The Effect of Intellectual Property Rights Protection on Stock Price Informativeness

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Abstract

We examine whether intellectual property protection facilitates the greater incorporation of firm-specific information into the stock price. Employing the staggered, country-level adoption of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), we find that after adoption, stock prices become less synchronous, consistent with more firm-specific information being impounded into the stock price. We further show that this effect is more pronounced for more innovative firms, firms in countries with stronger law enforcement, and firms with more financial analyst coverage. Finally, we document that TRIPS induces a richer information environment characterized by more management forecasts and media coverage.

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I. Introduction

The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) is widely regarded as the most comprehensive multilateral agreement on the protection of intellectual property (IP) rights. The international community hailed its adoption as a watershed moment in global IP rights protection.[1] The agreement's primary intent is to reduce distortions in and impediments to international trade by promoting the effective and adequate protection of global IP rights. TRIPS requires signatories to provide adequate IP rights and it specifies enforcement procedures, remedies, and dispute resolution mechanisms.[2] Though the agreement officially came into effect on January 1, 1995, countries ratified and adopted it at different times. Research documents TRIPS's profound impact on international trade, including on prices, quantities, and consumer choices (Chaudhuri, Goldberg, and Gia (2006) and Duggan, Garthwaite, and Goyal (2016)); trade flows (Ivus (2010) and Delgado Kyle, and McGahan (2013)); cross-country wealth transfers (McCalman (2001), (2005)); economic growth (Falvey, Foster, and Greenaway (2006)); technology transfer and innovation (Naghavi (2007), Abrams (2008), and Qiu and Yu (2010)); and investment (Kyle and McGahan (2012)).

Our study examines whether the strong IP protection afforded by TRIPS enables the incorporation of more firm-specific information into the stock price. We view this as an important, yet likely unintended, consequence of strengthening IP rights. Following the literature, we employ lower stock price synchronicity as an indication that more firm-specific information is incorporated into the stock price.[3] Stock prices' ability to reflect firm-specific

[1] See https://www.wto.org/english/tratop_e/trips_e/intel2_e.htm.

[2] TRIPS covers a wide variety of IP rights, such as copyright, trademarks, geographical indications, and patents. In this paper, we focus on patent rights, which have the greatest bearing on firms.

[3] An extensive literature uses low stock price synchronicity to indicate that more firm-specific information is impounded into the firm's stock price (e.g., Morck, Yeung, and Yu (2000), Durnev, Morck, Yueng, and Zarowin (2003), (2004), Piotroski and Roulstone (2004), Fernandes and Ferreira (2008), (2009), Haggard, Martin, and Pereira (2008), Gul, Kim, and Qiu (2010), Kim and Shi (2012), Dang, Moshirian, and Zhang (2015), Eun, Wang, and Xiao (2015), Israeli, Lee, and Sridharan (2017), Chung, Lee, and Rosch (2020), Lee and Watts (2021), and Kim, Su, Wang, and Wu (2021)).

information is important for efficient capital allocation both within and across countries (Wurgler (2000), Morck et al. (2000), Durnev et al. (2003), and Durnev, Morck and Yeung (2004)). Firm opacity (i.e., a lack of information about a firm) imposes a number of costs on the firm, from increased cost of capital to the inefficient allocation of R&D capital (e.g., Botosan (1997), Sengupta (1998), Lambert, Leuz, and Verrecchia (2007), and Zhong (2018)).[4] Firms' IP and innovation-related activities are especially susceptible to opacity because of inherent business uncertainty and concerns about the proprietary costs of transparency (e.g., Verrecchia (1983), Waymire (1985), and Huang, Ng, Ranasinghe, and Zhang (2021)).

In our study, we rely on stock price synchronicity to capture the amount of firm-specific information available to investors, with a more informative stock price captured by lower stock price synchronicity (Jin and Myers (2006), Ferreira and Laux (2007), and Eun et al. (2015)). Stock price synchronicity serves as "a good summary measure of information inflow" for a firm (Ferreira and Laux (2007), p. 952). This attribute makes stock price synchronicity particularly well-suited for examining changes to firms' information environments in international settings. In such settings, the relative importance of specific information channels, such as corporate disclosure, financial analysts, and the business press, can vary significantly from country to country. By focusing on a summary measure that aggregates the collective impact of all information channels, researchers can more effectively examine the overall changes to a firm's information environment without being limited to specific information channels.

We expect stronger IP rights to lead to more informative stock prices via two channels. First, well-protected IP materials (e.g., patents) are an important source of firm value (Griliches (1981), Bloom and van Reenen (2002), and Hall, Jaffe, and Trajtenberg

[4] For example, Zhong (2018) finds that transparency promotes a firm's innovative effort and efficiency.

(2005)). In the wake of TRIPS, distinguishing between innovators and imitators, as well as between more promising and less promising innovations, is likely to become increasingly important to investors, because strong IP rights enable successful innovators to capture a greater share of the economic value of their innovations. Hence, strong IP rights should incentivize investors to search for and process more firm information. If firms and information intermediaries respond to this demand by supplying more firm-specific information, and if investors then trade on this information, then stock prices should impound more firm-specific information. Second, we expect TRIPS to mitigate firms' IP-related proprietary cost concerns, which should facilitate the dissemination of more firm-specific information (Verrecchia (1983) and Kim and Valentine (2021)). The greater dissemination of information due to reduced proprietary costs should also facilitate more firm-specific information being impounded into the stock price. To the extent that these two channels enable improvement in firms' information environment, we should expect the firms to have more informative stock prices (i.e., lower stock price synchronicity) after TRIPS.

Our research design relies on TRIPS's staggered adoption as a shock to country-level patent rights protection. The staggered adoption of the agreement allows us to conduct a staggered difference-in-difference analysis, which in turn enables us to make stronger causal inferences. Our regressions also include both firm and year fixed effects, which respectively prevent the findings from being attributed to any time-invariant, unobservable firm characteristics or to time trends.

Consistent with the prediction that stronger IP protection results in more firm-specific information being incorporated into the stock price, we find that after controlling for a comprehensive set of known determinants of price synchronicity, firms' stock prices in a given country become less synchronous after the country adopts the agreement. Specifically, TRIPS adoption reduces our stock price synchronicity measure (R-squared) by 5.1 percentage points, which is equivalent to an 18.63 percent reduction in comparison to our sample mean. This magnitude is economically meaningful and comparable to prior international studies on stock price synchronicity (e.g., Fernandes and Ferreira (2008), Kim and Shi (2012), and Eun et al. (2015)). Having established a post-TRIPS decline in the affected firms' stock price synchronicity, we further establish causality by conducting parallel trend analyses. We find that firms' stock prices exhibit parallel trends in synchronicity prior to the adoption of TRIPS. The reduction in price synchronicity occurs only after adoption, beginning in the second year after TRIPS. The slight delay observed between TRIPS adoption and its impact on stock price synchronicity is consistent with the gradual nature of national-level TRIPS implementation, as the international trade and law literatures highlight (Yu (2001), Deere (2008), and Stoianoff (2012)).

We also conduct a battery of robustness tests to further substantiate our main result. We show that our findings are robust to the stacked difference-in-differences specifications employed to address the "bad comparisons" problem inherent to staggered difference-in-differences models, which the recent econometric literature highlights (Callaway and Sant' Anna (2021), Goodman-Bacon (2021), and Baker, Larcker, and Wang (2022)). While our primary regression specification includes firm and year fixed effects, we obtain qualitatively similar results with various other combinations of country, industry, and year fixed effects. Our outcomes are also robust to alternative clustering procedures and to the weighted regressions employed to mitigate potential problems due to the overweighting of countries with more observations. In additional tests that exclude tech firms, observations from the tech bubble period, and pharmaceutical firms, we demonstrate that our findings are not driven by possible changes in share price behavior during the tech bubble or by exceptions granted to the pharmaceutical industry under TRIPS. To ensure that the change in stock price informativeness captured by our results is due to the strengthened IP rights afforded by

TRIPS, rather than any secondary effects on price informativeness resulting from TRIPS-induced changes in firms' innovation activities, we control for innovation input (i.e., R&D expenditure) in our main regressions. In a robustness check, we show that our results are not affected by including additional controls for innovation output (i.e., patents). After further isolating the effect of increased IP rights from that of increased innovation activities, we show that the post-TRIPS decline in stock synchronicity is evident irrespective of whether a firm increases its post-TRIPS innovation output.

We next perform some validation tests to further strengthen our argument that the post-TRIPS reduction in stock price synchronicity can indeed be attributed to the strengthened IP protection the agreement affords. If, as we argue, the observed post-TRIPS reduction in stock price synchronicity stems from strengthened IP protection, this result should be stronger in countries where TRIPS induces greater increases in IP protection. We empirically test this by partitioning the TRIPS-affected firms into two groups based on whether they are domiciled in a country with a high or low change in patent protection following TRIPS adoption. As expected, the estimated results show that the impact of TRIPS is stronger for firms that experience a larger increase in IP protection. We further validate our argument by examining whether, after TRIPS, patents become more economically valuable, so that investors would naturally demand more firm-specific information to differentiate between firms based on their innovation ability. In line with this argument, our empirical analysis reveals a strengthened relationship between firm value and patents following the implementation of TRIPS. Moreover, we find that the post-TRIPS increase in stock price informativeness (i.e., the reduction in synchronicity) is concentrated among firms in countries with high patent-firm value sensitivity.

The benefits of TRIPS in terms of the reduced proprietary cost of disclosure should be greater for more innovative firms that stand to benefit more from stronger IP rights. However, the effectiveness of TRIPS, once implemented, could vary depending on institutional factors that shape a country's ability and incentives to effectively protect IP rights. We next conduct cross-sectional analyses to gain insight into these issues.

First, we examine whether the effect of TRIPS adoption on stock price informativeness is stronger for firms that are ex ante more innovative. If, after TRIPS, investors focus more on innovation information, we expect the agreement's effect on price informativeness to be stronger for more innovative firms. To capture firms' innovativeness, we use country-level innovation culture and the global innovation ranking. We argue that, on average, firms in countries with a culture that better cultivates innovation or those in countries with a higher global innovation ranking tend to be more innovative. In addition, we construct a patent-based measure of firm-level innovativeness that directly captures firms' innovation activities. As expected, we observe a significant reduction in the price synchronicity of more innovative firms post-TRIPS. In contrast, the impact on less innovative firms is either weaker or insignificant. These findings further strengthen our argument that the post-TRIPS strengthening of IP rights drives our main results.

