IIMB Management Review (2024) 36, 353–367

available at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/iimb

Blessing of geography: Impact of geographical indications on agricultural exports in India

Manu Bansal[a,*], **Rahul Singh**[b]

[a] *Indian Institute of Management Jammu, Jammu, Jammu and Kashmir, India*
[b] *Ahmedabad University, Navrangpura, Ahmedabad, Gujarat, India*

Received 31 January 2023; revised form 3 October 2023; accepted 17 October 2024; Available online 23 October 2024

KEYWORDS
Geographical indications;
Agricultural exports;
India;
Ownership;
Cropping pattern

Abstract We examine the effect of geographical indications (GIs) on India's agricultural exports. We combine a novel dataset of state-product-year level exports with data on registered GIs for agricultural products in India from 2004 to 2016. Our identification strategy relies on exploiting the within-state-product variation in exports over time in response to GI registration. We find a significant positive effect of GIs on agricultural exports. We also observe that this increase is driven by government-owned GIs, and by GIs in states with more efficient courts and better transport infrastructure. Finally, we find a shift in cropping pattern, especially towards the GI-tagged crops, albeit at the district level.
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Introduction

Geographical indication (GI) is a form of collective intellectual property rights (IPRs) that identifies a good originating in a particular geographical region, where its reputation, quality, and other characteristics are effectively attributable to its geographical origin (Jena & Grote, 2012). Governments in developing countries have actively promoted GIs for agricultural goods as a tool for rural and regional socio-economic development (van Caenegem & Cleary, 2017). This emphasis on GIs is driven partly by their presumed positive effect on agricultural exports. However, despite their widespread use, we have had little empirical evidence on the causal link between GIs and agricultural exports in developing countries. This is mainly due to the unavailability of regional export data for agricultural commodities at a disaggregated level. Additionally, there is also the need for systematic data on product-level GIs for developing countries.[1] Through this study, we attempt to fill this gap in the literature by providing the first evidence of the effect of GIs on agricultural exports for the full spectrum of agricultural commodities, specifically within the ambits of a large developing country like India.

By increasing the perceived quality of a product, GIs can increase exports at both intensive and extensive margins. For instance, Crozet, Head, and Mayer (2012) find that higher quality of champagne for French producers is associated with higher exports, higher prices, and a higher probability of entry into export markets. It may also be noted that

[1] There are a few product specific case studies documenting the trade impact of GIs in the European Union. See for instance, Agostino and Trivieri (2014), Raimondi et al. (2019), and Sorgho and Larue (2014). Further few case studies examine the impact of GIs on some important agricultural products like Darjeeling Tea (Rao, 2005) and Basmati Rice in India (Jena and Grote, 2012).

*Corresponding author: Tel.: +91-99800 41440.
E-mail address: manu@iimj.ac.in (M. Bansal).

https://doi.org/10.1016/j.iimb.2024.10.003
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GIs indicate product quality attributable to the local environment (Desquilbet & Monier-Dilhan, 2015; Moschini, Menapace, & Pick, 2008), and can thereby protect consumers from duplicates and counterfeits by removing information asymmetry (Sorgho & Larue, 2014). Further, GIs can increase exports by increasing physical efficiency by standardizing and modernizing the production process (Durand & Fournier, 2017). In heterogeneous firm models of trade, Melitz (2003) increased physical efficiency and higher quality promises to lead to increased exports. Furthermore, by increasing the profits of varieties, GIs can enable entry into export markets, as producers would be able to recover the fixed costs of exporting. Finally, GIs may increase exports through better marketing of the product in foreign markets (Agostino & Trivieri, 2014; Raimondi, Falco, Curzi, & Olper, 2019).

We combine a novel dataset on state-product-year level exports from the Directorate General of Commercial Intelligence and Statistics (DGCIS) with data on registered GIs for agricultural products from the GIs Registry for 2004–2016. India provides an ideal setting to study the effect of GIs on exports, as GIs were extensively promoted by both the Central and State governments as a regional development tool during this period. In fact, there were 123 agricultural products registered as GIs during 2004–2016, with 23 states registering at least 1 GI product during this period.

To estimate the impact of GIs on exports, we rely on a difference-in-differences framework comparing the changes in exports for GI-registered state products (treated) with other state-product observations that do not receive GI registration (control). Moreover, to ensure that the state products in the control group are comparable to those that receive GIs, we restrict our sample to comprise product lines for which, at least one state registers a GI during our sample period. Further, to ensure that our estimates are well identified, we control for the state-product-specific time trends to account for any differential pre-existing linear trends in exports for both treated and control state products. Finally, our specifications also include a rich set of high-dimensional fixed effects to absorb as much of the effect of time-varying unobserved shocks as possible. We include state-product, product-year, and state-year fixed effects to capture time-varying shocks at different levels of aggregation. This ensures that we control for the effect of the demand and supply side time-varying unobserved factors that are correlated with GI registration as well as exports. Our key finding is that GIs on agricultural products do have a significant positive effect on state-product level exports. Largely, our results suggest that the GI registration of a product increased the state-product level exports by 67.7% on average. Our results are robust to using a long-differenced specification.

A key question for policymakers is whether IPRs like GIs can promote the socio-economic development of relatively less-developed regions. Heterogeneity analysis based on the per-capita income of states reveals that states with higher per-capita income differentially increase their exports in GI products relative to low per-capita income states. To better understand these heterogeneous results, we test for the complementary role of state-level institutions and infrastructure in enabling exports in response to GIs. Notably, high-income states, on average, have more efficient institutions and better infrastructure. The effectiveness of GIs would depend crucially on the ability of producers to enforce IPR and restrict production in the designated geographical area. In turn, this would depend on the efficiency of judicial institutions. Furthermore, it may be noted that due to increased costs, weak rail and road infrastructure may hamper access to export markets, and thereby make products less competitive. We find that the effect of GI on exports is differentially higher for (1) states with better judicial efficiency, (2) states with better road and rail infrastructure, and (3) government-owned GIs. These results suggest that enforceability through an efficient judicial system, better transport infrastructure, and government support are crucial in enabling increased exports in response to GIs. Thus, GIs may not be as effective as a regional development tool in less developed regions with weak judicial institutions and inadequate infrastructure.

Finally, we study the impact of GIs on the cropping pattern at the local economy (district) level. We find a significant shift in the cropping pattern in favour of crops that receive the GI registration. We find that the GI registration of a crop does increase its share of the cropping area by 2%. These findings are consistent with an increase in the production of GI crops in response to GI registration.

Related literature

IPR affects exports through two main channels. The first refers to the market power effect, and the second refers to the market expansion effect. The former posits that an IPR provides a monopoly to the producer in the market (Awokuse & Yin, 2010; Doanh, Gam, & Heo, 2022), which in turn, may reduce the quantity of exports, but increase the price of the produce exported. The market expansion effect, on the other hand, increases exports from the producing country by compensating for the decline in the domestic production of the importing country for the product for which an IPR is given (Doanh et al., 2022; Maskus & Yang, 2018). We expect that these two effects together would lead to an increase in the value of the exports of a product with a GI tag. Instead of using the gravity model employed by the studies mentioned, which only analyses bilateral trade, we aim to do a comprehensive study on the impact of GIs on state-level exports.

