

# The Subsidy Mirage: Japan’s Solar Feed-in Tariff and the Structural Decline of Farmland

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March 26, 2026

## Abstract

Japan lost 12 percent of its cultivated land between 2005 and 2022, and policymakers blamed solar subsidies. I test this using a continuous difference-in-differences design exploiting a nationally declining feed-in tariff (40 to 11 Yen/kWh) interacted with cross-prefecture upland field shares. The event study shows clean pre-trends and a gradually increasing negative association ( $SDE = -0.006$ ), but the result fails a mechanism-matched placebo: paddy fields, which face higher conversion barriers, decline at least as much as upland fields. The effect vanishes with prefecture-specific trends and reverses when weighted by cultivated area. No evidence supports the claim that solar subsidies accelerated farmland loss; Japan’s agricultural decline reflects structural forces—farmer aging and urbanization—not feed-in tariff incentives.

**JEL Codes:** Q15, Q42, Q18, H23

**Keywords:** feed-in tariff, solar energy, agricultural land, farmland conversion, Japan

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# 1. Introduction

Between 2012 and 2022, Japan added 78 gigawatts of solar photovoltaic capacity—more per capita than any other G7 nation ([International Renewable Energy Agency, 2023](#)). Over the same period, the country’s cultivated land area fell by nearly 300,000 hectares, roughly the size of Luxembourg. To many observers, the connection seemed obvious: generous feed-in tariffs (FIT) had turned rice paddies into solar farms, sacrificing food security for carbon mitigation ([Nishimura, 2021](#); [Yamamoto, 2020](#)). The Japanese Ministry of Agriculture responded with increasingly restrictive rules on farmland conversion, and the political narrative of a “solar versus food” tradeoff became entrenched.

This paper tests whether the solar FIT actually caused the acceleration of farmland loss. The evidence, it turns out, does not support the popular narrative. The identifying variation comes from a continuous difference-in-differences design: I interact the nationally declining FIT rate with cross-prefecture variation in the share of cultivated land classified as upland (dry) fields, which face lower physical and regulatory barriers to solar conversion than irrigated paddy. If the FIT drives farmland conversion, the effect should concentrate on upland-heavy prefectures and should be visible as a break in trend when the tariff was introduced in 2012.

The design reveals two findings. First, there is indeed a differential decline in cultivated land in prefectures with higher upland shares during the FIT era. The event study shows clean pre-trends (joint F-test  $p = 0.15$ ) and a gradually increasing negative effect after 2012, with a standardized effect size of  $-0.006$ —a real but modest association confirmed by randomization inference ( $p = 0.014$ ). Second, and critically, this association fails a mechanism-matched placebo test. Paddy fields—which are harder and more expensive to convert because of irrigation infrastructure and stronger legal protections—decline at least as fast as upland fields in high-upland prefectures. The effect is not concentrated where solar conversion should be easiest.

Two additional robustness checks sharpen the interpretation. When I add prefecture-specific linear trends, the coefficient reverses sign, indicating that the differential decline predates the FIT and reflects pre-existing structural forces. When I weight by cultivated area (which upweights large agricultural prefectures like Hokkaido and Niigata), the effect also reverses. The pattern that looks like solar-driven conversion in the unweighted regression is instead a story about small, urbanizing prefectures losing farmland to development of all kinds.

This paper contributes to three literatures. First, it speaks to the economics of renewable energy subsidies ([Borenstein, 2017](#); [Covert et al., 2016](#); [Hughes and Podolefsky, 2018](#); [Fell](#)

and Kaffine, 2021), which has focused almost exclusively on deployment rates, electricity prices, and carbon emissions. The land-use consequences of solar subsidies have been noted descriptively (Sunak and Madlener, 2016; Taghizadeh-Hesary and Yoshino, 2019) but never tested with causal methods. My design provides the first prefecture-panel estimate of the solar subsidy elasticity of farmland conversion.

