Accounting Conservatism and Short-Selling: an international analysis[1]

Abstract
Short-selling is associated with bad news revelation, which may promote market efficiency. Prior literature has claimed that the short-selling bad news revelation leads to more conservative reporting, in which earnings tend to recognize bad news timelier than good news. We investigate this notion by testing whether country-level regulation of short-selling is associated with accounting conservatism. With a sample of 327,164 firm-year observations from 75 countries, we find that accounting conservatism is greater in countries where short-selling is legal than in countries where short-selling is illegal, which is consistent with prior literature. However, we find that this difference increases with enforcement, which supports the notion that countries' institutional enforcement increases the influence of short-market on financial reporting. We also find that even trading restrictions to short-sales (uptick rule and naked short-selling prohibition) are negatively associated with accounting conservatism and that this association decreases with enforcement, suggesting that in countries with strong enforcement, conservatism is promoted by other institutional mechanisms which limits the effect of short-selling. Our results are robust to several model specifications and additional analyses. We contribute to short-selling literature by showing that the short-market not only increases market efficiency but also plays a significant external governance role in financial reporting, and that this role is substantially dependent on institutions. Moreover, we contribute to conservatism literature by identifying a demand for conservative reporting that comes from a particular user of financial statements (i.e., short investors). Our cross-country approach may contribute to understanding the complexity of short-market interactions with financial reporting.

Keywords: conservative reporting; short-market; institutions; enforcement.

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1. INTRODUCTION

Accounting conservatism is defined as the tendency to require a lower degree of verification to recognize losses over profits in financial reporting (Watts and Zimmerman, 1986). Previous studies explore the demands of equity markets for accounting conservatism. Ball and Shivakumar (2005) find that private and public firms differ in the degree of accounting conservatism even where they are subject to substantially equivalent regulations on auditing, accounting standards, and taxes. This result is based on the notion that public financial reporting is often used to solve information asymmetry, which creates a market demand for timely recognition of bad news (over good news) in earnings (i.e., conditional conservatism) (Ball & Shivakumar, 2005; LaFond & Watts, 2008).

In this paper, we argue that the market demand for accounting conservatism is influenced by short-selling country-level regulation. Short-sellers profit from the decrease in stock prices (bearish). Thus, short-selling adds an incentive for investors to identify overvalued firms, which can be done by identifying upward biases in financial reporting (Hirshleifer et al., 2011; Karpoff & Lou, 2010; Massa et al., 2015). Firms that overestimate earnings are targeted by short-sellers and face higher costs of raising external capital (Gilchrist et al., 2005; Grullon et al., 2015). Therefore, firms may adopt conservative reporting in order to avoid the costs of being shorted. Consistent with this notion, Mashruwala and Mashruwala (2018) show that accounting conservatism and short-selling exhibit a substitutive effect on the overvaluation of stock prices, suggesting that conservative reports prevent short interest. Using a quasi-experiment, Clinch et al. (2019) also explore the role of short-selling in financial reporting and find that short-selling increases US firms' disclosure of bad news. However, there is little evidence on the effect of the market-wide short-selling regulation on accounting conservatism.

Short-selling is differently regulated across countries. Some countries restrict short-sales through different regulatory mechanisms, which creates market-wide short-selling constraints. Since short-selling is relevant for market efficiency, equity markets subject to country-level short-selling constraints recognize bad news later (Bris et al., 2007). In the absent of the bad news revelation promoted by short-selling, equity market may be more often misled by overstated earnings and may not penalize those firms for the lack of conservatism. Thus, we propose that market-wide short-selling constraints are negatively associated with the degree of accounting conservatism. Clinch et al. (2019) results are relevant to the extent that they show the role of short-selling activities in financial reporting. However, they do not test country-level differences in this relationship. This is particularly relevant since one can argue the ability of investors to influence financial statements may depend on countries' institutions. We explore this gap by testing the role of short-selling on financial reporting through an international sample and analyzing the moderating role of enforcement.

Using a sample of 327,164 firm-year observations from 75 countries, we find that accounting conservatism is greater in countries where short-selling is legal than in countries where short-selling is illegal and that this difference increases with enforcement. Thus, our evidence suggests that even though conservatism is positively associated with the short market, this association depends on institutions. We argue and find that in countries with strong enforcement, investors (both long and short) have more (mechanisms to) influence on financial reporting, which results in short-selling bad news revelations being more related to conservative reporting. We also find that restrictions to short-selling trading, such as uptick rules and naked short-selling prohibition, are also negatively associated with accounting conservatism. However, enforcement moderates this relationship in the opposite direction to how it moderates the association between short-selling legal status and accounting conservatism, i.e., the difference between unrestricted and restricted countries decreases with enforcement.

