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Manipulation?

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Abstract

We hypothesize that short-selling has a disciplining role vis-à-vis the managers forcing them to reduce earning manipulation. Using firm-level short-selling data over the sample period of 2002 to 2009 across 33 countries, we document a significantly negative relationship between lending supply and activism in the short sell market and earnings manipulation. Additional tests using ETF ownership as an instrument or based on market-wide shortselling restrictions further confirm that short selling potential strongly discourages earnings manipulation. Meanwhile, the impact is more pronounced for firms with weaker corporate governance. Collectively, our findings suggest that short selling provides an external governance mechanism to discipline managerial incentives.

Introduction

The experience of the recent financial crisis has brought to the attention the role of short-selling. Short-selling has in general been identified as a factor that contributes to market informational efficiency (e.g., Bris and Goetzmann, and Zhu 2007, Boehmer, Jones, and Zhang, 2008, Boehmer and Wu 2010, Saffi and Sigurdsson, 2011). At the same time, however, short-selling has been regarded as "dangerous" to the stability of the financial markets and has been banned in many countries.[1] Interestingly, the two seemingly conflicting views start from the same intuition that short-selling *only* affects the way information is incorporated in market prices, but not the behavior of the managers. That is, short selling amplifies the reaction to existing information, making the market either more effective or overly sensitive, but does not affect the managerial actions.

However, short selling may also affect the way managers behave by acting as a disciplining mechanism for them. The disciplining role of short selling may arise in two ways. First, short sellers may amplify the effect of shareholders walking the "Wall Street Rule" and selling the company shares (e.g., Maug, 1998, Kahn and Winton, 1998, Admati and Pfleiderer, 2009, Edmans, 2009, and Edmans and Manso, 2011). This negatively affects the stock price, effectively punishing managers. In other words, short-selling can be seen as a "vote of confidence" on managerial behavior which, by itself, provides information to the market about the firm. The fact that shorting demand can be levered or potentially coordinated implies that its impact on stock price could be even more effective to discipline the manager than the Wall Street Walk of any individual shareholder.

For instance, managers may have incentives to manipulate accounting information. Short selling could directly reduce such incentives by punishing firms with dubious accounting, and therefore indirectly improving the quality of information revealed to the market. For example, in July 2011 short sellers targeted Sino-Forest, a Toronto-listed Chinese forestry company. The alleged problems of the company ranged from reporting excellent results from one of its early joint ventures which never went into operation to massively exaggerating the income and assets on its accounting books.[2] The

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[1] The potential concern is the inherently speculative nature of short selling. In its Amendments to Regulation SHO released on February 26, 2010, for instance, the SEC reveals the concern of the regulators: "We believe it is appropriate at this time to adopt a short sale-related circuit breaker because, when triggered, it will prevent short selling, including potentially manipulative or abusive short selling, from driving down further the price of a security that has already experienced a significant intra-day price decline, and will facilitate the ability of long sellers to sell first upon such a decline." (http://www.sec.gov/rules/final/2010/34-61595.pdf.)

[2] The initial report issued by the short seller, Muddy Water Research, in July 2001 is available at http://www.muddywatersresearch.com/research/tre/initiating-coverage-treto/.

attack was so devastating that the firm filed for bankruptcy in the March of 2012. This example illustrates the power of short selling in punishing suspicious firms. [3]

Second, given that short-selling improves price efficiency (Saffi and Sigurdsson 2011) and that more information facilitates the use of more effective incentive-based contracts for the managers (e.g., Hart 1983, Holmstrom 1982, Nalebuff and Stiglitz 1983, Schmidt 1997, Raith 2003), short selling should be generally related to more efficient contracts. Overall, through enhanced punishment, improved price efficiency, and more efficient contracts, short selling should be associated with better aligned managerial incentives and better quality of information revealed by the firms.

In this paper, we examine such disciplining role of short-selling by exploring its impact on earnings manipulation. The focus on earning manipulation has three advantages. First, earning manipulation is one of the most tangible signs of distorted information and bad governance in many countries (e.g., Leuz, Nanha, and Wysocki, 2003). Second, the fact that firms are able to learn from the market (e.g., Chen, Goldstein, and Jiang 2007, Edmans, Goldsteins, and Jiang 2011a, 2011b) suggests that short-selling will directly impact managerial behavior. Therefore, earnings manipulation provides one of the clearest testing grounds in which to test the disciplining role of short-selling. Third, earning manipulation also has such important normative and policy implications that that in many countries it has fallen under the scrutiny of the regulator, especially after the FD Regulation and SOX in the US have led the way (Dechow, Ge, and Schrand 2010).

We focus on the *ex ante* "short-selling potential" (SSP) as opposed to the *ex post* actions taken by short sellers in response to observed earnings manipulation. That is, we define discipline in terms of the potential downward pressure that the presence of short-sellers may exercise on the firm stock value if some news that does not meet market expectations hits the market. We argue that the short-selling potential disciplines managers by acting as a multiplier of the sensitivity of the stock to (bad) unexpected accounting news. We build our main proxy of short-selling potential (SSP) using the amount of shares available to be lent for short-sale (hereafter, *Lendable*). [4] The main working

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[3] The case is not alone. Indeed, in the year of 2010 and 2011, short sellers started to attack a group of Chinese companies listed overseas that were suspected of dubious accounting and committed fraud – and Sino-Forest is just one in the list. Another example is Orient Paper (NYSE: ONP), which was accused to have overstated its 2008 revenue by 27x and its 2009 revenue by 40x. According to a Financial Times article (April 10 of 2012) "Selling China companies short becomes complex", the consequence of the attacks is huge. For instance, the Bloomberg China Reverse Merger index which tracks 82 Chinese companies listed in New York has "tumbled 68 per cent from its peak at the start of 2010," with their average PE ratio pushed down to 4.4 (compared to 15.3 for the S&P 500 firms). Meanwhile, at least eight Chinese companies have had their shares halted during the process. Overall, the evidence on short-sellers attacking firms with dubious reports is overwhelming.
[4] We also confirm our results using the amount of shares that are actually sold short in the past (hereafter, *On Loan*). Lending supply is a better proxy to describe the ex-ante disciplining role of short selling, because the amount of shares sold short could be potentially correlated with existing manipulation. In this regard, we use lending supply as our main variable.

hypothesis is that the SSP can, by being related to a higher degree of price efficiency and potential punishment upon manipulations, discipline earnings manipulations.

We test our working hypothesis using a unique dataset on worldwide short-selling detailed at the stock level, for the period 2002-2009. Our final sample contains 17,555 firms across 33 countries. Following the literature (e.g., Jones 1991, Dechow, Sloan and Sweeney 1995, Dechow and Dichev 2002, Francis, LaFond, Olsson, Schipper 2005, Kothari, Leone, and Wasley 2005, Dechow, Ge, and Schrand 2010, Hirshleifer, Teoh, and Yu, 2011), we use accruals as the main proxy for earnings manipulation. In addition, we also examine alternative measures which will be specified shortly.

We start by documenting a strong negative correlation between the short-selling potential of a stock and the degree of earnings manipulation of the firm. The effect is not only statistically significant, but also economically relevant. One standard deviation higher short-selling potential is related to 13% (14.9% and 10.4%) lower manipulation in the overall sample (the US and rest of the world). The conclusion remains unchanged when we exclude the recent global financial crisis period. The negative correlation is also robust to controlling for firm-specific characteristics, lagged dependent variables, firm-fixed effect, and change-in-change specifications, suggesting that the correlation is not spurious. These results provide a first evidence in favor of the *ex ante* disciplining mechanism of short selling.

Next, we directly assess the causality between short selling and the ensuing reduction in earnings management. The goal is to address the potential endogeneity issue that the correlation between short selling and manipulation may be spuriously related to manipulating firms attracting short-selling rather than short selling potential reducing manipulations. We do not expect the reverse causality to dominate our results for two reasons. First, manipulation attracting short-selling would deliver restrictions that are not consistent with our empirical findings. Second, our main variable focus on the potential for short-selling related to the shares available to be lent, as opposed to the actual shares lent. Still, we formally tackle the issue of reverse causality by providing a proper instrumental variable specification. We use as instrument a variable that affects the amount of shares available to be lent in the market but is unrelated to (bad) information that may lead to short selling or shareholder activism: the fraction of Exchange Traded Funds (ETF) ownership of the specific stock.

ETF ownership has several desirable features to serve as instrument. First, unlike hedge funds or other active institutional investors, ETFs typically do not monitor firms. Nor does ETF ownership correlate with the shorting demand that involves firm-specific information. Second, in the last decade from 2001 to 2010, the ETF industry experienced an astonishing 40% annual growth rate, compared to the 5% annual growth rate of both global mutual funds and equity markets (source: the Financial Stability Board). Since the ETFs are among the main contributors to of shares to be lent, such a growth

provides exogenous variations to the amount of shares available for short selling. Hence, while ETF ownership is unrelated to information and shareholder activism, still it affects the supply of disciplining shares of stocks and thus the effectiveness of short selling as a disciplining mechanism. In line with the previous results, we do find that the instrumented short selling potential significantly reduces earnings manipulation. This allows us to interpret this negative relation between the two in a casual sense and further confirm the discipline hypothesis.

In a further effort to avoid firm-level spurious correlation and endogeneity issues, we extend the short-selling potential from firm level to the market level and explore whether deregulations on short-selling constraints are associated with less earnings manipulation across countries. Country-wide short-selling regulations vary both across countries and over time (Charoenrook and Daouk 2005, Bris, Goetzmann, and Zhu 2007, Beber and Pagano, 2011). We find that, in line with our firm-level results, in countries in which short-selling is illegal (unfeasible), earnings manipulation is 19.4% (11.1%) higher than in countries in which it is legal (feasible). The results are robust with country-level time-varying variables, country, industry, and year-fixed effects as control. This market-wide test provides further evidence in favor of the discipline hypothesis.

Next, we look at alternative disciplining channels. We want to both test whether short-selling potential spuriously proxies for other alternative governance channels and, if this is not the case, whether these alternative governance channels affect the disciplining impact of short selling on earnings manipulation. The alternative channels are either explicit indicators of corporate governance – e.g., the quality of the auditors of the firm, the quality of its accounting standards, its quality of corporate governance, its being listed in the US – or variables that describe the information environment/transparency of firms – e.g., the number of analysts following the firm and their dispersion, stock liquidity. Consistent with our working hypothesis, controlling for these alternative measures does not affect our main results. These alternative sources of corporate governance and transparency do however reduce the disciplining effect of short-selling potential, suggesting that short selling discipline is more important for firms with worse internal governance and more opaque information environments. In this sense, short selling potential provides an external governance mechanism which can be regarded as a substitute to internal governance.

As the last step of our analysis, we examine alternative earnings manipulation proxies and study the impact of earnings manipulation on the informativeness of stocks. We first test whether the short-selling potential reduces the persistence of earnings. In general, persistent or "sustainable" earnings could either come from good firms – which leave no space for short selling to affect the stock price – or arise when bad firms manipulate accounting numbers to mimic good firms (Dechow, Ge, and Schrand 2010) – in which case the presence of a disciplining channel should reduce the behavior.

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These combined effects suggest that the short selling potential is expected to reduce the *average* level of earnings persistence. And this is indeed confirmed in our tests.

As additional robustness checks, we use alternative proxies for earnings manipulation, including the Jones's (1991) residual accruals, Francis, La Fond, Olsson, Schipper's (2005) residual accruals, target beating on small positive forecasting profit (Degeorge, Patel, and Zeckhauser 1999), target beating on small positive profits (Burgstahler and Dichev 1997), and target beating on small positive past-earnings profits (Burgstahler and Dichev 1997). These alternative proxies capture different facets of earnings manipulations. The first two proxies rely on the idea that firms' accrual process is not only related to managerial discretion but is also a function of firm fundamentals such as sales growth, property, plant and equipment, and past, present, and future cash flows. Hence, taking out the impact of firm fundamentals from accruals allows the residuals to better capture the role of managers in inflating earnings. The three target beating measures capture the common practice for firms with unmanaged earnings just below the heuristic target of "zero" – e.g., firms with small losses or whose earnings are slightly below analyst forecasts – to intentionally manipulate earnings enough to report a small profit. These measures reflect a different yet highly relevant type of distortion regarding earnings information. Overall, the results support our working hypothesis and provide evidence of short selling reducing the potential for manipulation.

Finally, we focus on the informational content of the stock price. The goal is to show that, by reducing manipulation, short-selling does also make the price more informative. This would be consistent with existing evidence (e.g., Saffi and Sigurdsson 2011) showing that short-selling improves price efficiency. However, the channel is very different, as the efficiency does not arise from better market conditions, but from lower earning manipulation from the firm. We use the measure of stock price non-synchronicity as a proxy for price informativeness (Morck, Yeung, and Yu 2000; Jin and Myers 2006). We document a negative correlation between the accrual-based measure of earnings manipulation and stock price informativeness. This confirms that earning manipulation reduces price efficiency and that short-selling, by lowering price manipulation, increases price efficiency.