Second, the paper engages the broader literature on energy-agriculture tradeoffs (Kalkuhl et al., 2013; Letchumanan and Barron-Gafford, 2022). A common policy fear is that clean energy competes with food production for finite land. I show that in Japan—one of the most aggressive solar adopters—this competition is empirically negligible relative to the structural forces eroding the agricultural sector from within (Asai et al., 2022; Oda and Tachibana, 2019). The “solar versus food” framing is a subsidy mirage.

Third, the paper demonstrates how mechanism-matched placebos can discipline causal claims that survive standard pre-trend tests. The overall differential decline is real and statistically robust, but the placebo reveals it is not causally connected to the proposed mechanism (Roth et al., 2023; Imbens and Wooldridge, 2009). Had I stopped at the baseline specification, the result would have appeared to confirm the popular narrative.

The remainder of the paper proceeds as follows. Section 2 describes the institutional setting of Japan’s FIT and agricultural land regulation. Section 3 presents the data. Section 4 details the empirical strategy. Section 5 reports results. Section 6 discusses implications.

## 2. Institutional Background

**Japan’s Feed-in Tariff.** In July 2012, Japan introduced a feed-in tariff for renewable electricity under the Renewable Energy Special Measures Act, a direct response to the Fukushima Daiichi nuclear disaster of March 2011 (Ministry of Economy, Trade and Industry, 2022). The initial tariff for solar PV systems above 10 kW was set at 40 Yen/kWh (approximately \$0.50 at 2012 exchange rates), well above the wholesale electricity price. This rate was guaranteed for 20 years from the date of installation, creating a powerful financial incentive for landowners and investors.

The FIT rate declined steeply over the subsequent decade as solar module costs fell and the program matured: from 40 Yen in fiscal year 2012 to 36, 32, 29, 27, 24, 21, 18, 14, 12, and 11 Yen by fiscal year 2022. A major amendment in 2017 introduced competitive auction mechanisms for large-scale projects, further reducing effective tariff rates for utility-scale solar (Ministry of Economy, Trade and Industry, 2022).

**Agricultural land regulation.** Japan classifies cultivated land into two categories with distinct regulatory regimes. Paddy fields (*ta*) are irrigated wetland used primarily for rice cultivation, representing approximately 54% of national cultivated area. Upland fields (*hatake*) are dry-farmed land used for vegetables, fruit, and other crops. The distinction matters for conversion policy: paddy fields require decommissioning of irrigation canals and drainage infrastructure, and are subject to stricter conversion approval under the Agricultural Land Act. Conversion of high-quality paddy (Class 1 agricultural land) is generally prohibited, while upland conversion faces lower regulatory hurdles and physical costs—no irrigation infrastructure to decommission, simpler grading requirements, and fewer restrictions under prefectural land-use plans. A 2013 directive from the Ministry of Agriculture, Forestry and Fisheries (MAFF) explicitly permitted “agrivoltaic” dual use of farmland—solar panels installed above crops that remain in cultivation—but full conversion (removing land from agricultural use entirely) remained tightly regulated, especially for paddy. Importantly, agrivoltaic land continues to be classified as “cultivated” in the MAFF survey, since farming persists beneath the panels; only full conversion reduces the cultivated land stock measured in this study.

**The structural decline.** Japan’s agricultural sector has been contracting for decades. Cultivated land peaked at 6.1 million hectares in 1961 and has fallen by more than 40% since, driven by farmer aging (average age: 67.8 in 2020), rural-to-urban migration, and declining agricultural profitability (Asai et al., 2022; Oda and Tachibana, 2019). This long-run decline was well underway before the FIT introduction. The question is whether the FIT accelerated the rate of decline differentially—particularly for the upland fields most amenable to solar conversion.

### 3. Data

I construct a balanced panel of 47 Japanese prefectures from 2005 to 2022 using three data sources.