Next, we turn our attention to the issue of the enforcement of legislation. Governments that adopt supranational legislation agreed upon by the international community may have differing abilities and incentives to enforce the legislation effectively (La Porta, Lopez-De-Silanes, Shleifer, and Vishny (1998) and Djankov, La Porta, Lopez-De-Silanes, and Shleifer (2003)). The effect of these international regulations should thus vary with the strength with which they are enforced. Because the ability to efficiently and effectively enforce legislation is a function of the rule of law and judicial efficiency, we expect the post-TRIPS decline in stock price synchronicity to be stronger for firms in countries with a strong rule of law and high judicial efficiency relative to firms domiciled in countries with a weak rule of law and low judicial efficiency. In addition, a large body of literature on international trade highlights that the welfare benefits of strong international IP rights vary significantly between developed and developing countries (e.g., Helpman (1993) and Grossman and Lai (2004)). Unlike developed countries, developing countries lack the technological and financial resources to enable constant innovation. From a national welfare perspective, these countries are likely better off when IP protection is lax because they can imitate other nations' innovations with minimal repercussions. Accordingly, a major controversy around TRIPS is that greater protection for international IP rights is significantly more advantageous to developed than developing countries (McCalman (2001), (2005), and Chaudhuri et al. (2006)). For this reason, the economic incentives to strictly enforce TRIPS and its consequences are likely weaker in developing countries (Duggan et al. (2016)). These circumstances lead us to predict that the post-TRIPS reduction in firms' stock price synchronicity is stronger for firms in developed countries. Our findings align closely with these predictions. We find that the reduction in share price synchronicity following the enactment of TRIPS is significantly stronger for firms in countries with a stronger rule of law or more judicial efficiency compared to those in countries where those characteristics are weaker. We also find that our results are stronger for firms in developed countries than they are for those in developing countries.

Finally, we conduct a supplementary analysis to examine the role of information intermediation by financial analysts, as well as the supply of information by firms and the business press, following the adoption of TRIPS. These analyses reveal that the negative association between TRIPS and synchronicity is stronger when a firm has more financial analysts covering it. This outcome suggests that when there is a greater flow of information into the market (for which we proxy using analyst following), the effect of TRIPS on stock price informativeness is stronger. We also find that after adoption, firms engage in more management forecasting activities and attract more media coverage. In other words, after

TRIPS, both the firms and the media appear to supply the market with more firm-specific information. While the greater supply of information by firms can be attributed to both a higher demand for information and a lower proprietary cost of disclosure due to stronger IP rights, more media coverage is consistent with the media responding to investors' heightened demand for information. Taken together, these findings suggest that the information supply channel that we propose is a likely contributor to the observed post-TRIPS reduction in firms' stock price synchronicity.

Our paper makes several contributions. First, we contribute to the growing body of literature on the consequences of TRIPS. As mentioned previously, prior papers have examined the various positive and negative economic consequences that trade negotiators explicitly identified and debated during the TRIPS adoption process. A key factor that distinguishes our paper from this prior research is that, to the best of our knowledge, we are the first to examine an important yet likely unintended positive consequence of TRIPS: lower stock price synchronicity, which indicates the greater incorporation of firm-specific information into the stock price. Our paper also identifies several systematic factors that affect the strength of TRIPS enforcement. Given the agreement's seminal importance to international IP protection, we consider documenting its likely unintended consequences to be an important contribution. More broadly, to the best of our knowledge, our paper is the first to show that supranational regulations that protect firms' IP can lead to more firm-specific information being impounded into the stock price, which is important for efficient capital allocation both within and across countries (Morck et al. (2000), Wurgler (2000), Durnev et al. (2003), (2004), and Chen, Goldstein, and Jiang (2007)).[5] To the extent that the efficient allocation of capital is an important driver of economic growth (e.g., Beck and

[5] These studies conclude that if a firm has high firm-specific price variation, its stock price will closely track its fundamentals due to the presence of informed arbitrageurs. The resulting increase in price efficiency facilitates external financing and capital spending decisions.

Levine (2002), Peretto and Valente (2011), and Kung and Schmid (2015)), one inference from our study is that this information channel offers an additional avenue through which the firm and the broader economy benefit from IP protection.

Our paper also contributes to the literature on the determinants of stock price synchronicity. Some of these determinants that prior literature considers include culture (Eun et al. (2015)), ownership concentration (Gul et al. (2010)), and trade secret laws (Kim et al. (2021)). In particular, Kim et al. (2021) examine how stock price synchronicity is impacted by the proprietary costs of disclosure that arise from trade secrets laws. They find that the recognition of the Inevitable Disclosure Doctrine (IDD) by U.S. state courts, which, they argue, increases firms' proprietary costs, also increases price synchronicity. Our paper differs from Kim et al. (2021) in that their study focuses on a legal doctrine that deters the leakage of trade secrets by constraining labor movement in the U.S. In contrast, we focus on global IP protection that explicitly target the enforcement of IP rights to promote global trade and technological innovation. We find that TRIPS reduces price synchronicity because strengthened IP rights promote greater managerial disclosure by reassuring managers that their firm's innovations are legally protected. To our knowledge, our study is the first to examine how international regulations aimed directly at protecting IP rights affect the level of firm-specific information that is impounded into a firm's stock price. It also responds to Glaeser and Lang's (2024) call for more research into information-based challenges in the context of innovation.

II. Institutional Background and Research Design

A. The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)

Negotiated at the Uruguay Round of the General Agreement on Tariffs and Trade between 1989 and 1990, the TRIPS agreement sets minimum standards for national governments' protection of IP. Widely acknowledged as the most important global agreement on international IP rights, TRIPS requires that national governments grant patents for inventions across all fields of technology, provided the inventions meet certain requirements (Article 27.1). The patents must be enforceable for at least 20 years (Article 33). With a few exceptions, no unreasonable prejudice to the patent holders' legitimate interests is allowed. Moreover, unlike other IP agreements, TRIPS has a powerful enforcement system: non-compliant countries can be disciplined through the World Trade Organization's (WTO) dispute settlement mechanism. Between 1995 and 2019, 41 consultations were initiated under this mechanism, including 18 by the United States and 8 by the European Union (Van den Bossche (2020)).[6]

TRIPS went into effect on January 1, 1995, though several countries were granted extensions. Countries that self-identified as "developing" were given an initial 5-year extension until January 1, 2000, which was then extended to January 1, 2005. Interestingly, 69 countries, including high-income countries such as Israel and South Korea, identified themselves as "developing" for this purpose. Countries that were categorized as "least developed" by the United Nations were given until 2006; this deadline was subsequently extended to January 1, 2013. As a result, TRIPS's global adoption is staggered. Moreover, because adoption occurs at the national level, it is not within the control of a single firm and is therefore an exogenous event at the firm level.

To the extent that TRIPS meets its intended objective of strengthening IP rights, we expect it to enhance both the demand for and the supply of affected firms' firm-level information. Prior literature finds that innovation outputs (e.g., patents) are significant sources of firm value (Griliches (1981), Bloom and van Reenen (2002), and Hall et al. (2005)). If TRIPS strengthens IP rights, the agreement should also enhance the value of

[6] One reason for the relatively low number of complaints is that only WTO members, not the IP holders themselves, can bring a TRIPS dispute to the WTO.

innovations accrued to the creator by mitigating the likelihood that imitators will infringe on the creator's IP rights. The value gap between innovators and imitators then widens, incentivizing investors to search for and process information about innovative firms. In addition, investors have enhanced incentives to actively seek information that allows them to distinguish between innovations with more versus less commercial potential. TRIPS may therefore increase the demand for information about firms and their innovation activities. Moreover, because TRIPS ensures the stronger protection of IP rights, firms' proprietary cost concerns should diminish after adoption. Proprietary costs are a major deterrent to firms' voluntary disclosure (Verrecchia (1983) and Kim and Valentine (2021)). If TRIPS ameliorates these concerns, then after adoption, firms should increase their supply of information. Investors' increased searching for firm-level information and firms' increased dissemination of that information should result in firms' stock price reflecting more firm-specific information, leading to decreased stock price synchronicity.

However, TRIPS enforcement varies across countries (Helpman (1993) and Grossman and Lai (2004)), which raises concerns about the agreement's universal effectiveness as the associated cost–benefit tradeoffs differ from country to country (Duggan et al. (2016)) Moreover, the dispute settlement process could be long and tedious (Van den Bossche (2020)). Hence, if TRIPS's overall efficacy is weaker than initially intended, these conjectured effects could be attenuated or vary systematically with enforcement strength.

B. Measure of Price Synchronicity

To empirically capture the incorporation of firm-specific news into the stock price, we construct a measure of stock price synchronicity. Following Jin and Myers (2006) and Eun et al. (2015), we first obtain R^2 from firm-level regressions on an expanded market model as follows:

(1) $$r_{i,c,t} = \beta_0 + \beta_1 r_{m,c,t} + \beta_2 [r_{US,t} + EX_{c,t}]$$

$$+\beta_3 r_{m,c,t-1} + \beta_4[r_{US,t-1} + EX_{c,t-1}]$$

$$+\beta_5 r_{m,c,t-2} + \beta_6[r_{US,t-2} + EX_{c,t-2}]$$

$$+\beta_7 r_{m,c,t+1} + \beta_8[r_{US,t+1} + EX_{c,t+1}]$$

$$+\beta_9 r_{m,c,t+2} + \beta_{10}[r_{US,t+2} + EX_{c,t+2}] + \varepsilon_{i,c,t},$$

where $r_{i,c,t}$ is the weekly return of stock *i* in country *c* for week *t* of a given year; $r_{m,c,t}$ is country *c*'s weekly market return for week *t* of a given year; and $r_{US,t} + EX_{c,t}$ is the U.S. market return adjusted for the change in country *c*'s exchange rate to U.S. dollars. As Eun et al. (2015) explain, the inclusion of lead and lag market returns accounts for non-synchronous trading in each market, and the inclusion of U.S. market returns proxies for the world stock market performance.

Following prior literature, we impose several filters to mitigate data errors in estimating equation (1) (e.g., Eun et al. (2015), Dang et al. (2015)). We remove firm observations with weekly stock returns that exceed 300% and that reverse in the subsequent week. We also require each firm-year to have at least 30 weekly observations for calculating the stock price synchronicity. After obtaining the firm-year-level R^2, we transform the value of R^2 and obtain our synchronicity measure using the following equation:

(2) $$Synch_{i,t} = \text{Ln}\left(\frac{R_{i,t}^2}{1-R_{i,t}^2}\right).$$

This measure of synchronicity is widely used in prior studies, including Morck et al. (2000); Dang, Dang, Hoang, Nguyen, and Phan (2020); and Kim et al. (2021).

