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«БИР АЛКАК — БИР ЖОЛ» ДЕМИЛГЕСИНИН АЛКАГЫНДА КЫРГЫЗСТАН МЕНЕН КЫТАЙДЫН ОРТОСУНДАГЫ АЙЫЛ ЧАРБА СООДАСЫНДАГЫ ТҮЗҮМДҮК ДИСБАЛАНС ЖАНА ЭКСПОРТТУ ДИВЕРСИФИКАЦИЯЛОО ПОТЕНЦИАЛЫ (2020–2025-жж.)

СТРУКТУРНЫЙ ДИСБАЛАНС И ПОТЕНЦИАЛ ДИВЕРСИФИКАЦИИ ЭКСПОРТА В СЕЛЬСКОХОЗЯЙСТВЕННОЙ ТОРГОВЛЕ МЕЖДУ КЫРГЫЗСТАНОМ И КИТАЕМ В РАМКАХ ИНИЦИАТИВЫ «ОДИН ПОЯС — ОДИН ПУТЬ» (2020–2025 гг.)

STRUCTURAL IMBALANCE AND EXPORT DIVERSIFICATION POTENTIAL IN AGRICULTURAL TRADE BETWEEN KYRGYZSTAN AND CHINA UNDER THE BELT AND ROAD INITIATIVE (2020–2025)

Кыскача мүнөздөмө: Бул макалада «Бир алкак — бир жол» демилгесинин алкагында Кыргызстан менен Кытайдын ортосундагы айыл чарба соодасындагы түзүмдүк дисбаланс жана экспортту диверсификациялоо потенциалы 2020–2025-жылдар аралыгында изилденди. Эмпирикалык база 339 экспорттук жана 312 импорттук операцияны камтып, маалыматтар жылдар жана товардык топтор боюнча жалпыланды. Изилдөөдө түзүмдүк-динамикалык талдоо, HHI жана CR5 концентрация көрсөткүчтөрү, импортту экспорт менен жабуу коэффициенти, корреляциялык талдоо жана лог-сызыктуу моделдер колдонулду. Натыйжалар Кыргызстандын экспорту 2021-жылы 17,04 млн АКШ долларынан 2025-жылы 1,73 млн АКШ долларына чейин төмөндөгөнүн, ал эми Кытайдан импорт 9,02 млн АКШ долларынан 68,52 млн АКШ долларына чейин өскөнүн көрсөттү. Экспорттун HHI көрсөткүчү 6774,44 пункттту түзүп, алдыңкы беш товардык топ экспорттун 97,58%ын камсыз кылды. Экспортту диверсификациялоо потенциалын ишке ашыруу санитардык жана фитосанитардык талаптарды сактоону, сертификациялоону, продукциянын келип чыгышын жана кыймылын көзөмөлдөө мүмкүнчүлүгүн, логистиканы, ишканаларды каттоону жана туруктуу келишимдерди түзүүнү талап кылат. Диверсификациялоонун реалдуу багыттары катары бал, буурчак өсүмдүктөрү, кургатылган жемиштер, жүн, тери, жүгөрү жана кайра иштетилген продукциялар аныкталды.

Аннотация: В статье исследованы структурный дисбаланс и потенциал диверсификации экспорта в сельскохозяйственной торговле между Кыргызстаном и Китаем в рамках инициативы «Один пояс — один путь» в 2020–2025 гг. База включает 339 экспортных и 312 импортных транзакций, агрегированных по годам и товарным группам. Применены структурно-динамический анализ, показатели HHI и CR5, коэффициент покрытия импорта экспортом, корреляционный анализ и логлинейные модели. Установлено, что экспорт Кыргызстана снизился с 17,04 млн долл. США в 2021

г. до 1,73 млн долл. США в 2025 г., тогда как импорт из Китая вырос с 9,02 млн долл. США до 68,52 млн долл. США. Индекс экспортной концентрации HHI составил 6774,44 пункта, а пять ведущих товарных групп обеспечили 97,58% экспорта. Реализация потенциала диверсификации экспорта требует соблюдения санитарных и фитосанитарных требований, сертификации, прослеживаемости продукции, развития логистики, регистрации предприятий и заключения стабильных контрактов. Реалистичными направлениями диверсификации определены мёд, бобовые, сухофрукты, шерсть, шкуры, кукуруза и переработанные продукты.