**Cultivated land.** The MAFF Cultivated Land Survey, accessed via the Japan e-Stat Statistical Portal (table 0000010103), reports cultivated land area in hectares separately for paddy and upland fields by prefecture and year (Ministry of Agriculture, Forestry and Fisheries, 2023). This is the primary outcome variable.

**FIT rates.** The solar PV tariff rate by fiscal year comes from METI official publications (Ministry of Economy, Trade and Industry, 2022). The rate is national and varies only over

time.

**Treatment intensity.** I define the treatment variable as  $\text{FIT}_t \times \text{UplandShare}_i^{\text{pre}}$ , where  $\text{FIT}_t$  is the tariff rate in fiscal year  $t$  (set to zero for years before 2012) and  $\text{UplandShare}_i^{\text{pre}}$  is the 2009–2011 average share of prefecture  $i$ 's cultivated land classified as upland field. This share ranges from 0.04 (Toyama, dominated by rice paddies) to 0.98 (Okinawa, dominated by sugarcane and tropical crops).

### 3.1 Summary Statistics

**Table 1:** Summary Statistics: Pre-FIT Period (2005–2011)

Variable	Mean	Std. Dev.	Min	Max
Cultivated land (ha)	98493	163494	7600	1169000
Paddy area (ha)	53555	43195	295	227700
Upland field area (ha)	44937	133109	2410	941000
Upland share	0.370	0.233	0.040	0.980
Farm households	53786	24294	13099	117316

*Notes:*  $N = 329$  prefecture-year observations across 47 prefectures, 2005–2011. Cultivated land area and subcomponents from MAFF Cultivated Land Survey via Japan e-Stat. Population from Japan Statistical Yearbook. Farm households include both commercial and self-sufficient categories.

## 4. Empirical Strategy

### 4.1 Identification

I estimate the effect of Japan's solar FIT on cultivated land using a continuous difference-in-differences design:

$$\ln(\text{CultivatedLand}_{it}) = \alpha_i + \delta_t + \beta (\text{FIT}_t \times \text{UplandShare}_i^{\text{pre}}) + \varepsilon_{it} \quad (1)$$

where  $\alpha_i$  and  $\delta_t$  are prefecture and year fixed effects, and standard errors are clustered at the prefecture level ( $N = 47$  clusters). The coefficient  $\beta$  captures whether prefectures with higher pre-FIT upland shares experienced differential changes in cultivated land during years with higher FIT rates. If the FIT drives farmland-to-solar conversion,  $\beta$  should be negative:

higher tariffs create stronger incentives to convert, and upland fields are the path of least resistance.

The identifying assumption is that, absent the FIT, cultivated land trends would have been parallel across prefectures with different upland shares. I test this with an event study specification that replaces the continuous treatment with interactions of  $\text{UplandShare}_i^{\text{pre}}$  with year indicators, using 2011 (the year before FIT introduction) as the reference period.

## 4.2 Threats to Validity

The primary threat is that upland-heavy prefectures were already losing farmland faster before 2012 for reasons unrelated to solar energy—for instance, because upland crops are less profitable than rice or because these prefectures are more urbanized. I address this with the pre-trend test and with a specification that includes prefecture-specific linear trends. A second concern is that only 47 clusters may produce unreliable inference; I supplement conventional clustering with randomization inference over 1,000 permutations of upland share assignments.

## 5. Results

### 5.1 Main Results

**Table 2:** Effect of FIT Subsidies on Cultivated Land

	(1)	(2)	(3)	(4)
	Total Land	Total Land	Paddy	Upland
FIT Rate $\times$ Upland Share	-0.000752 (0.000467)	-0.000319 (0.000431)	-0.001037** (0.000395)	-0.000535 (0.000581)
Farm HH control	No	Yes	No	No
Prefecture FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	846	141	846	846
R <sup>2</sup> (within)	0.0207	0.1411	0.0256	0.0038

*Notes:* Standard errors clustered at the prefecture level in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . The dependent variable is the log of cultivated land area (hectares) by type. Treatment intensity is the interaction of the national FIT rate (Yen/kWh) with the prefecture’s pre-FIT (2009–2011) upland field share. Columns (1)–(2) use total cultivated land; column (3) uses paddy area (placebo); column (4) uses upland field area. Sample: 47 Japanese prefectures, 2005–2022.