Besides international trade, there have been both theoretical and empirical studies examining the effect of GIs on development outcomes. The theoretical studies stem from distortions and market failures, caused by asymmetric information, and the importance of GIs and other tools in correcting them. Lence, Marette, Hayes, and Foster (2007), Moschini et al. (2008), Menapace and Moschini (2014), and Zago and Pick (2004) used a model of vertical differentiation to explain the impact of GIs on the consumer and producer surplus. Lence et al. (2007) described the benefits for farmers if they grow a geographically differentiated agricultural product (GDAP) and sell it collectively. Through the model of vertical differentiation, the authors conclude that the decision of the social planner to invest in the GDAP is indeed beneficial for farmers. Moschini et al. (2008) found a positive impact of the quality premium possessed by GI products on the producers' welfare. The authors used the model of vertical differentiation in the quality arising because of the GIs,

solely to emphasise that it does solve the problem of misinformation for customers by lending credibility to the product. The study further underlines the need for future research to explore the impact of GI on international trade. Zago and Pick (2004) theoretically studied the market power in the presence of quality labels. With the help of the vertical differentiation model, they observed that producers of high-quality goods with the label would benefit from the market power arising from the high-quality difference between labelled and non-labelled goods. This also gives credence to our mechanism of an increase in the market power because of a GI tag through which, exports may increase. Menapace and Moschini (2014) found that producers growing high-quality products would benefit more from full protection under GI, with no free entry and exit. Using the model of vertical differentiation, the authors observed that a GI tag on a product even benefits its substitutes by increasing their producer surplus. It will be interesting to see if the same is true in the case of exports as well.

Durand and Fournier (2017) incorporated four case studies of plantation crops and honey from Indonesia and Vietnam to explore the positive impact of GIs on the modernisation of agriculture. While recognising the positive role played by both national and local governments in terms of the interventions in GI development, the authors highlight the government's know-how of the supply chain, and reiterate that it is the local environment, which effectively helps the GI product growers in selling and marketing their produce. Taking the discussion forward, our analysis also examines the impact of ownership of the GIs on the exports. Chabrol, Mariani, and Sautier (2017) studied cases for six specific products, of which, three received GI tags in Africa. They suggested that active government involvement is necessary to provide the benefits of GIs to the producers. As GIs are quality indicators, they should also command a higher price in the market. Relatedly, it may be noted that there is evidence from literature discussing the effect of quality labels on product price. In fact, the studies unequivocally observed that 'quality labels' do lead to an increase in product price (Balogh, Bekesi, Gorton, Popp, & Lengyel, 2016; Combris, Lecocq, & Visser, 1997; Costanigro, McCluskey, & Goemans, 2010; Stefani, Romano, & Cavicchi, 2006).

Studies on GI in India have largely been limited to certain products. The first GI tag in India, for instance, was awarded to Darjeeling Tea in 2004. Rao (2005) studied the issues in the TRIPS agreement within India's context and chose to specifically explore Darjeeling Tea as a case. The author pointed out that by the year 2000, while 10,000 tons of Darjeeling Tea was being produced in the Indian state of Darjeeling, 40,000 tons of tea was actually being sold under its tag (i.e., Darjeeling Tea). This does highlight a clear case of 'counterfeit' to which, the 'GI tag' seems to be the only solution. Jena and Grote (2012) surveyed 299 Basmati and non-Basmati growing farmers in the Indian state of Uttarakhand; intended as a welfare analysis of Basmati production. The authors noted that growing Basmati was more profitable than growing non-Basmati rice. Further, they indicated that growing Basmati seemed to have significantly increased the welfare of the households. Based on the discussion thus far, we propose to further explore the benefits of a GI tag, especially for producers. Besides, we also discuss the impact of a GI tag on the farmers' cultivation decisions by studying the cropping patterns over the years.

It may be noted here that one of the main objectives of a Geographical Indication (GI) is to promote exports of the product/s. However, only a few studies seemed to have documented the link between GIs and exports, and even the ones that do exist, have primarily been 'case-driven'.

Agostino and Trivieri (2014) used the gravity model to find that quality wines produced in a specific region (QWPSR) attracted higher export prices. Sorgho and Larue (2014) also used the same model to find that there is a positive impact of GI on trade if both importing and exporting countries have GI-protected products. Raimondi et al. (2019) used country product GI data of the European Union to find that if GI is indeed protected in the exporting country, it does positively affect intensive as well as extensive margins of trade.

We contribute to extant literature in at least two critical ways; first, we provide evidence of a strong positive effect of GIs on agricultural exports for all agricultural products at a disaggregated level. In the process, we show that empirical evidence on the trade effects of GIs from product-level case studies thus far tends to generalise to the full spectrum of agricultural products. Second, our study makes progress in identifying the complementary role of judicial efficiency and transport infrastructure in enabling increased exports in response to GIs.

GIs in India

India uses the *Sui Generis* method of protecting GIs. This system gives a special right to GIs not provided to a trademark, a patent, or any other intellectual property right. Under this system, there is a separate law that governs GIs, owing to which, while applying for a GI, one needs to prove the association of quality, characteristics, and reputation of the product with the place of its origin. Notably, the European Union, African Intellectual Property Organization (OAPI), Switzerland, and Andean Community countries also use a similar system.

After the adoption of the TRIPS agreement in 1995, India started working on a law for protecting GIs. The first law enacted by the Indian parliament was *The Geographical Indications of Goods (Registration and Protection) Act 1999*. It was passed in the parliament on December 30, 1999. Under the act, one was required to maintain a Geographical Indications Registry that should contain names, descriptions, and addresses of the proprietors and authorised users of the GI. It should also include any other matter relating to the GI (e.g., a legal case). Under sub-section 87 of the 1999 act, the central government had the power to make rules for registering GIs. These rules cannot apply retrospectively to any product registered as GIs before the enactment of the rules. Under this section, the central government of India modified the rules of GIs by bringing *The Geographical Indications of Goods (Registration and Protection) Rules, 2002*. The final act came into force with effect from September 15, 2003.

Any organisation, association, or authority established under law, and representing the interests of the producers of the goods concerned could apply for a GI. This application had to be made to the registrar of the GI and had to include the below-mentioned documents. First, a statement

explaining how the characteristics, reputation, or quality of the product for which, GI is sought relates to the geographical environment of its production. The application should also mention the product class under which, the GI is sought.[2] Third, the application should have a clearly demarcated geographical map that shows the areas, where the good is being produced, manufactured, and/or originates. Then the application should include the particulars of the appearance of GI; in other words, whether it would be a logo or would it be in words or some other figurative element. Finally, the details of the producers, who would initially be registered with the GI registration would be required.

From the data available on the website of the Controller General of Patents Design and Trademark (ipindia.nic.in), the time elapsed between the filling of GI and its availability for use by the producers has varied drastically over products and years. Some products, namely Kangra tea, Coorg orange, and Mysore Betel leaf, got the GI tag within seven months of their application. On the other hand, Alphonso, a famous variety of mangoes that is largely exported, took almost 10 years from the date of application to get the GI registration.