Abstract: This article examines structural imbalance and export diversification potential in agricultural trade between Kyrgyzstan and China under the Belt and Road Initiative in 2020–2025. A dataset of 339 export and 312 import records was aggregated annually and by commodity group. The analysis combines structural and dynamic analysis, HHI and CR5 concentration measures, the import coverage ratio, correlation analysis, and log-linear models. Kyrgyzstan's exports declined from USD 17.04 million in 2021 to USD 1.73 million in 2025, whereas imports from China increased from USD 9.02 million to USD 68.52 million. The export HHI reached 6,774.44 points, while the top five commodity groups accounted for 97.58% of exports. Realizing the potential for export diversification requires compliance with sanitary and phytosanitary requirements, certification, product traceability, logistics development, enterprise registration, and stable contracts. Honey, pulses, dried fruits, wool, hides, corn, and processed products represent realistic areas for diversification.

Негизги сөздөр: айыл чарба соодасы; Кыргызстан; Кытай; «Бир алкак — бир жол» демилгеси; экспортту диверсификациялоо; соода дисбалансы; рынокко чыгуу; санитардык жана фитосанитардык талаптар; логистика; Херфиндал–Хиршман индекси.

Ключевые слова: сельскохозяйственная торговля; Кыргызстан; Китай; инициатива «Один пояс — один путь»; диверсификация экспорта; торговый дисбаланс; доступ к рынку; санитарные и фитосанитарные требования; логистика; индекс Херфиндаля–Хиршмана.

Keywords: agricultural trade; Kyrgyzstan; China; Belt and Road Initiative; export diversification; trade imbalance; market access; sanitary and phytosanitary requirements; logistics; Herfindahl–Hirschman Index.

Introduction. Agricultural trade between the Kyrgyz Republic and the People's Republic of China occupies a strategically important position at the intersection of export diversification, rural development, food supply, logistics modernization, and regional connectivity. For a landlocked economy, the Chinese direction is not simply one of several external markets: it combines geographical proximity with access to a very large consumer and import market, while the Belt and Road Initiative (BRI) creates a broader institutional framework for transport corridors, border procedures, infrastructure investment, and regulatory coordination. Nevertheless, physical proximity and transport connectivity do not automatically produce a balanced trade relationship. The economic effect of the corridor depends on whether Kyrgyz producers can transform agricultural resources into regular, certified, traceable, and commercially scalable export consignments.

The practical relevance of this problem is revealed by the contrasting dynamics of the two trade directions. The empirical series examined in the dissertation shows that agricultural exports from Kyrgyzstan to China reached USD 17.04 million in 2021 but declined to USD 1.44 million in 2022 and remained below USD 2.1 million through 2025. During the same period, agricultural imports from China increased from USD 9.02 million in 2021 to USD 68.52 million in 2025. Thus, the bilateral agricultural balance changed from a surplus in 2020–2021 to a persistent deficit after 2022. This shift is not adequately explained by the size of production alone; it points to differences in supply organization, transaction regularity, product composition, and access to the importing country's sanitary and phytosanitary regime.

The significance of the issue is strengthened by the mismatch between Kyrgyzstan's broad agricultural resource base and its narrow effective export basket. Official Kyrgyz statistics report substantial production in grains and legumes, potatoes, vegetables, fruit, livestock, milk, eggs, and wool [10; 11]. However, the export data analyzed here show that foreign-exchange earnings in the Chinese direction are concentrated in a small number of commodity groups. Such a structure creates a high degree of exposure to changes in one product,

one contract, one border procedure, or one regulatory requirement. In other words, the central weakness is not merely low export volume; it is the absence of an internal mechanism that distributes export risk across several stable product lines.

The research problem is therefore formulated as follows: why has the expansion of connectivity and the growth of the Chinese agricultural market not yet produced a stable and diversified Kyrgyz export response, and which product and institutional measures can convert formal market access into regular trade? The answer requires the simultaneous analysis of value flows, commodity concentration, annual instability, operational intensity, trade costs, and SPS-related market access. A purely macroeconomic comparison would conceal the role of dominant products and large one-off transactions, whereas a purely institutional description would not show the measurable scale of the imbalance.

