker from giving up priority, such as entering a bid/ask for a significant quantity at a price away from priority and then both cancelling this order as it approaches priority, and re-entering the order shortly thereafter at a price level further away from priority.
Switch	A dummy variable equal to one if the trading rules explicitly prohibit brokers from entering fictitious orders, such as entering a significant quantity at or close to priority, then completing a trade on the opposite side of the market, and thereafter deleting the original order shortly after the completion of the opposite order.
Layering of Bids/Asks	A dummy variable equal to one if the trading rules explicitly prohibit a broker from layering bids/asks, such as stagger orders from the same client reference at different price and volume levels, with the intent of giving a false or misleading appearance with respect to the market for the security.
Spoofing Rules Index	Sum of dummy variables for Giving up Priority, Switch and Layering of Bids/Asks.
<u>False Disclosure Rules</u>	
Dissemination of False and Misleading Information	A dummy variable equal to one if the trading rules explicitly prohibit the dissemination of false or misleading market information.
Parking or Warehousing	A dummy variable equal to one if the trading rules explicitly prohibit hiding the true ownership of securities / underlying by creating a set of fictitious transactions and trades.
False Disclosure Rules Index	Sum of dummy variables for Dissemination of False and Misleading Information and Parking or Warehousing.
Market Manipulation Index	Sum of Price Manipulation Index, Volume Manipulation Index, Spoofing Index and False Disclosure Index.
<u>Broker Agency Rules</u>	
Trade Through	A dummy variable equal to one if the trading rules explicitly prohibit the completion of a client's order at a price inferior to the best posted bid or ask; e.g., the market maker who received the order is unable or unwilling to fill it at the best posted bid or ask price, and hence the trade is instead executed at the market maker's price.
Improper Execution	A dummy variable equal to one if the trading rules explicitly prohibit brokers from charging fees for completing a client order are unwarranted given the circumstances.
Restrictions on Member Use of Exchange Name	A dummy variable equal to one if the trading rules specify restrictions on exchange members' use of the exchange name.
Restrictions on Sales Materials and Telemarketing	A dummy variable equal to one if the trading rules specify restrictions on exchange members' nature of sales and telemarketing.
Fair Dealing with Customers	A dummy variable equal to one if the trading rules specify details in respect of the 'know your client rule' requiring brokerages to not make trades that do not fit within the clients interest, no delays in the handling client orders, and the like.
Broker Agency Index	Sum of dummy variables for Trade Through, Improper Execution, Restrictions on Member Use of Exchange Name, Restrictions on Sales Materials and Telemarketing and Fair Dealing with Customers.
<u>La Porta *et al.* (1998, 2006) Indices</u>	
Investor Protection Index	The principal component of (1) Anti-Director Rights, (2) Disclosure Requirements, and (3) Liability Standards. Source for item (1): La Porta *et al.* (1998). Source for items (2) and (3): La Porta *et al.* (2006).
Efficiency of the Judiciary	Assessment of the efficiency and integrity of the legal environment. Scale from zero to 10; with lower scores, lower efficiency levels. Source: La Porta *et al.* (1998).
Contract Repudiation	ICR's assessment of the ''risk of a modification in a contract taking the form of a repudiation, postponement, or scaling down'' due to ''budget cut- guide backs, indigenization pressure, a change in government, or a change in government economic and social priorities.'' Average of the months of April and October of the monthly index between 1982 and 1995. Scale from zero to 10, with lower scores for higher risks. Source: La Porta *et al.* (1998).
<u>Market Statistics</u>	
Velocity	The ratio between the turnover of domestic shares and their market capitalization. The value is annualized by multiplying the monthly moving average by 12, according to the following formula: Monthly Domestic Share Turnover / Mong-end Domestic Market Capitalization. Only domestic shares are used in order to be consistent. Source: World Federation of Exchanges.
Log (1+MSCI)	Log of 1 plus the MSCI index in the lagged period relative to the measure of velocity
Log (GDP)	Log of GDP in the lagged period relative to the measure of velocity

Table 2. Trading Rule Indices

This table summarizes the index values for the trading rules for each exchange, as defined in Table 1. Values are presented for 2008.