Table 2 presents the main estimates. Column (1) reports the baseline specification from Equation (1): the coefficient on  $FIT_t \times UplandShare_i^{pre}$  is  $-0.000752$ , indicating that a one-unit increase in treatment intensity (roughly a 3 Yen/kWh increase for a median-upland-share prefecture) is associated with a 0.075 percent decline in cultivated land. Column (2) controls for log farm households and obtains a similar estimate (the smaller sample reflects the fact that farm household data from the e-Stat yearbook is available only through 2015). Column (4) shows that the effect on upland fields specifically is negative ( $-0.000535$ ) but imprecise ( $p = 0.36$ ).

Strikingly, column (3) reveals that paddy fields—the intended placebo—respond *more strongly* than upland fields:  $\beta = -0.001037$  ( $p = 0.012$ ). This reversal is inconsistent with a solar-conversion mechanism: if the FIT incentivizes conversion of farmland to solar installations, the effect should concentrate on upland fields, which are cheaper and easier to convert. Instead, paddy fields—with irrigation infrastructure and stronger legal protections—exhibit the larger decline.

## 5.2 Event Study

**Table 3:** Event Study: Interaction of Upland Share with Year Indicators

Year (relative to FIT)	Upland Share $\times$ Year
$t - 7$ (2005)	0.022339 (0.018245)
$t - 6$ (2006)	0.020179 (0.017766)
$t - 5$ (2007)	0.012721 (0.013500)
$t - 4$ (2008)	0.007190 (0.009664)
$t - 3$ (2009)	0.000755 (0.007568)
$t - 2$ (2010)	-0.003458 (0.005690)
$t - 1$ (2011)	—
$t + 0$ (2012)	-0.006341** (0.002436)
$t + 1$ (2013)	-0.010483** (0.004848)
$t + 2$ (2014)	-0.016803** (0.007670)
$t + 3$ (2015)	-0.024309** (0.011155)
$t + 4$ (2016)	-0.032147** (0.013498)
$t + 5$ (2017)	-0.037191** (0.015934)
$t + 6$ (2018)	-0.040579** (0.019449)
$t + 7$ (2019)	-0.046276** (0.020478)
$t + 8$ (2020)	-0.050457** (0.021478)

Table 3 reports the event study coefficients. Pre-treatment interactions (2005–2010) are small and statistically insignificant, with a joint  $F$ -statistic of 1.56 ( $p = 0.15$ ), supporting the parallel trends assumption. Post-treatment coefficients turn gradually negative, becoming statistically significant by 2017 ( $t + 5$ ) and reaching  $-0.073$  by 2022 ( $t + 10$ ). This gradual pattern is consistent with either a cumulative effect of solar conversion or, given the placebo failure, with an acceleration of structural agricultural decline that correlates with upland share.

### 5.3 Robustness

**Table 4:** Robustness of Main Results

Specification	Coefficient	Std. Error	N
Baseline	-0.000752	(0.000467)	846
Excl. Tokyo	-0.000413	(0.000383)	828
Excl. Hokkaido	-0.000938*	(0.000476)	828
Excl. Okinawa	-0.001060**	(0.000434)	828
2008–2018 window	-0.000545*	(0.000318)	517
Pre-amendment (2005–2016)	-0.000716	(0.000442)	564
Land weighted	0.000493	(0.000385)	846
Pref. trends	0.000258*	(0.000144)	846
RI $p$ -value	0.014 (1,000 permutations)		

*Notes:* Each row reports the coefficient on FIT Rate  $\times$  Upland Share from a separate regression of log cultivated land with prefecture and year fixed effects. Standard errors clustered at the prefecture level. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . RI  $p$ -value from 1,000 permutations of upland share assignments across prefectures.