India registered its first GI in 2004, which was Darjeeling Tea. Since then, India has registered more than 200 GIs in agricultural, manufacturing, handicraft, natural goods, and foodstuff categories by March 2016. In fact, recent years have seen an increase in GI applications from smaller states like Bihar, Odisha, and the North-Eastern states.

Data

We use state-product harmonised system (HS6) level export data from the Directorate General of Commercial Intelligence and Statistics (DGCIS).[3] All exporters are required to report the state of origin of the exported goods. The overall value of agricultural exports from the state-product level data is close to 90% of the total value of agricultural exports from India, suggesting thereby a high level of reporting.

However, there is a potential concern with the data; there could be misreporting of the product origin, owing to which, exporters would not be aware of the actual origin of the agricultural product. We undertake two quality tests to ensure that misreporting is not an essential concern in our setting. First, we test the extent of misreporting on several agricultural products, where production is localised to a few states. Hence, it is relatively simple to measure the extent of misreporting. The second column of Table 1 shows the average percentage of exports outside the states of production of certain crops per year. For example, coffee is produced majorly in Karnataka, Kerala, and Tamil Nadu in India. We calculate the percentage of coffee exports from the states other than these three for every year, starting from 2004 right up to 2016. Then we average this percentage across the years to arrive at the value in the second column of the table. The third column shows the aggregate percentage of exports reported in our data from outside the production states, taking together all the years of our analysis from 2004 to 2016. For example, in the case of coffee, we arrive at the value in the third column by dividing the total exports across years from states other than Karnataka, Kerala, and Tamil Nadu by the total coffee exports from India across the years. Notably, for most products, there seems to be very low levels of misreporting.

Table 1 Mis-reporting across states.

Crops	Average percentage of exports outside production states per year	Agg. percentage of exports outside production states
Coffee	0.82	0.76
Tea	7.48	7.38
Cashew	0.54	0.52
Cardamom, mace, and nutmeg	10.83	9.3
Vanilla	2.44	2.03
Banana	3.48	3.8
Grapes	17.63	17.73
Soybean	8.16	1.6
Groundnut	0.25	0.27

Source: Author's calculations based on the data from the website of the Registry of GI, India.
Note: Production states mean the states where the product is majorly grown.

There are also some observations in our data, where the state of origin for product-wise exports is not mentioned. We test if the product-wise share of export values, where the state of origin is unreported is correlated with that product having a GI. For this test, we regress the percentage of unreported export values for a product on a dummy variable, which is 1 if that product line has received a GI and 0 otherwise. Table 2 shows that the percentage of unreported export values for a product is not significantly associated with the registration of GI for the product. Taken together, these tests do confirm that misreporting is low and that non-reporting of the origin of production of a product does not systematically vary with the GI status of a product.

Table 3 shows the variation of exports for different types of products over the years at the HS2 level of product classification. All the product types except HS2 product type 05 (animal originated products; not elsewhere specified or included) and 11 (products of the milling industry; malt, starches, inulin and wheat gluten) see an increasing trend in exports. Interestingly, these products witnessed a sharp decline in exports in the year 2016. Both these product types are industry based. One of the reasons for the decline may be attributed to the 'cash crunch' within these industries, because of 'demonetisation' of higher denomination currency, introduced in India in 2016.

Table 4 presents the variation in the state-wise total agricultural exports across the years. This table shows that Maharashtra, Gujarat, Haryana, Andhra Pradesh, Kerala, Uttar Pradesh, Tamil Nadu, and Punjab are major contributors to Indian agricultural exports. Together, these states

[2] http://www.ipindia.nic.in/classification-of-goods.htm
[3] Data is available for purchase on the DGCIS website. http://dgciskol.gov.in/

Table 2 Effect of unreported data on GI.

Variables	(1) GI
Unreported	−0.00850 (0.0252)
Observations	2,911
R-squared	0.786
Year FE	YES
Product FE	YES

Note: GI is an indicator variable equal to 1 if the product has a GI certificate in that year. Unreported is a variable that measures the share of export values of a product in a year where the state of origin is not reported. Robust standard errors are in parentheses. ***, **, and * denotes statistical significance at 1%, 5%, and 10%, respectively.

account for an average of 38.5% of the agricultural exports from India over the years. However, most of these states, except Kerala and Tamil Nadu, have not been active in seeking GIs for their agricultural products. In fact, Maharashtra has also received a large number of GIs only in recent years. Further, the table indicates that high-export states are not necessarily more active in registering their products for GI.

Data on agricultural GIs are sourced from the website of India's Geographical Indications Registry.[4] The website reports information on the name of the GI, the state in which, it was registered, the year of application, and the year in which the GI was registered. We also use the information on ownership of GIs from the website of India's Geographical Indications Registry. We map the product description of GIs to the harmonised system (HS) 6-digit product lines. Appendix A provides the concordance table for this mapping. Notably, a total of 80 GIs were registered during our sample period, mapped to 123 state products (HS6). Figure 1 shows the increase in the number of registered GIs from 2004 to 2016. Recent years have shown high growth of registered GIs in the country. From 2004 to 2014, the total number of agricultural GIs registered in India was 47, but from 2014 to 2016, the number increased to 80. This significant rise points towards a policy shift for identifying, encouraging, and applying for more GIs by state governments. Table 5 shows the HS6 product lines within the broader category of live trees, vegetables, fruits, plantation crops, cereals, oilseeds and medicinal plants, and vegetable products. Plantation crops, fruits, and vegetables account for most of the product lines with a GI tag. Specifically, plantation crops have 47 HS6 product lines with a GI tag, whereas fruits and cereals account for 34 and 27, respectively. On the other hand, vegetables and vegetable products together form only eight product lines with a GI tag. Table 6 shows how the number of available GIs has increased in different states over the years. The table makes it clear that despite having the maximum number of HS6 product lines with an available GI in 2016, Maharashtra did receive most of the GIs in the last two years of our study period. Karnataka, Kerala, Assam, Tamil Nadu, and Himachal Pradesh received a good number of GIs by 2007. Table 7 provides the concordance of HS2 code with the type of products it is related to. This concordance is administered by the World Customs Organization (WCO).

Next, we take the district-wise data of area under various crops from the Agricultural Census of India. The Indian government conducts an agricultural census across all the states every five years. The statistical unit of data collection in the agricultural census is agricultural operational holding. This dataset is publicly available on its website.[5]

Data on roads and highways are taken from basic road statistics, published by the Government of India every year. Rail length data, for instance, is taken from the data library of the Ministry of Information and Broadcasting. Data on the pendency of cases by courts are taken from the National Crime Records Bureau (NCRB).[6] It provides the percentage of cases that have been pending in the respective courts of the states in 2001. We also utilise data on state-level GDP from government websites for 2004. As economic growth, infrastructure, and judicial efficiency may respond to the registration of GIs, we use their values in the pre-sample period, that is, 2004 or earlier. This ensures that our heterogeneity analysis is based on cross-sectional differences across states in these characteristics within the pre-sample period.