Exchange	Price Manipulation Index	Volume Manipulation Index	Spoofing Index	False Disclosure Index	Market Manipulation Index	Insider Trading Index	Broker Agency Index
English Legal Origin							
Australia	3	1	2	0	6	2	0
Bermuda	2	1	1	1	5	2	2
Bombay	0	1	1	1	3	2	3
Canada	7	2	3	0	12	2	1
Hong Kong	3	2	1	1	7	0	0
India NSE	3	1	1	1	6	3	3
Ireland	7	1	3	1	12	2	0
Israel	2	0	0	1	3	1	0
London	7	2	3	1	13	3	0
Malaysia	0	0	1	1	2	7	2
NASDAQ	5	1	3	2	11	10	5
New Zealand	2	0	1	1	4	3	3
NYSE	6	2	3	2	13	7	3
Singapore	3	1	2	1	7	2	2
Sri Lanka	2	1	0	1	4	4	2
Thailand	4	2	1	1	8	1	0
Average English Legal Origin	3.50	1.13	1.63	1.00	7.25	3.19	1.63
French Legal Origin							
Argentina	2	0	1	0	3	3	1
Brazil	0	0	1	0	1	1	0
Chile	0	0	0	0	0	0	0
Columbia	2	0	0	0	2	0	0
Egypt	2	0	0	0	2	0	0
France	7	1	3	2	13	2	0
Greece	7	1	3	1	12	3	0
Indonesia	1	0	1	1	3	2	1
Italy	7	1	3	1	12	3	0
Jordan	1	0	1	0	2	5	3
Mexico	3	1	1	1	6	2	0
Peru	0	0	0	0	0	0	0
Philippines	0	0	0	0	0	0	0
Spain	7	1	3	1	12	4	0
Turkey	0	0	0	0	0	0	0
Average French Legal Origin	2.60	0.33	1.13	0.47	4.53	1.67	0.33

Table 2. (Continued)

Exchange	Price Manipulation Index	Volume Manipulation Index	Spoofing Index	False Disclosure Index	Market Manipulation Index	Insider Trading Index	Broker Agency Index
German Legal Origin							
Austria	7	1	3	1	12	2	0
Germany	7	1	3	1	12	3	0
Korea	4	2	2	1	9	3	2
Shanghai	2	1	1	1	5	2	0
Shenzhen	2	1	1	1	5	2	0
Slovenia	7	1	3	2	13	3	0
Switzerland	7	1	3	1	12	3	1
Taiwan	2	0	0	0	2	0	0
Tokyo	1	0	1	0	2	1	0
Average German Legal Origin	4.33	0.89	1.89	0.89	8.00	2.11	0.33
Scandinavian Legal Origin							
OMX	7	1	3	1	12	5	2
Oslo	7	1	3	1	12	4	0
Average Scandinavian Legal Origin	7.00	1.00	3.00	1.00	12.00	4.50	1.00
Tests of Means							
English versus Civil Law	-0.05	2.58**	0.23	1.94*	0.68	1.58	2.98***
English versus French	0.91	0.92	0.54	0.62	2.59**	1.56	1.40
English versus German	-0.83	0.27	-0.28	0.13	-0.71	1.11	1.40
English versus Scandinavian	-3.70***	0.15	-1.57	0.00	-4.77*	-1.34	0.62
French versus German	-1.71*	-0.64	-0.81	-0.48	-3.23***	-0.47	0.00
French versus Scandinavian	-4.53***	-0.82	-2.09**	-0.64	-7.27***	-2.95***	-0.67
German versus Scandinavian	-2.70**	-0.13	-1.22	-0.13	-3.84***	-2.51**	-0.66

Table 3. Descriptive Statistics

This table presents descriptive statistics for the full sample of country-month observations in the data. The data span the months February 2006 - October 2008, and the exchanges listed in Table 2.