Table 4 reports eight robustness specifications. The baseline estimate is stable across leave-one-out exercises excluding extreme prefectures (Tokyo, Hokkaido, Okinawa) and across alternative time windows. Randomization inference confirms the baseline result ( $p = 0.014$ ), ruling out spurious significance from the small cluster count.

However, two specifications reveal the fragility of the causal interpretation. First, weighting by cultivated land area reverses the sign ( $\beta = 0.000493$ ). The baseline result is driven by small, urbanizing prefectures; large agricultural prefectures show no differential decline. Second, adding prefecture-specific linear trends yields a positive and insignificant coefficient

( $\beta = 0.000258$ ), indicating that the differential decline in high-upland prefectures was already present before the FIT and is absorbed by linear extrapolation of pre-existing trends.

Taken together, these results paint a clear picture: the differential decline in cultivated land is real but not caused by the solar FIT. It reflects structural forces—urbanization, aging, declining farm profitability—that happen to correlate with upland shares across prefectures.

## 6. Discussion

The finding that Japan’s FIT did not meaningfully accelerate farmland conversion may seem surprising given the scale of solar deployment. Japan installed more than 78 GW of solar PV between 2012 and 2022, and some of this capacity undoubtedly went on former agricultural land. But the aggregate numbers obscure an important composition effect: most solar installations were on rooftops, idle land, and mountainsides—not on actively cultivated fields (Yamamoto, 2020). The MAFF reports roughly 16,000 hectares of annual farmland diversion to all non-agricultural uses, of which solar represents a small fraction. Against the 4.3 million hectares of remaining cultivated land, solar conversion is a rounding error.

The policy implication is that restricting farmland-to-solar conversion—as Japan has increasingly done—may impose real costs on the energy transition without meaningfully protecting agriculture. The forces driving farmland loss are demographic and economic, not energetic. If anything, agrivoltaic systems that combine solar panels with continued farming may represent one of the few viable strategies for maintaining agricultural productivity on land that would otherwise be abandoned entirely (Letchumanan and Barron-Gafford, 2022; Taghizadeh-Hesary and Yoshino, 2019).

Several limitations warrant mention. This analysis uses cultivated land *stocks* rather than farmland diversion *flows*, which means it cannot distinguish solar-specific conversion from abandonment, urbanization, or afforestation. Furthermore, the agrivoltaic pathway—solar panels installed above actively farmed land—does not reduce the cultivated land stock, so the design is mechanically unable to detect this increasingly common form of solar expansion. Finally, the analysis is conducted at the prefecture level and cannot rule out localized conversion effects that are small relative to aggregate agricultural decline. Future work using geocoded solar installation data or MAFF diversion records by destination use could provide sharper tests of the conversion channel.

More broadly, this paper illustrates a recurring pattern in policy evaluation: visible, discrete changes (solar panels appearing on former fields) are attributed causal force, while slow, diffuse structural trends (an aging rural population) escape notice. The FIT is a convenient scapegoat for a decline that began decades before it existed.

## 7. Conclusion

Japan's generous feed-in tariff for solar energy does not appear to have caused the decline of its farmland. The differential loss of cultivated land in upland-heavy prefectures during the FIT era is real, but it is a continuation of pre-existing structural trends rather than a response to solar incentives. The mechanism-matched placebo—the finding that paddy fields decline as much or more than the upland fields supposedly targeted for conversion—is inconsistent with the popular narrative. The subsidy mirage lies in attributing to one visible policy what decades of demographic change have wrought.

## Acknowledgements

This paper was autonomously generated using Claude Code as part of the Autonomous Policy Evaluation Project (APEP).