Further, for our analysis, we provide HS6 codes to the agricultural products registered as GIs. If the GI is available for a crop in a state in a particular year, we assign '1' to our dummy variable 'GI'; otherwise, we keep it as '0'. The registry of GI also provides a map of the area, where it is applicable. We identify the districts benefiting from each GI through these maps to do our district-level analysis. An example of one such map used for identifying the growing districts of *Shahi Litchi of Bihar* (a GI of Bihar) is shown in Figure 2.

Empirical strategy and results

GI and exports

GIs impact exports through multiple mechanisms. First, they can increase the perceived quality of the products by providing them with a label. This has a positive impact on both the extensive as well as the intensive margins. Earlier, Mérel and Sexton (2012) argued that the GI tag helps increase a product's quality by removing the market of lemons and encouraging the producers to provide better quality. Second, GIs help remove duplicates and counterfeit products from the market (Sorgho & Larue, 2014), which further increases exports by ensuring product originality for consumers. Third, GIs can lead to an increase in exports through modernisation and standardisation of the production process, while increasing physical efficiency in the process (Melitz 2003). Fourth, receiving a GI tag results in better marketing of the product in the international markets, which in turn, enhances opportunities for exporters to tap foreign markets (Agostino & Trivieri, 2014; Raimondi et al., 2019).

[4] http://www.ipindia.nic.in/gi.htm

[5] Agricultural Census: agcensus.dacnet.nic.in

[6] https://ncrb.gov.in

Table 3 Total exports (lakhs INR) from India for different HS2 product lines over the years.

HS2	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
1	1930	2608	221	3876	5515	7509	2470	782	675	952	733	395	38071	5364
2	188058	272947	328069	369082	533281	616443	890718	1405890	1786978	2721058	3018435	2759979	2703276	1353401
3	590093	629045	702693	526939	595508	692843	966950	1576187	1802322	2943383	3207030	2934040	3685351	1604030
4	72865	108471	77986	135789	151876	87273	107937	97364	211746	415358	225386	209446	192893	161107
5	16864	17738	17152	20746	18699	31603	47858	91010	60962	77950	60788	60214	53504	44238
6	22283	30136	28674	30564	36873	29013	29292	36366	42304	45460	46018	48176	54619	36906
7	167331	247956	270794	230546	328106	361115	367619	402439	493819	666579	647023	735650	781781	438520
8	340028	375790	395927	368667	493800	513131	508701	707368	747759	955060	973536	993401	1131060	654171
9	363565	393319	532169	603035	757011	749024	964376	1369673	1405937	1626407	1723573	1891920	2118213	1115248
10	887395	713055	754031	1407459	1419913	1351391	1480125	2947876	5072786	6075074	5625927	3896739	3890028	2732446
11	18082	12741	15883	22109	24582	29315	41593	71345	121072	171599	182315	188342	142031	80077
12	173349	182588	237431	343471	389128	329935	509126	941621	918995	998833	1330518	1081236	1205755	664768
13	147093	175458	174071	164581	206880	179600	377345	1767418	2341854	1424630	1181577	561234	560502	712480
14	10557	9878	11196	14211	13748	23573	33556	24508	31945	35430	36527	40736	45180	25465
15	152086	123831	146234	202313	261660	256886	307660	507613	521090	515971	594166	568595	596881	365768

Source: Author's calculation based on the export data from DGCIS.

To study the effect of GIs on agricultural exports, we estimate the following baseline specification.

$$log(exports)sht = \beta 1GI + \alpha 0 + \alpha sh + \alpha sh(4)t + \alpha ht + \nu sht \quad (1)$$

where GI represents an indicator variable equal to 1 if the state-HS6, *sh*, the product line has been registered as a GI by year *t*. Our coefficient of interest, β_1, captures the effect of GI registration on (log of) exports at the state-product level. We use a rich set of fixed effects to control for the effects of confounding variables at multiple levels. α_{sh} sweeps out the effect of all variables specific to the state-HS6 product. α_{ht} controls for product-year particular factors, such as demand shocks, that may be correlated with GI as well as exports. Finally, we control for time-varying factors at the state-product level by including state-product (HS4)-year fixed effects, $\alpha_{sh(4)t}$. We cluster heteroskedasticity robust standard errors at the state-product level.

However, one concern still remains; product lines that receive GI registration are systematically different in other characteristics, which could bias the estimates as shown in Equation (1). For example, one may worry that particular varieties of paddy and horticultural products are more likely to get a GI tag, as they are already exported in high quantities. To address this endogeneity concern, we restrict our analysis to those HS6 product lines, which receive at least one GI during our sample. Thus, in any given year, our control group comprises state products that would receive GI in a later year, and other non-GI state products in product lines that would receive at least one GI during our sample period. For example, if Fazli Mango (HS Code 080450 registered in West Bengal) received a GI tag in 2008, our control group would have all the state products (at HS6) with HS Code 080450.

Table 8 reports results from estimating Equation (1) and its variants. In column 1, we estimate the baseline specification in Equation (1); the coefficient is positive and statistically significant, suggesting that GIs do lead to an increase in state-product exports.

It can also be the case that application for a GI may also contribute to the increase in the exports of the product. This is possible because the registrar of the GIs in India publishes the event of the applications made for the GIs on their website. Even the local and national newspapers report about the applications for GIs. Hence, the application for a GI tag can itself impact exports. Another primary concern is that our estimates may be biased due to differences in the quality of state-level institutions. Suppose states that have organised agricultural trade bodies, and other institutions are more likely to apply for GI and spend more on export promotion activities. In that case, we may be attributing the effect of these institutions on exports to GI. To provide suggestive evidence against this, we show that the timing of receiving GI is indeed essential, besides the application for GI. In column 2 of Table 8, we include an indicator variable that equals 1 for all years, starting from the year of application for GI till the year preceding the one in which, the state product receives GI registration. The coefficient on this variable is positive and significant at a 10% level. The coefficient on GI remains positive, increases in magnitude, and is statistically significant. This result suggests that both the application and the registration of GIs have a positive and significant impact on agricultural exports.

Following Martin, Nataraj, and Harrison (2017), in column 3 of Table 8, we include state-product-specific event-time trends to control for pre-existing linear trends in exports in years before the GI registration. The event-time variable is defined as the difference between the current year and the year of GI registration. The variable takes a value of 0 in the year GI is registered and is negative (positive) in the years before (after) GI registration. For state products that do not receive a GI in our sample, it takes a value of 0 for all years. The coefficient on GI remains positive and significant, albeit with a reduced magnitude. The coefficient on GI implies that state products receiving GI experienced, on average, an increase in exports by 67.6%.[7] Finally, we test for the robustness of our results to alternative specifications in long differences. We include the initial value of exports as a control variable to capture the cross-sectional differences in exports across state products at the start of the sample. The coefficient is positive and significant with a larger magnitude compared to column 3. Taken together, these results imply that GIs do lead to a significant increase in agricultural exports.

[7] We calculate implied percentage change in exports as $100 \times (e^{\beta 1} - 1)$.

Table 4 State-wise total agricultural exports (lakhs INR) across years.