Our study contributes to the literature in several ways. First, we identify a country-level determinant of accounting conservatism. Previous studies document that conservatism is driven by institutions, the size of the equity and debt market, culture, and regulation (Ball et al., 2000, 2008; Bushman & Piotroski, 2006; Kanagaretnam et al., 2014). We add to this literature by testing whether short investors' demand for conservatism is associated with the firms' conservative practices. Unlike

other studies that associated long investors' demand for conservatism, our study is focused on a particular type of investors (i.e., short-sellers) that are particularly more interested in bad news recognition. This analysis is potentially able to isolate the informativeness aspect of conservative practices across countries, which is less likely to be done using long investors since they are contractually linked to the firm.

Second, we also contribute to the debate regarding the role of short-selling in the equity market. Many studies have explored whether short-sellers are skillful at information mining, collection, and analysis, or pure speculators (Blau & Pinegar, 2013; Blau & Wade, 2012). During the 2007-2008 financial crisis, regulators around the world, including the Security Exchange Commission (SEC) in the United States and the Financial Services Authority (FSA) in the United Kingdom, altered short-selling regulations, restricting the short-selling of particular stocks based on the argument that under some circumstances short-sales may drive down share prices far above their fundamental values (Saffi & Sigurdsson, 2011). A branch of this literature has used the consequences of short-selling on financial statements to document whether short-sellers are really informed and able to identify overvalued firms. Our study adds to this literature by showing that short-selling trading is positively associated with conservative reporting, which may be a benefit of short-sales. Conservatism is considered a governance mechanism since it decreases information asymmetry between insiders and outsiders and disciplines management decisions (García Lara et al., 2016; LaFond & Watts, 2008; Watts, 2003).

Third, we also contribute to the previous literature on the association between accounting conservatism and short-selling. On the one hand, Clinch et al. (2019) use a research design with strong internal validity; their quasi-experiment supports a causal link between short-selling and conservative reporting. On the other hand, their results are limited in terms of external validity. A causal link between short-selling and conservatism in the US market does not imply that short-selling increases conservatism in other countries. Our international approach relates short-selling with accounting conservatism using 75 countries. Moreover, consistent with the literature on country-level differences in financial reporting, our results suggest that prior evidence of the relation between the short market and conservatism is sensible to countries' enforcement in two directions depending on the type of short-selling constraint. First, our results show that short-sellers may have more influence on financial reporting whether the stock market has institutional mechanisms to pressure firms toward more conservative practices. Second, we find that when it comes to countries where short-selling is legal, the effect of other types of short-selling constraints (e.g., naked short-selling prohibition) on accounting conservatism is negatively associated with enforcement. This suggests that high enforcement decreases the 'need' for a short market to increase accounting conservatism since high levels of accounting conservatism tend to be achieved with regulatory/institutional mechanisms.

2. RELATED LITERATURE

2.1. SHORT-SELLING CONSTRAINTS AND EQUITY MARKET

The debate around short-selling operations is as old as the first public firm, beginning in 1600s, when a group of well-connected Dutch businessmen shorted the shares of East Indian Company in anticipation of the incorporation of a rival French chartered trading firm (Bris et al., 2007; Charoenrook & Daouk, 2009). Since then, investors, traders, regulators, and several market participants have debated the role of short-selling on the equity market. Opponents of short-selling argue that it causes panic selling, high volatility, and market crashes, whereas proponents support that short-selling facilitates information transfer, increases liquidity, and improves risk sharing in the economy (Charoenrook & Daouk, 2009). This controversy around short-selling induced regulators from several countries to create restrictions regarding short-selling. Even in the United States, where short-selling has been allowed since before the twentieth century, concerns about it always come up during market bubbles and financial crises (Charoenrook & Daouk, 2009; Saffi & Sigurdsson, 2011).

Market-wide short-selling constraints are not simple to determine since different economic and regulatory arrangements can restrict investors' ability to short securities. A country like Singapore officially prohibits short-selling, but it routinely takes place via off-shore markets (Charoenrook & Daouk, 2009). On the other hand, some countries do not explicitly prohibit short-selling but make the taxes so high that it is unfeasible for investors to engage in short trading. Scholars have studied the role of short-selling in order to support/refute market participants' arguments and bring up insights about short-selling consequences.

Several papers address short-selling consequences through a theoretical approach. Miller (1977) hypothesizes that in the presence of uncertainty, risk, and divergence of opinion, short-selling constraints lead to optimistic expectations and overvaluation. Diamond and Verrecchia (1987) model the effect of short-selling constraints on the speed of adjustment of security prices to private information and establish that restrictions in short-selling activities decrease the informational efficiency of equity markets, especially to bad news. Moreover, Nezafat et al. (2017) analyze a model of a costly private information acquisition and asset pricing under short-sale constraints and show that imposing short-selling bans during economic crises not only fails to curb volatility but also may fail to support prices.

