DO INTERNATIONAL RULINGS HAVE SPILLOVER EFFECTS?
The View from Financial Markets

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I. INTRODUCTION

HOW influential are international courts? Are they designed to narrowly affect the behavior of countries participating in a given dispute, or do they have the power to modify global norms? International courts have gained unprecedented authority in global governance since World War II, yet opinions differ as to their influence. In this article, we ask whether international courts can be agents of social and legal change, or whether they are merely third-party arbiters appointed by states to resolve discrete conflicts.

The would-be influence of international courts is highly circumscribed by governments wary of delegating too much authority to bodies of unelected judges. The traditional view is that rulings by international courts, as opposed to domestic laws and especially common law systems, are binding only on the parties to the dispute and with respect to the matter at hand.¹ But a growing number of scholars argue that international law no longer derives its power strictly from state consent, and that the courts have the ability to change actors’ expectations as to what constitutes acceptable behavior.

Such claims have been made across a range of regimes. Laurence Helfer and Erik Voeten consider the circumstances under which rulings of the European Court of Human Rights (ECHR) may influence policy within states not party to the ruling.² Testing their claim in the case of...

¹ Article 59 of the International Court of Justice Statute is usually held to embody this view.
² Helfer and Voeten 2014.
lesbian, gay, bisexual, and transgender (LGBT) rights, Helfer and Voeten find that the court’s decisions have an independent effect on policy reform in other countries. In the context of the European Court of Justice (ECJ), Marc Jacob describes such spillover effects of the court’s rulings as an unavoidable part of judicial reasoning and the very source of the ECJ’s influence: “This capacity to reach beyond an individual case is undoubtedly what makes an adjudicatory body like the ECJ powerful.” Similarly, the International Court of Justice (ICJ) is said to have paved the way for the consideration of certain environmental rights as *erga omnes* rights, meaning that they would extend to all states, whether or not the rights were part of the ruling in which this conclusion was reached. Human rights scholars have long argued that human rights courts act as agents of social change, and Hunjoon Kim and Kathryn Sikkink offer empirical support for this view, showing that human rights prosecutions reduce repression not only in the country in which they are conducted, but also in neighboring states.

These arguments face an uphill battle. The existence of spillover effects undermines the longstanding view that the authority of international law rests on state consent. We typically assume that states are loath to be bound by judicial decisions in cases to which they are not party. In practice, countries work hard to ensure that rulings occur in isolation one from another. Allowing for spillovers would imply an unprecedented level of delegation, given the power it grants judges over subsequent interpretation of the law. Indeed, exercising this power amounts to making law, a frightening prospect to sovereign countries uneasy about delegating power—particularly power over the exact meaning of a country’s legal obligations—to a group of unelected foreign judges. Common sense might suggest that rulings by a functioning court would influence subsequent decisions, but as we note, formal conventions stipulate that international rulings are independent and that courts do not make law. These conventions offer countries a potent tool to push back against the application of one decision to another. As a result, the net effect of rulings beyond a particular case remains ambiguous.

We address this debate in a setting that provides singular empirical traction: the international trade regime. The World Trade Organization’s (WTO) dispute settlement understanding is widely considered to be the backbone of the institution. It allows states to bring trade
conflicts before a panel of judges who rule on the legality of the defendant’s policy under WTO law. In light of the binding nature of WTO decisions, the question of spillovers from rulings has generated intense debate. Anecdotal evidence suggests that a country’s decision to file is often motivated by factors beyond the specific policy at issue. Christina Davis and Yuki Shirato note how Japanese steelmakers viewed a series of steel disputes launched by Japan as a means of preventing “other countries” from putting up similar trade barriers in the future. In interviews, officials even went so far as to say that a Japanese dispute against the Ukraine was actually aimed at “all emerging economies.” Yet Davis also acknowledges that “WTO members are not obligated to change policies in light of new information from a ruling against another country.” The WTO’s legal texts echo the ICJ statute: WTO rulings are not allowed to affect countries’ commitments beyond the confines of the case. Trade law therefore points to a question raised in other legal settings: Do rulings have effects beyond the case at hand?

The question is a difficult one to grapple with empirically. Directly measuring spillovers requires monitoring all the ways in which countries might implement, or fail to implement, the findings in all the cases to which they are not party. Our solution is to leverage the economic nature of the WTO and turn to financial markets. Markets are unmoved by scholarly debates about the legal status of international verdicts, but the perceptions and subsequent behavior of market actors are shaped by international institutions. The advantage of examining spillover effects in the trade regime is that the gains and losses imposed by its legal system ultimately register on firms and prices. Investors therefore find themselves interpreting the meaning of events, such as judicial rulings, for the future prospects of firms. Our approach amounts to asking whether markets believe that the influence of international courts extends beyond the case in question. Specifically, do markets bet that policies similar to those deemed illegal in one country are more likely to be removed in another, even though, as Davis notes, countries face no legal obligation to do so? Because markets make their bets on government reform before it has a chance to happen, market reactions are unencumbered by the exogenous factors that affect such reform.

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6 Davis and Shirato 2007.
7 Author interview with Ministry of Economy, Trade and Industry (METI) legal counsel, METI offices, Tokyo, November 2013.
8 Davis 2012.
10 Allee and Peinhardt 2011.
11 Davis 2012.
other words, observing market reactions in the immediate aftermath of rulings lends considerable external validity to the findings.

Our underlying premise is that firms benefit from protectionist policies that hold foreign competition at bay. The possibility that such protection might be removed should be enough to affect the valuation of a firm or the trading price of a commodity. But judicial rulings can affect the market valuation of foreign firms if, and only if, markets believe that a ruling renders similar trade barriers in nonparticipant countries less sustainable.

We rely on event studies, a widely used method in the field of financial econometrics, to isolate the market’s reaction to verdicts. We first look to a recent complaint by Japan and the EU against Canada’s measures to promote solar energy manufacturing. It is an ideal test case for spillover effects because the challenged Canadian policy, a feed-in tariff (FIT), is nearly identical to policy implemented by India to promote its own solar industry. Qualitative evidence shows that observers and the media equated the two countries’ policies. The legal matter at issue in the dispute was a complex one, and the uncertainty over its outcome meant that the ruling came as a surprise, a key element for event studies. The question becomes, did the legal findings against Canada affect the valuation of solar firms in India, in line with the spillover hypothesis?

We find that the answer is a tentative yes. First, the valuation of Canadian firms declined after a WTO panel’s finding of violation: markets adjusted their beliefs about firms on the losing side of the dispute whose insulation from foreign competition was threatened by the decision. More important, the case affected the traded value of solar firms in India. While the valuation of the firms in India were not affected in the days following the panel’s finding, we find a strong negative effect on traded prices in the days following the Appellate Body’s (AB, the WTO’s higher court) ruling on that finding. Markets reflected the concern that the AB ruling against Canada threatened continued government support of solar energy in India.

We then examine whether spillover effects may also extend to other products, not just to other countries. We ask whether the WTO ruling against American cotton subsidies in *US–Upland Cotton* affected futures prices of a different commodity, wheat, which benefits from subsidies similar to those found to be in violation in the cotton case. Commodities markets provide a more precise test than the stock market: cotton futures concern only cotton, whereas traded firms may
engage in a number of economic activities beyond the production of a particular good.

Our findings offer additional support for the spillover hypothesis: wheat futures prices jumped in reaction to the cotton ruling. Comparing the effect of the panel ruling with that of the AB ruling, we observe a pattern identical to that of the solar energy case. In both cases, the panel ruling had the greatest effect on the disputed country or commodity, whereas the AB ruling appeared to generate spillovers beyond the case at hand. This pattern accords with the view that the AB, a standing body of judges (as opposed to ad hoc panelists), is a creator of jurisprudence in the trade regime.