The aim of the article is to identify the structural determinants of agricultural trade asymmetry between Kyrgyzstan and China in 2020–2025 and to substantiate realistic directions for export diversification under the BRI. The article pursues five objectives:

1. to measure the annual dynamics of agricultural exports, imports, trade balance, and import coverage by exports;
2. to assess the concentration and structural instability of the export and import baskets using HHI, CR5, and top-product shares;
3. to compare the operational mechanisms associated with export and import values through correlations and reduced log-linear models;
4. to relate the statistical results to SPS compliance, logistics, certification, registration, and other institutional conditions of market access;
5. to identify product groups and policy instruments capable of forming a more stable and diversified Kyrgyz export portfolio.

The working hypothesis is that sustainable growth of Kyrgyz agricultural exports to China is constrained less by the absence of external demand than by the joint effect of high commodity concentration, irregular transaction structure, and incomplete institutional readiness. Under this hypothesis, the BRI can improve export performance only when lower trade costs and better connectivity are combined with product-specific SPS roadmaps, accredited testing, enterprise registration, traceability, consolidation of small producers, and repeated buyer contracts.

Materials and methods. The empirical base consists of the transaction-level agricultural trade database developed in the dissertation for the Kyrgyzstan–China direction. The database contains 339 export records and 312 import records for 2020–2025, or 651 observations in total. Each record is classified by trade direction, year, commodity group, product item, value in USD, physical quantity in the original reporting unit, and a transaction or record identifier. The data were aggregated in two complementary ways. First, annual aggregates were used to measure the dynamics of the trade relationship. Second, commodity and transaction-level data were retained to calculate concentration, dispersion, and the contribution of individual products. This dual structure is important because annual totals can be dominated by a small number of large consignments.

The study combines descriptive, structural, and exploratory econometric procedures. Descriptive statistics include annual totals, means, medians, standard deviations, interquartile ranges, and transaction counts. Structural analysis compares the share of dominant product groups, the share of the ten leading products, and the cumulative share of the five largest groups. The Herfindahl–Hirschman Index is calculated as $HHI = \Sigma s_i^2$, where s_i is the percentage share of commodity group i. With percentage shares, the index ranges from near zero to 10,000; higher values indicate greater concentration. The CR5 indicator is calculated as $CR5 = \Sigma_{i=1}^{5} s_i$. Import coverage is defined as Coverage = (Exports / Imports) × 100, while the trade balance is Balance = Exports − Imports.

The comparative interpretation also uses Pearson correlation coefficients. Correlations are not treated as causal estimates; they are used to identify whether the annual value of each flow is more closely associated with physical volume, unit price, or the number of operations. This distinction is particularly important because the physical quantities in the underlying database are reported in mixed units of measurement. A change in

aggregate quantity may therefore reflect a change in the composition of the basket rather than a pure increase in a homogeneous physical flow.

To complement the structural analysis, two reduced log-linear equations were estimated. The export equation is $\ln(Yexp) = 3.2578 + 0.9258\ln(Xvol) - 2.4389D$, where Yexp is export value, Xvol is physical export volume, and D is a structural-shift dummy equal to zero for 2020–2022 and one for 2023–2025. The import equation is $\ln(Yimp) = 11.8183 + 0.0909Nimp + 0.7669D$, where Yimp is import value and Nimp is the number of import records. The models are intentionally parsimonious because the annual series contains only six observations per trade direction. Their purpose is exploratory diagnosis of different mechanisms, not definitive causal inference or long-term forecasting.

External verification was conducted through official statistical and institutional sources. Kyrgyz agricultural production indicators were compared with the National Statistical Committee's open data [10; 11]. The scale of Chinese agricultural demand was checked against the General Administration of Customs of China, which reported agricultural imports of USD 207,408.8 million in 2025 [9]. The interpretation of BRI-related transport effects follows the World Bank country case study for the Kyrgyz Republic [13] and the 2025 Country Economic Memorandum, which emphasizes trade facilitation, accredited laboratories, quality infrastructure, and export capacity [14]. These sources do not replace the dissertation dataset; they provide an external context for evaluating whether the estimated export potential is economically and institutionally plausible.