State	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
Andhra Pradesh	388096	390498	562306	609270	462650	400684	527239	1218813	1526022	2079267	2114445	1734476	2105210	1086075
Arunachal Pradesh	325	143	79	237	102	79	271	11	310	109	28	53	92	141
Assam	65416	71009	79383	83925	114918	131941	143011	159439	144613	231766	176536	219757	238463	143091
Bihar	15561	13937	8525	4423	9381	5211	8143	28575	105737	120203	122071	88562	118810	49934
Chhattisgarh	12944	3580	6273	8823	33798	15010	6359	41378	167638	187401	227094	264320	339685	101100
Goa	4553	7288	6964	4153	12748	21990	25930	39506	51645	56812	61303	54572	69163	32048
Gujarat	343441	356786	432579	478237	616579	513774	848584	1808385	2236731	2358545	2657787	2056620	2335193	1311018
Haryana	252515	251088	236253	394349	611522	724164	704635	1215863	1615429	1948519	1820305	1448705	1368870	968632
H. Pradesh	378	170	271	437	413	387	1883	633	920	1590	1445	1030	1200	828
J&K	3153	7542	8395	11172	10344	18733	14430	23955	25219	43027	18699	14024	6939	15818
Jharkhand	2822	2671	3282	3396	2002	2159	1956	5277	15934	13666	8375	3614	9045	5708
Karnataka	156565	209728	250836	255763	338904	291590	422647	588038	617830	680680	692368	698111	779584	460203
Kerala	421336	421572	452657	448323	515402	506236	546183	904921	897277	1160868	1269128	1232456	1298810	775013
Madhya Pradesh	42375	49770	29682	54608	74744	43454	75299	135424	355722	391616	319353	248693	222802	157196
Maharashtra	439467	549549	609532	726009	1020861	1022993	1167326	1674214	2082780	2615195	2554193	2423795	2570445	1496643
Manipur	52	13	11	7	6	3	19	NA	15	41	7	NA	NA	17
Meghalaya	2059	1575	836	1163	1444	548	601	1634	853	1650	604	1529	875	1182
Mizoram	253	243	208	556	290	401	643	444	NA	24	112	14	NA	290
Nagaland	9	14	163	NA	NA	10	44	31	NA	1662	911	1648	161	465
Orissa	43785	38359	41773	52704	48608	45829	66168	117333	181305	221763	236153	209178	248464	119340
Punjab	217219	144954	112794	157417	278076	350104	375883	609739	982397	1318506	1119213	811846	801148	559946
Rajasthan	39571	51576	70060	100352	111237	90993	209166	1063823	1297479	773360	693399	270389	241080	385576
Sikkim	4	21	NA	145	101	56	15	26	48	16	36	21	5	41
Tamil Nadu	265700	273030	315166	388595	431511	432350	521323	783540	842723	1069995	1136249	1058292	1092353	662371
Tripura	122	354	333	228	10	9	35	719	205	61	285	86	28	190
Uttar Pradesh	120764	141479	135630	131549	95705	114616	405045	682780	1031710	1702373	1747364	1470711	1510013	714595
Uttaranchal	1682	2011	2275	2878	1693	790	2278	25255	78233	46687	29719	27507	28661	19205
West Bengal	250069	225618	228650	401192	267130	334063	338925	362592	489221	805975	942237	709368	890166	480400

Source: Author's calculation based on the export data from DGCIS.

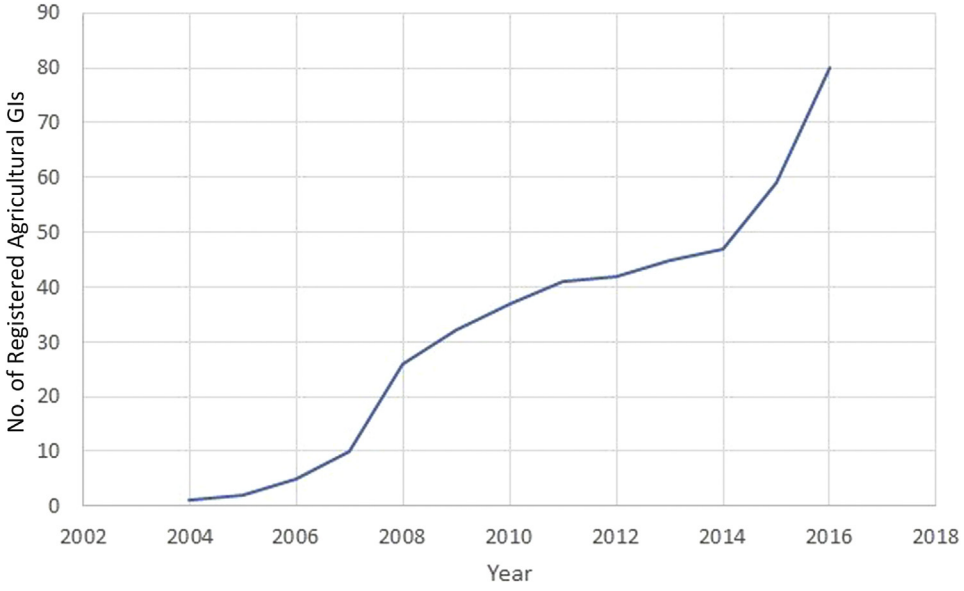


Figure 1 Cumulative number of agricultural GIs.
Source: Official website of registry of GI, India.

Heterogeneity based on state characteristics

The overall effect of GI on agricultural exports may be masking considerable heterogeneity based on state-level characteristics. From a policy viewpoint, a key concern is whether relatively underdeveloped regions can benefit from GIs. We hypothesise that GI tags help the richer states more in increasing their agricultural exports; this could happen because of the existing market efficiencies within a state with a higher per capita GDP. In fact, the effectiveness of GIs in promoting agricultural exports may also depend on the quality of transportation infrastructure, along with the efficacy of judicial institutions. States with better transport infrastructure should be able to benefit more from GI tags. Moreover, better connectivity to domestic as well as global markets should act as a complement to the GI tag for increasing exports. The reason for the same can be attributed to reduction in the cost of inputs, along with the cost of transporting the harvest to the markets. Then, we hypothesise that judicial efficiency works in favour of a GI tag for increasing agricultural exports. We take the pendency ratio as a proxy for the inefficiencies in the judicial system. Geographical indications as part of IPR come under the legal aspects of business; judicial efficiency becomes critical to its success.

We estimate the specification below to test for complementarities between state-level characteristics and gains in exports from GIs.

$$log(exports)hst = \beta 1GI + \beta 2GI \times Z_s + \alpha 0 + \alpha hs + \alpha sh(4)t + \alpha ht + \nu hst \quad (2)$$

where Z_s denotes either state-level income measured by state GDP per capita, while transportation infrastructure is measured by national highways, and railways is measured in km per million population, and judicial inefficiency is measured by the pendency ratio of court cases.[8]

Table 5 HS chapter-wise number of product lines registered as GIs by 2016.

Chapter	HS chapter code	No. of HS6 lines registered as GIs
Live trees	06	6
Vegetables	07	7
Fruits	08	34
Plantation crops	09	47
Cereals	10	27
Oilseeds and medicinal plants	12	1
Vegetable products	14	1
Total		**123**

Source: Authors' calculations using data from the official website of the registry of GI, India.