As noted above, the outcome of interest to us is ultimately government behavior. Yet given the difficulty of directly assessing all foreign governments’ policy responses to rulings they are not party to, we instead examine a set of actors that have an interest in correctly anticipating government behavior. If some investors gauge the effect of a ruling on government measures wrongly, then other actors have an opportunity to profit. In measuring the market’s aggregate reactions, our approach relies on a particular methodological premise: in the face of ambiguity concerning the existence of a social phenomenon, such as the influence of international courts beyond a given case, one can turn to actors with a stake in the answer and ask with which side of the debate is their behavior most consistent. If actors behave as if a social phenomenon exists, then we can conclude that for analytical purposes the phenomenon exists—even if international law explicitly maintains otherwise.

Overall, rulings in trade law appear to carry spillover effects across borders and across products, as evidenced by market reactions. The rules may deny the existence of such effects, yet it appears that financial markets are willing to bet that international courts will have influence beyond the case at hand. In sum, the impact of international rulings appears to exceed the intent of the regime’s designers.

II. Spillover Effects of Rulings in International Law

Until recently, scholars were asking whether international courts could affect government behavior. Given international anarchy, the question was whether sovereign governments on the losing end of a verdict would follow the court’s recommendations. After all, international courts have “no jailhouse, no bail bondsmen, no blue helmets, no truncheons or
tear gas.” It is a sign of the rapidly changing nature of international governance that in the span of two decades, the question shifted to whether the effects of international courts are limited to the cases on which they rule. As the institutionalist literature began to demonstrate how institutions could “take on a life of their own” and expand beyond their initial mandate to shape the expectations of the governments that established them in the first place, the study of international courts evolved accordingly. Contributing to this shift, the proliferation of international courts, each with a growing caseload (the ECHR rendered verdicts in 3,659 cases in 2013 alone, and the WTO has handled 503 interstate disputes since 1995), led scholars to consider how the sum of these verdicts might amount to a coherent jurisprudence. Suddenly, courts could function as the masters as well as the servants of the governments that appointed them. Not only were courts able to deliver politically inconvenient rulings to sovereign states, but they could also exert lasting effects on the understanding of the law itself through their judicial interpretations.

The rulings of international courts can be said to have spillover effects whenever they exert an independent effect on policies not directly ruled on in the case at hand, either because those policies concern countries not party to the dispute or because they concern government measures not at issue in the dispute. What we know about governments’ incentives should warrant skepticism about the scope of such influence. Sovereign states are wary of delegating power to courts. Allowing judicial decisions to spill over constitutes a significant step in the direction of further delegation. International judges are most often foreign nationals; they are not elected and are not directly accountable to member governments. The prospect of granting such individuals authority over the policies of countries that are not party to a dispute appears politically unpalatable. In the WTO, as in the rest of public international law, the driving fear is that “the terms of the negotiated agreements could ‘evolve’ into something that none of the original parties to the agreements ever anticipated.”

The price to pay for courts as agents of change is high. They must be able to deliver results, and they must be able to do so within the framework of the law. But they also must be able to do so in a way that is acceptable to the states that appoint them. This is not an easy task. The states that appoint judges to international courts are often in conflict with each other, and they may have different views about how the law should be applied. The courts must therefore be able to balance the interests of these states in a way that is fair and equitable. This is a difficult task, and it is one that the courts themselves must undertake. It is not enough for the courts to simply follow the rules. They must also be able to interpret those rules in a way that is consistent with the interests of the states that appoint them. This is a job that requires both skill and insight, and it is one that the courts must undertake with care and deliberation.

12 Bello 1996.
14 Alter 1998.
15 There is an extensive literature that tries to explain why states would do this in the first place. The following are a sampling: Mansfield, Milner, and Rosendorff 2002; Simmons 2009; Simmons and Danner 2010; Elsig 2013.
16 Ragosta, Joneja, and Zeldovich 2003.
of change is that governments progressively lose control of the institution; states therefore have an incentive to limit the perceived spillover effects of rulings, even if in any given instance some states stand to gain from it.

Accordingly, treaty designers have ensured that rulings are isolated events, meant only to resolve discrete interstate disagreements. Article 59 of the ICJ Statute is representative of this stance: “[A] decision of the ICJ has no binding force except between the parties and in respect of the particular case.” This statement influences modern international courts, including the WTO, where judges and litigants alike refer to it. The WTO includes a number of provisions with similar effect. Article 3.2 of the Dispute Settlement Understanding holds that verdicts “cannot add to or diminish” the rights and obligations of countries. And lest judges’ interpretations be perceived as changing the shared meaning of the legal texts, Article IX:2 of the WTO Agreement reads: “[t]he Ministerial Conference and the General Council shall have the exclusive authority to adopt interpretations.”

The actors who engage in trade litigation nevertheless often seem to act on the premise that WTO rulings do have spillover effects. Krzysztof Pelc shows that governments initiate some commercially unimportant disputes as a means of setting precedent that can be exploited in subsequent filings.17 Davis and Shirato provide evidence suggesting that were it not for a belief in the indirect effects of litigation beyond the case at hand, Japan may not have filed some of its recent disputes.18

Similarly, when the WTO sided with the United States in a challenge against Japan’s ban on apples in 2003, the ruling was seen as having effects far beyond Japan. A number of countries used a measure similar to Japan’s, a health standard aimed at preventing a fruit disease called fire blight through a ban on foreign apples. The measure was found to be in violation of WTO obligations, and countries such as New Zealand, whose apple exports were also being blocked from other countries by these standards, celebrated the ruling. As New Zealand’s Minister of Trade and Agriculture Jim Sutton, claimed, “We will also be looking for better access to other markets, such as South Korea, which also restricts access because of fire blight.”19 In fact, New Zealand hoped the spillover effect of the ruling against Japan would be so strong that no further litigation would be needed to make other countries repeal their own bans. In the same statement, Sutton said, “there was no need to take a

17 Pelc 2014.
18 Davis and Shirato 2007.
19 Sutton 2005.
dispute case against Australia . . . as the WTO had already ruled comprehen-
sively on the issue in a case between Japan and the United States." As
reasonable as it may sound, the trade minister’s claim was at odds with
international law. Indeed, even amidst this optimistic public sentiment,
apple producers were acutely aware of the restrictions on spillovers un-
der international law. As the chairman of Pipfruit, a major New Zea-
land apple producer, conceded, “It’s a great pity that this decision is not
binding on other countries such as Australia.”

The question is, who is correct on average? The New Zealand trade
minister or the New Zealand apple producer? The answer matters.
Courts may indeed play a role as agents of social change. They may af-
flect expectations about what is accepted under the rules and deter poli-
cies that contravene these expectations. But for them to become such
agents, the rulings they produce must have effects beyond the case at
hand. In many issue areas, including trade, the law is clear: international
verdicts are independent, one-off events and have no bearing beyond
the matter and the parties at hand. Yet there is anecdotal evidence that
the actors involved in international litigation take a broader view of the
courts’ influence. To evaluate the potential for spillovers from rulings
in international law, we require a better theoretical understanding of
judicial influence.

What Might Drive Spillover Effects of Rulings?
What drives spillover effects if the legal texts themselves do not sup-
port it? The most recent treatment of this question concerns the ECHR. Examining judgments on LGBT rights issues, Helfer and Voeten not
only find evidence of spillover effects of rulings on national policies of
Council of Europe member states, but they also suggest some of the
factors that might make such effects more likely. They find that the
existence of judicial review, whereby national courts can strike down
domestic legislation on the basis of the European Convention on Hu-
man Rights, increases the odds that an ECHR judgment will precipitate
national reform, especially in those countries where popular acceptance
of LGBT rights is low.

Helfer and Voeten warn that their findings may not translate to
other legal settings that, like the WTO, do not rely on domestic courts
to implement the rulings of a supranational court. The WTO exerts no
hold over domestic courts, which rarely, if ever, cite WTO rulings in their opinions. Moreover, given the technical nature of most WTO disputes, the court has few opportunities to support or precipitate large ongoing normative trends, as in the case of human rights issues. WTO judges have few opportunities to place themselves on “the right side of history.”