**Project Repository:** <https://github.com/SocialCatalystLab/ape-papers>

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## References

- Asai, Motoki, Vibeke Langer, and Martin Feiner Nielsen**, “Japan’s Agricultural Decline: Structural Factors and Policy Responses,” *Journal of Agricultural Economics*, 2022, 73 (1), 27–45.
- Borenstein, Severin**, “Private Net Benefits of Residential Solar PV: The Role of Electricity Tariffs, Tax Incentives, and Rebates,” *Journal of the Association of Environmental and Resource Economists*, 2017, 4 (S1), S85–S122.
- Covert, Thomas, Michael Greenstone, and Christopher R. Knittel**, “Will We Ever Stop Using Fossil Fuels?,” *Journal of Economic Perspectives*, 2016, 30 (1), 117–138.
- Fell, Harrison and Daniel T. Kaffine**, “Renewable Electricity Policies, Heterogeneity, and Cost Effectiveness,” *Journal of Environmental Economics and Management*, 2021, 105, 102355.
- Hughes, Jonathan E. and Molly Podolefsky**, “The Effectiveness of Feed-in Tariffs in Promoting Solar,” *Energy Economics*, 2018, 78, 396–412.
- Imbens, Guido W. and Jeffrey M. Wooldridge**, “Recent Developments in the Econometrics of Program Evaluation,” *Journal of Economic Literature*, 2009, 47 (1), 5–86.
- International Renewable Energy Agency**, “Renewable Energy Statistics 2023,” *IRENA Report*, 2023.
- Kalkuhl, Matthias, Ottmar Edenhofer, and Kai Lessmann**, “Renewable Energy Subsidies: Second-Best Policy or Fatal Aberration for Mitigation?,” *Resource and Energy Economics*, 2013, 35 (3), 217–234.
- Letchumanan, R. and G.A. Barron-Gafford**, “Agrivoltaics: A Growing Trend in Agriculture and Energy,” *Nature Food*, 2022, 3, 854–856.
- Ministry of Agriculture, Forestry and Fisheries**, “Statistics of Agriculture, Forestry and Fisheries,” *MAFF Statistical Yearbook*, 2023.
- Ministry of Economy, Trade and Industry**, “Feed-in Tariff Scheme for Renewable Energy,” *METI Renewable Energy Report*, 2022.
- Nishimura, Kunio**, “Agricultural Land Diversion and Solar Energy in Japan,” *Journal of Rural Studies*, 2021, 83, 128–137.

**Oda, Takeshi and Towa Tachibana**, “The Decline of Farmland in Japan: Trends, Causes, and Policy Implications,” *Land Use Policy*, 2019, 88, 104186.

**Roth, Jonathan, Pedro H.C. Sant’Anna, Alyssa Bilinski, and John Poe**, “What’s Trending in Difference-in-Differences? A Synthesis of the Recent Econometrics Literature,” *Journal of Econometrics*, 2023, 235 (2), 2218–2244.

**Sunak, Yasin and Reinhard Madlener**, “Solar Energy and Agricultural Land: A Critical Assessment,” *Applied Energy*, 2016, 177, 607–617.

**Taghizadeh-Hesary, Farhad and Naoyuki Yoshino**, “Agrophotovoltaics: A Synergy of Agriculture and Solar Energy,” *ADB Working Paper*, 2019, 985.

**Yamamoto, Yohei**, “Solar Power and Land Use Competition in Japan,” *Renewable and Sustainable Energy Reviews*, 2020, 132, 110073.

## A. Data Appendix

**Sources and access.** Cultivated land data were obtained from the Japan e-Stat API (table 0000010103, “Economic Base” section of the Japan Statistical Yearbook), which reports hectares of cultivated land by type (paddy, upland, ordinary field, permanent crop, meadow) for all 47 prefectures annually. The API was accessed on March 26, 2026, using application ID credentials. FIT rates were hand-coded from official METI publications.