Other studies explore the consequences of short-selling empirically. Boehmer and Wu (2013) document several informational benefits of short-sales. They show that shorting flow improves the intraday informational efficiency of stock prices, accelerates the incorporation of public information into prices, reduces post-earnings-announcement drift for negative earnings surprises, and reduces divergence from fundamental values. Using the US temporary restrictions for short-sales in 2008, Boulton and Braga-Alves (2010) find that the announcement (expiration) of the restrictions caused positive (negative) market reactions, consistent with Miller (1977) hypothesis. Moreover, Chang et al. (2013) show that the difference between the market reaction to good news and bad news in earnings increases with the degree of heterogeneous interpretations in the presence of a limited supply of shares available to be shorted.

In the international context, Bris et al. (2007) show that short-selling is a relevant mechanism to improve the efficiency of equity markets in recognizing bad news. In countries where short-selling is not allowed and practiced (i.e., countries with short-selling constraints), the equity market recognizes bad news earlier (Bris et al., 2007). Charoenrook and Daouk (2009) conduct a broad analysis of short-sales consequences to the equity market using a sample of 111 countries and testing the three possible effects of short-sales on markets: skewness, volatility, and liquidity of stock prices. They conclude that short-selling decreases volatility, increases liquidity, and has no effect on skewness of returns. These studies suggest that country-level short-selling constraints impact the equity market as a whole and that the expectations of short investors – for informative or speculative reasons – affect long investors.

2.2. SHORT-SELLING LEGAL STATUS AND ACCOUNTING CONSERVATISM

Several studies investigate whether short-sellers target overvalued stocks. Desai et al. (2002) show that heavily shorted firms experience significant abnormal returns ranging from -0.76 to -1.13, which indicates that short interest is a bearish signal. Moreover, Cohen et al. (2007) show that an increase in short demand leads to negative abnormal returns of 2.98% in the following month and that this result is stronger in environments with less public information flow, indicating that short-selling works as a mechanism of private information revelation. Consistently, Boehmer et al. (2008) document that more informed investors contribute better to the efficiency of stock prices to the extent that they short overvalued firms and profit with subsequent price adjustments.

The downward effect of short-selling activity on stock prices tends to increase market efficiency to the extent that the equity market adjusts the security prices of overvalued firms. However, other studies support that this effect may be overwhelming or purely speculative since short-sellers are not incrementally informed prior to earnings announcements (Blau & Pinegar, 2013) and prior to analysts' recommendations (Blau & Wade, 2012). Nevertheless, in both cases (transfer of information or

speculation), short-selling adds to investors' pessimism about the firm and raises investors' required cost of equity. Gilchrist et al. (2005) document that firms exploit stock market bubbles caused by short-selling constraints by issuing new shares at inflated prices and increasing real investments. Similarly, Grullon et al. (2015) use a regulatory experiment to show that short-selling constraints do not only affect asset prices but also have a causal impact on financing and investment decisions. Moreover, Meng et al. (2020) find that short interest increases firms' financial constraints, limiting firms' access to external capital. These studies imply that it is costly for firms to be targeted by short-sellers.

An alternative for firms to avoid being shorted may be to adopt disclosure mechanisms that reduce the chance of being targeted. Indeed, many studies document a relationship between short-selling and financial reporting. For instance, short-sellers can uncover and disseminate misrepresentation in financial reporting after going short, whether this misrepresentation makes a stock price overvalued (Karpoff & Lou, 2010). They can use accounting information to identify overvalued shares, which makes them go short on these firms and pressure them to restate their reports (Desai et al., 2006). Moreover, short interest increases in the presence of accruals anomaly since firms with high accruals may be overvalued by the equity market (Hirshleifer et al., 2011). This influence of short-selling on stock price implies that short-selling may work as an external governance mechanism for reducing earnings management (Massa et al., 2015).

As short-sellers are interested in identifying overvalued firms, the effect of short-selling activity on accounting information tends to involve firms that overestimate their performance through financial reports. The overestimation of accounting earnings is the opposite of the conservatism principle in accounting. Accounting conservatism can be defined as the tendency to require a higher degree of verifiability to recognize good news than bad news, which introduces a downward bias into financial reports (Watts and Zimmerman, 1986). Thus, a conservative financial report is less likely to lead to overvaluation in the equity market. This induces a negative association between short-selling and conservatism, whereas conservative practices are adopted in order to avoid short interest (Jain et al. 2020; Jin et al., 2018; Mashruwala & Mashruwala, 2018). Nevertheless, in the absence of this mechanism due to the legal prohibition of short-selling (i.e., market-wide short-selling constraint), firms would tend to be overvalued since there would be less incentive for market participants to profit from a bearish firm and less incentive for firms being conservative. In line with this argument, we establish the following hypothesis:

H1: Accounting conservatism is greater in countries where short-selling is legal than in countries where short-selling is illegal.