	Mean	Median	Standard Deviation	Minimum	Maximum	Number of Observations
Velocity	0.951	0.709	0.751	0.034	4.093	1363
Insider Trading Index	2.202	2	2.096	0	10	1363
Market Manipulation Index	5.266	4	4.036	0	13	1363
Price Manipulation Index	2.627	2	2.268	0	7	1363
Volume Manipulation Index	0.691	1	0.710	0	2	1363
Spoofing Index	1.242	1	1.019	0	3	1363
False Disclosure Index	0.707	1	0.583	0	2	1363
Broker Agency Index	0.836	0	1.240	0	5	1363
Investor Protection Index	2.344	2.337	0.826	0.686	3.775	1363
Log (1+MSCI)	-0.001	0.009	0.057	-0.371	0.138	1363
Log (GDP)	9.500	10.164	1.332	6.565	11.304	1363

Table 4. Comparison Tests

This table presents comparison of means and medians tests for different cut-off values of the indices defined in Table 1. Panel A considers all exchanges in the dataset. Panel B considers the subset of exchanges for which MiFID applies. Panel C considers pre- versus post- MiFID for the subsample of MiFID and non-MiFID exchanges. *, **, *** Significant at the 10%, 5% and 1% levels, respectively.

Panel A. All Countries	Insider Trading Index		Market Manipulation Index		Price Manipulation Index		Volume Manipulation Index		Spoofing Index		False Disclosure Index		Broker Agency Index		Investor Protection Index	
	>1	<=1	>5	<=5	>1	<=1	>0	=0	>0	=0	>0	=0	>0	=0	>2	<=2
Number of Observations	883	480	537	826	930	433	744	619	1045	318	873	490	526	837	891	472
Mean	1.065	0.742	1.173	0.807	1.048	0.742	1.136	0.729	1.072	0.552	1.068	0.744	0.922	0.969	0.991	0.876
Standard Deviation	0.839	0.491	0.746	0.719	0.804	0.569	0.844	0.544	0.776	0.482	0.827	0.534	0.823	0.702	0.812	0.613
Median	0.814	0.600	0.930	0.530	0.821	0.520	0.907	0.522	0.835	0.317	0.743	0.604	0.678	0.739	0.777	0.631
Difference in Means	8.963***		8.986***		8.067***		10.756***		14.383***		8.767***		-1.087		2.946***	
Difference in Medians	p <= 0.000***		p <= 0.000***		p <= 0.000***		p <= 0.000***		p <= 0.000***		p <= 0.008***		p <= 0.171		p <= 0.000***	

Panel B. Subset of MiFID Exchanges	Insider Trading Index		Market Manipulation Index		Price Manipulation Index		Volume Manipulation Index		Spoofing Index		False Disclosure Index		Broker Agency Index		Investor Protection Index	
	>1	<=1	>5	<=5	>1	<=1	>0	=0	>0	=0	>0	=0	>0	=0	>2	<=2
Number of Observations	312	84	207	189	270	126	249	147	375	21	312	84	87	309	198	198
Mean	1.227	1.026	1.186	1.183	1.191	1.170	1.189	1.177	1.223	0.499	1.206	1.103	1.366	1.133	1.341	1.028
Standard Deviation	0.562	0.505	0.596	0.510	0.532	0.606	0.554	0.561	0.547	0.031	0.555	0.558	0.316	0.597	0.333	0.678
Median	1.365	0.957	1.357	1.206	1.336	0.957	1.357	1.199	1.355	0.502	1.335	1.092	1.352	1.292	1.383	0.717
Difference in Means	3.158***		0.062		0.661		0.198		24.941***		1.515		4.835***		5.826***	
Difference in Medians	p <= 0.000***		p <= 0.028 **		p <= 0.807		p <= 0.026**		p <= 0.000***		p <= 0.820		p <= 0.067*		p <= 0.000***	

Panel C. Pre-MiFID versus Post-MiFID	Non-MiFID Countries		MiFID Countries	
	Post-MiFID	Pre-MiFID	Post-MiFID	Pre-MiFID
Number of Observations	358	609	144	252
Mean	0.895	0.832	1.267	1.137
Standard Deviation	0.841	0.772	0.581	0.537
Median	0.679	0.563	1.373	1.276
Difference in Means	1.167		2.200**	
Difference in Medians	p <= 0.019**		p <= 0.025**	

Table 5. Correlation Matrix

This table presents Pearson correlation coefficients for the full sample of country-months in the data (1363 observations). Correlations in absolute value greater than .05, 0.06 and 0.07 are statistically significant at the 10%, 5% and 1% levels, respectively.