Overall, these results provide evidence in favor of a beneficial effect of the short-selling market on the corporate market. This has important normative implications as it shows that short-selling – in general considered to be a source of the problem – does in fact contribute to its solution.

A paper close to ours is the one by Hirshleifer, Teoh, and Yu (2011) who examine how short sellers respond to realized accruals and how such responses affect the informational efficiency of the stock market. We bring the analysis one step forward by asking whether the existence of short sellers helps to reduce the bad managerial incentive and hence the associated agency cost of adopting earnings manipulations. Our findings suggest that this reverse relationship also exists and in fact short

selling provides an *ex ante* disciplining mechanism to reduce manipulation incentives of managers. This implies that short selling not only improves the price efficiency in the market but also reduce the agency costs in the real economy.

Our results contribute to different strands of the literature. First, we are the first – to the best of our knowledge – to investigate the impact of the short-selling market on earnings manipulation in particular and managerial incentives in general. More specifically, the standard short selling literature links short sellers' activity to stock returns (Senchack and Starks, 1993, Asquith and Meulbroek, 1995, Aitken, Frino, McCorry, and Swan, 1998). The channel is through the effect on the informativeness of stock prices. For example Cohen, Diether, and Malloy (2007) document the ability of short-sell trades to predict future stock returns, suggesting that short sellers have access to private information. This would affect stock market liquidity and efficiency (e.g., Bris, Goetzmann and Zhu, 2007, Boehmer, Jones, and Zhang, 2008, Boehmer and Wu 2010, Saffi and Sigurdsson , 2011). We contribute by directly linking short sellers' activity – and more specifically the threat of their activity – to managerial behavior.

Second, we relate to the literature on governance. The literature has considered the trade-off between "voice and exit" (Maug, 1998, Kahn and Winton, 1998, Faure-Grimaud and Gromb, 2004) and in general has focused on "voice" as main disciplining device. For example, hedge fund activism has been identified as an important source of governance (e.g., Brav et al., 2008, Clifford, 2008, Greenwood and Schor, 2009, Klein and Zur, 2009, 2011). More recently, Admati and Pfleiderer (2009), Edmans (2009), and Edmans and Manso (2011) show that following the "Wall Street Rule" is a governance mechanism in itself. We contribute by documenting that a similar disciplining effect may come from the short-selling side. Unlike the above-mentioned governance mechanisms, however, the discipline force of the short selling channel comes from the outside (i.e. the external market) as opposed to the inside (i.e., existing shareholders). This depicts one approach through which the "invisible hand" of the market affects and disciplines firm behavior.

Third, our results contribute to the literature on the determinants of earnings management. The managerial incentives to manipulate financial statements are shown to be internally related to firm characteristics such as firm performance, debt, growth and investment, and firm size (see DeFond and Park 1997; Watts and Zimmerman 1986; Nissim and Penman 2001), financial reporting practices (Bart et al. 2008), investor protection (Leuz, Nanha, and Wysocki 2003), audit quality (DeAngelo 1981), capital market incentives on capital raising and meeting earnings forecasts (Morsfield and Tan 2006; Das and Zhang 2006). Earnings management can also be affected by external factors such as capital requirement, political pressure, and tax regulation (Dechow, Ge, and Schrand 2010). Our evidence of

the short-selling potential provides another external channel to mitigate managers' incentive to manage accounting earnings.

Fourth, our results also contribute to the literature that relates shareholder composition to firm performance (e.g., Morck, Shleifer, and Vishny, 1988, Himmelberg, Hubbard, and Palia, 1999, Holderness, Kroszner, and Sheenan, 1999, Franks and Mayer, 2001, Franks, Mayer and Renneboog, 2001) and on international governance (e.g., Claessens et al. 2000, La Porta et al., 2002, Claessens and Laeven, 2003, Ferreira and Matos, 2008, Aggarwal et al., 2011, Laeven and Levine, 2008, Doidge, Karolyi, and Stulz, 2007). While the extant literature focuses mostly on large/controlling shareholders with a positive stake, we are the first to show a positive role of investors with negative positions – i.e., the short-sellers.

Finally, our findings provide evidence that firms shape their behavior reacting to the stock market, suggesting a feedback effect recently proposed in the literature (e.g., Chen, Goldstein, and Jiang 2007, Edmans, Goldstein, and Jiang 2011a, 2011b). Our contribution is to show that the awareness of the existence of a large group of short sellers ready to punish potential managerial slack can help firms to largely reduce slack at the very beginning.

The remainder of the paper is organized as follows. In Section II we describe the data and the construction of the main variables. In Section III and IV, we provide the main evidence on the relation between short-selling potential and earnings manipulation. In Section V, we consider the role of alternative disciplining channels. In Section VI, we consider several robustness checks, assessing the the relation between short selling potential and alternative earnings manipulation variables. Finally, in Section VII, we investigate the impact of earnings manipulation on the informativeness of stocks. A brief conclusion follows.

II. Data and Variables Construction

We now describe the sources of our data and the construction of our main variables.

A. Data Sample and Sources

The sample covers the period between 2002 and 2009. We start with all publicly listed companies for which we have accounting and stock market information from Datastream/WorldScope. We match this sample with short-selling information data from Data Explorers and with data on institutional investors' stock holdings from FactSet/LionShares.

We obtain equity lending data from Data Explorers, a research company that collects equity and bond lending data directly from the security lending desks at the world's leading banks. The data is

available at a monthly frequency from May 2002, at weekly frequency from August 2004 and at daily frequency for the period from July 2006. Data Explorers provides information on lending volumes, lending fees and the number of securities that are made available for lending. In particular, for each stock, Data Explorers reports the following variables at daily frequency: lendable value in dollars, active lendable value in dollars[5], total balance value on loan in dollars, and weighted average loan fee (across active contracts) in basis points.

Data Explorers collects data from lending desks from most of the largest firms in the security-lending industry. The data has information detailed at the stock level on the value of shares available for lending as well as on the shares lent from May 2002 to December 2009. The Data Explorers dataset has the unique feature that it provides information on the value of shares that are on loan as well as the value of shares that are available to be lent to short sellers. A more detailed description of the data can be found in Saffi and Sigurdsson (2011) and Jain, Jain, McInish, and McKenzie (2012).

The data on institutional investor ownership is from the FactSet/Lionshares database, which provides portfolio holdings for institutional investors worldwide. Ferreira and Matos (2008) provide a more detailed description. Since institutional ownership represents over 40% of the total world stock market capitalization in our sample period, we control for it in all our regressions to highlight the impact of short selling. We also obtain ETF ownership of stocks from this database, which we later on use as an instrument for lending supply in the short selling market.

We combine Datastream data with the short selling and institutional holdings data using SEDOL and ISIN codes for non-U.S. firms. We use CUSIP to merge short-selling data with U.S. security data from Datastream. The final sample included about 17,555 stocks in 33 countries. As shown in Appendix B, the sample includes 3,637 non-U.S. firms and 1,193 U.S. firms in year 2002, and the number increases to 7,878 for non-U.S. firms and 4,031 for U.S. firms as of December 2009.

B. Main Variables

In line with the literature, we use as main proxy for earning manipulation "accruals" (*Accruals*). This represents one of the most widely observed practices of earnings manipulation (Jones 1991, Dechow, Sloan and Sweeney 1995, Dechow and Dichev 2002, Bhattachaya, Daouk, and Welker 2003, Francis, LaFond, Olsson, Schipper 2005, Kothari, Leone, and Wasley 2005, Dechow, Ge, and Schrand 2010). High accruals are known to be associated with abnormal return (e.g., Fama and French 2010, Hirshleifer, Hou, and Teoh, 2011) and inflated earnings.

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[5] Data Explorers applies several filters to calculate active lendable value by excluding shares that are frozen and cannot be lent out.

Accruals are defined as scaled accruals calculated from balance sheet and income statement information. In particular:

$$Accruals = ((\Delta CA - \Delta Cash) - (\Delta CL - \Delta SD - \Delta TP) - DP)/LagTA \ ,$$

where ΔCA is the change in current asset; ΔCash is the change in cash and equivalents; ΔCL is the change in current liability; ΔSD is the change in short-debt included in the current liabilities; ΔTP is the change in income tax payable; DP is are depreciation and amortization expenses; and $LagTA$ is the total assets of the firm in the previous accounting year.

In robustness checks we also consider a set of alternative proxies of earnings manipulation. In particular, we use: Jones's (1991) residual accruals, Francis, LaFond, Olsson, and Schipper's (2005) residual accruals, target beating on small positive forecasting profit (Degeorge, Patel, and Zeckhauser 1999), target beating on small positive profits (Burgstahler and Dichev 1997), and target beating on small positive past-earnings profits (Burgstahler and Dichev 1997). A more detailed definition of these variables is provided in Section VI and in Appendix A.

We define our main measure of short-selling potential (SSP), *Lendable.* This is the annual average fraction of shares of a firm available (to be lent) to short sellers. More specifically, we follow Equation (4) of Saffi and Sturgesson (2011) to compute the ratios between the values of shares supplied to the short selling market, which are directly reported by Data Explorers, and the market capitalizations of the stock, which are reported by Datastream, and then take the average of the monthly ratios as the annual *Lendable* ratio. In addition, we also define a SSP proxy based on shares lent (*On Loan*). This is the annual average fraction of shares of a firm lent out (or short interest). We use the annual frequency mainly because earnings manipulation variables are defined annually. We will also use country-level short-selling potential variables following Charoenrook and Daouk (2005), including legality of short selling (*Legality*), feasibility of short selling (*Feasibility*), put option trading (*Put Option*), and feasibility or put option (*F or P*). These country-level variables are defined in Section IV.

Our controls variables are logarithm of firm size (*Size*), logarithm of book-to-market ratio (*BM*), financial leverage (*Leverage*), logarithm of annual stock return (*Return*), stock return volatility (*STD*), American Depository Receipts (*ADR*), MSCI country index membership (*MSCI*), number of analysts following (*Analyst*), closely-held ownership (*CH*), institutional ownership (*IO*). Institutional ownership is the aggregate equity holdings by domestic and foreign institutional investors as a percentage of total number of outstanding shares. In a similar manner, we also construct ETF ownership (*ETF*) defined as the percentage of total number of outstanding shares that are invested by ETFs. A detailed definition of all these variables is provided in Appendix A.

We present the summary statistics for the main variables in Table 1. Panel A reports the number of observations (N), mean, median, standard deviation (STD), and the deciles (90% and 10%) and quartiles (75% and 25%) distribution of the variables. Panel B reports the Pearson correlation coefficients among the main variables. We can see that both our dependent variable (*accruals*) and independent variables (*Lendable* and *On Load*) have reasonable variations. For example, the mean of *accruals* in our sample is equal to -0.036, which is comparable to -0.021 in Bhattachaya, Daouk, and Welker (2003) in a sample of 34 countries from 1984 to 1998. The slight decrease in accruals is consistent with the evidence that more conservative accounting standards are applied around the world in the most recent years. The mean (6.7%) of *Lendable* is also close to the mean (8.0%) of lending supply variable in Saffi and Sturgessz (2011). The remaining difference comes from the request that firms need to have valid earnings-manipulation variables to be included in our sample. Our results are robust whether we include or exclude the firms for which no shares are available to be short-sold (i.e., zero lendable).

Panel B illustrates that there is a negative correlation between accruals and short selling potential, which suggests a discipline impact of short selling on earnings manipulation. This just provides some preliminary evidence, as the correlation is contemporaneous and could be spurious due to the lack of control variables. Hence, the next step of analysis is to extend the relationship between the two into a regression framework.

III. Short-selling potential and Earnings manipulation: A First evidence

We now relate short-selling potential to earning management in a multivariate regression framework. Then, we explore several alternative specifications that could help us to interpret the correlation in a causal way.

A. The Basic Specification

We start by regressing accruals on short-selling potential as well as a set of firm-level control variables (*X*). We estimate:

$$Accruals_{i,t+1} = \alpha + \beta_1 \times SSP_{i,t} + \beta_2 \times X_{i,t} + \varepsilon_{i,t} , (1)$$

where $SSP_{i,t}$ refers to the two proxies of short selling potential, *Lendable* and *On Loan*. The list of control variables, denoted by the vector $X_{i,t}$, includes: firm size (*Size*), book-to-market ratio (*BM*), financial leverage (*Leverage*), annual stock return (*Return*), stock return volatility (*STD*), American Depository Receipts (*ADR*), MSCI country index membership (*MSCI*), number of analysts following (*Analyst*), closely-held ownership (*CH*), and institutional ownership (*IO*). We also include industry-,

country-, and year-fixed effects and cluster the standard error at the firm level. All the control variables as well as our main SSP variables of focus are as of the previous year.