The ownership of a GI also plays a vital role in determining its overall impact on economic parameters such as exports. We hypothesise that government ownership of a GI should benefit the product more as compared to its private ownership. This may happen because of the necessary financial and marketing support provided by the government for the GI-tagged product. As suggested by Durand and Fournier (2017), the government is aware of the local situations, which effectively helps in identifying the optimum supply chain for sales and distribution of a GI-tagged product. We provide an empirical contribution to the debate on

[8] Pendency ratio is calculated as the share of cases pending trial in total cases for trial in courts within a state.

Table 6 Number of HS6 product lines with available GIs across years in different states.

State	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Maharashtra	0	0	0	0	0	0	3	3	3	3	5	14	25
Karnataka	0	4	4	13	13	15	18	19	21	21	22	22	22
Kerala	0	0	0	9	9	10	10	10	10	10	12	12	12
Assam	0	0	0	4	4	4	4	4	4	4	7	7	11
Tamil Nadu	0	0	0	5	8	8	8	8	10	10	10	10	10
Gujarat	0	0	0	0	0	0	0	5	5	5	5	5	5
Himachal Pradesh	0	4	4	4	4	4	5	5	5	5	5	5	5
Uttar Pradesh	0	0	0	0	0	0	1	1	1	5	5	5	5
Nagaland	0	0	0	0	3	3	3	3	3	3	4	4	4
Andhra Pradesh	0	0	0	0	0	3	3	3	3	3	3	3	3
Mizoram	0	0	0	0	0	0	0	0	0	0	3	3	3
Sikkim	0	0	0	0	0	0	0	0	0	0	3	3	3
Orissa	0	0	0	0	0	0	0	2	2	2	2	2	2
Tripura	0	0	0	0	1	1	1	1	1	1	1	2	2
Uttarakhand	0	0	0	0	0	0	1	1	1	1	1	1	2
West Bengal	1	1	1	1	2	2	2	2	2	2	2	2	2
Arunachal Pradesh	0	0	0	0	0	0	0	0	0	0	1	1	1
Delhi	0	0	0	0	0	0	1	1	1	1	1	1	1
Haryana	0	0	0	0	0	0	1	1	1	1	1	1	1
J&K	0	0	0	0	0	0	1	1	1	1	1	1	1
Manipur	0	0	0	0	0	0	0	0	0	0	1	1	1
Meghalaya	0	0	0	0	0	0	0	0	0	0	1	1	1
Punjab	0	0	0	0	0	0	1	1	1	1	1	1	1
Total	1	9	9	36	44	50	63	71	75	79	97	107	123

Source: Author's calculation based on the data from the website of the registry of GI, India.

Government Ownership vs. Private Ownership of GI. We study the effect of ownership of GIs on their impact on agricultural exports by estimating the following specification:

$$log(exports)_{hst} = \beta_1 GI + \beta_2 GI \times Government_{hs} + \alpha 0 + \alpha_{hs} + \alpha_{sh(4)t} + \alpha_{ht} + \nu_{hst} \quad (3)$$

where $Government_{hs}$ takes a value of 1 if the GI is government owned, and 0 if it is privately owned. Table 9 reports the results from estimating Equation (2) (columns 1–4) and Equation (3) (column 5). In column 1, the coefficient on the interaction term between GI and initial GDP per capita is positive and significant. Although the coefficient on GI term is negative, the minimum value of the log of per capita state domestic product is 8.66 for Bihar in 2004. This makes the overall coefficient on GI positive for all the states when state GDP is actually taken into consideration. The result suggests that, initially, high-income states tend to benefit more from GI certification. In columns 2 and 3, the coefficient on the interaction terms between GI and measures of state-level transportation infrastructure is positive and significant, suggesting positive complementarities between highways and railway networks through which, there are gains in agricultural exports from GI registration. Notably, roads and railways are the preferred modes of freight transport in India (Figure 3). With lower cost of transportation, the states that have better road and railway networks are better placed to gain from GIs. In column 4, the coefficient on the interaction term between GI and pendency ratio is negative and significant, suggesting that export gains from GIs are higher in states with a more efficient judiciary. Maharashtra, Meghalaya, Gujarat, Arunachal Pradesh, West Bengal, Nagaland, and Manipur have more than a 90% pendency ratio, making them the least likely places where a GI tag can lead to an increase in exports. Taken together, these results imply that both institutions and infrastructure play an essential complementary role in increasing exports in response to GIs. Further, in column 5, we note that the export gains from GI registration are driven by government-owned GIs compared to privately owned GIs. The result indicates an increase in benefits for a GI owned by a government entity. This result does have an important policy implication that the governments of the respective states should take the lead in applying for a GI tag for their indigenous agricultural products. Besides, a better knowledge of the local environment and the international reach of the government could help popularise GI-tagged products for the purpose of increasing their exports. Finally, in columns 1 and 2 of Table 10, we test for heterogeneity based on the number of GI registrations of a state, and whether the state is a coastal state. We do not find significant differences based on these characteristics.

Impact on cropping pattern

Next, we study how GIs affect the cropping pattern at the district-crop level. As discussed by Awokuse and Yin (2010), Doanh et al. (2022), and Maskus and Yang (2018), production of a GI-tagged product can have both market power and

Table 7 Concordance table for matching HS2 codes with products.

HS2	Product
1	Animals: Live
2	Meat and edible meat offal
3	Fish and crustaceans, molluscs, and other aquatic invertebrates
4	Dairy produce, birds' eggs, natural honey, edible products of animal origin, not elsewhere specified or included
5	Animal-originated products, not elsewhere specified or included
6	Trees and other plants, live; bulbs, roots, and the like; cut flowers and ornamental foliage
7	Vegetables and certain roots and tubers, edible
8	Fruit and nuts, edible; peel of citrus fruit or melons
9	Coffee, tea, mate, and spices
10	Cereals
11	Products of the milling industry; malt, starches, inulin, wheat gluten
12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit, industrial or medicinal plants; straw and fodder
13	Lac; gums, resins, and other vegetable saps and extracts
14	Vegetable plaiting materials; vegetable products not elsewhere specified or included
15	Animal or vegetable fats and oils and their cleavage products, prepared animal fats, animal or vegetable waxes

Source: Information from the website of UN Statistics (https://unstats.un.org/).