C. Regression Specification

To examine the impact of TRIPS adoption on the incorporation of firm-specific news into the stock price, we estimate the following staggered difference-in-differences (DID) regression using an international sample:

(3) $$Synch_{i,t} = \beta_0 + \beta_1 POSTTRIPS_{c,t} + \gamma Controls_{i,t} + \alpha_i + \delta_t + \varepsilon_{i,t}.$$

Synch is the firm-level measure of stock price synchronicity for firm *i* in year *t*.[7] *POSTTRIPS* equals one for post-TRIPS firm-year observations in country *c*, zero otherwise. If, as we conjecture, firms' stock prices become less synchronous (i.e., they impound more firm-specific information) after the country-level adoption of TRIPS, we expect the coefficient on *POSTTRIPS* (β_1) to be significantly negative. We include firm and year fixed effects to respectively mitigate concerns about the effects of time-invariant, firm-specific characteristics and time trends. With both firm and year fixed effects in place, the coefficient β_1 in equation (3) is a DID estimator that captures the effect of TRIPS adoption on firms' stock price synchronicity. Throughout the paper, we report t-statistics based on standard errors clustered at the country level.

The model includes a series of control variables. For the firm-level controls, we follow prior literature (e.g., Kim et al. (2021) and Dang et al. (2020)) and include the following variables: firm size, measured as the natural logarithm of total assets (*Size*); growth opportunity, measured as the book-to-market ratio (*BM*); financial leverage, measured as the ratio of total debt to total assets (*Leverage*); profitability, measured as the return on assets (*ROA*); performance volatility, measured as the standard deviation of ROA over the previous five years (*SDROA*); return volatility, measured as the standard deviation of the firm-specific weekly stock returns during a year (*Sigma*); mean returns, measured as the mean value of the firm-specific weekly stock returns during a year (*MeanRet*); and analyst coverage, measured as the natural log of one plus the number of analysts following the firm (*Analyst*). We also control for innovation inputs, as captured by the R&D intensity (*RD*). We calculate *RD* as a firm's R&D expenditure scaled by its lagged total assets. If the firm's R&D expenditure is missing, we set *RD* to zero. Because it is unclear whether the missing R&D information is due to a lack of R&D activity or to the firm's reluctance to disclose them, we control for

[7] For simplicity, throughout the paper we omit each variable's subscripts for firm (*i*), year (*t*), and country (*c*).

RDMissing, a dummy variable that equals one if a firm's R&D expenditure is missing in the Compustat database and zero otherwise (Koh and Reeb (2015)).

We also control for firms' financial reporting opacity (*AcctOpacity*) because prior literature, such as Hutton, Marcus, and Tehranian (2009), suggests that opaque financial reports are associated with less revelation of firm-specific information. The model also includes an indicator of a firm's cross-listing status (*CrossListed*) and the correlation between its earnings and industry-level earnings (*FundaCorr*). Finally, we control for stock illiquidity. Gassen, Skaife, and Veenman (2020) emphasize the importance of controlling for stock illiquidity when examining synchronicity due to the strong negative and non-linear relationship between illiquidity and the market model R-squared. Following Gassen et al.'s (2020) example, we first measure stock illiquidity as the fraction of trading days with a zero return during a year. We then create 100 dummies based on the percentile rank of the illiquidity measure with a zero return and include them as control variables.[8]

For the country-level control variables, we follow Jin and Myers (2006) and include GDP growth (*GDPGrowth*) and the natural logarithm of per-capita GDP (*GDPPC)*). We also control for equity market development (*EquityMktDev*), as captured by the ratio of a country's total stock market capitalization to its annual GDP, and whether the country adopted International Financial Reporting Standards (*IFRS*). Further, we follow the prior stock price synchronicity literature (e.g., Eun et al. (2015) and Dang et al. (2015)) and control for the number of public firms in a country (*NumFirm*); the firms' Herfindahl index (*FirmHerf*), calculated as the summed square of the ratio of firm *i*'s sales to the total sales within each country and year; and the industry Herfindahl index (*IndHerf*), calculated as the

[8] Our inferences remain the same if we directly include the fraction of trading days with a zero return during a year as a control variable.

summed square of the ratio of industry *j*'s sales to the total sales within each country and year. We summarize all variable definitions in Appendix A.

D. Data and Sample

Our study employs several data sources. We obtain data on the TRIPS adoption year primarily from Kyle and Qian (2017), supplemented with further information from Kyle and McGahan (2012). We then double-check these data using information from the WTO. The stock returns data used to construct the synchronicity measure come from the Compustat Global database. Data for the firm-level measures are from the Compustat Global & North America databases. For the other control variables and the partitioning variables, we obtain country-level data from the World Bank's World Development Indicators, International Financial Reporting Standards (IFRS) adoption data from the IFRS website, analyst coverage data from IBES, and corporate innovation data from the World Patent Statistical Database (PATSTAT), which is maintained by the European Patent Office.[9] For the mechanism tests, we also use media coverage data from RavenPack and management forecast data from Capital IQ.

To construct our sample, we merge all necessary data from their respective sources and take the intersection as the starting point for our sample selection. Given that most countries adopted TRIPS and almost all adoptions occurred between 1995 and 2005, we focus on these adoption events by excluding non-adopting countries.[10] Accordingly, we limit our sample period to 1990–2010, which covers the five years before the earliest adoption to the five years after the latest one.

[9] PATSTAT is a global patent database that covers about 80% of the patents filed in over 100 patent offices worldwide (including the U.S. Patent and Trademark Office). The database is updated bi-annually; we use the 2016 autumn release. Some recent papers that employ PATSTAT data are Levine, Lin, and Wei (2017); Moshirian, Tian, Zhang, and Zhang (2021); and Hou, Ng, Xu, and Zhang (2025).

[10] Only a few countries are non-adopters, such as Nigeria, Oman, and Vietnam. These countries are typically small economies with a limited number of listed firms. We also exclude Russia, which adopted TRIPS in 2012. We do so because i) Russia only has a small number of listed companies, and more importantly, ii) it is the only country that adopted TRIPS after 2005, which makes its adoption much later than the majority. Untabulated tests indicate that our results remain qualitatively the same if we include all these countries in our sample.

After dropping observations with missing baseline regression variables, we further require each sample firm to have at least one observation in both the pre- and post-TRIPS adoption periods. Finally, we exclude from the regression analyses countries that have fewer than 50 firm-year observations. Our final sample consists of 84,844 firm-year observations from the period 1990−2010 for 6,161 unique firms from 29 economies.

Table 1 presents the sample distribution by economy and the corresponding year of TRIPS adoption. Due to the adoption's staggered nature, the sample exhibits significant variation with respect to the year of adoption. Specifically, 13 countries adopted the TRIPS agreement in 1995, nine in 2000, one in 2001, one in 2002, and five in 2005. The highest number of observations is from the United States (38,351), followed by Japan (18,634) and the United Kingdom (6,785). The smallest number of observations is from Chile (83), Israel (87), and Argentina (93).[11]

<Table 1 is about here>

Table 2 presents the descriptive statistics for the regression variables in our baseline model. All continuous variables are winsorized at the 1st and 99th percentiles. The mean (median) stock price synchronicity is −0.976 (−0.935). These statistics are consistent with prior studies that use the same measure (e.g., Jin and Myers (2006) and Eun et al. (2015)). The mean value of *POSTTRIPS* is 0.741, suggesting that 74.1% of firm-year observations are in the post-TRIPS period. The descriptive statistics for the control variables are largely consistent with prior international studies (e.g., Zhong (2018) and Khurana and Wang (2019)). For example, the mean (median) firm size, as measured by the natural logarithm of total assets, is 5.734 (5.698). On average, the sample firms have a book-to-market ratio of 0.805, a financial leverage of 0.245, and a return on assets of 3.2%.

[11] In robustness tests, we perform weighted regressions to address the issue of uneven representation due to firm-year observations from different economies (see Table 4, Panel D).

<Table 2 is about here>

III. The Effect of TRIPS on Firms' Stock Price Synchronicity

A. Main Findings

Table 3 presents our main findings. In Column 1, we estimate our baseline model as specified in equation (3). We find a significantly negative coefficient on *POSTTRIPS*, suggesting that firms' stock prices become less synchronous after a country adopts the agreement. That is, we find that after TRIPS adoption, the stock prices of the firms in the adopting country impound more firm-specific information. This finding is consistent with our argument that the enhanced IP rights protection resulting from TRIPS adoption enhances both the demand for and the supply of firm-level information, leading to more firm-specific information being incorporated into the firm's stock price.

The estimated coefficient on *POSTTRIPS* in Column 1 suggests that after adoption, stock price synchronicity (*Synch*) decreases by 0.274. This outcome translates to a shift in the average firm's stock price synchronicity measure from −0.976 (Table 2) to −1.250, which corresponds to a decrease in the proportion of stock price variation explained by industry and market returns from 27.37 percent to 22.27 percent.[12] Therefore, TRIPS adoption reduces the R-squared by 5.1 percentage points (= 27.37 percent − 22.27 percent), which is equivalent to 18.63 percent (= 5.10 percent / 27.37 percent) of our sample mean. This magnitude is economically meaningful and comparable to prior international studies on stock price synchronicity. For example, Kim and Shi (2012) document that IFRS adoption reduces synchronicity by 32.3 percent (roughly 59 percent of their sample mean), Eun et al. (2015) show that a one standard deviation increase in individualism culture is associated with a 18.2 percent decrease in synchronicity, and Fernandes and Ferreira (2008) shows that cross-listing

[12] When *Synch* = $\ln(R^2/(1-R^2)) = -0.976$, $R^2 = 27.37\%$, and when *Synch* = $\ln(R^2/(1-R^2)) = -0.976-0.274 = -1.250$, $R^2 = 22.27\%$.

in a developed market increases firms' synchronicity by 10.8 percent (roughly 10% of the sample mean), while cross-listing in an emerging market decreases firms' synchronicity by 29.2 percent (about 27% of the sample mean).

<Table 3 is about here>

B. Parallel Trends Analysis

To further establish causality and to ensure that our results are not due to a diverging, pre-adoption trend in the affected and unaffected firms' synchronicity, we also conduct a parallel trends analysis. Specifically, we re-estimate equation (3) by replacing the *POSTTRIPS* dummy with separate year indicators, each of which denotes the year relative to the TRIPS adoption year ($t = 0$). *TRIPS (t-n)* is an indicator variable that equals one if the firm-year observation is in the n^{th} year before the TRIPS adoption year, and zero otherwise. *TRIPS (t+n)* is an indicator variable that equals one if the firm-year observation is in the n^{th} year after the TRIPS adoption year, and zero otherwise. We omit the indicator variables for the years before t-3, which serve as the benchmark period.