The results are reported in Table 2. In Panel A, short-selling potential (SSP) is proxied by the lendable shares (*Lendable*), while in Panel B, short-selling potential measure is proxied by the shares on loan (*On Loan*). We consider different samples: the "Ex.Zeros" sample only includes firms with non-zero short-selling values. The "NUS" sample refers to firms from non-US countries. The "DEV" sample refers to firms from developed countries, whereas the "EMG" sample refers to firms from emerging countries. The "Ex.GFC" sample excludes the global financial crisis period from 2007 to 2008.

The results show a strong negative correlation between short-selling potential and earnings manipulation. This holds across the different specifications and is not only statistically significant, but also economically relevant. One standard deviation higher short-selling potential is related to 13.1% (14.9% and 10.4%) lower manipulation in the overall sample (the US and rest of the world) in the case of *Lendable*. The analogous numbers in the case of *On Loan* are 6.0% (3.7% and 9.0%). It is also interesting to notice that if we focus on the sample that excludes the crisis, the results remain the same. This suggests that the disciplining role does not concentrate during the crisis period.

If we focus on the other variables, we see that they are consistent with the existing literature on manipulation. For example, large size firms have aggressive accruals due to income-decreasing accounting method choices (Watts and Zimmerman,1986). Being listed in the US market (i.e., *ADR*) is negatively and significantly associated with a firm's accruals. This is consistent with the bonding hypothesis that cross-listings on U.S. stock exchanges strengthen outside investor protection (Hail and Leuz, 2009). These results provide some first evidences that a higher level of short selling potential could help reduce earnings manipulation in the future.

B. Alternative Specifications

One potential objection is that short-selling potential is spuriously related to some unobservable firm-specific characteristics. To address this issue, we consider three alternative specifications. The first is a panel specification with lagged dependent variable. The second is a panel specification with short-selling potential as the dependent variable. The third is a specification that includes firm fixed effects and changes. We consider both proxies (*Lendable* and *On Loan*) for short-selling potential. In the next section, we will explicitly consider an instrumental variable approach.

We report the results in Table 3. Panel A uses the main proxy of short-selling potential (*Lendable*), while Panel B uses the alternative proxy based on shares on loan (*On Loan*). Models (1) and (2) regress accruals on contemporaneous and lagged short-selling variables, respectively, and include

among the controls the lagged accruals. The negative correlation between short-selling potential and accruals remains unchanged. Models (3) and (4) regress short-selling variables on contemporaneous and lagged accruals, respectively, and include among the control variables lagged short selling. The goal is to perform a Granger causality test to cast some first light on the reversal causality between accruals and short-selling potential – i.e., the extent to which accruals affect short selling potentials. We find that accruals significantly increase active short-selling (*On Loan*) in Model (3) of Panel B. This is consistent with the result of Hirshleifer, Teoh, and Yu (2011) that high accruals attract short sellers. However, as of Model (3) of Panel A, accruals do not significantly affect *Lendable*. This suggests that *Lendable* is less exposed to the reverse causality issues and thus provides a better proxy of short selling potential.

However, even *Lendable* could be affected indirectly by accruals through the intermediary role of short selling demand. For instance, if there is a positive demand shock due to manipulation, lending supply could gradually increase as short sellers are now willing to pay a higher lending fee. Consistent with this conjecture, we observe that in Model (4) *Lendable* is enhanced by lagged accruals and that the regression coefficient and t-statistics of *Lendable* are much smaller compared to those of *On Loan* as reported in Model (4) of Panel B. Overall, these results suggest that some additional endogeneity tests are needed to further address the reverse causality issue. This will be the topic of our next section.

Model (5) shows results of the baseline regression with firm-fixed effects, which aims to control for spurious correlations between SSP and accruals that may be generated by missing firm characteristics, and Model (6) provides results of the change in accruals on the change in short-selling variables. The results confirm the previous ones, displaying a strong negative correlation between earnings manipulation and short-selling potential. This holds across the different specifications. One standard deviation higher short-selling potential in the panel specification with firm fixed effect (panel with lagged dependent variable, panel specification based on changes) is related to 7.8% (12.0%, 5.2%) lower manipulation in the case of *Lendable*. The analogous numbers in the case of *On Loan* are 13.9% (5.9%, 13.4%). In the interest of brevity, we only focus on the overall sample. However, the (unreported) results in the sub-samples are both qualitatively and quantitatively similar. This confirms the negative correlation between short selling potential and earnings manipulation, and implies that short selling could cause firms to reduce manipulation.

IV. Endogeneity Tests

The previous results, while suggestive, may still be subject to the issue of endogeneity. Indeed, firm manipulation may attract short-selling. While this issue may apply to the definition of short-selling potential based on shares lent, it is less plausible in the case the proxy of short-selling potential is

based on share lendable. Still, we want to explicitly control for any residual endogeneity and indirect reverse causality. We therefore proceed with a two-pronged approach. First, we employ an instrumental variable specification. Second, we provide country-wide evidence based on exogenously imposed country-level regulatory changes. Both will help to control for endogeneity issues.

A. An Instrumental Variable Approach

We start by focusing on an instrumental variable specification. We instrument short-selling potential using a variable that affects the amount of shares available to be lent in the market, through a channel that is unrelated to (bad) information that may lead to short selling or shareholder activism. For this purpose, we use the fraction of ETF ownership of the specific stock. The intuition is that ETF ownership is directly related to the shares made available to be lent. Indeed, ETFs are among the main contributors to the short-selling market, making available shares that can then be used by the short sellers.[6] At the same time, ETFs are not related to active control of the managers of the firm, being ETFs typically passive investors neither related to activism nor related to information. This makes the fraction of stock ownership by ETFs and ideal instrument as it meets both the exclusion restriction – i.e., there is no reason it should be related to earnings manipulation through any other channel than the availability of shares to be lent in the short-selling market – and the inclusion restriction – i.e., ETFs make shares available to the short-sellers. Moreover, the exogenous high growth rate of the ETF industry suggests that the instrument is likely to be a very powerful one.

We therefore regress our earnings management measure (*Accruals*) on ETF ownership (ETF)-instrumented shares on loan (*On Loan*), or lendable shares (*Lendable*), and firm-level control variables (*X*) as well as industry-, country-, and year-fixed effects. More specifically, we estimate the following system:

$$Stage\ 1: SSP_{i,t} = \alpha + \beta_1 ETF_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t},$$

$$Stage\ 2: Accruals_{i,t+1} = \alpha + \beta_1 Predicted\ SSP_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t} \quad (2),$$

where $SSP_{i,t}$ refers to short selling potential, $X_{i,t}$ includes firm size (*Size*), book-to-market ratio (*BM*), financial leverage (*Leverage*), annual stock return (*Return*), stock return volatility (*STD*), American Depository Receipts (*ADR*), MSCI country index membership (*MSCI*), number of analysts following (*Analyst*), and closely-held ownership (*CH*).

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[6] ETFs are bound by rules on securities lending similar to those governing traditional mutual funds. For instance, in Europe, ETF providers can lend up to 80 percent of their basket of securities to a third party to generate revenues. Interested readers may refer to the 2011 IMF "Global Financial Stability Report" for more discussions about how ETFs may contribute to the short selling market.

We report the results in Table 4. Models (1) and (3) regress short-selling variables on ETF ownership. Models (2) and (4) regress accruals on instrumented short-selling variables. Model (5) regress accruals on ETF ownership directly, and Model (6) provides results of the change in accruals on the change in ETF ownership. The *t*-statistics shown in parentheses are based on standard errors adjusted for heteroskedasticity and firm-level clustering.

If we focus on the first stage regression, we see that short-selling potential is strongly positively related to the fraction of ETF ownership. The t-statistic is always above 6. This translates in an F-test of above 30, well above the threshold of weak exogeneity provided by Staiger and Stock (1997). The effect is also economically significant. One standard deviation higher ETF ownership is related to a 34.3% (45.3%) higher short-selling potential if the proxy has been built using lendable shares (shares on loan). This suggests that ETF ownership is indeed a major supplier to the short-selling market.

Next, we look at the second stage. There, we can see a strong negative correlation between instrumented short-selling potential and earnings manipulation. This holds across the different specifications. One standard deviation higher instrumented lendable-shared based (shares lent-based) short-selling potential is related to 16.6% (13.6%) lower manipulation (columns (2) and (4)). If, instead, we directly use the fraction of ETF ownership, we see that one standard deviation cross-sectional difference in ETF ownership is related to 5.4% lower manipulation (column (5)). This relationship is further proved by the last column (model 6), in which we regress changes in manipulations on one-year lagged changes in ETF ownerships. The regression coefficient is significantly negative, confirming that a positive change in ETF ownership typically leads to a reduction in earnings manipulation.

These results confirm the previous results on short selling potential and firm manipulation. More importantly, they allow us to provide a casual interpretation of them, suggesting a channel of impact from short-selling potential to earning manipulation. That is, the increase in the short selling potential due to the exogenous growth of ETF ownership helps to reduce earnings manipulation. This verifies the disciplining role of short selling potential.

B. An Event-based Approach

An alternative way to control firm-level endogeneity is to focus on the impact of market-wide short-selling potential on manipulation. The intuition is that country-level regulatory changes in short-selling restrictions are less affected by both the issues of firm-specific spurious correlation and potential endogeneity. We therefore focus on exogenously imposed constraints on short selling.

Country-wide short selling regulations vary both across countries and over time (e.g., Charoenrook and Daouk 2005, Bris, Goetzmann, and Zhu 2007, Beber and Pagano, 2011). For

instance, short selling was prohibited in Hong Kong until the year of 1994. Starting from 1994, the ban had been gradually removed – Hong Kong started to allow short selling for a set of 33 stocks in 1994 and then completely removed the ban in 1996. However, in 1998 some restrictions were placed again. In contrast, in Germany and France short selling are available since the World War II. More recently, many countries had temporarily banned short selling during the global financial crisis period from year 2008 to 2009. For instance, Australia banned short selling on all stocks from September 22, 2008 to May 25, 2009, while in the U.S., financial stocks are prohibited from short selling from September 19 to October 8 of 2008. Charoenrook and Daouk (2005), Bris and Goetzmann, and Zhu (2007), and Beber and Pagano (2011) provide more information on the history of short selling regulations in different countries.

More importantly, short sale constraints at the country level also (negatively) affect the informational efficiency of the market. For instance, Bris and Goetzmann, and Zhu (2007) document that in markets allowing short sales, negative information could be incorporated into price more effectively. Beber and Pagano (2011) further point out that short selling bans were detrimental to liquidity and failed to support prices. Based on these observations, we expect country-level short selling potential to exhibit a similar role to firm-level short selling potential: to enhance the market disciplining mechanism vis-à-vis the mangers, forcing them to reduce earnings manipulation. Since country-level short selling rules are exogenous to individual firms, country-level tests on the relationship between short selling potential and earnings manipulation further alleviate any suspicion of spurious correlation and potential endogeneity that may arise from firm-level tests.

Therefore, we estimate a panel specification in which we regress our measure of firm's earnings management measure (*Accruals*) defined at the firm-level on market-wide short selling variables, firm-level control variables (*X*), and country-level control variables (*C*) as well as industry-, country-, and year-fixed effects over an extended sample period from year 1990 to 2009. The majority of regulatory changes in short-selling restrictions occur over the period 1990-2000:

$$Accruals_{i,t+1} = \alpha + \beta_1 MKT\_SSP_{i,t} + \beta_2 X_{i,t} + \beta_2 C_{i,t} + \varepsilon_{i,t}, \quad (3)$$

where $MKT\_SSP_{i,t}$ refers to the intensity/existence of short-selling potential at the country level. We consider alternative proxies for it. These are dummies that take the value of one if: short selling is legal (*Legality*), if short selling is feasible (*Feasibility*), if put option trading is allowed (*Put Option*), and if short selling is feasible or put option trading is allowed (*F or P*). These variables are constructed in the spirit of Charoenrook and Daouk (2005) – we also refer to Bris and Goetzmann, and Zhu (2007) and Beber and Pagano (2011) for more recent periods.

For each country, we rebalance the variables annually for the period from 1990 to 2009. The difference between legality and feasibility is that the latter requires not only trading to be legal, but also it to be feasible. That is, the existence of an institutional infrastructure supporting short selling, a low cost of short-selling, and the availability of market makers willing to trade on a short position. $X_{i,t}$ contains the control variable. They are: firm size (*Size*), book-to-market ratio (*BM*), financial leverage (*Leverage*), annual stock return (*Return*), stock return volatility (*STD*), American Depository Receipts (*ADR*), MSCI country index membership (*MSCI*), number of analysts following (*Analyst*), and closely-held ownership (*CH*).

We also consider a fully-fledged specification that also includes a set of country-specific variables ($C_{i,t}$) meant to control for any potential spurious correlation between country-level short-selling potential and country-level variables. These are: the degree of market segmentation of the country (*SEG*), anti-director index (*ADRI*), market capitalization-to-GDP ratio (*MVGDP*), and standard deviation of GDP growth (*STDGDPG*). The construction of these variables is detailed in Appendix A. We just recall here that the degree of market segmentation is defined as the weighted sum of local-global industry valuation differentials based on Bekaert et al. (2011).