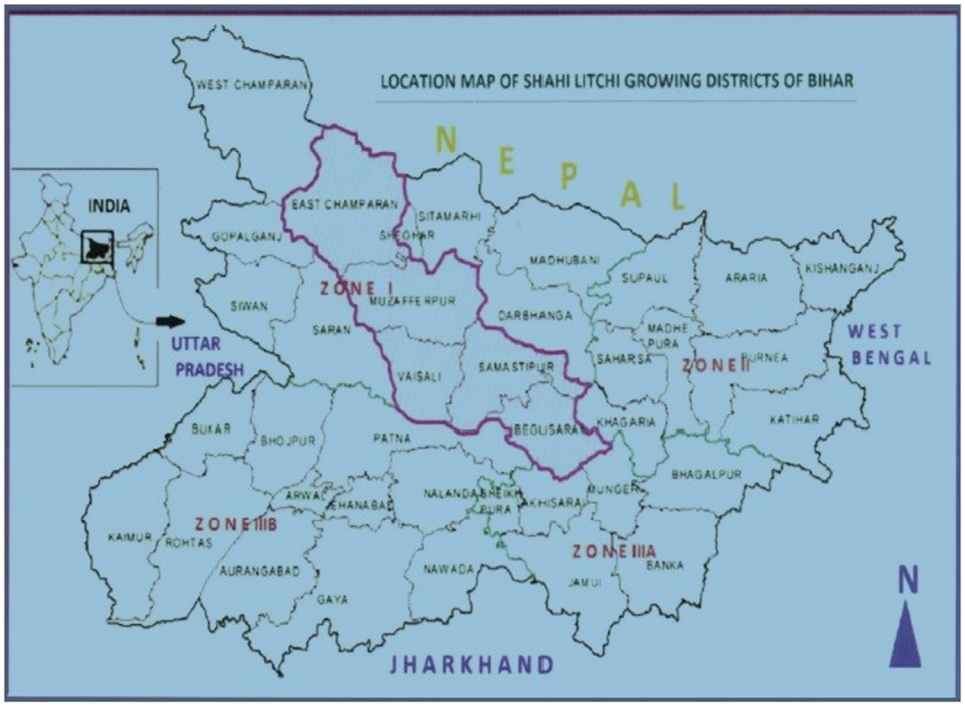


Figure 2 Map showing growing areas of *Shahi Litchi of Bihar*.
Source: Official website of registry of GI, India.

market expansion effect, which are opposite to each other when it comes to increasing production. As GI-tagged agricultural products command a premium price and higher global demand, we hypothesise that farmers must have higher motivation to plant these crops. Through our analysis, we propose the net effect of market power and market expansion effects of a GI tag on the production of agricultural products. Here, we take cropping pattern as a proxy for the relative production of different crops.

We use data on cropping patterns from the agriculture census to study the impact of GI tags on cropping patterns at the district level. We estimate the specification below:

$$share_{cdt} = \beta 1GI_{cdt} + \alpha 0 + \alpha cd + \alpha dt + \alpha ct + \nu cdt \quad (4)$$

We control for crop-district, district-year, and crop-year fixed effects. Here, $share_{cdt}$ represents the share of cropping pattern at crop-district-year level. On the right-hand side, GI_{cdt} is 1 if a GI tag is available for a particular crop c in district d at time t.

Table 11 reports the results from estimating Equation (4). Column 1 includes all district-crop observations, while

Table 8 Effect of GIs on exports.

	log(exports)			
			Long difference	
	(1)	(2)	(3)	(4)
GI	2.126**	2.738**	0.517**	1.287***
	(0.828)	(1.230)	(0.236)	(0.461)
GI filing year		1.578* (0.829)		
State-product event trend			0.246* (0.129)	
Observations	3,115	3,115	3,115	377
State-HS6 FE	Yes	Yes	Yes	-
State × HS4 × Year FE	Yes	Yes	Yes	-
HS6 × Year FE	Yes	Yes	Yes	-
State FE	-	-	-	Yes
HS6 FE	-	-	-	Yes
Control for initial exports	-	-	-	Yes

Note: The outcome variable is (log of) state product (HS6) level exports. GI is an indicator variable equal to 1 if the state product has a GI certificate that year. GI Filing Year is an indicator variable equal to 1 for all years between filing the application for a GI and the year of grant of the GI. State-Product Event Trend is an event time variable equal to the difference between the year when GI is granted and the current year. Robust standard errors clustered at the state product level in parentheses. ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively.

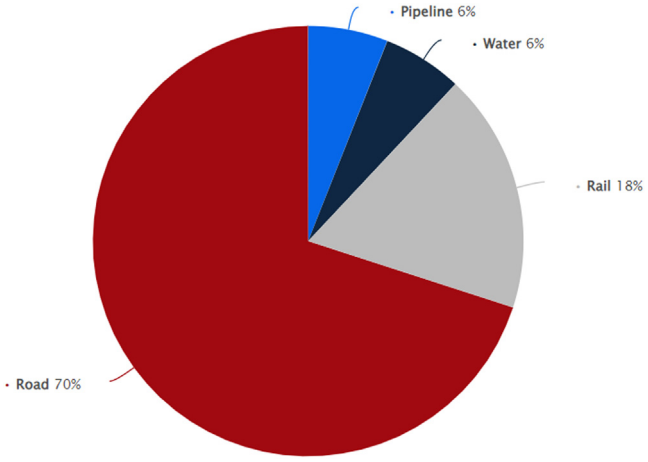


Figure 3 Share of freight logistics in India in 2022, by mode. *Source*: Statista.

column 2 restricts the sample to district crops that receive GIs during the sample period. The coefficient on GI is positive and statistically significant in column 1. In column 2, the coefficient remains positive and statistically significant, but does have a lower magnitude. The coefficient in our preferred specification (column 2) implies that GI leads to an increase in the share of GI-tagged crop area in the district by 2%. These findings are consistent with an increase in the production of GI crops in response to GI registration. Moreover, these results suggest that in the case of GIs of agricultural products, the market expansion effect overpowers the market power effect at an aggregate level.

Conclusion

Geographical indications have been seen as a tool for regional development by policymakers. They remove counterfeits from the market and thereby create a 'new' market for high-quality products by becoming a signal of quality for consumers. In the last decade, many Indian states have actively pursued GI tags for various agricultural products, keeping their farmers' interests in perspective. Even with a rich history of geographical appellations and indications worldwide, research on GIs has been limited to case studies on specific products, along with a few theoretical models explaining their benefits. Thus far, there seems to have been little evidence in literature empirically linking GIs to exports.

Our results suggest that GIs do lead to a substantial increase in agricultural exports, at least in the Indian context; however, these benefits materialise in settings with efficient judicial institutions and better transportation infrastructure. Thus, for GIs to be effective, less developed regions may have to invest in complementary institutions that improve judicial efficiency and transport infrastructure. State governments must not only make efforts to obtain GIs, but consistently work towards updating and building transport infrastructure, while improving judicial efficiency to maximise its benefits. Importantly, the government ownership of GIs does lend a helping hand to agricultural exports as compared to private ownership. However, it could also lead to broader distributional benefits, as a significant number of farmers could take advantage of the GI, unlike a scenario with a private player, where the benefits may be concentrated among a select few. We also observe a shift in cropping pattern in favour of crops with the GI tag as a potential explanation for the increased production of GI products. The results at large, do add to the ongoing discussion over the impact of GIs, indicating that the effect of market expansion is indeed more pronounced compared to the market power effect in the context of GIs.

A fruitful area for future research could be to document the effect of GIs on the welfare of both farmers and traders of GI products, with specific focus on understanding the distributional effects of gains from GIs across these groups.