Our main argument on how market-wide short-selling constraints induce accounting conservatism is based on the corporate governance mechanism of short-selling evidenced in prior literature. However, much of that literature is focused on countries with strong institutional environments. The corrective role of short-sellers in financial reporting may be even more relevant in countries where institutional mechanisms promote a higher capacity of capital markets to influence financial reporting practices.

Bushman and Piotroski (2006) offer a conceptual framework of how political and legal institutions influence the behavior of several market agents and ultimately shape accounting numbers in terms of conservative reporting. They argue that stronger legal/judicial regimes more often use accounting numbers in formal contracts, in which accounting conservatism is useful for designing optimal contracts. Prior literature documents that the demand for conservative reporting that comes from these contracts is enforced by litigation in countries with strong legal regimes (Basu & Liang, 2019; Black et al., 2022; Bushman & Piotroski, 2006). Bushman and Piotroski (2006) also propose that regulators from strong legal regimes have more power to enforce more conservative financial reporting, which they demand since the negative political consequences of overstatement of assets and profits tend to be worse than understatements. Consistent with this notion, many studies document that countries

with strong enforcement have high-quality financial reporting and a high level of accounting conservatism (Ball et al., 2000; Bushman & Piotroski, 2006; Salter et al., 2013).

We argue that, as enforcement increases, the influence of investors on financial reporting tend to be higher due to the institutional mechanisms that promote more conservative earnings, such as the litigation risk and regulatory supervision faced to firms and auditors that get involved in earnings overestimation. As a result, the influence of short-selling bad news revelation should be also higher in stronger enforcement environments. Based on this notion, we propose the following hypothesis:

H2: There is a positive moderating effect on the relationship between short-selling legal status and accounting conservatism.

3. EMPIRICAL APPROACH

3.1. SAMPLE

Our sample is drawn from the Refinitiv database. We collect financial reporting and stock price data from 1995 to 2023 in 81 countries. We measure short-selling constraints using a dummy variable equal to 1, whether short-selling is legal and zero otherwise, based on Jain et al. (2013). In the 2008 financial crisis, some countries banned short-selling activities, which was a valuable opportunity to study some consequences of short-selling regulation. In our study, 2008 short-selling bans are not useful since it was a short-term shock (less than one year), and it is unlikely it changed annual financial statements. Thus, our measure of short-selling constraints does not take these bans into account. Following Jain et al. (2013), we also collect data from the Transparency International website for our enforcement proxy and other country-level variables from the World Bank database. After excluding banks and missing values, our main sample comprises 327,164 observations from 75 countries.

Table 1 - Sample

Sample	Observations	Firms	Countries
Collected from Refinitiv	1,878,393	56,921	81
After Excluding Missing Values	340,975	35,159	75
After Excluding Banks	327,164	34,048	75

3.2. CONSERVATISM MEASURE AND REGRESSION MODEL

We measure accounting conservatism based on Givoly and Hayn (2000). The main reason for using this measure in our analysis is because it is accruals-based and does not depend on market efficiency. Other proxies based on stock returns may lead to inaccurate inferences in our study since we are dealing with a large number of countries where the capital market may not be efficient. Givoly and Hayn (2000) argue that conservative financial reporting leads to a negative accumulation of nonoperating accruals over time. Thus, several studies use the following equation as a measure of accounting conservatism:

$$Conservatism_{it} = \left(\frac{-1}{5}\right) * \sum_{j=0}^{4} \left(\frac{NoAcc_{it-j}}{TA_{it-j}}\right) \quad (1)$$

Where *i* and *t* index firm and year, respectively. *NoAcc* and *TA* are nonoperating accruals and total assets, respectively. Thus, accounting conservatism is the average of the *NonAcc* and *TA* ratio over the last five years multiplied by -1, then the greater its value, the higher accounting conservatism.

NonAcc is the difference between total accruals before depreciation and operating accruals, where operating accruals are calculated as follows:

$$Operating\ Accruals = \Delta Accounts\ Receivable + \Delta Inventories + \Delta Prepaid\ Expenses - \Delta Accounts\ Payable \quad (2)$$

To test *H1* and *H2*, we estimate the following regression model relating accounting conservatism with short-selling legal status:

$$Conservatism_{ijt} = \beta_1 ShortLegal_j + \beta_2 Enforcement_{jt} + \beta_3 ShortLegal_j Enforcement_{jt} + Controls_{ijt} + e_{ijt} \quad (3)$$

Where *i*, *j*, and *t*, index firm, country, and year, respectively. *ShortLegal* is a dummy variable equal to 1 whether short-selling is legal in the country *j* and zero otherwise, based on Jain et al. (2013). *Enforcement* is the Corruption Perceptions Index (CPI) provided by the Transparency International. CPI was rescaled to have 0 mean and 1 standard-deviation to enhance interpretability. We also use this measure for enforcement following Jain et al. (2013). *Controls* are a set of control variables that explain conservatism, and their absence might represent a confounding effect in our analysis. It includes firm-level variables, such as size, leverage, and market-to-book ratio, and country-level variables, such as IFRS-adoption indicator and market size. All variable definitions are presented in Appendix A.