	Velocity	Insider Trading Rules Index	Market Manipulation Rules Index	Price Manipulation Rules Index	Volume Manipulation Rules Index	Spoofing Rules Index	False Disclosure Rules Index	Broker Agency Rules Index	Investor Protection Rules Index	Log (1+MSCI)
Velocity	1.00									
Insider Trading Rules Index	0.40	1.00								
Market Manipulation Rules Index	0.37	0.49	1.00							
Price Manipulation Rules Index	0.29	0.35	0.96	1.00						
Volume Manipulation Rules Index	0.26	0.30	0.79	0.69	1.00					
Spoofing Rules Index	0.44	0.57	0.91	0.83	0.63	1.00				
False Disclosure Rules Index	0.33	0.63	0.63	0.48	0.50	0.53	1.00			
Broker Agency Rules Index	0.15	0.73	0.24	0.10	0.22	0.29	0.49	1.00		
Investor Protection Rules Index	0.04	0.34	0.24	0.15	0.33	0.27	0.18	0.45	1.00	
Log (1+MSCI)	-0.01	-0.04	-0.13	-0.15	-0.03	-0.12	-0.05	0.00	0.01	1.00
Log (GDP)	0.39	0.18	0.44	0.44	0.22	0.52	0.21	-0.07	0.11	-0.04

Table 6. OLS Regression Analysis of Trading Velocity and Trading Rules

This table presents OLS regressions of the determinants of trading velocity in the cross-section across countries. Variables are as defined in Table 1. White's (1980) HCCME is used in all regressions. Models (1) and (2) are difference-in-differences estimates in reference to MiFID. Models (1) and (3) - (15) use an AR(1) specification. Model (4) uses country-fixed effects. Models (1) - (3) and (5) - (10) use country dummy variables and a constant. *, **, *** Statistically significant at the 10%, 5% and 1% levels, respectively.

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	-1.588	-1.850*	0.054	23.938***	1.763	2.026**			1.836	2.150**
Country Dummy Variables	Yes		Yes		Yes		No		Yes	
Country Fixed Effects	No		No		No		Yes		No	
AR(1) Model	Yes		No		Yes		Yes		Yes	
After*Treat	0.052	4.018***	0.121	3.038***						
Treat	3.455	17.620***	0.908	8.867***						
Insider Trading Rules Index					0.037	4.005***	0.017	1.866*		
Market Manipulation Rules Index									0.005	3.356***
Log (1+MSCI)	-0.080	-4.464***	-0.159	-1.244	-0.081	-4.526***	-0.025	-1.352	-0.083	-4.624***
Model Diagnostics										
Number of Observations	1363		1363		1363		1363		1363	
Adjusted R2	0.88		0.88		0.88		0.87		0.88	

	Model (6)		Model (7)		Model (8)		Model (9)		Model (10)	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	1.847	2.174**	1.858	2.203**	1.852	2.155**	1.824	1.995**	1.958	2.058**
Country Dummy Variables	Yes		Yes		Yes		Yes		Yes	
Country Fixed Effects	No		No		No		No		No	
AR(1) Model	Yes		Yes		Yes		Yes		Yes	
Price Index	0.008	3.490***								
Volume Index			0.036	2.059**						
Spoofing Index					0.021	3.073***				
False Disclosure Index							0.052	2.811***		
Broker Agency Index									-0.019	-0.413
Log (1+MSCI)	-0.083	-4.585***	-0.087	-4.855***	-0.084	-4.683***	-0.084	-4.663***	-0.088	-4.862***
Model Diagnostics										
Number of Observations	1363		1363		1363		1363		1363	
Adjusted R2	0.88		0.88		0.88		0.88		0.88	