Literature review. The theoretical foundation of the article combines the gravity approach to international trade with the analysis of trade costs. In the gravity tradition, the volume of trade is shaped by the economic size of partners and by the costs of overcoming distance, borders, information asymmetries, and institutional differences. Anderson and van Wincoop conceptualize trade costs broadly, including all resources required for a good to reach a consumer across a border [1]. This perspective is particularly relevant for Kyrgyzstan because the country's landlocked geography makes the reliability of roads, border crossings, warehouses, and customs procedures a structural component of competitiveness rather than a temporary logistical inconvenience.

The BRI literature extends the trade-cost framework by examining infrastructure and corridor connectivity as instruments that can reduce shipment time and reorganize the spatial pattern of trade. De Soyres, Mulabdic, and Ruta show that BRI transport projects can reduce shipment time and trade costs, but the magnitude of the effect depends on the configuration of routes and complementary policies [5]. The World Bank's Kyrgyz Republic country case study similarly stresses that infrastructure improvements produce larger benefits when combined with reforms in trade facilitation and border efficiency [13]. The implication for agricultural trade is direct: a faster corridor may support perishable or time-sensitive products, but it cannot substitute for quality verification, packaging, contractual organization, and predictable border administration.

A second strand of the literature examines export diversification. Diversification is not limited to increasing the number of customs lines; it involves the emergence of regular products, additional firms, repeat contracts, and a lower dependence on a dominant commodity. Dennis and Shepherd find that trade facilitation can support export diversification by reducing the fixed costs that prevent firms from entering external markets [6]. Balassa's revealed comparative advantage framework [2] and subsequent product-space approaches also suggest that the existence of resource or production advantages is insufficient unless firms can convert them into marketable and repeatable export capabilities. This distinction is essential in the Kyrgyz case, where the production base is broader than the observed Chinese export basket.

A third strand concerns SPS and technical regulation. Agricultural trade is unusually sensitive to food safety, plant health, veterinary control, traceability, labeling, and the registration of overseas producers. Disdier, Fontagné, and Mimouni demonstrate that regulatory measures can significantly influence agricultural trade even when tariffs are low [7]. The FAO emphasizes that traceability allows supply-chain participants and regulators to connect a product with its producer, processing history, location, and quality information [8]. Therefore, SPS compliance should be analyzed as an endogenous component of export capacity: it determines

not only whether a product is legally admissible, but also whether it can be supplied repeatedly and at a commercially viable scale.

The Central Asian literature adds two contextual issues. First, landlocked economies face higher logistics costs and greater sensitivity to delays, which can narrow the range of goods that can be profitably exported. Second, the region contains significant re-export and statistical-measurement effects. Mirror statistics may diverge because national customs systems record re-exports, transit, warehousing, and classification differently [4]. For this reason, bilateral agricultural trade should not be interpreted through a single headline figure without checking the underlying product and transaction structure. The dissertation's use of a transaction-level database responds to this methodological problem by exposing the heavy tails and concentration that annual totals conceal.

Despite these contributions, a research gap remains. Existing studies commonly examine the BRI at the macroeconomic or regional level, estimate aggregate trade effects, or discuss infrastructure and institutional risks separately. Less attention is given to the combined diagnosis of annual trade asymmetry, product concentration, operational intensity, and selective export potential for the Kyrgyzstan–China agricultural corridor. The present article addresses this gap by joining structural indicators with a reduced empirical model and a product-specific interpretation of SPS and logistics barriers. The contribution is therefore diagnostic and applied: it identifies the mechanism of asymmetry and translates it into a measurable diversification agenda rather than treating market access as a purely formal legal outcome.

Results. The annual series demonstrates a clear break between the two directions of agricultural trade. Kyrgyz exports to China amounted to USD 12.497 million in 2020 and increased to USD 17.036 million in 2021. In 2022, the export value fell to USD 1.441 million, representing a 91.5% decline from the previous year. The subsequent recovery was weak: exports reached USD 2.022 million in 2023, declined to USD 1.537 million in 2024, and amounted to USD 1.727 million in 2025. The 2025 value was therefore only 10.1% of the 2021 peak. The trajectory is inconsistent with a stable expansion of a diversified export channel; it is more consistent with the disappearance of large anchor transactions and the restructuring of the dominant commodity core.