H1 is corroborated whether β_1 is positive, which indicates that accounting conservatism is higher in countries where short-selling is legal. *H2* is corroborated whether β_3 is positive, which indicates that the association between short-selling and conservatism increases as enforcement increases.

4. RESULTS

4.1. DESCRIPTIVE STATISTICS

Table 2 reports descriptive statistics for the regression model variables by short-selling legal status. *Conservatism* is substantially different between samples. In the US market between 1981 and 1998, the average value of nonoperating accruals deflated by assets was –0.037, according to Givoly and Hayn (2000). As we multiply this measure by –1, this is close to our sample of countries where short-selling is legal (0.034), which is the case of the US. Negative average values of nonoperating accruals are also found in other countries (Khalifa et al., 2016; Vichitsarawong et al., 2010). On the other hand, in the sample of countries where short-selling is illegal, *Conservatism* is negative on average (i.e., positive nonoperating accruals), which suggests that those firms are not conservative on average. As expected, accounting conservatism is higher in countries where short selling is legal.

Table 2 - Descriptive statistics by short-selling legal status

Variable	ShortLegal = 0			ShortLegal = 1		
	Mean	Median	SD	Mean	Median	SD
Conservatism	-0.154	-0.175	0.450	0.034	-0.159	1.082
Enforcement	-0.959	-0.975	0.540	0.212	0.590	0.953
Size	19.799	19.796	1.697	19.153	18.999	2.324
Leverage	0.236	0.207	0.196	0.268	0.216	0.282
MTB	3.432	2.102	4.930	2.464	1.226	5.109
IFRS	0.192	0.000	0.394	0.525	1.000	0.499
MarketSize1	27.965	29.024	2.350	28.230	28.189	1.596
MarketSize2	54.857	57.323	24.297	183.298	98.813	300.298
Observations		59,296a/45,508b			267,868a/210,159b	

Variable	ShortLegal = 0			ShortLegal = 1		
	Mean	Median	SD	Mean	Median	SD

All variables are defined in Appendix A. All continuous variables are winsorized at the 1 percent and 99 percent levels to mitigate the influence of extreme values.aFull sample. bSample after excluding additional controls' missing values.

In Appendix B, we also present the correlation matrix of all variables. In Appendix C, we report all countries included in the sample, the average value of the interest variables and the number of observations by country.

4.2. ACCOUNTING CONSERVATISM AND MARKET-WIDE SHORT-SELLING CONSTRAINTS

Table 3 reports the regression model results for the association between *ShortLegal* and *Conservatism*. We run four regression models: (1) the full sample without *IFRS* and *MarketSize* controls, (2) the full sample controlling for IFRS adoption, (3) a smaller sample controlling for *MarketSize1*, and (4) a smaller sample replacing *MarketSize1* with *MarketSize2*.

Table 3 - Accounting Conservatism and Short-Selling Regression Results

Variable	Dependent Variable = Conservatism			
	(1)	(2)	(3)	(4)
ShortLegal	0.028*	0.075***	0.010	0.074***
	(0.016)	(0.016)	(0.013)	(0.013)
Enforcement	-0.001	0.024	0.029***	0.037***
	(0.018)	(0.018)	(0.011)	(0.011)
ShortLegal × Enforcement	0.186***	0.184***	0.132***	0.191***
	(0.018)	(0.018)	(0.012)	(0.012)
Size	-0.130***	-0.133***	-0.150***	-0.143***
	(0.003)	(0.003)	(0.004)	(0.003)
Leverage	1.104***	1.077***	1.124***	1.137***
	(0.032)	(0.031)	(0.033)	(0.034)
MTB	0.005***	0.003***	0.003***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
IFRS		-0.181***	-0.037***	-0.174***
		(0.009)	(0.009)	(0.010)
MarketSize1			0.066***	
			(0.003)	
MarketSize2				0.000**
				(0.000)
Num.Obs.	327,164	327,164	255,667	255,667
R2 Adj.	0.229	0.234	0.259	0.253
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes

* p < 0.1, ** p < 0.05, *** p < 0.01
All variables are defined in Appendix A. All continuous firm-level variables are winsorized at the 1 percent and 99 percent levels to mitigate the influence of extreme values. Standard errors clustered by firm in parenthesis

The coefficient on *Shortlegal* is positive and statistically significant in all models except (3), which confirms H1. The coefficient increases after including IFRS and decreases after including *MarketSize1*. This coefficient indicates that when *Enforcement* is the average value of our sample, countries where short-selling is legal are expected to be between 0.010 and 0.075 (depending on the model specification) more conservative than countries where short-selling is illegal. Moreover, the

coefficient on *ShortLegal* × *Enforcement* is positive, which indicates that *Enforcement* has a moderating effect on this association. When *Enforcement* is high (i.e., one standard-deviation higher than the average value of our sample), the association between short-selling and accounting conservatism increase between 0.132 and 0.191 (depending on the model specification). This confirms H2 that the association of short-selling constraints and accounting conservatism increases with countries' enforcement.