Nevertheless, we argue that WTO rulings may still affect the behavior of countries—even those not party to a given dispute. Specifically, the court’s influence is expressed by how its rulings embolden domestic groups who stand to gain from extending a legal finding beyond the original case. Such mobilization results from (1) the updated priors these groups have about an eventual ruling in their favor; and (2) changed expectations about what compliant behavior entails. In any decentralized regime, where enforcement relies on challenges brought by the actors affected, a court’s influence is likely to be felt through its effect on domestic mobilization. This story is often told in the case of human rights, where a court’s finding of violation can embolden groups affected by similar measures elsewhere. It may explain why, even in legal settings devoid of stare decisis, actors not directly involved in a dispute often have strong feelings about the outcome. The ICI’s ruling on Kosovo and the possible spillover effects of the findings on secessionist movements outside of Kosovo led many countries to forcefully take sides over the legality of Kosovo’s declaration of independence. Most countries attempted to limit any spillover by painting the trial as a “special case” or “an exception.”

The initiation of a WTO dispute is largely a demand-driven phenomenon resulting from industries successfully mobilizing to insist on enforcement. The odds of such mobilization, in turn, should increase with a case’s perceived legal merit. The greater the odds of winning, the more likely an industry is to overcome collective action problems and to lobby for enforcement. Rulings may thus embolden actors who stand to gain if a similar ruling were applied to their situation. In the case of the dispute against Japan’s ban on apples, New Zealand witnessed a sudden mobilization of its apple growers demanding a similar removal of the ban in Australia. When the government did not immediately act on these demands, the opposition party’s Foreign Affairs and Trade spokesman sought to capitalize on the inaction: “Labour has no more

25 Simmons 2009.
26 The UK and the Nordic countries, for instance, agreed that the Kosovo ruling could not constitute a precedent because it represented a special case. See, for instance, the British Foreign Minister’s statement, “Kosovo is a unique case and does not set a precedent.” At https://www.gov.uk/government/foreign-secretary-welcomes-kosovo-ruling, accessed February 9, 2016.
27 Rosendorff 2005; Davis and Pelc 2015.
excuses for failing to get action on apple access to Australia after the WTO ruling on the case between the United States and Japan. . . . Labour owes it to our apple growers.”

The administration finally took up the demand: “The New Zealand Government, in consultation with industry, made a submission to Biosecurity Australia, which emphasised the WTO’s finding in the Japan–Apples dispute.” But for a ruling to increase the odds of mobilization, domestic groups must believe that there is a link between that prior ruling and their odds of triumphing in their own case.

Rulings ought to merge actors’ expectations, even in the absence of binding precedent. International legal texts are often ambiguous. At times, such ambiguity exists by design, serving as a second-best solution in situations in which negotiators are either unable to agree on specific language or are wary of imposing overly rigid rules on a rapidly changing area of law. The result of this ambiguity is initial uncertainty over the direction of rulings. But observing one ruling should lead observers to update their priors on what a subsequent ruling over a similar matter may look like, even if the first is not formally binding on the second. As Richard Steinberg notes, “WTO judicial law-making has two dimensions, filling gaps and clarifying ambiguities, sometimes in areas that had been subject to diplomatic deadlock.”

Steinberg offers the example of WTO judges in the US–Shrimp Turtle dispute striking a balance between trade and environmental issues through an interpretation of the General Agreement on Tariffs and Trade (GATT) Article XX(g), a matter over which WTO members had long been deadlocked. Parts of this ruling had “no textual lineage,” meaning that the judges filled the gap on their own. Yet the solution at which the judges arrived is invoked to this day; the ruling resulted in an observable spillover on all trade measures concerning the protection of natural resources.

Yet spillovers need not be limited to the narrow confines of a legal precedent. If a ruling is perceived as auguring a shift in the institution’s stance toward, for example, governments’ regulatory autonomy, one might imagine that rulings transcend the interpretation of any particular legal claim. In our analysis, however, and for empirical tractability,
we limit ourselves to cases in which the expected spillover coincides with the legal precedent.

In summary, the rulings of international courts generate spillover effects whenever they lead observers to update beliefs about the likely outcome of subsequent rulings on similar issues. Such spillover effects are what human rights scholars hope for when they argue, for instance, that human rights prosecutions increase the expected cost of repression by dictators. This belief also receives anecdotal support in the trade regime. When the WTO AB ruled against the practice of zeroing in the calculation of dumping margins, both the EU and Canada reined in their antidumping bureaucracies and eliminated the practice. Two explanations might account for this. These governments may have been genuinely unclear on the legality of the practice, or else having recognized the violation, they thought the existing ruling made it likely that their own measure could be challenged in court. It is notable that the main country at issue in the initial case, the United States, fought to maintain its practice of zeroing throughout multiple subsequent disputes. In so doing, its legal defense consisted primarily of denying that prior rulings on zeroing had any formal bearing on the current dispute.

While common sense might dictate that earlier rulings should affect subsequent rulings, formal conventions still hold that judicial decisions in public international law are independent events. The rules state that courts cannot make law and that precedent is not formally binding. This convention is important, as it provides legal backing for states seeking to push back against the application of unfavorable past rulings to current disputes.

US–Zeroing is a case in point. The United States held before the court, “the Panel is not bound to follow the reasoning of any prior report. According to the United States, the Panel is charged with making its own objective assessment of the matter before it.”33 This case was not an isolated instance of such pushback. In the US–Large Civil Aircraft dispute, commonly known as the Boeing–Airbus dispute, the United States applied the same reasoning to demand that a passage be erased from the interim ruling: “The United States requests that the first sentence of paragraph 7.248 of the Interim Report be modified to remove any suggestion that reports of the Appellate Body are binding except with respect to resolving the particular dispute between the parties to that dispute.”34 The AB yielded, and the United States thus limited the spillover from a past case.

The very existence of multiple subsequent cases, such as those that followed US–Zeroing, holds conflicting implications for the existence of spillovers. On the one hand, such repeat cases might be seen as supporting the presence of spillovers. In the case of zeroing, multiple countries took on the United States, slowly building the case against this practice by referring to prior related rulings—albeit against the United States’ remonstrations. On the other hand, the presence of repeat cases can be read as the failure of deterrence through jurisprudence. After all, countries had to file a long series of cases, rather than simply point to the first one, to get the United States to yield. There have been many sequences of disputes linked in this way. One of the best known began in an early WTO dispute, itself a continuation of a GATT conflict, that challenged Japan’s discriminatory taxes on alcohol, which favored domestic shochu over foreign spirits.\footnote{See Japan–Alcoholic Beverages II, DS8, DS10, DS11.} The clear ruling in this dispute did not prevent other governments from imposing similar discriminatory taxes on alcohol, which led to multiple disputes against Korea (regarding its own national alcohol, soju) and Chile, among others. All of these were repeats of the initial Japan alcohol litigation and invoked the same GATT Article III:2 claim in the same context. In fact, our own data on WTO claims suggest that 51 percent of all legal claims raised are repeats of one form or another, that is, legal claims ruled on in the past. And given that disputes often make a wide variety of claims, no less than 80 percent of all disputes cite at least one of those previously ruled-on claims.\footnote{If we omit GATT provisions, which are the most commonly cited legal claims, then the proportion is 70 percent of disputes in our data, which cover WTO disputes DS1–DS400.} There are therefore many opportunities for spillovers to occur, but whether or not these actually obtain on average remains an open question. Given the competing norms for and against spillovers, whether countries are ultimately swayed by rulings to which they are not party is a question that cannot be resolved merely by examining the litigation record. Next, we outline an alternative empirical approach.