Imports from China moved in the opposite direction. Their value rose from USD 7.895 million in 2020 to USD 9.019 million in 2021, then expanded to USD 15.451 million in 2022, USD 32.165 million in 2023, USD 52.903 million in 2024, and USD 68.519 million in 2025. Between 2021 and 2025, the import value increased approximately 7.6 times. The difference is not limited to scale. The import flow also displayed a more regular sequence of annual growth and a larger number of repeated records, indicating a stable supply channel. By contrast, the export flow was characterized by high volatility, heavy-tailed transaction values, and dependence on a narrow set of goods.

Table 1. Annual dynamics of agricultural trade between Kyrgyzstan and China, 2020–2025

Year	Exports USD m	Imports USD m	Balance USD m	Coverage %	Export HHI	Import HHI
2020	12.497	7.895	4.602	158.29	8750.40	4279.45
2021	17.036	9.019	8.017	188.89	9359.77	3789.63
2022	1.441	15.451	-14.010	9.33	3982.02	2947.59
2023	2.022	32.165	-30.143	6.29	3751.58	2967.18
2024	1.537	52.903	-51.366	2.91	5954.16	3170.66
2025	1.727	68.519	-66.792	2.52	5884.85	4896.93

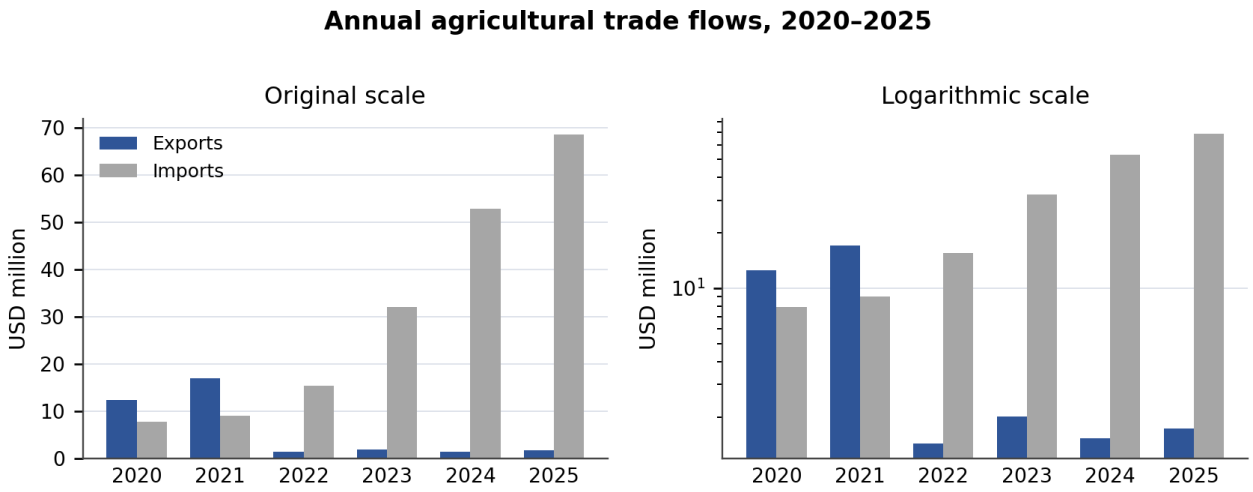


Figure 1. Annual agricultural trade flows, 2020–2025 (the right panel uses a logarithmic scale)

The trade balance confirms the structural character of the shift. The positive balance of USD 4.602 million in 2020 increased to USD 8.017 million in 2021, but became a deficit of USD 14.010 million in 2022. The deficit then widened to USD 30.143 million in 2023, USD 51.366 million in 2024, and USD 66.792 million in 2025. The import coverage ratio fell from 188.89% in 2021 to 2.52% in 2025. Thus, by the end of the period, export earnings covered only about one fortieth of the agricultural import value from China. This indicator is particularly important for policy evaluation because it captures the combined effect of export decline and import expansion rather than measuring either direction in isolation.