4.3. ADDITIONAL ANALYSES

4.3.1. Other market-wide short-selling restrictions

We conduct an additional analysis with other types of market-wide short-selling restrictions in countries where short-selling is legal. Jain et al. (2013) data provide two types of short-selling restrictions that are used in our analysis: uptick rule and naked short-selling prohibition. The uptick rule is a trading restriction that allows short-selling a stock only on an uptick, whereas naked short-selling prohibition requires that sold stocks be borrowed first. Whether the short market leads to more conservative practices, accounting conservatism must be greater in countries with no restrictions to short-selling trading. Thus, we conduct an analysis similar to Equation (3 but replacing *ShortLegal* with a dummy variable equal to 1 for countries without uptick rule and/or naked short-selling prohibition and zero otherwise in a subsample of countries where short-selling is legal. Table 4 reports the results.

Table 4 - Accounting Conservatism and Short-Selling Restrictions in Countries with Legal Short-Selling

Variable	Dependent Variable = Conservatism			
	(1)	(2)	(3)	(4)
Unrestricted	0.161***	0.129***	0.143***	0.156***
	(0.011)	(0.010)	(0.011)	(0.012)
Enforcement	0.192***	0.207***	0.164***	0.214***
	(0.006)	(0.006)	(0.007)	(0.007)
Unrestricted × Enforcement	-0.081***	-0.068***	-0.070***	-0.049***
	(0.009)	(0.009)	(0.010)	(0.011)
Size	-0.145***	-0.145***	-0.160***	-0.157***
	(0.003)	(0.003)	(0.004)	(0.004)
Leverage	1.150***	1.133***	1.177***	1.188***
	(0.033)	(0.033)	(0.036)	(0.036)
MTB	0.005***	0.005***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
IFRS		-0.128***	-0.005	-0.111***
		(0.009)	(0.010)	(0.010)
MarketSize1			0.063***	
			(0.004)	
MarketSize2				0.000
				(0.000)
Num.Obs.	267,868	267,868	210,159	210,159
R2 Adj.	0.250	0.252	0.274	0.270
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes

* p < 0.1, ** p < 0.05, *** p < 0.01
All variables are defined in Appendix A. All continuous firm-level variables are winsorized at the 1 percent and 99 percent levels to mitigate the influence of extreme values. Standard errors clustered by firm in parenthesis

The coefficient on *Unrestricted* is positive for all models, which indicates that *Conservatism* is greater in countries where short-selling is unrestricted, and this association increases with *Enforcement*. When *Enforcement* is the average value of our sample, unrestricted countries exhibit an average *Conservatism* between 0.129 and 0.161 greater than restricted countries depending on the model specification. However, when *Enforcement* is high, the association between short-selling and accounting conservatism decreases between 0.049 and 0.081. All model specifications corroborate the notion that short-selling promotes more conservative financial reporting. However, *Enforcement* increases this association instead of decreasing it, as it occurs with *ShortLegal* analyses. The explanation for these different effects of *Enforcement* may come from the role of *Enforcement* in financial reporting. Considering that the moderating effect on accounting conservatism is low, the interaction may only capture the well-documented evidence that accounting conservatism is already high in high-enforcement environments and the potential effect of short-selling on financial reporting decreases whether conservative reporting is enforced by other mechanisms.

4.3.2. Controlling for a set of country-level factors

On the one hand, our analyses provide broader evidence of the relationship between short-selling regulation and accounting conservatism all over the world, which may deliver better external validity. On the other hand, our research design does not ensure a causal link, which may decrease internal validity. One of the main threats of our model is the risk of omitted country-level variables causing both short-selling regulation and accounting conservatism. Thus, we conduct an analysis controlling for a set of country-level factors that capture a large number of country-level variables. Isidro et al. (2020) find that many country-level variables related to accounting attributes can be clustered into a small number of factors. They reduce a list of 72 country attributes to four underlying factors that capture several potential confounding variables in international accounting studies. Even though we do not have a causal research design, by controlling for those factors, we aim to reduce the chance of omitted variables to explain our results.

We are unable to test the association between *ShortLegal* and *Conservatism* in this analysis since Isidro et al. (2020) factors are only measured for countries where short-selling is legal. Thus, we use the other types of short-selling restrictions mentioned in the previous sections. Moreover, Factor 1 is excluded since it captures our enforcement variable. Table 5 reports the results.