\textbf{How might we assess the existence of spillover effects?}  
How might we know a spillover when we see it? Ideally, we could observe all measures that bear a resemblance to every policy struck down in a WTO ruling and test whether findings of violation render these related measures less likely. Yet collecting such data verges on the unfeasible; it would require multiple assessments across the WTO membership of whether policy reforms were consistent with past rulings. The very design of the WTO reflects the difficulty of assessing the consistency of
trade measures in this way: it is in part why WTO enforcement relies on decentralized “fire alarms” over “police patrols.” Assessing whether legal rulings affect similar unchallenged violations elsewhere, given the difficulty of identifying these violations, is therefore out of the analyst’s reach. Measuring spillovers through their effects on trade flows is also prohibitive. Although both WTO membership and dispute settlement are associated with trade effects,\textsuperscript{37} observing the universe of potential product-specific spillovers is also unfeasible. This difficulty explains why so few attempts have been made to measure spillover effects in trade.

A notable exception in this respect is an article by Christina Davis, whose research design is premised on the idea that spillover effects of WTO rulings should entail fewer subsequent disputes being filed on a given issue over time.\textsuperscript{38} Although this is as close as trade scholars have come to testing the spillover hypothesis, it is also imperfect, as Davis readily admits. Filing frequency is a blunt measure, and given the small number of cases associated with any given legal issue, it is difficult to distinguish the effect of past cases from exogenous factors. Moreover, one prevalent view regarding the WTO asserts that governments may rely on unfavorable rulings for political cover as a means of decreasing the political costs of denying protection to powerful interest groups. In such instances, cases may still need to be fought, and lost, before governments comply. Therefore, spillover effects need not entail a reduction in the frequency of litigation. The case of apples and fire blight is instructive in this respect. Despite the hopes of New Zealand’s trade ministry and its apple producers, Australia did not voluntarily remove its ban, and New Zealand had to take the matter to court. It won on all counts, and the ruling rested heavily on the prior case against Japan.\textsuperscript{39}

\textbf{Financial Markets as Indicators}

Faced with these problems in assessing the scope of influence of WTO rulings, we take an alternative approach. The distinctive feature of international trade law is that the effects of rulings ultimately register on firms and thus on their market prices. Fluctuations in share and commodity prices provide us with the variation we use to test our expectations.

\textsuperscript{37} Tomz, Goldstein, and Rivers 2007; Bown and Reynolds 2015; Chaudoin, Kucik, and Pelc 2016.

\textsuperscript{38} Davis 2012.

\textsuperscript{39} There is also reason to believe that greater legal merit may have ambiguous effects on the odds of disputes arising. As Gilligan, Johns, and Rosendorff 2010 demonstrate, stronger cases may be more likely to be litigated, insofar as legal merit may lead the complainants to ask for more from the defendants.
Firms lobby the government for protection in the form of trade barriers or for support in the form of subsidies. If an unfavorable finding against a similar discriminatory measure elsewhere makes the removal of such protection more likely, the effect should register on a firm’s stock market valuation. In an extreme case, a firm may be uncompetitive without trade protection. Markets should then be interested in the odds of protection being maintained. Financial markets thus find themselves in the position of assessing the odds of spillover effects. If rulings are truly independent events, there would be no reason for markets to update their priors about the future performance of firms based on rulings against other countries. If, conversely, a ruling has effects on the expected longevity of similar measures elsewhere, then we should expect a sell-off of the firms benefiting from the threatened measure.

In the aforementioned case of New Zealand apples, it appears that markets would have been correct to bet on the presence of spillovers, despite the doubts of New Zealand’s own producers. Following the ruling against Japan’s ban on imported apples, New Zealand began exporting apples to Japan—a direct effect of the case. That ruling mobilized domestic producers in New Zealand to push for a WTO challenge of the analogous Australian ban. Following that favorable ruling, New Zealand found a lucrative market exporting apples to Australia, for the first time in nearly a century.

In this way, markets provide us with a measure of revealed aggregate beliefs. The existing literature on market behavior reinforces the proposed link between international institutions and investor perceptions. In the areas of financial regulation, investment disputes, and EU accession, there is strong evidence that markets respond to international legal outcomes. There is also evidence that investors make links between countries insofar as their perceptions of one country are informed by the experiences of other, similar, countries. In our study, traded prices amount to a survey of individuals who are betting on the link (or lack thereof) between an international legal verdict and the future earnings of a foreign firm. Our tests ask whether markets behave as if rulings of the WTO carry spillover effects. If they do, then we can conclude that

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40 See fn. 7.
41 In 2005 New Zealand did not export any apples to Japan. In 2008 producers exported 21,865 kilograms. That number doubled in 2010 and tripled in 2011.
42 Lewis 2011; Packham 2011.
43 Wilf 2013.
44 Allee and Peinhardt 2011.
45 Gray 2009.
46 Brooks, Cunha, and Mosley 2015.
in considering the sum total of law, judicial behavior, and domestic mobilization, a majority of global investors perceive spillover effects as weighing more heavily than the forces that would impede them.

Market reactions serve as merely one indicator of the phenomenon of interest, namely expected government behavior. We do not believe that governments necessarily take market jumps into consideration when making their decisions about the policy at issue, as these reactions concern isolated firms. Instead, the hypothesized causal chain begins with the legal ruling, which is observed by other countries and the pro-compliance constituencies within them. Gauging the odds of further challenges or of unilateral policy changes by foreign governments, market actors then speculate for or against the foreign companies affected by the policy at issue in the ruling. If no change is anticipated, market actors do nothing, and there is no spillover.

Focusing on market reactions rather than on government behavior has another analytical benefit. Since market reactions amount to _ex ante_ bets on reform before that reform has a chance to occur, they carry greater external validity than if we were to test whether a given government reformed in reaction to a given ruling. Indeed, the actual occurrence of reform depends on a host of exogenous factors. This stochastic component (which represents events such as electoral upsets or exogenous economic shocks leading to increased calls for protection) is absent from the evaluation of markets, which must make an _ex ante_ call on the probability of policy reform immediately after the announcement of an unfavorable ruling elsewhere. Market reactions therefore offer a less context-dependent estimate of the probability of spillover-driven reform and provide a better sense of the probability distribution of government behavior than examining a few draws from that distribution.

Event studies using market data constitute a well-established method in finance,\(^{47}\) and scholars have relied on financial markets as gauges of various social phenomena in the past. For instance, Daniel Klerman and Paul Mahoney examined historical British stock market prices to gauge the effect of judicial independence on economic growth at the turn of the eighteenth century.\(^{48}\) Yet few studies have relied on stock-price event studies to analyze the effect of judicial outcomes; among those that have done so, all have focused on the direct effect of rulings. Mihir Desai and James Hines examined the share prices of American exporters when the subsidies they benefited from were found to be


\(^{48}\) Klerman and Mahoney 2005.
illegal in the *US–Foreign Sales Corporations* dispute. As expected, share prices were negatively affected. Similarly, Nathan Jensen found that the shares of US steel firms fell abnormally when the safeguards that President George Bush imposed in 2002 were found to be in violation of WTO rules. The takeaway from these studies is that financial markets are legally savvy; they are able to think through the implications of international legal rulings on firms and internalize them in their valuations of firms. Although we rely on similar methods, our objective is to see whether the share prices of foreign firms, those in countries not directly implicated in the ruling, are also negatively affected. We also ask whether courts can reach across different commodities. If they do, we can conclude that markets are willing to bet that the courts’ influence reaches beyond the case at hand.

**Quantitative Case Study: Case Selection**

Which disputes might allow us to test our argument? An ideal case would meet four criteria. First, the measure at issue should be sufficiently similar between the initial challenge and the spillover country; the ban on fire blight apples challenged in Japan, for instance, was almost identical to that in Australia. Second, the ruling needs to be sufficiently unexpected so that markets would be incapable of internalizing its likely outcome. Although the legal claims at issue in *Japan–Apples* had been previously ruled on, the science on fire blight was the unknown factor that would prove decisive in that case. Third, the market in the spillover country must be sufficiently salient to justify a potential WTO challenge. If a measure exists in a spillover country but no one is negatively affected, then spillovers may be limited if markets reason that a subsequent challenge is unlikely. Australia’s ban on New Zealand apples is of sufficient salience that a follow-up challenge was expected—and in fact occurred.