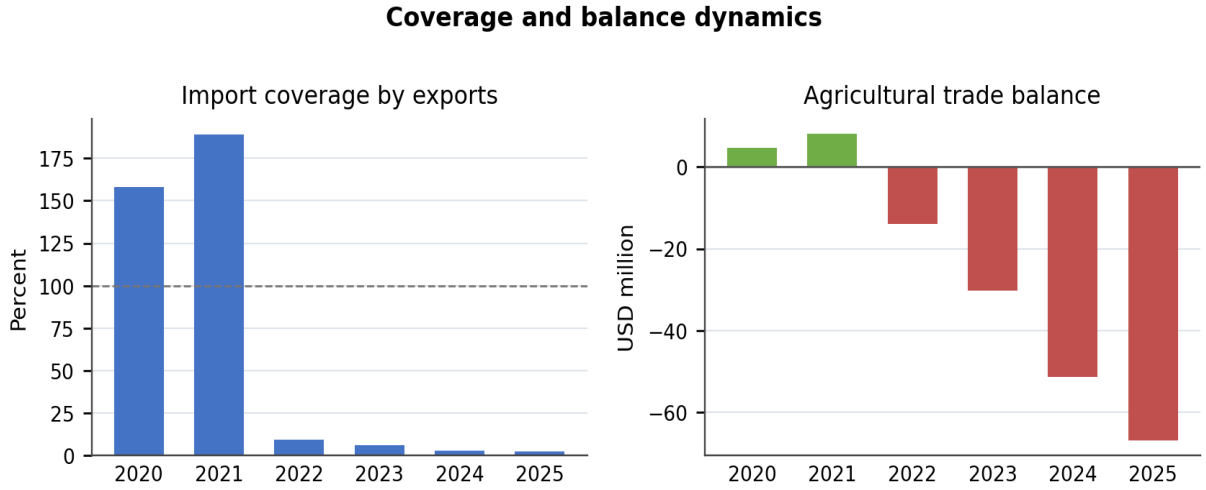


Figure 2. Import coverage by exports and agricultural trade balance, 2020–2025

The export basket is highly concentrated at both the aggregated-group and individual-product levels. Tobacco and manufactured tobacco substitutes generated 81.47% of the total export value in 2020–2025, while alcoholic and non-alcoholic beverages and vinegar contributed 11.31%. The first five aggregated product groups generated 97.58% of export value, and the ten leading individual products accounted for 97.53%. At the individual-product level, cigars, cigarillos, and cigarettes containing tobacco alone represented 79.20%. These values describe a Pareto-type structure in which a very small core determines almost the entire annual outcome. Consequently, the aggregate export indicator is highly sensitive to the appearance, disappearance, price, or regulatory treatment of one or two product positions.

The import basket is also concentrated but is less mono-dependent. Preparations of vegetables, fruits, nuts, or other parts of plants accounted for 59.75% of total imports, followed by miscellaneous edible preparations at 12.08%, oil seeds and other seeds at 7.91%, tobacco at 7.36%, and sugar confectionery at

4.41%. The first five groups therefore generated 91.51% of import value, while the ten leading individual products accounted for 82.61%. The leading poultry-related item represented 46.53% of the total. Although these numbers show meaningful import concentration, the broader supporting structure and more regular transaction pattern make Chinese imports less dependent on a single annual anchor than Kyrgyz exports.

Table 2. Structural concentration of agricultural trade, 2020–2025

Indicator	Kyrgyz exports to China	Chinese imports to Kyrgyzstan	Interpretation
HHI	6774.44	3860.75	Export concentration is substantially higher
Dominant aggregated group	81.47%	59.75%	Dependence on the leading commodity direction
CR5	97.58%	91.51%	Share generated by five largest groups
Top 10 individual products	97.53%	82.61%	Dependence on a narrow product core
Largest individual product	79.20%	46.53%	Maximum product-level exposure

The annual HHI series demonstrates that export concentration is not a temporary feature of one year. The export HHI reached 8,750.40 in 2020 and 9,359.77 in 2021, indicating near-monopolization of the export result by the tobacco group. It declined to 3,982.02 in 2022 and 3,751.58 in 2023, but increased again to 5,954.16 in 2024 and 5,884.85 in 2025. This pattern does not represent a straightforward transition toward diversification. Instead, it reflects a change in the dominant group: tobacco was replaced by beverages and vinegar as the principal source of export value. Concentration therefore decreased in some years because the export core changed, not because a broad and stable portfolio emerged.