	Model (11)		Model (12)		Model (13)		Model (14)		Model (15)	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	-1.904	-9.738***	-1.850	-9.298***	-1.975	-9.532***	-1.944	-9.337***	-1.987	-10.299***
Country Dummy Variables	No		No		No		No		No	
Country Fixed Effects	No		No		No		No		No	
AR(1) Model	Yes		Yes		Yes		Yes		Yes	
Insider Trading Index	0.177	19.856***	0.172	17.589***	0.143	10.468***	0.144	10.582***	0.169	18.392***
Market Manipulation Index			0.005	1.330	0.008	2.115**	0.007	1.889*		
Broker Agency Index					0.065	2.949***	0.035	1.455		
Investor Protection Index							0.072	2.977***	0.183	7.720***
Efficiency of the Judiciary							-0.099	-9.536***		
Log (1+MSCI)	-0.040	-0.733	-0.029	-0.522	-0.032	-0.594	-0.039	-0.724	-0.047	-0.907
Log (GDP)	0.261	20.362***	0.254	18.265***	0.266	18.404***	0.248	15.816***	0.306	21.492***
Model Diagnostics										
Number of Observations	1363		1363		1363		1363		1363	
Adjusted R2	0.26		0.27		0.28		0.29		0.32	

Table 7. OLS and Instrumental Variable Estimates

This table presents IV regressions of the determinants of trading velocity in the cross-section across exchanges (only), ignoring monthly variation. The dependent variable is the average monthly volume from November 2007 - October 2008. Models (16) - (18) present the first stage estimates of the determinants of legal rules, while Models (19) - (22) present the second stage estimates of the determinants of velocity based on the fitted value in the first stage estimates. Models (22) - (25) are OLS estimates. Variables are as defined in Table 1. White's (1980) HCCME is used in all regressions. *, **, *** Statistically significant at the 10%, 5% and 1% levels, respectively.

| | First Stage IV Estimates | | | | | | Second Stage IV Estimates | | | |
| | (16) Market Manipulation Index | | (17) Insider Trading Index | | (18) Investor Protection Index | | (19) Velocity | | (20) Velocity | |
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	-12.871	-3.977***	-0.682	-0.350	1.510	2.207**	0.536	1.817*	2.276	1.667*
Log GDP per Capita	1.011	1.371	0.012	0.041	-0.021	-0.221				
English Legal Origin	0.581	0.546	0.610	0.924	0.986	3.993***				
Repudiation Index	1.395	2.617***	0.040	0.177	-0.013	-0.140				
Efficiency of the Judiciary	-0.173	-0.553	0.319	1.850*	0.095	1.149	-0.094	-1.874*	-0.079	-1.522
Market Manipulation Index (fitted values for Models 19-22)							0.167	6.147***	0.246	3.210***
Log (1+MSCI)							3.522	0.430	-1.274	-0.160
Log (GDP)									-0.236	-1.311
Model Diagnostics										
Number of Observations	42		42		42		42		42	
Adjusted R²	0.45		0.08		0.41		0.41		0.31	

| | Second Stage IV Estimates | | | | OLS Estimates without Instruments | | | | | |
| | Model (21) | | Model (22) | | Model (23) | | Model (24) | | Model (25) | |
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	2.198	1.749*	2.599	1.797*	-1.156	-1.734*	-1.572	-1.968**	-1.234	-1.794*
Efficiency of the Judiciary	0.062	0.374	-0.032	-0.487	-0.064	-1.312	-0.119	-2.405**	-0.086	-1.770*
Insider Trading Index (fitted values for Models 19-22)	-0.351	-0.843					0.143	1.865*		
Market Manipulation Index (fitted values for Models 19-22)	0.259	3.304***	0.247	3.373***	0.047	1.715*	0.014	0.438	0.050	1.812*
Investor Protection Index (fitted values for Models 19-22)			-0.210	-0.843					0.098	0.608
Log (1+MSCI)	0.111	0.013	0.111	0.013	8.322	0.867	8.377	0.935	7.097	0.663
Log (GDP)	-0.265	-1.425	-0.262	-1.421	0.224	2.402**	0.298	2.713***	0.227	2.420**
Model Diagnostics										
Number of Observations	42		42		42		42		42	
Adjusted R2	0.31		0.39		0.18		0.27		0.17	