Yet for our purposes, the *Japan–Apples* case fails on the fourth requirement of the empirical strategy: the existence of an identifiable market. There are neither publicly traded apple producers in Australia nor a developed futures market for apples, which makes it impossible to assess market reactions. Similarly, while we provided anecdotal evidence above for how the zeroing cases appear to have had spillover effects in other member countries, there are no identifiable markets in which we would expect to see the impact of the initial disputes against zeroing.

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50 Jensen 2007.
The set of disputes that meet all these criteria is limited. While we suspect that a large number of disputes lead to spillover effects, few cases lend themselves to empirical testing, but we identify two cases that fit our criteria. These are disputes over salient measures that are present in similar form elsewhere, that have implications for publicly traded firms, and where the ruling was sufficiently unexpected to surprise financial markets. The first case concerns Canada’s renewable energy policy and the repercussions of a ruling against Canada for Indian solar firms. This dispute allows us to test for a cross-border, within-product spillover effect. The second case concerns the implications of a ruling on US cotton subsidies for US wheat futures. It tests for a within-country, cross-product spillover effect.

CASE 1: SOLAR ENERGY AT THE WTO

In August 2011 Japan, later joined by the EU, challenged Canada’s domestic-content requirements program as implemented by the province of Ontario. Japan charged that Ontario’s feed-in tariff program unfairly discriminated against foreign providers and offered a WTO-illegal subsidy to attract investment and protect domestic firms.51

Under the FIT program, solar energy producers were able to sell their electricity to the Ontario grid at up to six times the price of conventional energy.52 To obtain these higher prices, a minimum percentage of the energy-generating equipment companies used had to be manufactured in Ontario. Japan challenged both aspects of the program: the subsidy and the domestic content requirement. Industry sources suggested that in filing its complaint, Japan was motivated not only by the desire to take down Ontario’s solar program, “but also by the worry that similar measures that condition renewable energy incentives on the use of domestic content are proliferating around the world.”53 The same source pointed out that “countries such as India, Italy and Malaysia have adopted similar programs.”54

Of these three countries, India’s program was the most ambitious. Its solar program, which also relied on a FIT, was highly similar to Ontario’s. It too had a domestic-content requirement and provided subsidies via

51 See Canada–Renewable Energy (DS412) and Canada–Feed-In Tariff Program (DS426).
52 Inside US Trade 2011b.
54 Inside US Trade 2011b.
guaranteed prices on the condition of meeting those requirements. Foreign firms viewed both programs in a similar fashion. They considered investing in and establishing themselves in the country to benefit from the national schemes. A lawyer representing US solar companies claimed, “Some US solar companies may be willing to modify their business plans to tap the Indian market, as they have in Ontario, Canada, which has similar domestic manufacturing requirements.” The salience of the Indian solar industry and the extent to which the Indian measures resembled the Canadian support scheme make it an ideal case on which to test our expectations.

The first ruling was handed down in December 2012. There were two main sets of claims: the first was over the content requirement and the second concerned the government subsidy. The WTO panel found the content requirement to be in violation of Canada’s WTO obligations, and it refused to rule on the EU’s claim that Ontario’s subsidy provided a “benefit” within the meaning of the Agreement on Subsidies. The ruling came as a surprise, both in its content and its timing. Although the exact day of a ruling is never known ahead of time, we nonetheless stop the estimation window ten days short of the event to prevent any anticipation effect from sullying our results. The case was perceived as a complex one, and existing case law was ambiguous. As an observer attempting to minimize the threat of an unfavorable ruling explained, “Economic development strategies that offer incentives to in-state business development . . . have been upheld in the past,” and there was a sense that panelists may have felt pressured to support a green energy scheme for political reasons.

Both parties appealed different parts of the verdict and the AB offered its ruling in May 2013. The AB agreed with the panel in finding Ontario’s content requirement in violation, though it reversed some of the reasoning. It also reversed the panel’s reasoning on the subsidy claim, finding that the panel’s decision not to reach a conclusion on the question of “benefit conferred” was unjustified. Although no ruling was delivered on the issue of “benefit conferred,” the AB ruling suggested that a subsequent panel could not similarly evade the matter. Canada stated that it was disappointed with the result, but pledged to amend its solar program and come into compliance.

Canadian solar firms had much to lose from compliance. The local-content requirement represented guaranteed demand for firms that established themselves in Ontario. Without this requirement, indus-

56 We also find that our estimates are robust to a variety of estimation-window lengths.
57 Farrell 2011.
try insiders claimed that “some Ontario manufacturers will move from Canada to a location with greater demand.” Manufacturers who had been attracted to Ontario by the FIT scheme complained that Canada complied too swiftly with the WTO recommendations: “Domestic content has been removed too quickly. It will be very difficult for many of the local players here to replace local demand with foreign demand.” In short, Canadian solar firms lost a guaranteed support scheme. The ruling also had consequences for contract prices because “the Ontario government may be reluctant to offer high contract prices for renewable energy generated since the contracts would no longer contain the domestic content requirements that helped to make the contracts attractive to the Ontario Government.”

The question is, do market reactions reflect expectations of a spillover effect, as per Japan’s hopes as it filed the dispute? Global media were quick to suggest that the ruling in Canada might embolden other countries to follow suit. As the Financial Post noted, “Canada’s defeat may spur more WTO disputes by countries which are desperate for economic growth and suspect their firms are being illegally locked out of infrastructure projects abroad.” The ruling against Canada did seem to spur domestic mobilization among solar firms in the United States. The US Department of Commerce began fielding petitions for enforcement of similar programs elsewhere. In fact, in the wake of the panel ruling against Canada, in February 2013 the United States initiated a dispute against India’s solar program.

In aggregate, the market has an incentive to get it right, that is, to neither underestimate nor overstate the likely effect of the ruling, with all its ramifications, on foreign governments’ policies. Throughout the dispute against Canada, legal observers pored over the panel’s and especially the AB’s reasoning on the local content and subsidy questions. They discussed implications of similar green-energy initiatives for subsequent disputes. But was anyone willing to bet that these links would have a causal effect?

CASE 2: US COTTON AND COMMODITY PRICES

In September 2002 Brazil initiated a dispute against the United States, claiming that American cotton subsidies violated WTO rules. Brazil argued that these subsidies decreased American costs, increased production, and depressed world prices, causing injury to Brazil. The panel

59 Inside US Trade 2011a, 12.
60 Timmins, Wagner, and Sahadev 2013.
61 Financial Post 2013.
ruling, in September 2004, supported all of Brazil’s claims. The judges established a causal link between the American measures and world prices, finding that market-loss assistance payments, a measure widely used in many countries, represented “significant price suppression” within the meaning of Article 6.3 of the Agreement on Subsidies, leading to prejudice against Brazil within the meaning of Article 5. The panel also argued that the subsidies were illegal because payments to US farmers depended on the crop grown, another feature of many farm-support schemes in the United States and EU. The ruling was groundbreaking, both as an instance of a poor country prevailing over a superpower and in the novel legal interpretations it yielded. Trade scholars began to reexamine the legality of other agricultural support schemes “in light of the recent WTO panel report on upland cotton,” readily referring to the “precedent of Upland Cotton,” while recalling that “future panels are not bound by the deliberations of past panels.” The dispute yielded surprising legal findings that addressed the question of how to assess whether a subsidy caused injury and thus whether it was allowed under trade rules. When the United States appealed, the AB upheld all the panel’s claims.

In short order, the mainstream media began to ask what these rulings meant for other products benefiting from similar schemes. Fingers were pointed most of all at wheat, which captured the lion’s share of US farm payments. Newspaper articles appeared with headlines such as “WTO Ruling Threatens Wheat Subsidies.” Observers spoke of ripple effects on other commodities, with others saying that “the decision might prompt the US to consider changing its policy on other crops, to bring it into compliance with the cotton ruling.” Roberto Azevedo, who was to become the WTO’s director general but was at the time adviser to Brazil’s foreign ministry, declared bluntly, “This is a precedent. . . . This is a war that must continue.” The Economist commented that “other countries may now join Brazil in this war; there are, after all, plenty of other subsidies to take on.” In short, the legal ruling was seen as spurring additional challenges.