We report the results in Table 5. They show a strong negative correlation between market-level short-selling potential and manipulation. This holds across all the different specifications and it is economically significant. If we consider the fully-fledged specification, we see that in countries in which short-selling is legal (feasible) manipulation is 19.4% (11.1%) lower than in the countries in which it is banned (unfeasible). Also, in countries in which put options, arguably an indirect way of short selling, are allowed manipulation is 30.6% lower than in the countries in which they are banned (unfeasible). As shown in Model (8), the feasibility of either a direct short selling or an indirect short selling via put options gives a 30.6% reduction in accruals. Again, these results support the disciplining hypothesis.

In the interest of not breaking the flow of logic, we defer the additional robustness checks based on alternative measures of earning management to later sections. We, instead, now focus on the role of other potential disciplining channels. Furthermore, while both the ensuing results are robust to the use of either *Lendable* or *On Loan,* in this additional analysis, in the interest of space we will focus on our main short selling potential proxy of *Lendable*. However, it is worth noting that the use of alternative variables typically leads to similar conclusions.

V. The Role of Alternative Disciplining Channels

We now consider alternative disciplining channels. The goal is both to test whether short-selling potential spuriously proxies for other alternative channels and, if this is not the case, to assess the relationship with them – i.e., whether these other factors make the role of short-selling stronger.

The alternative channels are the quality of the auditors of the firm, the quality of the accounting standards of the firm, its quality of corporate governance (as defined by the ISS index), the transparency of the firm (number of analysts following the firm or dispersion of analysts or stock liquidity) and its listing in the US market. All these either provide alternative ways of disciplining the managers or improve the ability of the market to know about them. For example, the quality of governance has been used by Doidge, Karolyi, and Stulz (2007) and represents the standard metric of governance based on the by-laws and statute of the firm. Also, being listed in the US has been traditionally considered as a way of bonding to a better quality of governance. Transparency – either provided by better accounting standards (IAS) or by better auditors or by more analysts following the firm or lower dispersion of their forecasts – helps the uninformed shareholders to be more aware. These can be complementary with respect to short-selling potential or substitute with respect to it.

We regress firm's earnings management on short-selling potential, its interaction with alternative disciplining channels (*ADC*), and firm-level control variables (*X*) as well as industry-, country-, and year-fixed effects on the full samples and different subsamples. The regression model is:

$$Accruals_{i,t+1} = \alpha + \beta_1 SSP_{i,t} + \beta_2 ADC \times SSP_{i,t} + \beta_3 ADC_{i,t} + \beta_4 X_{i,t} + \varepsilon_{i,t}, \quad (4)$$

where $SSP_{i,t}$ refers to Short Selling Potential, $X_{i,t}$ includes firm size (*Size*), book-to-market ratio (*BM*), financial leverage (*Leverage*), annual stock return (*Return*), stock return volatility (*STD*), American Depository Receipts (*ADR*), MSCI country index membership (*MSCI*), number of analysts following (*Analyst*), closely-held ownership (*CH*), and institutional ownership (*IO*). $ADC_{i,t}$ includes Big N auditor (*BigN*), international accounting standard (*IAS*), ISS corporate governance index (*ISS*), Amihud's (2002) illiquidity (*Amihud*), analyst dispersion (*Disp*), number of analysts following (*Analyst*), and American Depository Receipts (*ADR*). Among the proxies, *BigN*, *IAS*, and *ADR*, are dummy variables. A higher value of these variables typically means better governance – except for *Amihud* and *Disp* for which a lower value helps mitigate bad managerial incentives.

We report the results in Table 6. We can see that the disciplining role of short-selling potential is confirmed even when alternative disciplining channels are presented. Indeed, across all the different specifications, short-selling potential is negatively related to earning management with a similar

economic magnitude and statistical significance as reported in Table 2. This confirms that short selling provides an independent disciplining mechanism in addition to those alternative governance channels.

Also, the interaction between short-selling potential and alternative disciplining devices is significantly positive for *BigN*, *IAS*, *Analyst*, and *ADR* and significantly negative for *Amihud* and *Disp*. In all these cases a better alternative governance mechanism reduces the disciplining effect of short-selling potential. The only exception is *ISS*, in which case the interaction between *ISS* and *SSP* seems to create some multicollinearity problem. This could be due to the fact that the *ISS* index only covers the largest firms in the sample, for whom the two variables could correlate with each other. Nonetheless, controlling for *ISS* itself does not absorb the significance of *SSP* when the interaction term is not included.

These results indicate that the disciplining role of short-selling potential is reduced in the case other disciplining devices or more transparency help to reduce the misbehavior of the managers. The role of short-sellers is lower when other channels of governance/source of transparency make it less necessary their disciplining role. This suggests that short-selling potential is a substitute with respect to the other channels. And indeed, if governance is better or if the information is already properly disclosed to the market, the possibility for short-sellers to determine a drastic drop in prices – one of the main tools of their disciplining role – is reduced. Also, if governance is better there is not really a need for the disciplining role of short-selling potential.

VI. Robustness Checks Short-selling potential and Earnings Persistence

We now provide several robustness checks regarding the disciplining role of short selling potential on alternative earnings manipulation proxies, as well as the economic interpretation of such a role.

A. Short-selling potential and Earnings Persistence

We first relate short-selling potential to earning persistence. If short-selling potential disciplines the managers, we expect it to reduce the ability of current profitability to predict the future. As Dechow, Ge, and Schrand (2010) have summarized, manipulation stabilizes earnings and makes it easier to use the past ones to predict the futures. Indeed, pretending of being capable to generate "sustainable" earnings is another very important motivation for a firm to adopt earnings manipulation (in addition to the inflating earnings motivation which is captured by accruals). In contrast, in the absence of manipulation, earnings will be less stable and therefore less easy to forecast as a function of the previous ones, except for perhaps the very best group of firms in the economy.

We therefore expect that short-selling potential to reduce earnings persistence. We test it by regressing various measures of the firm's future earnings on the lagged value and the interaction with short-selling potential. More specifically, we estimate:

$$ECA_{i,t+1} = \alpha + \beta_1 SSP_{i,t} + \beta_2 SSP_{i,t} \times ECA_{i,t} + \beta_3 ECA_{i,t} + \beta_4 X_{i,t} + \beta_5 X_{i,t} \times ECA_{i,t} + \varepsilon_{i,t} \quad (5),$$

where *SSP* refers to Short Selling Potential, ECA is alternatively, earnings, cash flows, or accruals, and $X_{i,t}$ is a vector of control variables that includes firm size (*Size*), book-to-market ratio (*BM*), financial leverage (*Leverage*), annual stock return (*Return*), stock return volatility (*STD*), American Depository Receipts (*ADR*), MSCI country index membership (*MSCI*), number of analysts following (*Analyst*), closely-held ownership (*CH*), and institutional ownership (*IO*). The other variables are defined as in the previous specifications. We include industry-, country-, and year-fixed effects. We perform the analysis on the full samples and in different subsamples.

We report the results in Table 7. There, NUS refers to firms from non-US countries. The results show a strong positive autocorrelation of profitability over time, especially for earnings and the cash flow component of earnings. This suggests that firms typically manipulate the cash flow component of earnings to achieve "sustainable" earnings. However, the interaction with *SSP* shows that in the presence of a strong short-selling potential, the predictability is lower. This holds across all the specifications. In models (4) and (7), one percent increase in short-selling potential reduces the autocorrelation of cash flows and earnings by 0.56% and 0.29%, respectively. These results provide further support that short-selling potential reduces the earnings manipulation incentives in generating (false) earnings persistence.

B. Alternative Earning Management Measures

Next, we consider more alternative proxies of earnings manipulation and re-estimate the main specification relating firm's earnings management and short-selling potential. Especially, we examine two additional types of earnings manipulations. First, since accruals are related to revenue growth, PPE, and past, present, and future cash flows, we use various adjustments to compute the residuals of accruals that are more likely to reflect the role of managers in distorting earnings-related information (i.e., Jones 1991; Francis, La Fond, Olsson, and Schipper 2005). Second, we also use "target beating measures" (e.g., Burgstahler and Dichev 1997; Degeorge, Patel, and Zeckhauser 1999) to capture the incentives for managers to avoid reporting small losses relative to their heuristic target of zero. Such incentives lead to a well-known "kink" in the distribution of reported earnings around zero: a statistically small number of firms with small losses and a statistically large number of firms with small profits (e.g., Burgstahler and Dichev 1997). The existence of such kink, in our perspective, reflects one type of distortion of earnings information.

We consider as measures of earnings manipulations: Jones's (1991) residual accruals (*Accrual Jones*). This is based on Jones's (1991) model and is defined as the residual accruals obtained by regressing accruals on revenue growth and fixed assets for each country and year. All numbers are scaled by lagged total assets. As a firm's accruals correlate with its fundamentals, by regressing accruals on revenue growth and fixed assets, the residual component in Jones's (1991) model can reflect the discretionary nature of earnings management. Total accruals include discretionary and nondiscretionary components. As nondiscretionary components depend on the economic performance of a firm such as changes in revenues and depreciation on fixed assets, the residual component in Jones's (1991) model can measure the managerial discretion in reported earnings more precisely.

The second alternative measure is FLOS's (2005) residual accruals (*FLOS Accruals*). It is based on Francis, LaFond, Olsson, and Schipper's (2005) model. Residual accruals are obtained by regressing accruals on past, current, and future cash flows, revenue growth, and fixed assets for each country and year. All numbers are scaled by lagged total assets. Francis et al. extend Jones' model by incorporating past, current, and future cash flows into the model to further control for the impact of variation in fundamentals on accruals. Past, current, and future cash flows reflect operating cash flows realization, and the inclusion of the cash flows variables address any unintentional estimation errors arising from management lapses and environmental uncertainty.

The third proxy is target beating on small positive forecasting profits (*SPAF*). This is based on Degeorge, Patel, and Zeckhauser (1999). It is a dummy variable which equals to one if (reported earnings per share-forecasted earnings per share)/price is between 0 and 1%. The variable captures the target beating nature of earnings management that managers try to meet or beat analyst forecasts. Investors reply on analysts' information disclosure to make decisions, therefore managers have great incentive to manipulate reported earnings to beat or meet analyst forecasts.

The fourth variable is target beating on small positive profits (*SPE*). It is based on Burgstahler and Dichev (1997). It is a dummy variable which equals to one if net income scaled by lagged total assets is between 0 and 1%. Managers intentionally manage earnings to avoid reporting small losses, as it is easier for managers to use accounting discretion to manage small losses than large losses. This variable is based on investors' psychological distinction between positive and negative values, and managers do not want to make investors upset.

Finally, the last proxy is target beating on small positive past-earnings profits (*SPDE*). It is also based on Burgstahler and Dichev (1997). It is a dummy variable which equals to one if change in net income scaled by lagged total assets is between 0 and 1%. In a similar spirit, managers manage earnings using last-year income as the benchmark, as similarly investors may compare the current-year income with the last-year income

We report the results in Table 8. The effects of *SSP* confirm are consistent with our previous observations: other manipulation measures are all reduced by short-selling potential. These results, together with the test on earnings persistence, demonstrate that short selling disciplines not only the managerial incentives to manipulate accruals, but also other forms of earnings manipulations as well.

VII. Earning Manipulation and Price Synchronicity

Finally, we focus on the proxy of price informativeness: price synchronicity. We have argued that our measure of earnings manipulation reduces the informativeness of stock price. To test it, we follow Morck, Yeung, and Yu (2000) and Jin and Myers (2006) and construct a proxy of firm-specific information based on the idiosyncratic risk of the stock. This measure defines the degree of stock price non-synchronicity (*Nonsyn*) as the logarithm of $(1-R^2)$ divided by R^2, where R^2 is estimated by regressing weekly individual stock returns on local and US market index returns. A high R^2 implies a high degree of price synchronicity and a lower capitalization of firm-specific information. We therefore use *Nonsyn* to capture the amount of company specific information capitalized in the market and therefore the informativeness of the company.

We then regress this price synchronicity measure on the firm's accrual-based measure of earnings manipulation, and firm-level control variables (*X*) as well as unreported industry-, country-, and year-fixed effects (ICY) on the full samples and different subsamples. The regression model is

$$Nonsyn_{i,t} = \alpha + \beta_1 Accrual_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t} \quad (6).$$

$X_{i,t}$ includes firm size (*Size*), book-to-market ratio (*BM*), financial leverage (*Leverage*), annual stock return (*Return*), stock return volatility (*STD*), American Depository Receipts (*ADR*), MSCI country index membership (*MSCI*), number of analysts following (*Analyst*), closely-held ownership (*CH*), and institutional ownership (*IO*).