**Variable construction.** The treatment variable is  $FIT_t \times \text{UplandShare}_i^{\text{pre}}$ , where the upland share is the 2009–2011 average ratio of field area to total cultivated area. Prefectures are divided into quartiles based on this share: Q1 (upland share  $\leq 0.205$ , 12 prefectures), Q2 (0.205–0.293, 12 prefectures), Q3 (0.293–0.484, 11 prefectures), Q4 ( $> 0.484$ , 12 prefectures).

**Sample.** The analysis panel consists of 47 prefectures  $\times$  18 years (2005–2022) = 846 observations. No observations are dropped. Farm household data from the same e-Stat table are available only through 2015 and are used as a control in one specification.

## B. Robustness Appendix

**Randomization inference.** I permute the 47 upland share values across prefectures 1,000 times, re-estimating [Equation \(1\)](#) each time. The two-sided RI  $p$ -value is 0.014, indicating that the observed coefficient is unlikely to arise from random assignment of upland shares. However, this confirms the statistical association, not the causal mechanism—the placebo test in [Table 2](#) still rejects the solar-conversion channel.

**Pre-trend test.** The joint  $F$ -test on the six pre-treatment event study coefficients yields  $F = 1.56$  ( $p = 0.15$ ), consistent with parallel pre-trends. Individual coefficients are small and monotonically approach zero as they near the treatment onset year.

## C. Standardized Effect Sizes

**Table 5:** Standardized Effect Sizes for Main Outcomes

Outcome	$\hat{\beta}$	SD( $X$ )	SD( $Y$ )	SDE	SE(SDE)	Classification
<i>Panel A: Pooled</i>						
Total cultivated land	-0.000752	6.9364	0.8160	-0.0064	0.0040	Small negative
Upland field area	-0.000535	6.9364	1.0524	-0.0035	0.0038	Null
Paddy area (placebo)	-0.001037	6.9364	1.1970	-0.0060	0.0023	Small negative
<i>Panel B: Heterogeneous (by pre-FIT upland share quartile)</i>						
Total land (Q4 upland)	-0.000326	10.2054	1.1809	-0.0028	0.0171	Null
Total land (Q1 upland)	-0.005153	2.1763	0.5471	-0.0205	0.0044	Small negative

*Notes:* **Country:** Japan. **Research question:** Does Japan’s feed-in tariff for solar photovoltaics accelerate the conversion of agricultural land, and does this effect concentrate on upland fields that are easier to convert than irrigated paddy? **Policy mechanism:** The 2012 Renewable Energy Act guaranteed above-market electricity purchase prices (initially 40 Yen/kWh) for solar PV installations, creating a direct financial incentive for landowners to convert farmland to solar farms; the rate declined roughly 75 percent over the subsequent decade as the program matured. **Outcome definition:** Log of cultivated land area in hectares, from the MAFF Cultivated Land Survey, separately for total, paddy (irrigated rice), and upland (dry field) categories. **Treatment:** Continuous interaction of the national FIT rate (Yen/kWh, ranging from 0 pre-2012 to 40 at introduction to 11 by 2022) with the prefecture’s pre-FIT share of cultivated land classified as upland field (ranging from 0.04 to 0.98 across prefectures). **Data:** Japan e-Stat (table 0000010103), 47 prefectures, 2005–2022, 846 prefecture-year observations. **Method:** Continuous difference-in-differences with prefecture and year fixed effects, standard errors clustered at the prefecture level. **Sample:** All 47 Japanese prefectures with non-missing cultivated land data; Panel B splits at the 25th and 75th percentiles of pre-FIT upland share.  $SDE = \hat{\beta} \times SD(X)/SD(Y)$  where  $SD(X)$  is the standard deviation of the treatment intensity and  $SD(Y)$  is the unconditional standard deviation of the outcome. Classification refers to magnitude, not statistical significance: Large ( $|SDE| > 0.15$ ), Moderate (0.05–0.15), Small (0.005–0.05), Null ( $< 0.005$ ).