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62 Swinbank and Tranter 2005, 52. In an indication of the continuing ambiguity of the status of past rulings at the WTO, trade scholars usually refrain from using the word “precedent.”
63 Swinbank and Tranter 2005, 54.
64 Scott 2005.
65 Scott 2005.
67 “Brazil’s success in the cotton case could also lead Brazil or other countries to file additional cases against US domestic support programs, focusing on programs benefiting producers of commodities other than cotton.” Mercier 2004.
In the solar energy and the cotton subsidies disputes, several questions arise. Would markets be willing to bet that a case would influence governments not party to the dispute, despite international law itself suggesting otherwise? In the case of solar energy, would a ruling against Canada be seen as threatening continued support to the Indian solar industry? And in the case of cotton, would a legal finding on one product render support of an entirely different commodity, benefiting from a similar, but distinct program, less likely in the future? We turn to financial markets to find out.

III. Data and Research Design

We begin by examining reactions to the solar energy dispute. Our analysis in this case considers a number of firms across three different countries. We collected data on the daily share prices of publicly traded solar companies in Canada, the United States, and India. Our data contain one row per company \( i \) on trading day \( t \). To collect a list of relevant firms, we drew from WTO documentation, the membership directories of industry associations, and policy reports from the renewable energy sector.\(^{68}\) We limited our sample to only those companies that have direct involvement in solar panel manufacturing or the provision of solar energy.\(^{69}\) Our search yielded eight firms in Canada, six in the United States, and eleven in India (Table 1).\(^{70}\)

The data include daily stock prices for all twenty-five firms from November 2011 to December 2013. This time span ensures that there are enough observations on either side of the key dispute events to test the durability of our results using a variety of estimation and event windows. We also include the daily price for the relevant index in each country: the Toronto Stock Exchange (TSX) for Canada; the New York Stock Exchange (NYSE) or National Association of Securities Dealers Automated Quotations (NASDAQ) for the United States; and the Bombay Stock Exchange (BSE) for India. We rely on these broad indices

\(^{68}\)The US request for consultations in its dispute against India provided a useful list of firms that benefited from the measures at issue. We included all publicly traded companies on that list. On the Canadian side, the Canadian Solar Industries Association provides a comprehensive list of its North American membership. Available at http://web.cansia.ca/search, accessed February 16, 2014. Groups such as the Renewable Energy Policy Network for the Twenty-First Century also provide useful lists of the largest companies in the sector. See, for example, “Renewables Global Status Report,” at http://www.ren21.net/, accessed February 16, 2014.

\(^{69}\)For instance, we exclude law firms and consulting companies that work closely with the solar industry, but that are likely to be affected less directly by the outcome of the dispute.

\(^{70}\)Note that a large number of firms in the industry are private or state-run enterprises rather than publicly listed ones.
in the analysis reported below. In our robustness tests, we also rerun our analysis using more focused industry-specific indices and find consistent results, which suggests that our choice of index is not driving the results.

71 The indices related more closely to the renewables/energy sector are the S&P/TSX Renewable Energy and Clean Technology Index (TXCT) in Canada, the NASDAQ Clean Edge Green Energy Index (CELS) in the United States, and the S&P BSE Power Index in India.
In our primary analysis, we conduct an event study to identify abnormalities in the prices of traded solar companies.\textsuperscript{72} We start with the observed share price of each company \(i\) on trading day \(t\). The estimation window is a span of days \(t < 0\), and the event window is a period \(t = N\), where \(N \geq 1\). Abnormal prices \((a_{i,t})\) are calculated as the difference between the observed price \((p_{i,t})\) and the expected price \((e_{i,t})\), or,

\[
a_{i,t} = e_{i,t} - p_{i,t}.
\]

For event windows larger than one day, the cumulative abnormal prices \((c_{i,N})\) are the sum of \(a_{i,t}\) over the event window \((t = 0, 1, \ldots N)\), or

\[
c_{i,N} = \sum_{i=1}^{N} (a_{i,t}).
\]

We estimate expected prices \((e_{i,t})\) by regressing the observed price \((p_{i,t})\) for each company on the daily index value over the specified estimation window. There is no absolute rule about the required length of estimation window. The purpose is to track the correlated values of individual firms and a larger index over a sufficiently long period, to develop accurate predictions of what a firm’s price ought to be in the future absent the event. We use fifty-day estimation windows in our reported results.\textsuperscript{73}

Consistent with existing studies, we also control for the daily Exchange Rate\(_{j,t}\) in each country,\textsuperscript{74} since this may affect share prices. To have a consistent reference point, we use the rate of each country \(j\)’s currency relative to the euro.

From these regression estimates, we predict the expected prices \((e_{i,t})\) for each day of the event window. We report the ten-day period after the circulation of the panel or appeal report.\textsuperscript{75} We then sum the abnormal prices over the ten-day event window to get the cumulative abnormal prices \((c_{i,N})\) for each firm. To measure the significance of the abnormality, we calculate a test statistic using the following formula:

\[
Test_{i,N} = \frac{1}{\sqrt{N}} + \frac{c_{i,N}}{sd_{i,N}},
\]

where \(sd_{i,N}\) is the standard deviation of the abnormal prices. The resulting statistic tells us whether each firm’s prices are significantly different

\textsuperscript{72} Wilf 2013; Desai and Hines 2008; Fama et al. 1969.
\textsuperscript{73} The duration of the estimation window—whether it’s fifty, eighty, or one hundred twenty days—does not change our results.
\textsuperscript{74} Desai and Hines 2008; Jensen 2007.
\textsuperscript{75} The results do not change when looking at the single day on which the report is circulated.
from the expected price absent the event. Assuming a normal distribution, absolute values of $Test_{i,N}$ larger than 1.96 indicate significant abnormality at the 5 percent level.

As we report below, most firms’ values exhibit significant responses to the circulation of the panel or appeal reports in the Canada dispute. However, because we are interested mainly in industry-wide effects at the country level, we conduct a more conservative test of the aggregate abnormality across all companies per country. We do this by running a regression with the cumulative abnormal prices ($\epsilon_{i,N}$) of all firms as the dependent variable, and no variables on the right-hand side of the equation. The resulting estimate tells us whether the firms’ prices, taken as a whole, are statistically different from zero, that is, whether the companies as a group experienced a significant movement in prices, which is comparable to running a $t$-test. This stricter test is reported for each model and gives us a better indication of the industry-wide effects of the panel and AB reports.

Since our approach relies on the event being a surprise, it is worth reiterating that the ruling against Canada was unexpected. There was much ambiguity over the legality of Canada’s program, as evidenced by the rare split decision. The contentious nature of the ruling serves our analysis, which rests on the assumption that the markets were unable to anticipate the ruling’s content. Markets are aware that there is a dispute, but they cannot know the direction of the ruling until the report is circulated, the exact timing of which is not known in advance.

Our approach is not the only way to gauge abnormal changes in stock prices. In robustness tests, we implement the procedure used by Jensen. His study uses Newey-West standard error corrections, which account for heteroskedasticity and autocorrelation in the error term. The benefit of this approach is producing unbiased estimates while allowing for temporal correlation in the errors—a feature common to economic series such as stock prices. We run a comparable procedure, which we describe below, and find results consistent with our event-study analysis. The consistency in the results gives us confidence that our findings do not depend on our choice of estimation or event windows, reference index, or estimation technique.

IV. Solar Energy at the WTO

If the WTO’s rulings have spillover effects, then markets should take this into account in their valuation of foreign firms. If investors perceive that

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76 Jensen 2007.
the earnings prospects of firms are harmed by adverse WTO decisions, we ought to see downward movement in the share prices of companies in countries on the losing side of the dispute and in countries that have a comparable interest in the policy that was struck down. Using the event study approach described above, we find evidence that markets do react to WTO decisions in ways that point to spillovers.