Column 2 of Table 3 presents the results of the parallel trend test, and Figure 1 depicts the coefficients on the time dummies in graphical form. The coefficients on *TRIPS (t-n)* are not significant, indicating that the difference in stock price synchronicity for the treatment and control firms remains unchanged in the years leading up to TRIPS adoption. This finding supports the parallel trend assumption inherent to a difference-in-differences research design, allowing us to draw causal inferences from the results. Focusing on *TRIPS (t+n)*, we find that the treatment and control firms diverge significantly in terms of their stock price synchronicity from year t+2 onwards. In other words, firms in TRIPS-adopting countries begin to experience reduced stock price synchronicity from the second year after TRIPS adoption. This outcome suggests that changes in the information environment that lead to reduced stock price synchronicity require some time to manifest, as countries gradually implement their IP protection rules and establish adequate and effective enforcement mechanisms after the adoption of TRIPS (Yu (2001), Deere (2008), and Stoianoff (2012)).[13]

<Figure 1 is about here>

C. Robustness Tests

In this section, we perform a battery of robustness tests to confirm our main findings. We present these results in Table 4.

First, in Panel A, we investigate the sensitivity of our results to a stacked DID design. Because TRIPS adoption is staggered across countries, our baseline model is a conventional staggered DID design with two-way fixed effects. Recent literature in econometrics suggests that staggered DID research designs may result in the "bad comparisons" problem, which arises from using earlier-treated observations as controls for later-treated ones (see Callaway and Sant'Anna (2021), Goodman-Bacon (2021), and Baker et al. (2022)). We follow Baker et al.'s (2022) recommendation and examine whether our results are robust to a stacked DID specification in which we construct cohorts for the treatment and control groups around each batch of TRIPS adoption. The adoption batches are determined by year, and the earliest batch includes countries that adopted TRIPS in 1995. For each adoption batch, the treatment group (*TREAT* = 1) comprises firms in the adopting countries, and the control group (*TREAT* = 0) comprises firms in countries that have not yet adopted TRIPS. The event window in Panel A, Column 1 is [−5, +5]; it is [−10, +10] in Column 2. For both the treatment and control groups in each cohort, *POST* equals one for the years after TRIPS adoption and zero otherwise. We then combine all the constructed cohorts as the testing sample. Following standard practice for

[13] Given the practical nature of national rulemaking processes and the time lags between legislation and when the legislation goes into effect, TRIPS's effects need not take place immediately after adoption (Deere (2008)). For example, China amended its trademark law to comply with TRIPS just ten days before it joined the WTO in 2001 (Yu (2001)). However, the lengthy protocol of implementation accepted by China at that time necessitated further amendments to the copyright law in 2002 (Stoianoff (2012)). Similarly, although India adopted TRIPS in the wake of the passage of the Patents (Amendment) Bill of 2005, the applicable customs enforcement procedures were only enacted two years later. Moreover, there is approximately an 18-month time lag between a patent's filing and its publication (Hegde and Luo (2018)).

implementing a stacked DID design (e.g., Gormley, Matsa, and Milbourn (2013) and Cengiz, Dube, Lindner, and Zipperer (2019)), we include firm-cohort and year-cohort fixed effects and we cluster standard errors at the country-cohort level. Panel A reports the results for the stacked DID specifications. In both columns, we observe that the coefficient of interest on the interaction term, *TREAT* × *POST*, is significantly negative. The estimated coefficient magnitudes are also comparable to those from our baseline model. Therefore, our finding that TRIPS adoption has a negative effect on price synchronicity remains robust when we employ a stacked DID design.

Second, we consider the sensitivity of our results to the use of alternative fixed effects in the regression model. Note that our main analyses include firm and year fixed effects. Our dependent variable captures the extent to which firm-specific information is impounded into the stock price. To mitigate the concern that cross-country differences in market efficiency or industry factors might systematically affect this measure, we re-examine our model after including these fixed effects. Panel B, Column 1 shows the results with country and year fixed effects, and Column 2 shows the results with country, industry, and year fixed effects. Furthermore, in Column 3, we include country and industry-year fixed effects, and in Column 4, we include firm and industry-year fixed effects. The results show that our findings remain robust to these different fixed effects combinations.

Third, we consider alternative clustering methods. In our baseline regression, we cluster standard errors at the country level. In Panel C, Column 1, we investigate the sensitivity of our findings to two-way clustered standard errors at the country and year level. In Column 2, we cluster standard errors at the firm level, and in Column 3, we use two-way clustered standard errors at the firm and year level. We cluster standard errors at the industry level in Column 4 and employ two-way clustering by industry and year in Column 5. The use of these alternative clustering methods does not alter our inferences; we continue to observe significantly negative coefficients on *POSTTRIPS* in each column.

Our fourth set of robustness tests addresses the issue of the uneven representation of firm-year observations from different countries. We follow the prior literature and perform weighted regressions, ensuring that each country is given a similar weight, regardless of the number of observations it has. Panel D shows the estimation results. Following Akins, Dou, and Ng (2017), Column 1 uses the weighting of 1/the total number of firm-year observations per country. In Column 2, we construct the weights to improve the efficiency of the regression model by following Ball, Robin, and Sadka's (2008) approach, where each country's observations are weighted by the inverse of the square of the standard error of its beta estimate on the variable of interest (*POSTTRIPS*) when regressing the baseline model in the country.[14] As shown in Panel D, our results remain robust across both columns.

Our sample period includes the tech bubble. Moreover, 13 of the sample countries adopted TRIPS in 1995, around the time the tech bubble began. Hence, a potential concern arises that our observation of a post-TRIPS decline in stock price synchronicity could be related to the tech bubble. To allay this concern, Panel E considers whether our results are robust to the exclusion of technology industries or to the tech bubble period. Following Griffin, Harris, Shu, and Topaloglu (2011), we remove tech companies, specifically those firms denoted by the three-digit SIC code 737. The results in Column 1 show that excluding technology firms does not change our inference. In Column 2, we follow Campello and Graham (2013) and expand the definition of tech firms (i.e., those excluded from the sample) to include the additional three-digit SIC codes 481, 355, 357, 366, 367, 369, 381, 382, and 384. In Column 3, we further exclude firm-year observations from 1998 to 2002, which are

[14] In each single-country estimation, we exclude year fixed effects because the year fixed effects will absorb the *POSTTRIPS* dummy.

the two years before and after the tech bubble burst. All these robustness tests continue to show significantly negative coefficients on *POSTTRIPS*, suggesting that the tech bubble is unlikely to affect our results.

TRIPS made several exceptions with respect to IP protection for pharmaceutical products because low-cost access to life-saving drugs and essential medicines was deemed a higher public policy priority (see Chaudhuri et al. (2006), Qian (2007), and Kyle and McGahan (2012)). Accordingly, our next set of robustness tests considers the sensitivity of our findings when the sample excludes pharmaceutical firms (SIC 3-digit = 283). As shown in Panel F, Column 1, our coefficient of interest remains essentially the same. In Column 2, we broaden the definition of pharmaceuticals to include all chemical industries (SIC 2-digit = 28). We continue to find similar outcomes, suggesting that our results are not driven by the special exceptions granted to the pharmaceutical industry under TRIPS.

Promoting innovation is an intended objective of TRIPS's strengthening of IP rights (Abrams (2008) and Qiu and Yu (2010)). Prior literature suggests that innovation activities increase information demand (Huang et al. (2021)). Consequently, another channel through which TRIPS could impact stock price synchronicity is via the regulation's role in promoting innovation. Our paper's intent is not to rule out the role of innovation, but to focus squarely on the role that stronger IP rights play in improving stock price informativeness. To isolate TRIPS's role in strengthening IP rights, as opposed to its impact on innovation, we control for innovation input (i.e., R&D expenditure) in our baseline model. To ensure that our findings are not confounded by greater innovation in the post-TRIPS period, we control for innovation output in Panel G. Columns 1 and 2 respectively employ the number of patents and patent citations to measure innovation output. In both columns, we continue to find that TRIPS has a significantly negative effect on stock price synchronicity.

Columns 3 and 4 report the results of an alternative test designed to establish that our findings cannot be attributed to increased innovation activity. Specifically, we split the sample firms into two groups based on whether they experienced a post-TRIPS increase in innovation. Columns 3 and 4, respectively, capture the change in innovation activity in terms of the number of patents and the number of patent citations. *HIGH* equals one for firms that have more patents (or patent citations) during the five years after TRIPS adoption, compared with the five years before it, and zero otherwise. Suppose that the post-TRIPS decline in stock price synchronicity is solely driven by increased innovation. In that case, we should observe significant results for firms that experience an increase in innovation after TRIPS, but not for firms that do not. However, as reported in Columns 3 and 4, we find that the coefficient on the interaction term, *POSTTRIPS* × *HIGH*, is insignificant while the main effect on *POSTTRIPS* remains significantly negative. These results strongly suggest that our finding of lower stock price synchronicity after TRIPS adoption is likely independent of any effect due to heightened post-TRIPS innovation activities.

<Table 4 is about here>

IV. Validation Tests

A. The Increase in IP Protection

If, as we argue, the post-TRIPS reduction in stock price synchronicity can be attributed to the TRIPS-induced enhancement of IP protection, then the effect should be more pronounced for firms in countries where TRIPS leads to greater changes to IP rights. Results that are consistent with this conjecture would further enhance the validity of our assertion. To test the conjecture, we employ Park's (2008) country-level index of patent protection and partition the firms affected by TRIPS into two groups based on whether they are domiciled in countries with a high or low increase in patent protection after TRIPS adoption. Specifically, we create a dummy variable, *HIGH*, that equals one for firms in countries that experience an above-median increase in Park's (2008) country-level index of patent protection in the wake of TRIPS adoption, and zero otherwise.[15] We then interact *POSTRIPS* with *HIGH*. We expect a significantly negative coefficient on this interaction term. In Table 5, Panel A, we find a negative coefficient on *POSTTRIPS*, which is either significant (in Column 1) or marginally significant (in Column 2), depending on how we measure the change in IP protection. More importantly, we find that the coefficient on *POSTTRIPS* × *HIGH* is significantly negative, which is consistent with our expectations. This finding suggests a greater decline in stock price synchronicity after TRIPS for firms in countries where TRIPS led to a more significant increase in IP protection. These results support our argument that TRIPS enhances IP protection and, by this means, affects stock price synchronicity. This finding serves as an important validation test of our primary inferences.