Table 5 - Accounting Conservatism and Short-Selling Restrictions in Countries with Legal Short-Selling

Variable	Dependent Variable = Conservatism			
	(1)	(2)	(3)	(4)
Unrestricted	0.129***	0.163***	0.170***	0.177***
	(0.010)	(0.011)	(0.011)	(0.011)
Enforcement	0.207***	0.203***	0.216***	0.222***
	(0.006)	(0.006)	(0.006)	(0.006)
Unrestricted × Enforcement	-0.068***	-0.091***	-0.176***	-0.183***
	(0.009)	(0.010)	(0.011)	(0.011)
Size	-0.145***	-0.150***	-0.148***	-0.147***
	(0.003)	(0.003)	(0.003)	(0.003)
Leverage	1.133***	1.184***	1.163***	1.161***
	(0.033)	(0.035)	(0.035)	(0.035)
MTB	0.005***	0.005***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
IFRS	-0.128***	-0.091***	-0.003	-0.009
	(0.009)	(0.010)	(0.011)	(0.011)
IsidroFac2		-0.005***	-0.005***	-0.005***
		(0.000)	(0.000)	(0.000)

Variable	Dependent Variable = Conservatism			
	(1)	(2)	(3)	(4)
IsidroFac3			-0.009***	-0.008***
			(0.000)	(0.000)
IsidroFac4				-0.003***
				(0.001)
Num.Obs.	267,868	230,757	230,757	230,757
R2 Adj.	0.252	0.265	0.271	0.271
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes

* p < 0.1, ** p < 0.05, *** p < 0.01
All variables are defined in Appendix A. All continuous firm-level variables are winsorized at the 1 percent and 99 percent levels to mitigate the influence of extreme values. Standard errors clustered by firm in parenthesis

The coefficient on *Unrestricted* and *Unrestricted* × *Enforcement* remain with the same signs than Table 4 results. The negative moderating effect of *Enforcement* substantially increases after control for Isidro et al. (2020) factors.

5. CONCLUSION

Our study analyzes the relationship between short-selling constraints and accounting conservatism at the country level. Based on an international sample of 327,164 firm-year observations from 75 countries, we find evidence that accounting conservatism is greater in countries where short-selling is legal in comparison with countries where short-selling is illegal, and that this difference increases with enforcement, suggesting that strong enforcement may lead to greater influence of short-market on financial reporting. Additionally, we find that even restrictions on short-selling, such as the uptick rule and naked short-selling prohibition, are negatively associated with accounting conservatism, although this association decreases with enforcement.

Our study does not use a causal research design. We aim to offer international evidence of the short-market relationship with accounting conservatism that is lacking in current literature through different associations and controlling for different model specifications in order to complement prior evidence of the causal link between short-selling and conservative reporting in the US market (Jain et al., 2020) and shed light on other aspects of this relationship when taking into account the institutional environment.

In summary, this study provides important insights into how short-selling constraints and regulatory enforcement can influence financial reporting at the country level. Our results underscore the complexity of this relationship and emphasize the importance of considering the role of regulatory institutions when analyzing the effects of the short-selling market on accounting numbers. These findings have important implications for regulators, financial professionals, and researchers interested in the interaction between financial markets and accounting practices.

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Appendix A

Variable Definitions

Variable	Definition
Conservatism	Average nonoperating accruals deflated by assets over five years
ShortLegal	Dummy variable equal to 1 whether short-selling is legal and zero otherwise.
Enforcement	Rank values of Corruption Perceptions Index (CPI) multiplied by -1 and rescaled with mean equal to zero and standard-deviation equal to 1. CPI is provided by Transparency International at www.transparency.org.
Size	Natural logarithm of the book value of assets
Leverage	The ratio of the book value of total debt over the book value of assets
MTB	Market value of equity over book value of equity
IFRS	Dummy variable equal to 1 for IFRS adopters and zero for non-adopters
MarketSize1	Natural logarithm of the market capitalization of listed companies
MarketSize2	Market capitalization of listed companies divided by Gross Domestic Products
Unrestricted	Dummy variable equal to zero whether the country applies an uptick rule and/or prohibits naked short-selling and 1 otherwise
IsidroFac2	Rank value of the Factor 2 of Isidro et al. (2020) country-level factors
IsidroFac3	Rank value of the Factor 3 of Isidro et al. (2020) country-level factors
IsidroFac4	Rank value of the Factor 4 of Isidro et al. (2020) country-level factors

Appendix B

Correlation matrix

Panel A: Correlation coefficients

Variable	Conservatism	ShortLegal	Enforcement	Size	Leverage
Conservatism	1.000	0.076	0.157	-0.317	0.314
ShortLegal	0.076	1.000	0.483	-0.107	0.045
Enforcement	0.157	0.483	1.000	0.014	0.002
Size	-0.317	-0.107	0.014	1.000	-0.060
Leverage	0.314	0.045	0.002	-0.060	1.000
MTB	0.009	-0.085	-0.053	-0.028	-0.106
IFRS	-0.030	0.255	0.237	-0.058	-0.063
MarketSize1	0.127	0.058	0.326	0.153	0.034
MarketSize2	0.005	0.177	0.321	0.043	-0.030

Panel B: Correlation coefficients, continued from Panel A

Variable	MTB	IFRS	MarketSize1	MarketSize2
IFRS	-0.087	1.000	-0.351	0.263
MarketSize1	0.095	-0.351	1.000	0.163
MarketSize2	-0.032	0.263	0.163	1.000

All variables are defined in Appendix A. All continuous firm-level variables are winsorized at the 1 percent and 99 percent levels to mitigate the influence of extreme values. 255,667 observations.