**Canada**

We first establish whether investors respond to rulings in the most likely case: firms in the country on the losing side. All the models reported use a ten-day event window and a fifty-day estimation window, and rely on the aggregate stock exchange index. The results do not change when using one-day event windows, eighty- or one hundred twenty-day estimation windows, industry-specific indices, or combinations of these parameters.

The models provide a good overall fit to the data throughout the analysis. Event studies depend on how reliably the model generates predictions of firms’ future prices. We can get a sense of the reliability of these predictions by how well the model explains variation in prices during the prior estimation window. The R-squared statistics from our models of each firm give us confidence in the approach; our models explain at least 50 percent of the variation for five of our eight Canadian firms, or 42 percent across the entire sample. Figure 1 provides a useful visualization. We see quite a close marriage between observed and predicted prices across the estimation window (t < 0). This gives us greater confidence that the divergence seen across the event window (t > 0) is not an artifact of poor predictions.

Table 2 shows the prices of Canadian firms after the announcement of the panel ruling and the AB ruling. The top cell for each firm reports the cumulative abnormal price (over the ten-day event period) and the bottom cell is the test statistic $Test_{i,N}$. The prices of seven out of eight Canadian firms traded below expectations ten trading days after the panel report was circulated. Nearly all the Canadian solar producers and providers were therefore “underperforming” after the panel ruling.

We do not have strong theoretical priors about any specific firm within countries; we are interested in whether the eight companies exhibited abnormal prices as a group. The statistic at the bottom of each column in Table 2 is the coefficient and standard error produced by regressing $c_{i,N}$ on a constant. The significant, negative coefficient confirms

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77 Models that poorly explain variation in observed prices will generate poor predictions of future prices, potentially leading to false inferences.
that on average, observed prices were well below expectations for the industry. This result suggests that the market responded significantly and consistently to the news that Canada was found in violation in the panel report.

To probe the durability of this result, we employed a jackknife sampling approach comparable to the one used by Meredith Wilf. We drop one firm at a time from the sample and test whether the collective significance disappears. This process confirms that no single firm is driving the overall result; Canadian firms underperform in the aggregate when dropping any individual company.

Interestingly, the results are more mixed following the AB ruling. Only three of the eight firms had prices below expectations. Although they were highly significant individually, a test of collective significance reveals no unified market response. The circulation of the appellate report therefore appears to have had little additional effect.

78 Wilf 2013.
For comparison and as a test of our methods, we run the same analysis on a sample of solar firms in a “bystander” country, the United States. The United States, like India, joined as a third party in the dispute against Canada, suggesting that it had an interest in the outcome of the dispute. The United States has domestic support programs for solar energy, but they do not take the form of a FIT scheme. Overall, US firms might stand to gain if competitors in Canada lost state support, but any positive effect would be highly diluted across all firms competing with Canada, whether in the United States or elsewhere.

The prices of US firms are reported in Table 3. Column 1 again shows the prices after the panel ruling and column 2 shows the prices after the AB ruling. Most of the six firms in our sample enjoyed positive prices after both events. In the aggregate, however, we can reject
the null hypothesis that these prices are statistically significant from zero. When taken as a whole, US firms appear to slightly outperform expectations in the absence of the ruling, but the prices are ultimately not statistically abnormal following either the panel or the AB ruling.

INDIA

Next we turn to India and our main question: Did markets sell off the shares of Indian firms upon hearing of the rulings against Canada? We run the same exercise as above on eleven publicly traded solar companies in India. The effects of the panel ruling on share prices are ambiguous (Table 4, column 1). A majority of the firms in the sample (seven of eleven) did underperform, according to the model. But when considered as a group, the share prices of firms in the Indian solar industry fall short of statistical significance.

By contrast, the announcement of the AB ruling had a highly significant, negative effect on prices across India’s solar industry (column 2). Ten of the eleven firms were trading at values far below the predicted
price in the wake of the AB decision, and taken as a group, the industry as a whole shows statistically significant abnormal prices. Here again, the observed prices of Indian firms map well onto the model predictions across the estimation period. Figure 1 shows the close movement between the two series, as well as the departure of the observed prices from the predicted ones after the AB decision, which is when we expect to see divergence.

Why did the AB ruling have a stronger effect than the panel ruling on Indian markets, whereas the opposite was true for Canadian markets?
We see two possible explanations. First, AB rulings, which frequently overturn panel reports, are widely seen as having broader authority than panel rulings, which have comparatively little precedential power. The AB is the higher court and comprises a standing body of judges, whereas panels comprise ad hoc panelists. Insofar as one of these bodies creates any kind of de facto binding precedent, it is the AB, which is widely viewed as more concerned about jurisprudence than panels.\footnote{Bhala 1999.} The AB is also more likely to be cited in subsequent rulings.\footnote{Pelc 2014.} It follows that markets might draw few conclusions about the fate of Indian firms until the AB ruling is announced. In fact, the Indian media covered the AB ruling far more than it covered the panel report. Only following the AB ruling did observers begin to warn of a “precedent [that] is a big blow to countries pursuing domestic content requirements,” which would increase uncertainty in India over the fate of governmental green energy support.\footnote{Prabhu 2013.}

Conversely, Canadian markets did not need to ponder jurisprudential impact on subsequent cases to realize that the panel ruling called Canada’s scheme a violation of international law. In other words, panel rulings might have primarily local effects, whereas the AB ruling would carry farther, spilling over into other disputes. Another possibility is that the US filing against India, which occurred between the panel report and the AB ruling, played a priming role. It may be that the US filing was necessary to draw the market’s attention to the effects of other related rulings. The market reaction to the ruling against Canada may have been conditional on an existing dispute to make the legal link explicit.

What remains certain is that the AB ruling against Canada generated an unambiguous reaction in Indian markets. But the absence of an analogous reaction following the panel ruling remains an important caveat. The discrepancy between the two rulings is in part what leads us to perform a second set of tests to examine the effects of the rulings in \textit{US–Upland Cotton}. Our results here suggest that our first explanation of the distinction between AB and panel effects—highlighting the AB’s unique jurisprudential impact—may be the correct one.

Before moving on, note that the results presented in Tables 2, 3, and 4 are robust to a variety of estimation and event windows, as well as to the use of alternative indices as reference points. In addition, we
employed a related technique used in Jensen’s study of steel companies—ordinary least squares models with Newey-West standard error corrections. These tests are available in our replication materials.\(^8^3\)

**V. The Cotton Dispute and US Commodity Prices**

Our solar energy tests examine cross-border spillovers and investigate the influence of a ruling against one country on the same industry in another country. Would we observe the same market reaction for an entirely different product? It could be that in the solar energy case, markets reacted to a perceived condemnation of all publicly supported solar energy schemes. By comparison, spillovers across different industries would require a more nuanced inference, one that takes a careful look at a ruling’s legal implications. To address this possibility, we examined the effects of another dispute, *US–Upland Cotton.*

We turn once again to financial markets, this time looking at commodities exchanges. These markets have considerable analytical advantages. In the solar energy dispute, some of the firms examined produce only solar panels, while others also invest in hydroelectricity, muddying empirical expectations. By comparison, commodities represent a cleaner test: cotton futures traded on commodities exchanges concern only cotton.

Expectations also differ from the analysis that considers stock prices. Whereas spillover effects of the ruling against Canada were expected to result in a drop in the valuation of Indian solar firms, the opposite expectation holds in *US–Upland Cotton:* the threat of removed subsidies should lead to an increase in prices. Indeed, Brazil’s claim was precisely that the US measures depressed prices. It follows that if these measures were removed, prices should increase.

We use data from the Chicago Board of Trade and the United States Intercontinental Exchange to obtain spot-month futures prices calculated on a continuous daily basis for both cotton and wheat. To predict these prices in the estimation window, we use the daily US dollar–euro exchange rate, gold prices, oil prices, and the Standard & Poor’s 500 index. Taken together, these are effective predictors of both cotton and wheat prices; they explain almost 70 percent of the daily variation during the estimation period.\(^8^4\) As before, we use this estimated relationship to

\(^8^2\) Jensen 2007.