B. The Increase in Patent Value

We also validate whether, as we argue, patents become more economically valuable after TRIPS adoption. If so, it is quite natural that the agreement should increase information demand, because distinguishing between more and less innovative firms, as well as between innovations with more and less economic promise, becomes more important after adoption. We employ the following regression model to investigate TRIPS's effect on patents' value:

$$TobinQ_{i,t} = \beta_0 + \beta_1 Patent_{i,t} \times POSTTRIPS_{c,t} + \beta_2 Patent_{i,t} + \beta_3 POSTTRIPS_{c,t} + \gamma Controls_{i,t} + \alpha_i + \delta_t + \varepsilon_{i,t}. \quad (4)$$

The dependent variable *TobinQ* is a firm's Tobin's *q*, calculated as the market value of equity plus the book value of debt divided by total assets. *Patent* is the natural logarithm of one plus the number of patents that the firm applies for in a year that are eventually granted. *POSTTRIPS* equals one for post-TRIPS and zero for pre-TRIPS observations. The coefficient

[15] Park's (2008) index does not allow us to capture the change in patent protection that TRIPS specifically introduces. However, it is quite reasonable to assume that changes in country-level patent protection around TRIPS adoption can be largely attributed to the agreement.

of interest is on the interaction term *Patent* × *POSTTRIPS*. If the greater IP protection afforded by the agreement makes patents more economically valuable after TRIPS, we would expect the association between firm value and patents to become stronger following adoption, yielding a positive coefficient on *Patent* × *POSTTRIPS*.[16]

Table 5, Panel B reports the results. Consistent with our expectation, we find that the coefficient on the interaction term *Patent* × *POSTTRIPS* is significantly positive. These results validate our argument that the contribution of patents to firm value improves after TRIPS.

In Panel C, we further examine whether the effect of TRIPS on stock price synchronicity is concentrated among countries that experience a significant increase in the sensitivity of the firm value to patents. According to our argument, investors' information demand increases due to innovations becoming more valuable after TRIPS. Consequently, we should expect TRIPS's effect on stock price synchronicity to be more pronounced for countries where the agreement's adoption effectively enhances patent value. To validate this, we divide our sample countries into two subsamples based on the change in the sensitivity of firm value to patents around the TRIPS adoption. Specifically, we estimate TRIPS's effect on the association between patents and firm value in each country.[17] The subsample in Column 1 consists of countries where the sensitivity of firm value to patents significantly increases, as suggested by the coefficient on *Patent* × *POSTTRIPS*, which is positive and statistically significant (at the five percent level). The remaining countries are grouped into the subsample in Column 2.

Consistent with our expectation, we find that in Column 1, the coefficient on *POSTTRIPS* is negative and statistically significant; it is insignificant in Column 2. We also

[16] We employ this approach because data limitations make it infeasible to directly measure the value of individual patents in international settings.
[17] Using each country's firm-year observations from the five years before and after the country's TRIPS adoption, we estimate the model as specified in equation (4) after excluding year fixed effects.

formally test the difference between the magnitudes of the coefficients in these two columns; we confirm that the effect magnitude of TRIPS on stock price synchronicity is significantly larger in Column 1. These findings indicate that the effect of TRIPS on stock price synchronicity is concentrated in countries where TRIPS adoption effectively enhances the value of patents.

Collectively, the results reported in Table 5 show that the post-TRIPS reduction on stock price synchronicity is stronger for firms in countries where TRIPS more substantially enhances IP protection, patents become more economically valuable in the wake of TRIPS, and the agreement's effect on stock price synchronicity is stronger for firms in countries with higher patent-firm value sensitivity.

<Table 5 is about here>

V. Cross-sectional Analyses

A. The Moderating Role of Innovativeness

Naturally, TRIPS adoption should be of greater relevance to more innovative firms. However, in our baseline analyses, we do not distinguish between more and less innovative firms. Instead, we investigate the average effect of TRIPS adoption on firms' price informativeness. In this section, we examine the conjecture that a post-TRIPS increase in stock price informativeness (i.e., a decline in synchronicity) should be greater for more innovative firms.

To test this conjecture, we employ three measures of innovativeness: The first two are at the country level, and the third is at the firm level. Specifically, we first use country-level innovation culture to proxy for local firms' innovativeness. The data are from the 2008-2009 Global Innovation Index (GII) report published by the World Intellectual Property

Organization (WIPO).[18] A country's innovation culture is captured in terms of the response to the survey question: "To what extent do you feel that companies in your own country have fostered a culture that expects everyone to contribute to innovation?" (1: Not at all, 5: Definitely).[19] The report aggregates survey data at the country level and creates a global ranking of how effectively cultures foster innovation. Second, we directly use the overall ranking of innovativeness in the 2007 Global Innovation Index report, which is the first and most comprehensive assessment of the innovation capabilities for countries around the globe. Firms in countries with a culture that effectively fosters innovation or in countries with a higher global innovation ranking are likely to be more innovative. Third, we follow the innovation literature and construct a patent-based firm-level measure of innovativeness, calculated as the number of patents the firm applies for (and is eventually granted) during the five-year pre-TRIPS period.

Table 6 presents the results. In Columns 1 and 2, we construct the subsamples based on the country-level measure of innovation culture. In Columns 3 and 4, we split our sample based on the global innovation ranking at the country level. For each of these two country-level measures, *HIGH* equals one for countries with a value equal to or above the median, and it equals zero for all other countries. We find that the effect of TRIPS adoption on stock price informativeness is only pronounced for countries with a culture that can better foster innovation and for those with a higher overall innovativeness ranking. In Columns 5 and 6, we split the sample using a patent-based firm-level measure of innovativeness. *HIGH* equals one for firms for which the number of pre-TRIPS patents is equal to or above the median, and zero otherwise. We find significant negative coefficients on *POSTTRIPS* in both columns, but the coefficient magnitude is significantly larger in Column 6, suggesting a stronger effect for

[18] The Global Innovation Index was started in 2007 by INSEAD and World Business, a British magazine. We accessed the reports at https://english.www.gov.cn/news/2016/08/15/content_281475418125332.htm.
[19] The survey participants are senior executives and business leaders across different industries.

more innovative firms. Taken together, these results are consistent with our expectation that the effect of TRIPS on stock price informativeness should be stronger for firms that are likely to be more innovative.

<Table 6 is about here>

B. The Moderating Role of Enforcement

A key feature of supranational agreements such as TRIPS is that although they apply equally to all signatories, their enforcement varies significantly between countries. For example, in their examination of investor protection laws in 49 countries, La Porta et al. (1998) find the quality of enforcement to be highest in Scandinavian and German civil law countries and lowest in French civil law countries, with common law countries in the middle. Similarly, Djankov et al. (2003) observe significant country-level variation in judicial efficiency.

In theory, TRIPS strengthens all firms' IP rights. However, its practical efficacy for firms is likely to vary depending on the strength with which the country legally enforces it. As with any law, TRIPS is likely to be more enforced effectively in a country where the legal system is generally strong; enforcement is likely weaker in a country with a weak legal system. Moreover, although the WTO's dispute settlement mechanism ensures that TRIPS's global enforcement is stronger than that of many other international agreements, this mechanism is unlikely to be a perfect substitute for country-level enforcement. Therefore, we expect that any effects of TRIPS, including facilitating the incorporation of more firm-level information into firms' stock price, will be stronger for firms in countries with strong law enforcement than it is for those in weak-enforcement countries. If so, the agreement's impact on stock price synchronicity should be stronger (weaker) for firms in countries with strong (weak) enforcement.

To test this argument, we capture the strength of country-level legal enforcement using two alternative proxies. First, we utilize the Rule of Law Index from the World Justice Project to split our sample countries into two.[20] The World Justice Project's Rule of Law Index is an aggregated score for the following eight factors: 1) Constraints on Government Powers; 2) Absence of Corruption; 3) Open Government; 4) Fundamental Rights; 5) Order and Security; 6) Regulatory Enforcement; 7) Civil Justice; and 8) Criminal Justice. A higher value on the Rule of Law Index indicates stronger law enforcement. Second, we use La Porta et al.'s (1998) judicial efficiency measure, which captures the efficiency and integrity of the legal environment as it affects business, particularly foreign firms.

Irrespective of enforcement ability, enforcement incentives also vary at the country level. Especially in the short term, stronger IP protection is likely detrimental to developing countries because these countries lack the resources to produce valuable innovations, and IP rights limit their ability to produce imitations based on innovations generated in developed countries (e.g., Helpman (1993), Grossman and Lai (2004), and Santacreu (2025)). Accordingly, the stronger IP rights afforded by TRIPS are less advantageous to developing countries relative to their developed counterparts, which limits the former's incentives to effectively enforce the agreement (McCalman (2001), (2005), Chaudhuri et al. (2006), Duggan et al. (2016), and Brandl, Darendeli, and Mudambi (2019)). For this reason, we predict that the post-TRIPS reduction in firms' stock price synchronicity will be stronger for firms in developed countries relative to those in developing countries. We examine this by partitioning the sample into developed and developing countries based on the World Bank's classification of countries by gross national income per capita.

[20] The data is publicly available at https://worldjusticeproject.org/rule-of-law-index/. The earliest available year for this index is 2012; therefore, we use the 2012 index to split the sample. Our inferences remain unchanged if we construct the subsamples using the World Bank's Rule of Law Index from the year preceding TRIPS adoption.

Table 7 reports the results of the tests that examine how these country-level factors moderate TRIPS's effect on price informativeness. In Columns 1 and 2, we split our sample based on the Rule of Law Index. We find that the effect of TRIPS is only pronounced for the subsample with a higher Rule of Law Index, indicating that law enforcement plays an important moderating role. In Columns 3 and 4, we partition our sample based on judicial efficiency. The results indicate that the post-TRIPS increase in stock price informativeness (i.e., a decline in synchronicity) is significant for firms in countries with high judicial efficiency, but not for those in low-judicial-efficiency countries. The subsample in Column 5 consists of developing countries, and that in Column 6 includes developed countries. Consistent with our expectations, we find the impact of TRIPS on stock price synchronicity to be significant for developed, but not developing, countries. Taken together, these results suggest that the extent to which the agreement is likely to be effectively enforced at the country level moderates the effect of TRIPS on stock price informativeness.

<Table 7 is about here>

VI. Supplementary Analyses

A. The Moderating Role of Information Intermediation

Our main finding is consistent with the argument that strengthening IP rights through TRIPS facilitates the greater incorporation of firm-specific information into the stock price. The validation tests and cross-sectional analyses reported in prior sections offer corroborative evidence in support of this argument. As a supplementary analysis, we delve more deeply into information intermediation's role by focusing on financial analysts. Financial analysts are pivotal to the stock market because of the information that they process and produce (e.g., Bradshaw, Ertimur, and O'Brien (2017)). For example, analysts could examine patent filings along with firm disclosures and other pertinent information and create reports that enable investors to better assess fundamental firm value. If so, analyst coverage should enhance the informativeness of stock prices, and TRIPS's impact on stock price informativeness should be greater for firms with greater analyst coverage.