Table 9 Heterogeneity based on state characteristics and ownership.

log(exports)					
	(1)	(2)	(3)	(4)	(5)
GI	−41.18**	3.367**	−29.96***	19.65***	−1.650*
	(19.38)	(1.399)	(6.720)	(4.148)	(0.891)
GI × GDP	13.02**				
	(6.066)				
GI × highways		4.975**			
		(2.257)			
GI × rail			7.058***		
			(1.549)		
GI × pendency ratio				−23.42***	
				(4.977)	
GI × government					3.143***
					(0.705)
State product event trend	0.246*	0.247*	0.248*	0.242*	0.264**
	(0.129)	(0.129)	(0.132)	(0.132)	(0.134)
Observations	3,115	3,115	2,851	2,867	3,115
State-HS6 FE	Yes	Yes	Yes	Yes	Yes
State × HS4 × Year FE	Yes	Yes	Yes	Yes	Yes
HS6 × Year FE	Yes	Yes	Yes	Yes	Yes

Note: The outcome variable is (log of) state product (HS6) level exports. GI is an indicator variable equal to 1 if the state product has a GI certificate that year. GDP is the (log of) per capita state gross domestic product in 2004. Highway and rail denote (log of) length (in km) of highways and rail, respectively, per million persons in 2004. The pendency ratio is the share of cases pending trial in total cases for trial in courts within a state in 2004. State Product Event Trend is an event time variable equal to the difference between the year when GI is granted and the current year. Robust standard errors clustered at the state product level in parentheses. ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively.

Table 10 Robustness tests for checking the impact of state characteristics.

Variables	(1)	(2)
GI	0.180	0.166
	(0.311)	(0.311)
GI × coast	−0.287	
	(0.358)	
GI × Med_GIs		−0.261***
		(0.357)
State product event trend	0.247*	0.247*
	(0.129)	(0.129)
Constant	8.887***	9.167***
	(0.235)	(0.249)
Observations	3,115	3,115
State-HS6 FE	Yes	Yes
State × HS4 × Year FE	Yes	Yes
HS6 × Year FE	Yes	Yes

Note: The outcome variable is (log of) state product (HS6) level exports. GI is an indicator variable equal to 1 if the state product has a GI certificate that year. Coast is a dummy variable equal to one for all the coastal states and zero otherwise. Med_GIs is an interaction of the dummy variable equal to one for all states with the above-median number of GIs and zero otherwise, and the variable GI. State Product Event Trend is an event time variable equal to the difference between the year when GI is granted and the current year. Robust standard errors clustered at the state product level in parentheses. ***, **, and * denotes statistical significance at 1%, 5%, and 10%, respectively.

Table 11 GI and changes in cropping pattern at the district level.

	Share in total area	
	(1)	(2)
GI	0.0291***	0.0200***
	(0.00629)	(0.00619)
Observations	15,709	6,218
R-squared	0.137	0.213
District-crop FE	Yes	Yes
Crop × year FE	Yes	Yes
District × year FE	Yes	Yes

Note: The outcome variable is the share of the cropping area for a particular crop in the total cropped area for the district. GI is an indicator variable equal to 1 if the particular crop in that district has a GI license in that year. Robust standard errors clustered at the district crop level are in parentheses. ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively.

Moreover, GIs could also impact technology adoption and alter the supply chain of agricultural products. As more relevant data becomes available, understanding the impact of GI registration on agricultural supply chains and technology adoption in farming the products would enable a better understanding of the exact mechanisms that drive the link between GIs and local economic development.

Acknowledgements

We would like to thank Kunal Dasgupta, Vidhya Soundararajan, and seminar participants at the *International Conference on Public Policy and Management 2020* and *IMRDC Conference 2021* for their helpful comments. We are grateful to Tirumala Venkatesh Kaggundi for providing us with access to export data. All errors are our own.

Appendix A Concordance table to map the product description of GIs to the harmonised system (HS) at 6-digit product lines

GI commodity	HS6 code			
Ajara Ghansal rice	100610	100620	100630	100640
Allahabad Surkha guava	80450			
Alleppey Green cardamom	90830	90831	90832	
Ambemohar rice	100610	100620	100630	100640
Appemidi mango	80450			
Arunachal orange	80510			
Assam (Orthodox) Logo	90230			
Assam Karbi Anglong ginger	91011	91012		
Banaganapalle mangoes	80450			
Bangalore blue grapes	80610	80620		
Bangalore rose onion	70310			
Basmati	100630			
Beed custard apple	81090			
Bhalia wheat	100111	100119	100191	100199
Bhiwapur chilli	90412	90421	90422	
Bydagi chilli	90412	90421	90422	
Central Travancore jaggery	170113			
Chengalikodan Nendran banana	80310	80390		
Coorg green cardamom	90830	90831	90832	
Coorg orange	80510			
Dahanu Gholvad chikoo	81090			
Darjeeling tea (word)	90230			
Devanahalli Pomello	80540			
Eathomozhy tall coconut	80112	80119		
Fazli mango grown in the district of Malda	80450			
Ganjam Kewda flower	60319	60390		
Gir Kesar mango	80450			
Guntur Sannam chilli	90412	90421	90422	
Hadagali malligae	60319	60390		
Jalgaon banana	80310	80390		
Jalgaon Bharit brinjal	70930			
Jalna wweet orange	80510			
Joha rice of Assam	100610	100620	100630	100640
Kachai lemon	80550			
Kaipad rice	100610	100620	100630	100640
Kalanamak rice	100610	100620	100630	100640
Kamalapur red banana	80310	80390		
Kangra tea	90210	90220	90230	90240
Khasi Mandarin	80590			
Khirsapati (Himsagar) mango	80450			
Kolhapur jaggery	170113			
Lasalgaon onion	70310			
Laxman Bhog mango	80450			
Madurai malli	60319	60390		
Mahabaleshwar strawberry	81110			
Malabar pepper	90411	90412		
Mangalwedha jowar	100821			
Mango Malihabadi Dusseheri	80450	80450	80590	

(*continued*)

(*Continued*)

GI commodity	HS6 code			
Marathwada Kesar mango	80450			
Memong Narang	80510			
Mizo chilli	90412	90421	90422	
Monsooned Malabar Arabica coffee	90112	90111	90121	90122
Monsooned Malabar Robusta coffee	90112	90111	90121	90122
Mysore Betel leaf	140490			
Mysore malligae	60319	60390		
Naga Mircha	90412	90421	90422	
Naga Tree Tomato	70200			
Nagpur orange	80510			
Nanjanagud banana	80310	80390		
Nashik grapes	80610	80620		
Navapur tur dal	71360			
Navara rice	100610	100620	100630	100640
Nilgiri (Orthodox)	90230			
Palakkadan Matta rice	100610	100620	100630	100640
Pokkali rice	100610	100620	100630	100640
Purandar fig	80420			
Sangli raisins	80620			
Sikkim large cardamom	90830	90831	90832	
Sindhudurg & Ratnagiri kokum	120799			
Sirumalai Hill banana	80310	80390		
Solapur pomegranate	81090			
Tezpur litchi	81090			
Tripura Queen pineapple	80430			
Udupi malligae	60319	60390		
Udupi Mattu Gulla brinjal	70930			
Uttarakhand tejpat	91099			
Vazhakkulam pineapple	80430			
Vengurla cashew	80131	80132		
Virupakshi Hill banana	80310	80390		
Waghya Ghevada	71333			
Waigaon turmeric	91030			
Wayanad Gandhakasala rice	100610	100620	100630	100640
Wayanad Jeerakasala rice	100610	100620	100630	100640

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