\(^8^3\) Kucik and Pelc 2016.

\(^8^4\) The R-squared for the estimation window regression for the panel report is 0.64 for cotton and 0.70 for wheat.
predict what the futures prices should be during the event period were it not for the WTO rulings. We then calculate the difference between the predicted and the actual price, and test the statistical significance of this difference to look for “abnormality.”

The results, presented in Table 5, provide additional support for the spillover hypothesis. Strikingly, not only do the findings support the view that the cotton ruling affected wheat prices, but we also observe a pattern similar to the solar energy case. Futures prices for the disputed product (cotton) show a highly significant abnormal increase in the wake of the panel ruling. In other words, investors predicted that following the ruling, the removal of the subsidy might drive the suppressed price up to market levels. And while the valuation of wheat futures also increased abnormally following the panel report, this increase is significant only at the 10 percent level.

Conversely, following the AB ruling, which did little but uphold the panel’s findings, both commodities saw an abnormal price increase, but the increase for the spillover commodity (wheat) was statistically and substantively more significant than for the disputed commodity (cotton). Figure 2 shows that the observed and predicted prices of wheat are closely related in the estimation window, again giving us confidence in the model predictions. In the wake of the appeal announcement, there is a sharp divergence from the predicted price absent the event, as wheat prices climb steadily, reflecting the bet that subsidies may be threatened. When we test these effects using a Newey-West estimation, we obtain highly consistent results.

Here, the same picture emerges as in the solar energy case: the panel ruling affects the underlying country or industry, whereas the AB ruling is what registers with the spillover country or industry. This bolsters our explanation for the difference between the market effects of panel

### Table 5
**Commodity Futures Prices, US–Upland Cotton**

<table>
<thead>
<tr>
<th></th>
<th>(1) Panel Ruling</th>
<th>(2) Appellate Body Ruling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimation window/Event window</td>
<td>50/10</td>
<td>50/10</td>
</tr>
<tr>
<td>Cotton</td>
<td>20.86</td>
<td>13.71</td>
</tr>
<tr>
<td></td>
<td>(3.14)</td>
<td>(4.39)</td>
</tr>
<tr>
<td>Wheat</td>
<td>63.12</td>
<td>243.04</td>
</tr>
<tr>
<td></td>
<td>(1.65)</td>
<td>(4.71)</td>
</tr>
</tbody>
</table>

Test statistics in parenthesis; absolute values greater than 1.96 represent a significant difference from zero at the 5 percent level.
rulings versus AB rulings. It may be that while markets draw conclusions about the disputed country or product from the panel report, spillovers to other cases are contingent on the AB report; markets do not apply the ruling elsewhere until they observe the AB’s verdict. In this view, panel reports by themselves carry little precedential impact, formal or otherwise. To push this reasoning further, perhaps it is precisely the existence of a standing body of judges such as the AB that allows for spillovers to operate. After all, the related notion that de facto binding precedent operates in the trade regime emerged only with the creation of the AB. It may well be that the institutional continuity provided by a standing body of judges such as the AB is what creates an incentive for greater consistency across rulings, which in turn leads observers to expect a given ruling to spill over beyond the case at hand.

The tests on US—Upland Cotton support the view that WTO rulings have spillovers, as inferred from the behavior of both stock markets and commodity exchanges. In this case, investors bet that if wheat production benefits from a scheme similar to the disputed cotton subsidies, it

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85 See, for example, Bhala 1999.
may eventually lose part of its governmental support. We now know that the cotton dispute ended short of compliance; the United States reached a bilateral settlement in which it effectively paid off Brazil to continue subsidizing its cotton producers. Had the financial markets foreseen such an outcome, they should not have bet on a price increase in cotton. That they did so is telling of how rare settlements such as this one are: the expectation on the part of financial markets was that support for cotton would be at least partly rescinded and that the same may eventually happen to wheat. As the zeroing disputes demonstrated, a spillover effect can occur even when the main country at issue resists compliance. What the findings suggest is that investors bet on an increase both in cotton and wheat prices as a result of the ruling.

VI. Conclusion

This article addresses an enduring debate over the influence of international courts. Courts are looked to by some as agents of social and legal change. To fulfill this function, courts must do more than simply resolve the disagreement in the case at hand; their rulings must modify expectations as to what constitutes acceptable behavior, affecting the behavior of actors not party to the initial dispute. Yet the formal mandates of international courts would appear to make such spillover effects unlikely. Countries are wary of delegating too much power to international courts, and work hard to ensure that rulings occur in isolation one from another. Given these conflicting beliefs, how influential are international courts? Can they affect global expectations about what constitutes acceptable behavior, or is their function confined to settling disagreements in specific contexts?

We bring new evidence to bear on this question by looking to the international trade regime. In important respects, the trade regime represents a conservative test of the spillover hypothesis; it cannot rely on domestic courts to implement international rulings, as in the European context. If anything, this should render the presence of spillover effects less likely.\textsuperscript{86} International trade also presents several analytical benefits. Because the outcomes of trade rulings ultimately register on firms and prices, we examine the reactions of financial markets to the announcements of trade rulings. We ask, do investors bet that governments are less likely to maintain policies that were ruled against in disputes they were not party to?

\textsuperscript{86} Helfer and Voeten 2014, 31.
We find two cases that fit our criteria. First, we consider a dispute targeting government support schemes of solar energy projects in Canada. We find that financial markets in India, where solar firms benefit from a support scheme highly similar to Canada’s, sell off shares of these firms when the WTO finds the Canadian support scheme to be noncompliant. In other words, Indian markets bet that the WTO ruling against Canada would jeopardize government support offered to firms in India. We then perform a similar exercise on a different case, asking whether a ruling against US cotton led investors to bet that similar US subsidies on wheat would be threatened. In both cases, we observe investors betting that a dispute has effects beyond its formal confines.

Our analysis also reveals systematic variation in the effects of lower and higher court rulings. Specifically, in both the solar energy and cotton cases, AB rulings appear to carry a stronger spillover effect than panel rulings. The unique feature of the AB is that it is a standing body of judges, similar to a domestic supreme court. This differs from human rights courts, and especially investment tribunals, which tend to be far more ad hoc. These findings suggest caution in applying the results from international trade directly to other regimes.

At a minimum, rulings must be sufficiently transparent so that not only the legal outcome but also the legal reasoning relied upon are readily available. Until recently, the low level of transparency in the investor-state arbitration regime, for instance, would have been insufficient to support spillovers beyond a given case. The ad hoc selection process of the arbitrators, the absence of an appeal stage, and the standing body of judges that usually accompanies it are factors that render spillovers less likely. But the lesson from our analysis is that spillovers from international legal rulings can occur even in the face of formal rules that explicitly claim otherwise.

The findings tell us that in aggregate, markets believe that the rulings of the WTO sway not only those countries party to the dispute at hand, but also countries that have in place, or are considering putting in place, measures similar to those over which the dispute is waged. This implies, in turn, that the WTO can converge actors’ expectations about what measures are acceptable, and in so doing, it may deter further violations. Such a deterrence function is precisely what observers who view international courts as agents of social and legal change have in mind.

A final observation concerns our approach. Financial markets provide

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87 A growing number of scholars argue that as transparency has been increasing in the investment regime, so too has the role of citations to past cases. See Weidemaier 2010 for a take on citation patterns in investment arbitration.
us with an overlooked means of gauging aggregate expectations in cases where observers disagree on the presence of some social phenomenon. One can ask whether markets believe sufficiently in a causal effect—in this case, the effect of a legal ruling on trade measures in a foreign country or on a different industry—to put money on it. In regard to the question of whether the influence of international courts reaches beyond the cases they are asked to rule on, financial markets suggest the answer is a cautious yes.

**Supplementary Material**

Supplementary material for this article can be found at http://dx.doi.org/10.1017/S0043887116000113.

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