We examine this by splitting the sample based on the pre-TRIPS analyst coverage. In the first (second) column of Table 8, Panel A, the subsample consists of firms with analyst coverage that is below (equal to or above) the median. We find that while the negative effect of TRIPS adoption on stock price synchronicity is statistically significant for both subsamples, the magnitude of the effect is significantly larger for the subsample of firms with high analyst coverage. These results substantiate our argument by showing that when there is greater information flow into the market, as proxied by analyst following, the effect of TRIPS on stock price informativeness is stronger.

B. The Effect of TRIPS on the Supply of Information by Firms and the Media

Finally, we test our conjecture that one reason for the greater incorporation of firm-specific information into a firm's stock price after TRIPS adoption is the greater supply of information about the firm. We use management earnings forecasts to capture firms' proclivity to provide more information.[21] We also use media coverage to capture the media's supply of firm-specific information. We then run the following Poisson regression:

$$Information_{i,t} = \beta_0 + \beta_1 POSTTRIPS_{c,t} + \gamma Controls_{i,t} + \alpha_i + \delta_t + \varepsilon_{i,t}. \quad (5)$$

Information is measured using either *MFFrequency* or *MediaCov*. *MFFrequency* is the number of management forecasts issued by a firm in a given year. *MediaCov* is the number of media articles covering news that pertains to a firm in a given year. We obtain management forecast data from Capital IQ and media coverage data from RavenPack.[22] The coefficient of

[21] Some studies argue that management forecasts are largely non-proprietary in nature (e.g., Kim et al. (2021)). However, others posit that at least when combined with other information, management forecasts may reveal proprietary information (e.g., Bamber and Cheon (1998), Mercer (2004), and Huang et al. (2021)). In international settings, data constraints make it difficult to empirically capture other disclosures that impose significant proprietary costs.

[22] Because both management forecast and media coverage data are only available after the year 2000, these analyses rely on a relatively smaller sample.

interest is that on *POSTTRIPS*. A significant post-TRIPS increase in firm-level information via the information channels above would yield a positive coefficient.

Table 8, Panel B presents the results. In Column 1, we use the management forecast frequency (*MFFrequency*) as the dependent variable. We find a significantly positive coefficient on *POSTTRIPS*, suggesting that firms increase their supply of information after TRIPS adoption. In Column 2, we report the results that pertain to media coverage. Again, we find a significantly positive coefficient on *POSTTRIPS*, indicating an increase in media coverage in the wake of the agreement. These results support our argument that following TRIPS adoption, both the amount of information that firms supply and the firm-level information that the media disseminates increase, potentially contributing to the greater incorporation of firm-specific information into a firm's stock price (i.e., lower stock price synchronicity).

<Table 8 is about here>

VII. Conclusion

This paper investigates the effect of stronger IP protection on firms' stock price synchronicity. For our setting, we use the enactment of the TRIPS agreement, which significantly strengthens the IP rights of firms in adopting countries. We find that after a country adopts TRIPS, firms in that country exhibit lower stock price synchronicity, suggesting that their stock prices incorporate more firm-specific information. This finding is consistent with TRIPS adoption leading to increased investor demand for information about a firm's innovation, as well as a rise in the supply of such information by firms and information intermediaries. We further document that the negative effect of TRIPS adoption on stock price synchronicity is more pronounced for more innovative firms, firms in countries with stronger law enforcement, and firms with more financial analyst coverage. We also document that TRIPS induces a richer information environment, characterized by more management forecasts and media coverage.

Overall, our paper provides novel insights into how international regulations aimed at strengthening IP rights can impact capital markets. While the increased stock price informativeness that we document in our paper is likely to be an unintended positive externality of TRIPS, it is an important one that can further enhance TRIPS' effectiveness in promoting innovation. In particular, to the extent that higher stock price informativeness leads to improved access to capital, provides better signals to managers and investors, increases market discipline in managerial decisions, and encourages a long-term orientation of firms, one can expect firms to become even more innovative through the effect of TRIPS on stock price informativeness.

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Appendix A. Variable Definitions

Variable	Definition	Data Source
Variables in the baseline analysis (in Table 3)		
Synch	Firm-level stock price synchronicity measure (transformed R^2) constructed following Eun et al. (2015).	Compustat Global & North America
POSTTRIPS	Dummy variable that equals one if the firm-year observation is after the TRIPS adoption year and zero otherwise.	Kyle and Qian (2017), Kyle and McGahan (2012), WTO
TRIPS (t−/+n)	Dummy variable indicating a year relative to the TRIPS adoption year (t = 0). Specifically, *TRIPS (t-n)* equals one if the firm-year observation is in the n^{th} year before the TRIPS adoption year, and zero otherwise. *TRIPS (t+n)* equals one if the firm-year observation is in the n^{th} year after the TRIPS adoption year, and zero otherwise.	Kyle and Qian (2017), Kyle and McGahan (2012), WTO
Size	Natural logarithm of total assets in USD millions.	Compustat Global & North America
BM	Book-to-market ratio, calculated as the firm's book value of equity divided by its market value of equity.	Compustat Global & North America
Leverage	Leverage ratio, calculated as the sum of short- and long-term debt divided by total assets.	Compustat Global & North America
ROA	Return on assets, calculated as income before extraordinary items divided by the lagged total assets.	Compustat Global & North America
SDROA	Standard deviation of *ROA* for the previous five years.	Compustat Global & North America
Sigma	Standard deviation of the firm-specific weekly stock returns.	Compustat Global & North America
MeanRet	Mean value of the firm-specific weekly stock returns.	Compustat Global & North America
Analyst	Natural logarithm of one plus the number of analysts following the firm.	IBES
RD	Firm's R&D expenditure scaled by the lagged total assets. A firm's R&D expenditure is set to zero if it is missing.	Compustat Global & North America
RDMissing	Dummy variable that equals one if a firm's R&D expenditure is missing and zero otherwise.	Compustat Global & North America
AcctOpacity	Hutton et al.'s (2009) opacity measure, calculated as the sum of the absolute value of the discretionary accruals, as derived from the modified Jones model, over the past three years. Specifically, we derive the discretionary accruals by estimating the following model separately for each country-year-industry: $TA_{i,t}/AT_{i,t-1} = \beta_0(1/AT_{i,t-1}) + \beta_1\Delta REV_{i,t}/AT_{i,t-1} + \beta_2 PPE_{i,t}/AT_{i,t-1} + \varepsilon_{i,t}$. The dependent variable is the total accruals (*TA*), calculated as the change in non-cash current assets minus the change in non-interest-bearing current liabilities and minus depreciation and amortization expenses. Independent variables include the annual change in revenue (ΔREV) and the balance of net property, plant, and equipment (*PPE*). We scale these three variables by the lagged total assets (*AT*). Based on the coefficients	Compustat Global & North America

	estimated using the above model, we calculate discretionary accruals as $TA_{i,t}/AT_{i,t-1} - (\beta_0(1/AT_{i,t-1}) + \beta_1(\Delta REV_{i,t} - \Delta RECT_{i,t})/AT_{i,t-1} + \beta_2 PPE_{i,t}/AT_{i,t-1})$, where $\Delta RECT$ is the annual change in accounts receivable.	
CrossListed	Dummy variable that equals one if a firm is listed in more than one stock exchange and zero otherwise.	Compustat Global & North America
FundaCorr	The synchronicity of earnings, computed as the logged transformed R^2 estimated from regressing the firm's annual ROA on the industry value-weighted ROA for the previous five years.	Compustat Global & North America
GDPGrowth	Annual GDP growth rate.	World Development Indicators
GDPPC	Natural logarithm of GDP per capita.	World Development Indicators
EquityMktDev	A measure of equity market development, calculated as the ratio of a country's total stock market capitalization to its GDP in a year.	World Development Indicators
IFRS	Dummy variable that equals one if a firm-year observation is during or after the year of IFRS adoption and zero otherwise.	IFRS website
NumFirm	Natural logarithm of the number of public firms in a country-year.	Compustat Global & North America
FirmHerf	The summed square of the ratio of firm *i*'s sales to the total sales within each country and year.	Compustat Global & North America
IndHerf	The summed square of the ratio of industry *j*'s sales to the total sales within each country and year.	Compustat Global & North America
Additional variables in the remaining analyses (in alphabetical order)		
Citation	Natural logarithm of one plus the total number of forward citations of patents that a firm applies for in a year and that are eventually granted.	European Patent Office PATSTAT
MediaCov	The number of news media articles covering the firm in a given year.	RavenPack
MFFrequency	The number of management forecasts that the firm issues in a given year.	S&P Capital IQ
Patent	Natural logarithm of one plus the number of patents applied for in a year and eventually granted.	European Patent Office PATSTAT
TobinQ	Firm's Tobin's *q*, calculated as the market value of equity plus the book value of debt (calculated as total assets minus the book value of equity), divided by total assets.	Compustat Global & North America

Figure 1. Parallel Trend

This figure reports the coefficients produced by the regression that examines the effect of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) on stock price synchronicity in event time and that corresponds to Column 2 of Table 3. In this parallel trend test, we estimate baseline model (1) but replace the *POSTTRIPS* dummy with separate year indicators, each of which marks a year relative to the TRIPS adoption year ($t = 0$). We omit the indicators for the years before t-3, which serve as the benchmark period. The vertical bands represent the 95% confidence intervals for each point estimate.