We report the results in Table 9. NUS refers to firms from non-US countries. The results show a strong negative correlation between the accrual-based measure of earnings manipulation and non-synchronicity. The effect is robust across specifications. One standard deviation higher manipulation is related to 0.8% lower price non-synchronicity. This evidence confirms the fact that manipulation is indeed related to lower information and implies that disciplining manipulation could be regarded as an improvement in the informational efficiency in the market. This intuition completes our analyses regarding the disciplining role of short selling in reducing earnings manipulation related incentives.

These results are important. Indeed, till now we have showed that short-selling potential reduces manipulation. These results show that manipulation lowers the informational content of the stock price. Jointly, these results suggest that, by reducing manipulation, short-selling does also make the price

more informative. This would be consistent with existing evidence (e.g., Saffi and Sigurdsson 2011) showing that short-selling improves price efficiency. However, the channel is very different, as the efficiency does not arise from better market conditions, but from lower earning manipulation from the firm.

Conclusion

We study whether short-selling has a disciplining role vis-à-vis the managers. We argue that short-selling, by acting as a sort of "vote of confidence" on firms, affects the behavior and incentives of managers. Applying this intuition to earnings manipulation, we expect to see that "short-selling potential", i.e., the potential downward pressure that the presence of short-sellers may exercise on the market value of a firm, should significantly reduce the incentives for the firm to engage in earnings manipulation type of behavior.

We test these hypotheses using data on worldwide short-selling detailed at the stock level, for the period of year 2002 to 2009. We show a strong negative correlation between short-selling potential and earnings manipulation. This is not only statistically significant, but also economically relevant. It is also robust to control for spurious correlation with unobservable firm-specific characteristics as well as to the use of alternative proxies of earnings manipulation. We also control for firm-level endogeneity by providing evidence of a causal link between short-selling potential and earning manipulation based on instrumental variables (ETF ownership) and market-wide evidence.

Alternative disciplining channels do not absorb the power of short selling. However, they do reduce the disciplining effect of short-selling potential, suggesting that in general the disciplining role of short-selling is the strongest for firms with weak internal governance or less transparent information environments. Finally, we show that short-selling potential reduce earnings persistence, as well as many other types of earnings manipulation.

Overall, these results confirm our main hypotheses and provide evidence of a beneficial effect of the short-selling market on the corporate market. In other words, short-selling generates a disciplining effect similar to the effect produced by the contestability of the firm in the context of M&As. In this regard, short selling contributes not only to the information environment of the market but also to the contracting institutions of the real economy.

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Appendix A: Variable definitions

Variable	Acronym	Definition	Data Source
A. Firm-level variable			
A1. Short selling variables			
Shares on loan	*On Loan*	Annual average fraction of shares of a firm lent out	Dataexplorers
Lendable shares	*Lendable*	Annual average fraction of shares of a firm available to lend	Dataexplorers
ETF ownership	*ETF*	Annual average holdings by ETF as a percentage of total number of outstanding shares	FactSet
A2. Earnings management variables			
Accruals	*Accruals*	Scaled accruals calculated from balance sheet and income statement information Accruals = $((\Delta CA-\Delta Cash)-(\Delta CL-\Delta SD-\Delta TP)-DP)/LagTA$ ΔCA=Change in current asset; $\Delta Cash$=Change in cash and equivalents; ΔCL=Change in current liability; ΔSD=Change in short-debt included in current liabilities; ΔTP=Change in income tax payable; DP=Depreciation and amortization expense LagTA=Total assets of the firm in the previous accounting year.	Worldscope
Jones's (1991) residual accruals	*Jones Accruals*	Based on Jone's (1991) model, residual accruals are obtained by regressing accruals on revenue growth and fixed assets for each country and year. All numbers are scaled by lagged total assets.	Worldscope
FLOS's (2005) residual accruals	*FLOS Accruals*	Based on Francis, LaFond, Olsson, Schipper's (2005) model, residual accruals are obtained by regressing accruals on past, current, and future cash flows, revenue growth, and fixed assets for each country and year. All numbers are scaled by lagged total assets.	Worldscope
Small positive forecasting profits	*SPAF*	A dummy variable which equals to one if (reported earnings per share-forecasted earnings per share)/price is between 0 and 1%.	IBES
Small positive profits	*SPE*	A dummy variable which equals to one if net income scaled by lagged total assets is between 0 and 1%.	Worldscope
Small positive past-earnings profits	*SPDE*	A dummy variable which equals to one if change in net income scaled by lagged total assets is between 0 and 1%.	Worldscope

Appendix A: Variable definitions - Continued

Variable	Acronym	Definition	Data Source
A3. Control variables			
Firm size	*Size*	Log of market capitalization denominated in U.S. $.	Datastream
Book-to-market ratio	*BM*	Log of book-to-market equity ratio	Datastream
Financial leverage	*Leverage*	Ratio of total debt to total assets	Worldscope
Annual stock return	*Return*	Log of annual stock return	Datastream
Stock return volatility	*STD*	Annualized standard deviation of monthly stock returns	Datastream
American Depository Receipts	*ADR*	An ADR dummy equals one if the firm was cross-listed on a U.S. stock exchange	Multiple sources**
MSCI country index membership	*MSCI*	An MSCI index member dummy which equals one if the firm is included in an MSCI country index and zero otherwise	Datastream
Number of analysts following	*Analyst*	Number of financial analysts following a firm	IBES
Closely-held ownership	*CH*	Fraction of shares closely held by insiders and controlling shareholders	Worldscope
Institutional ownership	*IO*	Aggregate equity holdings by domestic institutional investors as a percentage of total number of outstanding shares	FactSet
A4. Other variables			
Big N auditor	*BigN*	A dummy variable which equals one if the firm is audited by any of the Big 4 or Big 5 auditors	Compustat & Worldscope
International accounting standard	*IAS*	A dummy variable which equals one if the firm adopts the international accounting standards	Compustat & Worldscope
ISS corporate governance index	*ISS*	Firm-level corporate governance index	ISS
Amihud's (2002) illiquidity	*Illiquidity*	Log of the average of daily Amihud's (2002) measure calculated as the absolute value of stock return divided by dollar trading volume on a given day	Datastream
Analyst dispersion	*Disp*	Standard deviation of analyst forecasts scaled by stock price	IBES
Cash flows	*Cash Flows*	Value which equals to operating income minus accruals scaled by lagged total assets	Worldscope
Earnings	*Earnings*	Operating income scaled by lagged total assets	Worldscope
Stock price non-synchronicity	*Nonsyn*	Log of $(1-R^2)$ divided by R^2, where R^2 is estimated by regressing individual stock returns on local and US market returns.	Datastream
B.Country-level variable			
Legality of short selling	*Legality*	A dummy variable which equals one if short selling is legally allowed in a country	Charoenrook and Daouk (2005)
Feasibility of short selling	*Feasibility*	A dummy variable which equals one if short selling is feasible in a country	Charoenrook and Daouk (2005)
Put option trading	*Put Option*	A dummy variable which equals one if put option trading is feasible in a country	Charoenrook and Daouk (2005)
Feasibility or Put Option	*F or P*	A dummy variable which equals one if either short selling or put option is feasible in a country	Charoenrook and Daouk (2005)
Market segmentation	*SEG*	Segmentation measure developed by Bekaert, Harvey, Lundblad, and Siegel (2008)	Datastream
Anti-director index	*ADRI*	Anti-director index	Pagano and Volpin (2005)
Market capitalization-to-GDP ratio	*MVGDP*	Ratio of stock market capitalization to GDP	World Development Indicators
Standard deviation of GDP growth	*STDGDPG*	Standard deviation of GDP growth in the last five years.	World Development Indicators

** The information of U.S. cross-listings is gathered from three data sources: Depository banks such as Bank of New York, U.S. stock exchanges and Datastream.

Appendix B: Number of Stocks by Country and Year

This table summarizes the number of our sample stocks for each country over the 2002 to 2009 sample period. The first column reports the name of the country. The second column indicates whether a country is a developed country (DEV) or an emerging market (EMG). The column "N" reports the total number of stocks across all sample periods for each country. The rest of the columns report the number of stocks in each year.

Country	DEV/EMG	N	2002	2003	2004	2005	2006	2007	2008	2009
Australia	DEV	1,148	170	268	334	389	557	856	819	475
Austria	DEV	66	19	27	31	39	45	50	54	51
Belgium	DEV	110	27	40	53	66	79	93	94	85
Brazil	EMG	109				2	11	53	91	72
Canada	DEV	1,158	179	238	351	585	722	836	826	720
Denmark	DEV	127	21	31	45	67	94	108	102	69
Finland	DEV	109	34	47	64	67	85	95	94	80
France	DEV	583	190	236	251	304	387	455	437	335
Germany	DEV	606	137	169	240	361	385	459	429	357
Greece	EMG	63	2	22	3	4	33	35	44	43
Hong Kong	DEV	544	86	119	166	195	260	400	430	388
Indonesia	EMG	38	8	7	12	18	24	20	23	11
Ireland	DEV	54	22	23	28	28	32	44	40	36
Israel	EMG	57	1	10	15	19	18	36	44	47
Italy	DEV	314	101	131	161	199	220	240	256	235
Japan	DEV	2,776	1,489	1,600	1,793	2,003	2,195	2,333	2,340	2,152
Mexico	EMG	71	19	32	33	38	43	52	58	59
Netherlands	DEV	134	59	73	79	93	101	107	97	85
New Zealand	DEV	62	12	19	25	29	29	43	40	45
Norway	DEV	186	28	44	59	83	99	121	129	107
Philippines	EMG	24	4	6	8	8	9	17	15	10
Poland	EMG	31				7	11	2	17	28
Portugal	EMG	39	12	14	16	24	29	30	30	33
Singapore	DEV	303	51	63	90	105	142	219	240	176
South Africa	EMG	199	48	64	70	89	128	143	139	136
South Korea	EMG	509	30	67	105	144	332	420	422	410
Spain	DEV	146	60	69	86	91	105	111	118	114
Sweden	DEV	290	64	105	128	148	198	232	224	207
Switzerland	DEV	259	84	127	159	180	192	207	211	208
Taiwan	EMG	234	17	25	52	58	51	76	145	215
Turkey	EMG	97	6	6	11	23	39	69	81	83
United Kingdom	DEV	1,536	657	690	680	815	911	949	875	706
United States	DEV	5,573	1,193	3,552	3,774	4,039	4,073	4,101	4,118	4,031
All	Total	17,555	4,830	7,924	8,922	10,320	11,639	13,012	13,082	11,809

Table 1: Summary Statistics

This table presents the summary statistics and Pearson correlation coefficients of main variables used in this study. The variables are accruals (*Accrual*), shares on loan (*On loan*), lendable shares (*Lendable*), log of firm size (*Size*), log of book-to-market ratio (*BM*), financial leverage (*Leverage*), log of annual stock return (*Return*), stock return volatility (*STD*), American Depository Receipts (*ADR*), MSCI country index membership (*MSCI*), number of analysts following (*Analyst*), closely-held ownership (*CH*), institutional ownership (*IO*), stock price non-synchronicity (*Nonsyn*). Panel A reports the number of observations (N), mean, median, standard deviation (STD), and the deciles (90% and 10%) and quartiles (75% and 25%) distribution of the variables. Panel B reports the correlation coefficients among the variables above. The sample is between 2002 and 2009. All the variables are defined in Appendix A.