Appendix C

Interest variables by country

Country	AvgConservatism	ShortLegal	AvgEnforcement	Observations
Argentina	-0.187	1	-1.485	926
Australia	0.528	1	0.990	10250

Interest variables by country

Country	AvgConservatism	ShortLegal	AvgEnforcement	Observations
Austria	-0.146	1	0.852	541
Bahrain	-0.273	0	-0.632	219
Bangladesh	-0.203	0	-2.943	498
Barbados	-0.188	0	0.472	2
Belgium	-0.155	1	0.815	952
Brazil	-0.124	1	-1.220	1922
Bulgaria	-0.302	0	-0.847	912
Canada	0.956	1	1.021	12192
Chile	-0.171	1	0.644	2020
China	-0.137	0	-0.942	43085
Colombia	-0.145	0	-1.351	374
Croatia	-0.171	0	-0.467	437
Cyprus	-0.154	0	0.224	633
Czech Republic	-0.183	1	-0.044	79
Denmark	-0.116	1	1.280	1213
Ecuador	-0.318	0	-1.389	1
Egypt	-0.313	0	-1.863	1772
Finland	-0.119	1	1.254	950
France	-0.114	1	0.669	5619
Germany	-0.114	1	0.967	5610
Greece	-0.175	1	-0.659	1735
Hong Kong	-0.045	1	0.923	21831
Hungary	-0.091	1	-0.278	180
Iceland	-0.121	1	0.973	176
India	-0.222	1	-1.157	22927
Indonesia	-0.144	1	-1.803	6978
Ireland	-0.097	1	0.819	224
Israel	-0.036	1	0.343	3184
Italy	-0.085	1	-0.248	2698
Jamaica	-0.181	0	-0.762	157
Japan	-0.137	1	0.783	4257
Jordan	-0.207	0	-0.325	1464
Kazakhstan	-0.112	0	-2.049	303
South Korea	-0.121	1	0.111	25659
Kuwait	-0.166	0	-0.664	1520
Latvia	-0.262	0	-0.039	54
Lithuania	-0.188	0	0.098	250
Luxembourg	-0.191	1	1.040	90
Malaysia	-0.174	1	-0.257	10554
Malta	-0.194	0	-0.011	188
Mauritius	-0.248	0	-0.123	257

Interest variables by country

Country	AvgConservatism	ShortLegal	AvgEnforcement	Observations
Mexico	-0.215	1	-1.887	1100
Morocco	-0.192	0	-1.165	168
Netherlands	-0.081	1	1.093	1080
New Zealand	-0.061	1	1.289	1014
Nigeria	-0.207	0	-2.956	625
Norway	-0.011	1	1.133	1566
Oman	-0.235	0	-0.273	1202
Pakistan	-0.257	1	-2.470	3870
Peru	-0.140	0	-1.202	1327
Philippines	-0.145	1	-2.105	1807
Poland	-0.114	1	0.106	3572
Portugal	-0.172	1	0.431	596
Qatar	-0.251	1	0.476	397
Republic of Serbia	-0.122	0	-1.286	139
Russia	-0.140	1	-2.653	1380
Singapore	-0.121	1	1.192	6498
Slovak Republic	-0.265	0	-0.325	30
Slovenia	-0.157	1	0.313	247
South Africa	-0.175	1	-0.515	2243
Spain	-0.159	1	0.322	1276
Sri Lanka	-0.257	0	-1.394	2415
Sweden	-0.076	1	1.207	3787
Switzerland	-0.110	1	1.146	2683
Taiwan	-0.153	1	0.403	24448
Thailand	-0.172	1	-1.319	8633
Turkey	-0.332	1	-0.904	3765
Ukraine	-0.238	0	-2.456	88
United Arab Emirates	-0.219	0	0.575	947
United Kingdom	-0.023	1	0.947	11137
United States of America	0.435	1	0.750	44002
Zambia	-0.248	0	-1.543	76
Zimbabwe	1.680	0	-3.331	153

Note: AvgEnforcement: Average value of Enforcement; AvgConservatism: Average value of Conservatism; ShortLegal: Dummy variable equal to 1 whether short-selling is legal and zero otherwise.