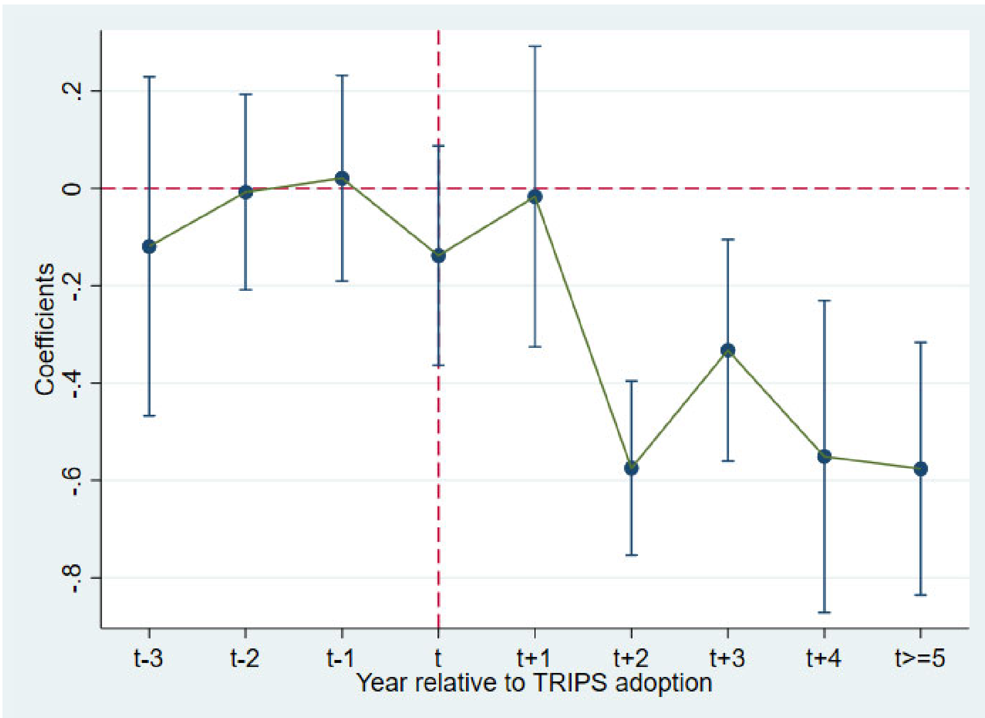

Table 1. Sample Distribution

This table reports the sample composition by economy. Our sample comprises the 29 economies that adopted the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) between 1995 and 2005. We determine the TRIPS adoption year primarily from Kyle and Qian (2017), supplemented with information from Kyle and McGahan (2012) and the World Trade Organization (WTO). The number of firm-years is the total number of firm-year observations for each TRIPS-adopting economy in our sample period, 1990−2010.

Economy	No. of Firm-Years	TRIPS Adoption Year	Economy	No. of Firm-Years	TRIPS Adoption Year
Argentina	93	2005	Mexico	258	2000
Australia	1,020	1995	Netherlands	271	1995
Brazil	195	2005	Norway	243	1995
Canada	3,880	1995	Pakistan	363	2005
Chile	83	2000	Philippines	166	2000
China	1,244	2001	Singapore	995	2000
Denmark	327	1995	South Africa	154	1995
Germany	1,871	1995	Spain	298	1995
Hong Kong	559	1995	Sweden	255	1995
India	1,987	2005	Taiwan	1,026	2002
Indonesia	504	2000	Thailand	597	2000
Israel	87	2000	Turkey	254	2005
Japan	18,634	1995	United Kingdom	6,785	1995
Korea, Rep.	1,656	2000	United States	38,351	1995
Malaysia	2,688	2000	Total	84,844	N/A

Table 2. Summary Statistics (*N* = 84,844)

This table presents the summary statistics for the regression variables used in our main analysis, which examines the effect of the adoption of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) on firms' stock price synchronicity. Our final sample is comprised of 84,844 firm-year observations from the 29 economies that adopt TRIPS during our sample period, 1990−2010. We winsorize all continuous variables at the 1st and 99th percentiles. Appendix A summarizes all the variable definitions.

Variable	Mean	SD	p25	p50	p75
Synch	-0.976	0.981	-1.618	-0.935	-0.283
POSTTRIPS	0.741	0.438	0.000	1.000	1.000
Size	5.734	2.092	4.275	5.698	7.175
BM	0.805	0.791	0.348	0.591	0.973
Leverage	0.245	0.191	0.084	0.227	0.367
ROA	0.032	0.107	0.005	0.033	0.075
SDROA	0.067	0.138	0.014	0.029	0.063
Sigma	0.061	0.033	0.038	0.053	0.075
MeanRet	0.003	0.009	-0.002	0.002	0.007
Analyst	1.063	1.082	0.000	0.693	1.946
RD	0.023	0.055	0.000	0.000	0.018
RDMissing	0.542	0.498	0.000	1.000	1.000
AcctOpacity	0.169	0.152	0.071	0.122	0.210
CrossListed	0.089	0.284	0.000	0.000	0.000
FundaCorr	-1.393	2.433	-2.698	-1.116	0.206
GDPGrowth	2.734	2.586	1.528	2.746	4.038
GDPPC	10.098	0.876	10.103	10.360	10.550
EquityMktDev	0.933	0.374	0.667	0.888	1.225
IFRS	0.052	0.222	0.000	0.000	0.000
NumFirm	8.013	1.219	7.253	8.011	9.137
FirmHerf	0.012	0.013	0.003	0.006	0.015
IndHerf	0.063	0.029	0.040	0.055	0.077

Table 3. Effect of TRIPS on Stock Price Synchronicity and the Parallel Trend Test
This table presents our main results, which examine the effect of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) on stock price synchronicity. Column 1 reports the results of the baseline regression model. The dependent variable is firms' stock price synchronicity (*Synch*). *POSTTRIPS* equals one for post-TRIPS observations and zero for pre-TRIPS observations. Column 2 reports the parallel trend test, in which we replace the *POSTTRIPS* dummy with separate year indicators, each of which marks a time period relative to the TRIPS adoption year ($t = 0$). We omit the indicators for the years before t-3, which serve as the benchmark period. Appendix A summarizes all the variable definitions. The model controls for a series of illiquidity rank dummies and includes firm and year fixed effects. The t values are based on standard errors clustered by country and are presented in parentheses below each coefficient. The constant terms and coefficients on the illiquidity rank dummies are estimated but omitted for brevity. ***, **, and * represent significance at the 1, 5, and 10% levels, respectively.

Dep. Var. = *Synch*	1	2
POSTTRIPS	-0.274**	
	(-2.53)	
TRIPS (t−3)		-0.119
		(-0.70)
TRIPS (t−2)		-0.008
		(-0.08)
TRIPS (t−1)		0.021
		(0.20)
TRIPS (t=0)		-0.138
		(-1.26)
TRIPS (t+1)		-0.017
		(-0.11)
TRIPS (t+2)		-0.575***
		(-6.58)
TRIPS (t+3)		-0.333***
		(-2.99)
TRIPS (t+4)		-0.551***
		(-3.52)
TRIPS (t>=5)		-0.576***
		(-4.55)
Size	0.090***	0.089***
	(11.67)	(10.30)
BM	0.003	0.002
	(0.21)	(0.12)
Leverage	0.014	0.006
	(0.38)	(0.19)
ROA	-0.022	-0.014
	(-0.52)	(-0.40)
SDROA	0.003	-0.008
	(0.09)	(-0.23)
Sigma	0.997***	0.950***
	(7.82)	(6.69)
MeanRet	-2.844	-2.558
	(-1.51)	(-1.38)
Analyst	0.004	0.005
	(0.56)	(0.72)
RD	0.053	0.050
	(0.89)	(0.82)

RDMissing	0.003	-0.001
	(0.10)	(-0.05)
AcctOpacity	0.039**	0.040**
	(2.16)	(2.25)
CrossListed	-0.011	-0.018
	(-0.28)	(-0.44)
FundaCorr	0.000	-0.000
	(0.23)	(-0.26)
GDPGrowth	-0.001	-0.003
	(-0.14)	(-0.48)
GDPPC	-0.394**	-0.256*
	(-2.41)	(-1.72)
EquityMktDev	0.181***	0.281***
	(3.34)	(3.57)
IFRS	0.038	0.012
	(0.54)	(0.21)
NumFirm	-0.281***	-0.224***
	(-7.54)	(-5.04)
FirmHerf	-7.188***	-6.349***
	(-2.84)	(-3.18)
IndHerf	2.662**	1.864
	(2.19)	(1.38)
Illiquidity rank dummies	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
N	84,844	84,844
adj. R^2	0.577	0.580

Table 4. Robustness Tests

This table presents our robustness checks. In Panel A, we examine whether our results are robust to the stacked difference-in-differences (DID) design. In Panels B and C, we present the results using various alternative fixed effects and alternative clustering. In Panel D, we investigate whether our results are robust to weighted regressions. In Panel E, we examine whether our results are affected by the tech bubble. To do so, we exclude from our sample technology firms and the tech bubble period. In Panel F, we examine whether our results hold after excluding the pharmaceutical industry, which was granted special exceptions under the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). In Panel G, we report tests that we conduct to rule out increased post-TRIPS innovation activity as an alternative explanation. Appendix A summarizes all the variable definitions. The *t* values are based on standard errors clustered by country (except in Panel C) and are presented in parentheses below each coefficient. The constant terms and coefficients on the control variables are estimated but omitted for brevity. ***, **, and * represent significance at the 1, 5, and 10% levels, respectively.

Panel A. Stacked DID designs

Dep. Var. = *Synch*	1 Event window [-5, +5]	2 Event window [-10, +10]
TREAT × POST	-0.276***	-0.301***
	(-3.27)	(-3.19)
Controls	Yes	Yes
Firm-cohort FE	Yes	Yes
Year-cohort FE	Yes	Yes
N	58,478	84,195
adj. R^2	0.594	0.570

Panel B. Alternative fixed effects

Dep. Var. = *Synch*	1	2	3	4
POSTTRIPS	-0.253**	-0.264**	-0.268**	-0.278**
	(-2.36)	(-2.45)	(-2.52)	(-2.59)
Controls	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	No
Industry FE	No	Yes	No	No
Year FE	Yes	Yes	No	No
Industry-year FE	No	No	Yes	Yes
Firm FE	No	No	No	Yes
N	84,844	84,844	84,823	84,823
adj. R^2	0.530	0.539	0.549	0.588

Panel C. Alternative clustering

Dep. Var. = *Synch*	1	2	3	4	5
POSTTRIPS	-0.274**	-0.274***	-0.274**	-0.274***	-0.274**
	(-2.13)	(-14.25)	(-2.54)	(-9.69)	(-2.58)
Controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Clustering	Country & Year	Firm	Firm & Year	Industry	Industry & Year
N	84,844	84,844	84,844	84,844	84,844
adj. R^2	0.577	0.577	0.577	0.577	0.577

Panel D. Weighted regressions

Dep. Var. = *Synch*	1	2
Weight =	1/#observations in each country	1/S.E.^{2} from the single-country regressions
POSTTRIPS	-0.252***	-0.357**
	(-3.98)	(-2.25)
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
N	84,844	84,844
adj. R^2	0.457	0.584

Panel E. Ruling out the tech bubble as an alternative explanation

Dep. Var. = *Synch*	1 Excluding SIC3=737	2 Excluding SIC3= 737,481,355,357,366,367,369,381,382,384	3 Further excluding the tech bubble period 1998–2002
POSTTRIPS	-0.280**	-0.307***	-0.204**
	(-2.58)	(-2.86)	(-2.15)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	81,864	70,033	49,614
adj. R^2	0.577	0.574	0.601