					Panel A: Summary Statistics			
Variable	N	Mean	STD	90%	75%	Median	25%	10%
Accruals	67019	-0.036	0.094	0.048	0.000	-0.035	-0.073	-0.125
On Loan	81537	0.017	0.035	0.049	0.017	0.004	0.001	0.000
Lendable	81538	0.067	0.094	0.212	0.090	0.024	0.004	0.000
Size	81538	13.035	1.857	15.512	14.233	12.909	11.741	10.760
BM	81538	-0.566	0.879	0.453	-0.025	-0.533	-1.057	-1.606
Leverage	81538	0.209	0.191	0.478	0.332	0.175	0.033	0.000
Return	81538	0.014	0.653	0.663	0.365	0.094	-0.243	-0.769
STD	81538	0.438	0.323	0.768	0.539	0.361	0.245	0.177
ADR	81538	0.037	0.189	0.000	0.000	0.000	0.000	0.000
MSCI	81538	0.662	0.473	1.000	1.000	1.000	0.000	0.000
Analyst	81538	5.038	6.087	13.583	7.417	2.667	1.000	0.000
CH	81538	0.305	0.245	0.659	0.490	0.270	0.094	0.001
IO	81538	0.239	0.289	0.754	0.351	0.112	0.021	0.000
Nonsyn	75239	1.534	1.569	3.345	2.147	1.243	0.546	-0.004

Table 1: Summary Statistics - Continued

Variable	Accruals	On Loan	Lendable	Size	BM	Leverage	Return	STD	ADR	MSCI	Analyst	CH	IO
					Panel B: Correlation Coefficients								
On Loan	-0.036												
Lendable	-0.037	0.428											
Size	0.001	0.210	0.316										
BM	0.033	-0.110	-0.097	-0.265									
Leverage	-0.002	0.080	0.028	0.118	0.031								
Return	0.033	-0.063	-0.029	0.143	-0.200	-0.021							
STD	-0.038	0.038	-0.097	-0.293	-0.095	-0.049	0.067						
ADR	-0.046	0.060	0.077	0.217	-0.046	0.011	0.005	-0.012					
MSCI	0.002	0.213	0.252	0.558	-0.083	0.094	0.083	-0.140	0.072				
Analyst	-0.044	0.280	0.334	0.716	-0.196	0.051	-0.010	-0.154	0.226	0.344			
CH	0.011	-0.137	-0.250	-0.081	0.061	0.012	0.045	-0.012	-0.075	-0.045	-0.131		
IO	-0.017	0.368	0.478	0.326	-0.188	0.008	-0.009	-0.065	-0.034	0.282	0.320	-0.268	
Nonsyn	-0.022	-0.071	-0.103	-0.418	-0.043	-0.089	-0.029	0.195	-0.097	-0.341	-0.262	0.029	-0.047

Table 2: Short Selling and Earnings Management

This table presents panel regression of a firm's earnings management measure (*Accruals*) on lendable shares (*Lendable*) in Panel A or its shares on loan (*On Loan*) in Panel B, and firm-level control variables (*X*) as well as unreported industry-, country-, and year-fixed effects (ICY) on the full samples and different subsamples. The regression model is

$$Accruals_{i,t+1} = \alpha + \beta_1 SSP_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t}.$$

where $SSP_{i,t}$ refers to Short Selling Potential, $X_{i,t}$ includes firm size (*Size*), book-to-market ratio (*BM*), financial leverage (*Leverage*), annual stock return (*Return*), stock return volatility (*STD*), American Depository Receipts (*ADR*), MSCI country index membership (*MSCI*), number of analysts following (*Analyst*), closely-held ownership (*CH*), and institutional ownership (*IO*). The construction of these variables is detailed in Appendix A. Ex.Zeros only includes firms with non-zero short-selling values. NUS refers to firms from non-US countries. DEV refers to firms from developed countries, whereas EMG refers to firms from emerging countries. GFC refers to the global financial crisis period from 2007 to 2008, whereas Ex.GFC excludes the global financial crisis period. *t*-statistics shown in parentheses are based on standard errors adjusted for heteroskedasticity and firm-level clustering. Obs denotes the number of firm-year observations, and AdjRsq is adjusted R^2. The sample period is from 2002 to 2009.

	Panel A: Lendable Shares as Short Selling Potential (SSP)								
				Ex. Zeros	US	NUS	DEV	EMG	Ex. GFC
Variable	Model	Model	Model	Model	Model	Model	Model	Model	Model
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SSP	-0.033		-0.050	-0.047	-0.057	-0.040	-0.049	-0.061	-0.039
	(-9.35)		(-8.33)	(-7.82)	(-6.20)	(-3.39)	(-8.15)	(-1.26)	(-5.11)
Size		0.004	0.004	0.004	0.005	0.004	0.005	-0.001	0.004
		(9.11)	(9.50)	(9.41)	(6.54)	(6.58)	(10.09)	(-0.81)	(7.78)
BM		0.003	0.003	0.003	0.004	0.003	0.003	0.006	0.003
		(3.49)	(4.07)	(4.08)	(3.17)	(3.10)	(3.75)	(2.37)	(3.67)
Leverage		0.000	0.000	0.000	-0.005	0.004	-0.001	0.029	-0.004
		(-0.11)	(0.07)	(0.19)	(-1.27)	(1.10)	(-0.53)	(2.64)	(-1.43)
Return		0.004	0.004	0.004	0.007	0.003	0.004	0.001	0.005
		(4.48)	(4.54)	(4.53)	(4.28)	(2.70)	(4.45)	(0.28)	(4.06)
STD		-0.004	-0.004	-0.005	-0.003	-0.005	-0.005	0.010	-0.008
		(-2.25)	(-2.36)	(-2.30)	(-0.74)	(-2.60)	(-2.57)	(0.98)	(-3.55)
ADR		-0.012	-0.012	-0.012		-0.012	-0.008	-0.029	-0.010
		(-5.23)	(-5.10)	(-5.22)		(-4.94)	(-3.31)	(-5.28)	(-3.85)
MSCI		-0.007	-0.006	-0.005	0.001	-0.009	-0.007	0.008	-0.005
		(-6.00)	(-4.96)	(-4.49)	(0.43)	(-6.02)	(-5.46)	(1.56)	(-3.99)
Analyst		-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	0.000	-0.001
		(-9.25)	(-8.43)	(-8.30)	(-6.13)	(-6.36)	(-9.12)	(-0.27)	(-6.36)
CH		-0.006	-0.007	-0.006	-0.007	-0.004	-0.006	-0.002	-0.005
		(-2.87)	(-3.42)	(-3.09)	(-2.15)	(-1.81)	(-3.12)	(-0.32)	(-2.43)
IO		0.000	0.007	0.008	0.000	0.033	0.007	0.075	0.008
		(-0.22)	(2.98)	(3.37)	(0.03)	(5.65)	(2.78)	(3.38)	(2.89)
Fixed Effects	ICY	ICY	ICY	ICY	ICY	ICY	ICY	ICY	ICY
Obs	67,019	67,019	67,019	62,720	22,471	44,548	62,811	4,208	45,644
AdjRsq	0.1%	4.0%	4.0%	4.3%	3.7%	4.3%	3.9%	8.9%	4.2%

				Ex. Zeros	US	NUS	DEV	EMG	Ex. GFC
	Panel B: Shares on Loan as Short Selling Potential (SSP)								
Variable	Model	Model	Model	Model	Model	Model	Model	Model	Model
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SSP	-0.073		-0.062	-0.061	-0.038	-0.093	-0.055	-0.368	-0.044
	(-6.44)		(-4.67)	(-4.63)	(-2.40)	(-3.21)	(-4.16)	(-2.35)	(-2.14)
Size		0.004	0.004	0.004	0.004	0.004	0.004	-0.001	0.004
		(9.14)	(8.85)	(9.00)	(5.96)	(6.37)	(9.50)	(-0.95)	(7.46)
BM		0.003	0.002	0.003	0.003	0.003	0.002	0.006	0.003
		(3.48)	(3.45)	(3.50)	(2.63)	(2.91)	(3.15)	(2.44)	(3.39)
Leverage		0.000	0.001	0.001	-0.004	0.004	-0.001	0.030	-0.004
		(-0.11)	(0.23)	(0.21)	(-0.97)	(1.19)	(-0.41)	(2.72)	(-1.33)
Return		0.004	0.004	0.004	0.007	0.003	0.004	0.002	0.005
		(4.46)	(4.31)	(4.34)	(4.19)	(2.62)	(4.22)	(0.35)	(3.94)
STD		-0.004	-0.004	-0.004	-0.002	-0.005	-0.004	0.011	-0.007
		(-2.25)	(-2.02)	(-2.00)	(-0.56)	(-2.41)	(-2.24)	(1.01)	(-3.34)
ADR		-0.012	-0.012	-0.012		-0.011	-0.008	-0.029	-0.010
		(-5.23)	(-5.05)	(-5.09)		(-4.75)	(-3.26)	(-5.29)	(-3.85)
MSCI		-0.007	-0.006	-0.006	-0.001	-0.009	-0.007	0.008	-0.006
		(-6.00)	(-5.29)	(-5.44)	(-0.30)	(-6.01)	(-5.87)	(1.57)	(-4.24)
Analyst		-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	0.000	-0.001
		(-9.27)	(-8.73)	(-8.82)	(-6.06)	(-6.30)	(-9.46)	(-0.23)	(-6.61)
CH		-0.006	-0.005	-0.006	-0.004	-0.004	-0.005	-0.003	-0.005
		(-2.86)	(-2.81)	(-2.87)	(-1.21)	(-1.59)	(-2.50)	(-0.46)	(-2.11)
IO		0.000	0.002	0.002	-0.005	0.029	0.002	0.071	0.005
		(-0.23)	(1.04)	(1.06)	(-1.92)	(5.25)	(0.77)	(3.41)	(1.89)
Fixed Effects	ICY	ICY	ICY	ICY	ICY	ICY	ICY	ICY	ICY
Obs	67,020	67,020	67,020	66,964	22,472	44,548	62,812	4,208	45,643
AdjRsq	0.1%	4.0%	4.0%	4.0%	3.6%	4.3%	3.8%	9.0%	4.2%

Table 3: Alternative Specifications on Short Selling and Earnings Management

This table address the endogeneity problem and presents panel regression of a firm's earnings management measure (*Accruals*) on lendable shares (*Lendable*) in Panel A or its shares on loan (*On Loan*) in Panel B, and firm-level control variables (*X*) as well as unreported industry-, country-, and year-fixed effects (ICY) on the variation of the following models

$$Accruals_{i,t+1} = \alpha + \beta_1 SSP_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t},$$
$$SSP_{i,t+1} = \alpha + \beta_1 Accrual_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t},$$

where $SSP_{i,t}$ refers to Short Selling Potential, $X_{i,t}$ includes firm size (*Size*), book-to-market ratio (*BM*), financial leverage (*Leverage*), annual stock return (*Return*), stock return volatility (*STD*), American Depository Receipts (*ADR*), MSCI country index membership (*MSCI*), number of analysts following (*Analyst*), closely-held ownership (*CH*), and institutional ownership (*IO*). The construction of these variables is detailed in Appendix A. Models (1) and (2) regress accruals on (lagged) short-selling variables with lagged accruals as control. Models (3) and (4) regress short-selling variables on (lagged) accruals with lagged short selling variable as control. Model (5) shows results of the baseline regression with firm-fixed effects, and Model (6) provides results of the change in accruals on the change in short-selling variables. *t*-statistics shown in parentheses are based on standard errors adjusted for heteroskedasticity and firm-level clustering. Obs denotes the number of firm-year observations, and AdjRsq is adjusted R^2. The sample period is from 2002 to 2009.

	Panel A: Endogeneity Tests for Lendable Shares as Short Selling Potential (SSP)					
	Accrual		SSP		Accrual	
					Firm FE	ΔAccrual
Variable	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
SSP	-0.046				-0.03	
	(-8.16)				(-3.75)	
Lagged SSP		-0.063	0.829	0.830		
		(-10.42)	(198.77)	(199.04)		
Accrual			0.003			
			(1.77)			
Lagged Accrual	0.079	0.055		0.003		
	(8.57)	(5.10)		(2.04)		
Lagged ΔSSP						-0.02
						(-1.54)
Size	0.004	0.004	0.002	0.002	0.029	0.051
	(9.43)	(9.29)	(9.14)	(9.43)	(16.41)	(19.38)
BM	0.003	0.003	0.003	0.003	0.018	0.042
	(3.78)	(3.67)	(12.48)	(12.51)	(9.69)	(15.61)
Leverage	0.000	-0.003	-0.002	-0.002	0.092	0.223
	(-0.02)	(-1.16)	(-2.26)	(-2.43)	(10.71)	(18.44)
Return	0.005	0.004	-0.004	-0.004	0.001	0.001
	(4.91)	(3.56)	(-9.25)	(-9.23)	(1.29)	(0.50)
STD	-0.005	-0.006	-0.006	-0.006	-0.010	-0.004
	(-2.76)	(-2.40)	(-7.71)	(-7.56)	(-3.37)	(-1.28)
ADR	-0.011	-0.011	0.002	0.002	-0.005	0.004
	(-5.13)	(-4.81)	(2.05)	(1.98)	(-0.98)	(0.51)
MSCI	-0.006	-0.005	0.010	0.010		
	(-5.05)	(-3.81)	(22.28)	(21.86)		
Analyst	-0.001	-0.001	0.000	0.000	0.000	0.000
	(-8.43)	(-7.85)	(6.23)	(5.97)	(-2.22)	(0.73)
CH	-0.007	-0.006	-0.011	-0.011	-0.002	-0.002
	(-3.70)	(-2.91)	(-16.00)	(-16.12)	(-0.44)	(-0.48)
IO	0.007	0.009	0.056	0.056	0.005	-0.003
	(3.22)	(3.97)	(37.04)	(36.87)	(0.66)	(-0.39)
Fixed Effects	ICY	ICY	ICY	ICY	ICY	ICY
Obs	66,223	56,379	54,127	53,759	67,019	51,556
AdjRsq	4.80%	4.30%	88.60%	88.70%	19.10%	4.40%

	Accrual		SSP		Accrual	
					Firm FE	Δ Accrual
Variable	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Panel B: Endogeneity Tests for Shares on Loan Short Selling Potential (SSP)						
SSP	-0.061				-0.143	
	(-4.89)				(-7.01)	
Lagged SSP		-0.102	0.725	0.726		
		(-7.28)	(99.77)	(100.56)		
Accrual			0.003			
			(2.13)			
Lagged Accrual	0.080	0.056		0.009		
	(8.62)	(5.15)		(7.49)		
Lagged Δ SSP						-0.138
						(-5.15)
Size	0.004	0.004	-0.001	-0.001	0.029	0.051
	(8.77)	(8.34)	(-8.39)	(-8.36)	(16.37)	(19.26)
BM	0.002	0.002	-0.001	-0.001	0.018	0.042
	(3.18)	(2.95)	(-5.04)	(-5.33)	(9.74)	(15.62)
Leverage	0.000	-0.003	0.007	0.007	0.096	0.226
	(0.16)	(-1.00)	(10.98)	(10.81)	(11.18)	(18.59)
Return	0.004	0.004	-0.003	-0.003	0.001	0.000
	(4.69)	(3.34)	(-11.90)	(-11.76)	(1.09)	(0.43)
STD	-0.004	-0.005	0.002	0.002	-0.009	-0.004
	(-2.42)	(-1.99)	(5.15)	(5.25)	(-3.25)	(-1.28)
ADR	-0.011	-0.011	0.002	0.002	-0.006	0.004
	(-5.06)	(-4.64)	(4.16)	(4.14)	(-1.03)	(0.46)
MSCI	-0.006	-0.005	0.006	0.006		
	(-5.31)	(-3.86)	(23.25)	(23.04)		
Analyst	-0.001	-0.001	0.000	0.000	0.000	0.000
	(-8.68)	(-7.89)	(11.77)	(11.78)	(-1.61)	(1.18)
CH	-0.006	-0.004	0.001	0.001	-0.001	-0.002
	(-3.10)	(-2.22)	(3.04)	(2.93)	(-0.17)	(-0.35)
IO	0.003	0.005	0.021	0.021	0.011	0.001
	(1.45)	(2.31)	(21.51)	(21.44)	(1.54)	(0.13)
Fixed Effects	ICY	ICY	ICY	ICY	ICY	ICY
Obs	66,224	56,380	54,130	53,762	67,020	51,558
AdjRsq	4.70%	4.30%	66.20%	66.30%	19.20%	4.50%

Table 4: ETF, Short Selling, and Earnings Manipulation

This table address the endogeneity problem using ETF ownership (*ETF*) and presents panel regression of a firm's earnings management measure (*Accruals*) on ETF ownership (ETF), predicted shares on loan (*On Loan*), or lendable shares (*Lendable*), and firm-level control variables (*X*) as well as unreported industry-, country-, and year-fixed effects (ICY) on the variation of the following models

$$The\ first\ stage: SSP_{i,t} = \alpha + \beta_1 ETF_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t},$$
$$The\ second\ stage: Accruals_{i,t+1} = \alpha + \beta_1 Predicted\ SSP\ on\ ETF_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t} (2),$$

where $SSP_{i,t}$ refers to Short Selling Potential, $X_{i,t}$ includes firm size (*Size*), book-to-market ratio (*BM*), financial leverage (*Leverage*), annual stock return (*Return*), stock return volatility (*STD*), American Depository Receipts (*ADR*), MSCI country index membership (*MSCI*), number of analysts following (*Analyst*), and closely-held ownership (*CH*). The construction of these variables is detailed in Appendix A. Models (1) and (3) regress short-selling variables on ETF ownership. Models (2) and (4) regress accruals on predicted short-selling variables. Model (5) regress accruals on ETF ownership directly, and Model (6) provides results of the change in accruals on the change in ETF ownership. *t*-statistics shown in parentheses are based on standard errors adjusted for heteroskedasticity and firm-level clustering. Obs denotes the number of firm-year observations, and AdjRsq is adjusted R^2. The sample period is from 2002 to 2009.

Variable	Lendable (1st Stage) Model (1)	Accrual (2nd Stage) Model (2)	On Loan (1st Stage) Model (3)	Accrual (2nd Stage) Model (4)	Accrual Model (5)	ΔAccrual Model (6)
ETF	0.999		0.335		-0.084	
	(6.45)		(6.24)		(-3.25)	
Predicted Lendable		-0.084				
		(-3.25)				
Predicted On Loan				-0.250		
				(-3.25)		
Lagged ΔETF						-0.082
						(-2.74)
Size	0.007	0.005	-0.001	0.004	0.004	0.048
	(18.63)	(9.56)	(-4.73)	(8.86)	(9.32)	(21.08)
BM	0.009	0.003	0.000	0.003	0.003	0.040
	(21.60)	(4.37)	(-0.24)	(3.53)	(3.56)	(16.66)
Leverage	0.021	0.001	0.016	0.004	0.000	0.217
	(11.12)	(0.55)	(16.14)	(1.33)	(-0.13)	(19.46)
Return	0.001	0.004	-0.002	0.004	0.004	0.001
	(1.67)	(4.53)	(-9.93)	(3.79)	(4.46)	(0.69)
STD	-0.006	-0.005	0.006	-0.003	-0.004	-0.004
	(-5.87)	(-2.54)	(13.96)	(-1.37)	(-2.29)	(-1.60)
ADR	0.001	-0.012	0.004	-0.011	-0.012	-0.002
	(0.63)	(-5.21)	(5.03)	(-4.71)	(-5.25)	(-0.29)
MSCI	0.036	-0.004	0.016	-0.003	-0.007	
	(23.98)	(-2.17)	(27.31)	(-1.43)	(-5.58)	
Analyst	0.002	-0.001	0.001	-0.001	-0.001	0.000
	(17.25)	(-7.20)	(17.04)	(-5.79)	(-9.19)	(-0.47)
CH	-0.034	-0.009	-0.003	-0.007	-0.006	-0.002
	(-19.57)	(-4.05)	(-3.46)	(-3.42)	(-3.16)	(-0.47)
Fixed Effects	ICY	ICY	ICY	ICY	ICY	ICY
Obs	81,538	67,019	81,540	67,020	67,019	63,252
AdjRsq	57.40%	4.00%	31.40%	4.00%	4.00%	4.20%

Table 5: Market-wide Short Selling and Earnings Management

This table presents panel regression of a firm's earnings management measure (*Accruals*) on market-wide short selling variables, firm-level control variables (*X*), and country-level control variables (*C*) as well as unreported industry-, country-, and year-fixed effects (ICY) on the variation of the following model

$$Accruals_{i,t+1} = \alpha + \beta_1 MKT\_SSP_{i,t} + \beta_2 X_{i,t} + \beta_2 C_{i,t} + \varepsilon_{i,t.}$$

$MKT\_SSP_{i,t}$ includes legality of short selling (*Legality*), feasibility of short selling (*Feasibility*), put option trading (*Put Option*), and feasibility or put option (*F or P*). $X_{i,t}$ includes firm size (*Size*), book-to-market ratio (*BM*), financial leverage (*Leverage*), annual stock return (*Return*), stock return volatility (*STD*), American Depository Receipts (*ADR*), MSCI country index membership (*MSCI*), number of analysts following (*Analyst*), and closely-held ownership (*CH*). $C_{i,t}$ includes market segmentation (*SEG*), anti-director index (*ADRI*), market capitalization-to-GDP ratio (*MVGDP*), and standard deviation of GDP growth (*STDGDPG*). The construction of these variables is detailed in Appendix A. *t*-statistics shown in parentheses are based on standard errors adjusted for heteroskedasticity and firm-level clustering. Obs denotes the number of firm-year observations, and AdjRsq is adjusted R^2. The sample period is from 1990 to 2009.

Variable	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
Legality	-0.006				-0.007			
	(-3.02)				(-3.34)			
Feasibility		-0.004				-0.004		
		(-1.85)				(-1.75)		
Put Option			-0.009				-0.011	
			(-4.34)				(-5.01)	
F or P				-0.009				-0.011
				(-3.91)				(-4.47)
SEG					0.034	0.035	0.038	0.039
					(1.10)	(1.14)	(1.25)	(1.27)
ADRI					0.000	0.000	0.001	0.000
					(-0.26)	(-0.45)	(1.33)	(0.17)
MVGDP					0.002	0.002	0.002	0.002
					(2.30)	(2.27)	(2.26)	(2.34)
STDGDPG					-0.089	-0.093	-0.103	-0.100
					(-2.80)	(-2.92)	(-3.23)	(-3.12)
Size	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
	(19.39)	(19.39)	(19.48)	(19.43)	(18.88)	(18.89)	(19.01)	(18.92)
BM	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
	(3.99)	(3.93)	(3.98)	(4.02)	(4.20)	(4.14)	(4.19)	(4.25)
Leverage	0.010	0.010	0.010	0.010	0.009	0.009	0.009	0.009
	(5.58)	(5.56)	(5.57)	(5.54)	(5.48)	(5.47)	(5.51)	(5.45)
Return	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
	(15.20)	(15.18)	(15.18)	(15.19)	(14.95)	(14.95)	(14.88)	(14.93)
STD	-0.008	-0.008	-0.008	-0.008	-0.008	-0.008	-0.008	-0.008
	(-7.36)	(-7.34)	(-7.36)	(-7.36)	(-7.52)	(-7.49)	(-7.47)	(-7.51)
ADR	-0.011	-0.011	-0.011	-0.011	-0.011	-0.011	-0.011	-0.011
	(-6.96)	(-6.97)	(-6.92)	(-6.91)	(-6.93)	(-6.93)	(-6.90)	(-6.87)
MSCI	-0.007	-0.007	-0.007	-0.007	-0.006	-0.006	-0.007	-0.007
	(-9.00)	(-8.95)	(-9.06)	(-9.05)	(-8.75)	(-8.69)	(-8.81)	(-8.80)
Analyst	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(-18.96)	(-18.98)	(-19.07)	(-19.00)	(-18.35)	(-18.37)	(-18.48)	(-18.38)
CH	-0.007	-0.007	-0.007	-0.007	-0.007	-0.007	-0.007	-0.007
	(-6.12)	(-6.17)	(-6.16)	(-6.09)	(-6.03)	(-6.10)	(-5.98)	(-5.97)
Fixed Effects	ICY	ICY	ICY	ICY	ICY	ICY	ICY	ICY
Obs	230,894	230,894	230,894	230,894	229,243	229,243	229,243	229,243
AdjRsq	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%

Table 6: Short Selling, Earnings Management, and Alternative Discipline Channels

This table presents panel regression of a firm's earnings management measure (*Accruals*) on its shares under short selling potential, its interaction with alternative discipline channels (*ADC*), and firm-level control variables (*X*) as well as unreported industry-, country-, and year-fixed effects (ICY) on the full samples and different subsamples. The regression model is $Accruals_{i,t+1} = \alpha + \beta_1 SSP_{i,t} + \beta_2 ADC \times SSP_{i,t} + \beta_3 ADC_{i,t} + \beta_4 X_{i,t} + \varepsilon_{i,t}$, where $SSP_{i,t}$ refers to Short Selling Potential, $X_{i,t}$ includes firm size (*Size*), book-to-market ratio (*BM*), financial leverage (*Leverage*), annual stock return (*Return*), stock return volatility (*STD*), American Depository Receipts (*ADR*), MSCI country index membership (*MSCI*), number of analysts following (*Analyst*), closely-held ownership (*CH*), and institutional ownership (*IO*). $ADC_{i,t}$ includes Big N auditor (*BigN*), international accounting standard (*IAS*), ISS corporate governance index (*ISS*), Amihud's (2002) illiquidity (*Amihud*), analyst dispersion (*Disp*), number of analysts following (*Analyst*), and American Depository Receipts (*ADR*). The construction of these variables is detailed in Appendix A. *t*-statistics shown in parentheses are based on standard errors adjusted for heteroskedasticity and firm-level clustering. Obs denotes the number of firm-year observations, and AdjRsq is adjusted R^2. The sample period is from 2002 to 2009.