Panel F. Results excluding the pharmaceutical industry

Dep. Var. = *Synch*	1 Excluding SIC3=283	2 Excluding SIC2=28
POSTTRIPS	-0.277**	-0.277**
	(-2.54)	(-2.52)
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
N	81,854	77,129
adj. R^2	0.579	0.578

Panel G. Ruling out increased post-TRIPS innovation as an alternative explanation

Dep. Var. = *Synch*	1	2	3	4
Controlling for or defining the *HIGH* dummy based on:	Number of patents	Number of patent citations	Increase in the number of patents	Increase in the number of citations
POSTTRIPS	-0.274**	-0.274**	-0.269**	-0.270**
	(-2.53)	(-2.53)	(-2.53)	(-2.53)
POSTTRIPS × *HIGH*			-0.017	-0.015
			(-0.77)	(-0.88)
Patent	0.001			
	(0.21)			
Citation		0.001		
		(0.19)		
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	84,844	84,844	84,844	84,844
adj. R^2	0.577	0.577	0.577	0.577

Table 5. Validation Tests

This table presents the results of the validation tests. Panel A presents the results on the post-TRIPS change in stock price synchronicity based on whether firms are domiciled in countries that experience a high or low change in the strength of their intellectual property (IP) protection following the adoption of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). The changes in IP protection strength are captured via changes in Park's (2008) country-level index of patent protection around the adoption of TRIPS. In the first (second) column, *HIGH* equals one for countries with an above-median change in the IP protection index (the change in the IP protection index scaled by the pre-TRIPS IP protection index), and zero otherwise. Panel B shows the effect of TRIPS on the association between patents and firm value. The dependent variable *TobinQ* is a firm's Tobin's *q*, calculated as the market value of equity plus the book value of debt (calculated as total assets minus the book value of equity), divided by total assets. We focus on the two-way interaction term *Patent* × *POSTTRIPS*. *Patent* is the natural logarithm of one plus the number of patents applied for in a year and eventually granted. *POSTTRIPS* equals one for post-TRIPS observations and zero for pre-TRIPS observations. In Panel C, we examine whether the effect of TRIPS on stock price synchronicity is concentrated in the subsample of countries with a significant increase in the sensitivity of firm value to patents around TRIPS adoption. To construct the subsamples, we estimate the effect of TRIPS on the association between patents and firm value in each country using a model similar to that in Panel B. The subsample in Column 1 consists of countries with a significant increase in the sensitivity of firm value to patents, as suggested by a significantly positive coefficient on *Patent* × *POSTTRIPS*. The remaining countries are grouped into the subsample in Column 2. Appendix A summarizes all the variable definitions. The model includes firm and year fixed effects. The *t* values are based on standard errors clustered by country and are presented in parentheses below each coefficient. The constant terms are estimated but omitted for brevity. ***, **, and * represent significance at the 1, 5, and 10% levels, respectively.

Panel A. Increase in IP protection around TRIPS adoption

Dep. Var. = *Synch*	1	2
A higher increase in IP protection (*HIGH*) is based on:	Change in the IP protection index	Change in the IP protection index scaled by the pre-TRIPS IP protection index
POSTTRIPS × *HIGH*	-0.180**	-0.186**
	(-2.06)	(-2.18)
POSTTRIPS	-0.186*	-0.175
	(-1.79)	(-1.65)
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
N	84,844	84,844
adj. R^2	0.577	0.577

Panel B. Effect of TRIPS on the association between patents and firm value

Dep. Var. = *TobinQ*	1
Patent × *POSTTRIPS*	0.040***
	(4.57)
Patent	0.008
	(0.69)
POSTTRIPS	-0.429
	(-1.65)
Size	-0.608***
	(-11.09)

ROA	-0.972***
	(-8.32)
RD	3.976***
	(6.58)
RDMissing	0.194***
	(4.55)
GDPGrowth	0.009
	(0.92)
GDPPC	0.000
	(1.47)
EquityMktDev	0.705***
	(6.01)
IFRS	0.227
	(1.05)
Firm FE	Yes
Year FE	Yes
N	209,957
adj. R^2	0.566

Panel C. Increase in the sensitivity of firm value to patents

Dep. Var. = *Synch*	1 Subsample of countries with a significant increase in the firm value's sensitivity to patents	2 Subsample of countries without a significant increase in the firm value's sensitivity to patents
POSTTRIPS	-0.504***	-0.067
	(-6.39)	(-0.69)
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
N	70,993	13,850
adj. R^2	0.582	0.453
Coeff. Difference (p-value)	0.000***	

Table 6. Cross-sectional Analyses: Innovativeness

This table presents the cross-sectional variation for innovativeness. We split our sample into two subsamples based on country- or firm-level measures of innovativeness prior to the adoption of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). In the first two columns, we construct the subsamples based on a country-level measure of innovation culture. In Columns 3 and 4, we split our sample based on the global innovation ranking at the country level. For each of these two country-level measures, *HIGH* equals one for countries for which the value is equal to or above the median; it equals zero for the remaining countries. In Columns 5 and 6, we split the sample based on a patent-based firm-level measure of innovativeness, calculated as the number of patents the firm applies for (and is eventually granted) during the five-year pre-TRIPS period. *HIGH* equals one for firms for which the number of pre-TRIPS patents is equal to or higher than the median, and zero otherwise. *POSTTRIPS* equals one for post-TRIPS observations and zero for pre-TRIPS observations. Appendix A summarizes all the variable definitions. The model controls for a series of illiquidity rank dummies and includes firm and year fixed effects. The *t* values are based on standard errors clustered by country and are presented in parentheses below each coefficient. The constant terms and coefficients on the control variables are estimated but omitted for brevity. ***, **, and * represent significance at the 1, 5, and 10% levels, respectively.

	Country-level innovation culture		Global innovation ranking		Patent-based firm-level innovativeness	
Dep. Var. = *Synch*	1	2	3	4	5	6
Subsamples:	*HIGH* = 0	*HIGH* = 1	*HIGH* = 0	*HIGH* = 1	*HIGH* = 0	*HIGH* = 1
POSTTRIPS	-0.039	-0.482***	-0.054	-0.312*	-0.229**	-0.444**
	(-0.38)	(-4.52)	(-0.71)	(-2.07)	(-2.41)	(-2.66)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	6,755	78,089	7,138	76,678	64,269	20,575
adj. R^2	0.433	0.579	0.438	0.575	0.563	0.572
Coeff. Difference (p-value)	0.000***		0.005***		0.000***	

Table 7. Cross-sectional Analyses: Enforcement

This table presents the cross-sectional variations in enforcement. We split our sample into two subsamples based on country-level measures of enforcement prior to the adoption of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). In the first two columns, we construct the subsamples based on a country-level rule of law index. In Columns 3 and 4, we split our sample based on the judicial efficiency of each sample country. For each of these two country-level measures, *HIGH* equals one for countries for which the value is equal to or above the median, and it equals zero for the remaining countries. In Columns 5 and 6, we split the sample based on an indicator variable for developed countries. *HIGH* equals one for developed countries, and zero otherwise. *POSTTRIPS* equals one for post-TRIPS observations and zero for pre-TRIPS observations. Appendix A summarizes all the variable definitions. The model controls for a series of illiquidity rank dummies and includes firm and year fixed effects. The *t* values are based on standard errors clustered by country and are presented in parentheses below each coefficient. The constant terms and coefficients on the control variables are estimated but omitted for brevity. ***, **, and * represent significance at the 1, 5, and 10% levels, respectively.

	Rule of law index		Judicial efficiency		Developed country	
Dep. Var. = *Synch*	1	2	3	4	5	6
Subsamples:	*HIGH* = 0	*HIGH* = 1	*HIGH* = 0	*HIGH* = 1	*HIGH* = 0	*HIGH* = 1
POSTTRIPS	0.061	-0.550***	-0.068	-0.589***	0.143	-0.453***
	(0.72)	(-6.36)	(-0.93)	(-6.79)	(1.47)	(-4.41)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	8,586	75,145	7,634	75,966	5,056	79,788
adj. R^2	0.438	0.576	0.417	0.577	0.455	0.579
Coeff. Difference (p-value)	0.000***		0.000***		0.000***	

Table 8. Information Intermediation and Information Supply

This table presents the results of the moderating role of information intermediation and firms' information supply in response to the adoption of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). In Panel A, we investigate the role of information intermediation by focusing on financial analysts. We split our sample into two subsamples based on the pre-TRIPS analyst coverage. In the first (second) column, the subsample consists of firms with analyst coverage that is lower than (equal to or higher than) the median analyst coverage. In Panel B, we examine the effects of TRIPS on firms' information supply by estimating Poisson regressions. In Column 1, the dependent variable, *MFFrequency*, is the number of management forecasts that the firm issues in a given year. In Column 2, we investigate the media's dissemination of firm-disclosed information as captured by the number of news media articles covering the firm in a given year (*MediaCov*). *POSTTRIPS* equals one for post-TRIPS observations and zero for pre-TRIPS observations. Appendix A summarizes all the variable definitions. The model includes firm and year fixed effects. The *t* values (OLS regressions in Panel A) or z values (Poisson regressions in Panel B) are based on standard errors clustered by country; they are presented in parentheses below each coefficient. The constant terms are estimated but omitted for brevity. ***, **, and * represent significance at the 1, 5, and 10% levels, respectively.

Panel A. The role of information intermediation

Dep. Var. = *Synch*	1 Subsample of firms with relatively lower analyst coverage	2 Subsample of firms with relatively higher analyst coverage
POSTTRIPS	-0.254**	-0.341**
	(-2.30)	(-2.74)
Controls	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
N	34,994	41,856
adj. R^2	0.591	0.567
Coeff. Difference (p-value)	0.019**	

Panel B. Firms' information supply

Dep. Var. =	1 *MFFrequency*	2 *MediaCov*
POSTTRIPS	0.722***	0.390***
	(2.65)	(2.90)
Size	0.402***	0.328***
	(13.67)	(3.55)
BM	-0.294**	-0.062***
	(-2.11)	(-2.99)
Leverage	-0.187*	-0.081
	(-1.94)	(-0.46)
ROA	0.017	-0.030
	(0.08)	(-0.39)
RD	0.248	2.975***
	(1.11)	(4.59)
RDMissing	-0.124**	-0.011
	(-2.52)	(-0.16)
GDPGrowth	-0.098**	0.005
	(-2.17)	(0.77)
GDPPC	0.000***	-0.000

	(3.02)	(-1.53)
EquityMktDev	-0.630	0.055
	(-1.07)	(0.44)
IFRS	0.442***	-0.022
	(3.29)	(-0.17)
Firm FE	Yes	Yes
Year FE	Yes	Yes
N	53,152	36,951
pseudo R^2	0.378	0.708