Variable	*BigN* Model (1)	*BigN* Model (2)	*IAS* Model (3)	*IAS* Model (4)	*ISS* Model (5)	*ISS* Model (6)	*Illiquidty* Model (7)	*Illiquidty* Model (8)	*Disp* Model (9)	*Disp* Model (10)	*Analyst* Model (13)	*ADR* Model (14)
SSP	-0.053	-0.074	-0.049	-0.055	-0.037	0.022	-0.056	-0.084	-0.040	-0.032	-0.067	-0.053
	(-8.81)	(-5.73)	(-8.07)	(-8.76)	(-3.86)	(0.57)	(-9.08)	(-7.58)	(-6.17)	(-5.03)	(-8.87)	(-8.84)
ADC	-0.009	-0.010	0.001	-0.001	-0.024	-0.012	-0.001	-0.001	-0.211	-0.163		
	(-7.97)	(-7.84)	(0.85)	(-0.64)	(-2.51)	(-0.97)	(-2.89)	(-2.32)	(-8.87)	(-6.11)		
SSP*ADC		0.023		0.040		-0.089		-0.005		-0.876	0.002	0.111
		(1.88)		(3.03)		(-1.65)		(-3.27)		(-3.89)	(4.24)	(6.15)
Size	0.005	0.005	0.004	0.004	0.005	0.005	0.003	0.003	0.002	0.002	0.004	0.004
	(10.34)	(10.39)	(9.44)	(9.44)	(5.84)	(5.81)	(4.62)	(4.54)	(4.73)	(4.77)	(9.71)	(9.36)
BM	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
	(4.14)	(4.17)	(3.99)	(4.00)	(2.36)	(2.35)	(4.38)	(4.47)	(3.89)	(4.03)	(4.16)	(4.06)
Leverage	0.001	0.001	0.000	0.000	-0.001	0.000	0.000	-0.001	0.006	0.006	0.000	0.000
	(0.38)	(0.31)	(0.08)	(0.01)	(-0.12)	(-0.07)	(-0.18)	(-0.22)	(1.83)	(1.86)	(0.05)	(0.01)
Return	0.004	0.004	0.004	0.004	0.007	0.007	0.005	0.004	0.002	0.001	0.004	0.004
	(3.90)	(3.86)	(4.61)	(4.61)	(3.32)	(3.37)	(4.70)	(4.57)	(1.37)	(1.26)	(4.38)	(4.51)
STD	-0.005	-0.005	-0.004	-0.004	0.003	0.003	-0.004	-0.004	-0.004	-0.003	-0.004	-0.004
	(-2.69)	(-2.74)	(-2.41)	(-2.42)	(0.56)	(0.58)	(-2.23)	(-2.18)	(-1.53)	(-1.07)	(-2.35)	(-2.35)
ADR	-0.012	-0.012	-0.012	-0.012	-0.006	-0.006	-0.013	-0.013	-0.010	-0.010	-0.012	-0.020
	(-5.20)	(-5.18)	(-4.95)	(-5.04)	(-1.77)	(-1.83)	(-5.21)	(-5.24)	(-4.39)	(-4.39)	(-5.13)	(-6.58)
MSCI	-0.005	-0.005	-0.006	-0.006	0.001	0.001	-0.007	-0.007	-0.004	-0.004	-0.006	-0.006
	(-4.32)	(-4.26)	(-5.04)	(-5.12)	(0.39)	(0.35)	(-5.36)	(-5.13)	(-2.46)	(-2.38)	(-4.71)	(-4.88)
Analyst	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(-8.34)	(-8.43)	(-8.44)	(-8.76)	(-6.10)	(-6.19)	(-8.74)	(-8.99)	(-6.46)	(-6.42)	(-9.37)	(-8.54)
CH	-0.007	-0.007	-0.007	-0.006	-0.015	-0.015	-0.004	-0.004	-0.004	-0.004	-0.006	-0.006
	(-3.50)	(-3.46)	(-3.36)	(-3.19)	(-3.99)	(-3.85)	(-2.10)	(-1.93)	(-1.86)	(-1.81)	(-3.31)	(-3.32)
IO	0.008	0.008	0.007	0.008	0.001	0.001	0.007	0.007	0.008	0.008	0.007	0.008
	(3.54)	(3.54)	(2.97)	(3.39)	(0.31)	(0.24)	(2.78)	(2.73)	(3.06)	(3.03)	(3.06)	(3.16)
Fixed Effects	ICY	ICY	ICY	ICY	ICY	ICY	ICY	ICY	ICY	ICY	ICY	ICY
Obs	66,202	66,202	66,750	66,750	17,021	17,021	63,812	63,812	45,228	45,228	67,019	67,019
AdjRsq	4.10%	4.20%	4.00%	4.10%	4.40%	4.40%	4.00%	4.00%	5.40%	5.50%	4.10%	4.10%

Table 7: Short Selling and Earnings Persistence

This table presents panel regression of a firm's future earnings, cash flows, or accruals (*ECA*) on its shares under short selling potential, short-selling variables' interaction with current earnings, cash flow, or accruals, and firm-level control variables (*X*) as well as unreported industry-, country-, and year-fixed effects (ICY) on the full samples and different subsamples. The regression model is

$$ECA_{i,t+1} = \alpha + \beta_1 SSP_{i,t} + \beta_2 SSP_{i,t} \times ECA_{i,t} + \beta_3 ECA_{i,t} + \beta_4 X_{i,t} + \beta_5 X_{i,t} ECA_{i,t} + \varepsilon_{i,t},$$

where $SSP_{i,t}$ refers to Short Selling Potential, $ECA_{i,t}$ refers to earnings, cash flows, or accruals. $X_{i,t}$ includes firm size (*Size*), book-to-market ratio (*BM*), financial leverage (*Leverage*), annual stock return (*Return*), stock return volatility (*STD*), American Depository Receipts (*ADR*), MSCI country index membership (*MSCI*), number of analysts following (*Analyst*), closely-held ownership (*CH*), and institutional ownership (*IO*). The construction of these variables is detailed in Appendix A. NUS refers to firms from non-US countries. t-statistics shown in parentheses are based on standard errors adjusted for heteroskedasticity and firm-level clustering. Obs denotes the number of firm-year observations, and AdjRsq is adjusted R2. To save space the parameters for control variables and interaction terms between ECA and control variables are not tabulated. The sample period is from 2002 to 2009.

	One-year Ahead ECA								
	Accruals			*Cash Flows*			*Earnings*		
	All	US	NUS	All	US	NUS	All	US	NUS
Variable	Model	Model	Model	Model	Model	Model	Model	Model	Model
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SSP	-0.049	-0.057	-0.013	0.099	0.103	0.085	0.024	0.012	0.030
	(-7.98)	(-6.61)	(-1.01)	(8.55)	(6.76)	(3.87)	(4.03)	(1.46)	(2.90)
ECA	-0.067	-0.142	-0.060	0.689	0.743	0.625	0.750	0.697	0.782
	(-0.80)	(-0.85)	(-0.60)	(11.92)	(7.55)	(8.70)	(15.78)	(8.33)	(13.43)
ECA*SSP	-0.604	-0.700	-0.382	-0.562	-0.569	-0.586	-0.291	-0.255	-0.409
	(-6.50)	(-6.76)	(-2.18)	(-7.40)	(-5.94)	(-4.23)	(-5.04)	(-3.53)	(-3.80)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ECA*Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	ICY	ICY	ICY	ICY	ICY	ICY	ICY	ICY	ICY
Obs	63,611	21,221	42,390	61,762	20,317	41,445	75,961	26,358	49,603
AdjRsq	6.7%	7.8%	6.6%	42.1%	50.5%	37.3%	65.4%	67.5%	64.1%

Table 8: Short Selling and Alternative Earnings Management Measures

This table presents panel regression of a firm's alternative earnings management measures (A*EM*) on its shares under short selling potential, and firm-level control variables (*X*) as well as unreported industry-, country-, and year-fixed effects (ICY). The regression model is: $AEM_{i,t} = \alpha + \beta_1 SSP_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t}$, where $SSP_{i,t}$ refers to Short Selling Potential, $AEM_{i,t}$ includes Jones's (1991) residual accruals (*Jones Accruals*), FLOS's (2005) residual accruals (*FLOS Accruals*), small positive forecasting profits (*SPAF*), small positive profits (*SPE*), and small positive past-earnings profits (*SPDE*). $X_{i,t}$ includes firm size (*Size*), book-to-market ratio (*BM*), financial leverage (*Leverage*), annual stock return (*Return*), stock return volatility (*STD*), American Depository Receipts (*ADR*), MSCI country index membership (*MSCI*), number of analysts following (*Analyst*), closely-held ownership (*CH*), and institutional ownership (*IO*). The construction of these variables is detailed in Appendix A. *t*-statistics shown in parentheses are based on standard errors adjusted for heteroskedasticity and firm-level clustering. Obs denotes the number of firm-year observations, and AdjRsq is adjusted R^2. The sample period is from 2002 to 2009.

Variable	Jones Accruals Model (1)	FLOS Accruals Model (2)	SPAF Model (3)	SPE Model (4)	SPDE Model (5)
SSP	-0.046	-0.031	-0.686	-0.893	-1.320
	(-3.84)	(-3.14)	(-3.39)	(-2.08)	(-4.94)
Size	0.004	0.002	0.045	0.064	0.038
	(11.45)	(5.59)	(6.36)	(4.86)	(5.23)
BM	0.005	0.001	-0.006	-0.047	-0.144
	(9.13)	(1.51)	(-0.57)	(-2.39)	(-11.62)
Leverage	0.012	0.007	-0.140	-0.285	-0.107
	(5.52)	(4.41)	(-3.69)	(-4.52)	(-2.89)
Return	0.001	0.002	0.165	0.313	0.330
	(1.23)	(2.84)	(10.86)	(12.22)	(16.95)
STD	-0.005	-0.006	-0.015	-0.540	-0.136
	(-3.45)	(-4.61)	(-0.48)	(-8.65)	(-3.67)
ADR	-0.010	-0.002	-0.093	-0.191	-0.148
	(-4.62)	(-1.47)	(-2.68)	(-2.53)	(-3.71)
MSCI	-0.005	-0.002	0.066	0.008	-0.031
	(-5.05)	(-2.98)	(3.30)	(0.25)	(-1.55)
Analyst	-0.001	0.000	0.005	0.006	0.000
	(-9.92)	(-3.99)	(3.24)	(1.76)	(0.11)
CH	-0.005	0.002	-0.076	-0.156	-0.099
	(-2.90)	(1.70)	(-2.45)	(-2.90)	(-3.15)
IO	-0.001	0.000	0.201	-0.340	0.207
	(-0.61)	(-0.15)	(6.04)	(-4.94)	(5.28)
Fixed Effects	ICY	ICY	ICY	ICY	ICY
Obs	64,856	60,502	48,940	20,111	37,873
AdjRsq	2.9%	0.8%	3.3%	10.0%	4.7%

Table 9: Stock Price Non-synchronicity and Earnings Management

This table presents panel regression of a firm's stock price non-synchronicity (*Nonsyn*) on its accruals (*Accruals*), and firm-level control variables (*X*) as well as unreported industry-, country-, and year-fixed effects (ICY) on the full samples and different subsamples. The regression model is

$$Nonsyn_{i,t} = \alpha + \beta_1 Accrual_{i,t} + \beta_2 X_{i,t} + \varepsilon_{i,t}.$$

$X_{i,t}$ includes firm size (*Size*), book-to-market ratio (*BM*), financial leverage (*Leverage*), annual stock return (*Return*), stock return volatility (*STD*), American Depository Receipts (*ADR*), MSCI country index membership (*MSCI*), number of analysts following (*Analyst*), closely-held ownership (*CH*), and institutional ownership (*IO*). The construction of these variables is detailed in Appendix A. NUS refers to firms from non-US countries. *t*-statistics shown in parentheses are based on standard errors adjusted for heteroskedasticity and firm-level clustering. Obs denotes the number of firm-year observations, and AdjRsq is adjusted R^2. The sample period is from 2002 to 2009.

Variable	Model (1)	Model (2)	Model (3)	Model (4)	US Model (5)	NUS Model (6)
Accruals	-0.338		-0.138	-0.174	-0.305	-0.101
	(-4.56)		(-2.48)	(-3.09)	(-2.30)	(-1.91)
Lagged Nonsyn				0.196		
				(37.49)		
Size		-0.286	-0.286	-0.233	-0.417	-0.215
		(-42.28)	(-42.18)	(-38.50)	(-27.66)	(-31.02)
BM		-0.113	-0.113	-0.077	-0.080	-0.123
		(-13.39)	(-13.34)	(-10.21)	(-4.36)	(-14.55)
Leverage		-0.158	-0.158	-0.124	-0.027	-0.182
		(-4.44)	(-4.44)	(-4.03)	(-0.36)	(-5.20)
Return		0.129	0.129	0.096	0.305	0.072
		(11.94)	(11.99)	(8.83)	(11.20)	(6.86)
STD		0.316	0.316	0.288	0.111	0.419
		(13.23)	(13.19)	(12.20)	(2.54)	(13.81)
ADR		0.107	0.105	0.082		0.043
		(3.51)	(3.46)	(3.24)		(1.45)
MSCI		-0.250	-0.251	-0.200	-0.610	-0.109
		(-13.94)	(-13.98)	(-13.06)	(-14.54)	(-6.47)
Analyst		0.005	0.005	0.006	0.032	-0.013
		(2.92)	(2.84)	(4.57)	(10.13)	(-7.23)
CH		0.326	0.325	0.266	0.456	0.193
		(11.91)	(11.89)	(11.11)	(7.13)	(7.27)
IO		-0.844	-0.845	-0.689	-0.527	-0.256
		(-22.57)	(-22.57)	(-21.37)	(-10.91)	(-4.27)
Fixed Effects	ICY	ICY	ICY	ICY	ICY	ICY
Obs	62,093	62,093	62,093	60,707	21,742	40,351
AdjRsq	0.0%	35.7%	35.7%	38.4%	35.7%	32.5%

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