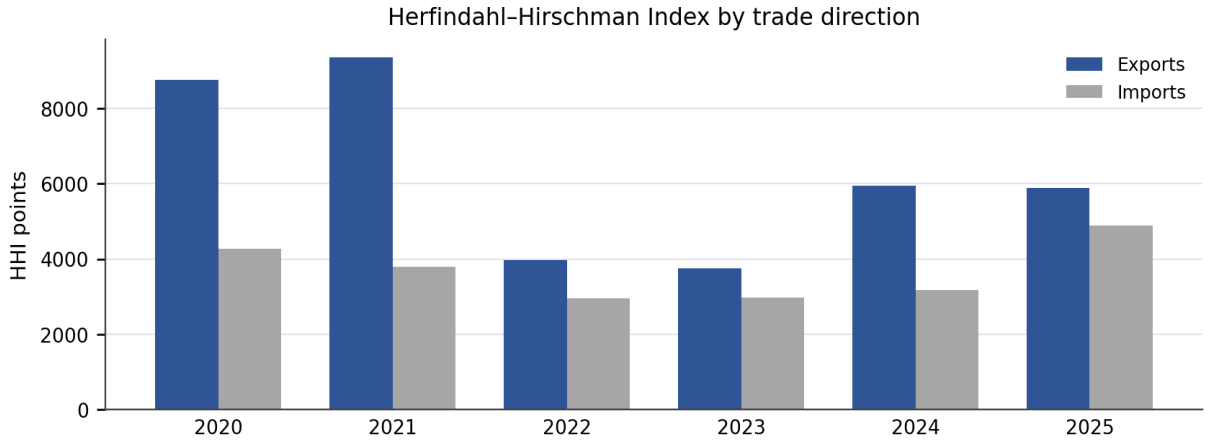


Figure 3. Annual HHI values for agricultural exports and imports, 2020–2025

The structural shift is visible in the annual composition. Tobacco accounted for 93.48% of export value in 2020 and 96.73% in 2021. Its share declined to 59.29% in 2022, while cereals and prepared food items became more visible. In 2023, beverages and vinegar became the leading group with 57.31%; their contribution reached 76.05% in 2024 and 75.06% in 2025. This sequence indicates structural instability rather than the consolidation of one predictable specialization. A diversified export system would reduce the HHI while maintaining several product lines across successive years; the observed data instead show alternating dependence on different dominant groups.

The correlation structure confirms that exports and imports are governed by different operational mechanisms. Export value has a very weak relationship with physical volume (r = -0.04) and a moderate

negative relationship with the average unit price (r = -0.36), but a strong negative relationship with the number of export transactions (r = -0.93). The negative coefficient does not mean that additional transactions mechanically reduce exports. Rather, it reflects the fact that the largest export values occurred in years with a small number of very large transactions, whereas later years contained more fragmented but lower-value shipments. The import flow shows the opposite pattern: import value correlates positively with physical volume (r = 0.70) and strongly with the number of records (r = 0.89). Imports therefore expanded through the scaling of a repeatable operational channel rather than through isolated extreme consignments.

Table 3. Results of the reduced log-linear models

Equation	Specification	Key coefficient	p-value	R^2	Adj. R^2	MAPE
Export	lnYexp = 3.2578 + 0.9258lnXvol - 2.4389D	lnXvol: 0.9258; D: -2.4389	0.0028; 0.0013	0.9801	0.9668	10.19%
Import	lnYimp = 11.8183 + 0.0909Nimp + 0.7669D	Nimp: 0.0909; D: 0.7669	0.0223; 0.0408	0.9821	0.9701	9.80%

The export model has a high goodness of fit (R^2 = 0.9801; adjusted R^2 = 0.9668; MAPE = 10.19%). The coefficient of ln(Xvol), 0.9258, indicates that a 1% increase in the recorded physical volume is associated with an approximate 0.93% increase in export value, holding the structural dummy constant. The coefficient of D is -2.4389, which captures a pronounced downward shift in the post-2022 export regime. The result is consistent with a break in the series rather than a smooth growth process. The model reproduces the general level shift well, but it does not eliminate residual variation because the value of individual years remains sensitive to product mix and large consignments.

The import model also fits the six annual observations closely (R^2 = 0.9821; adjusted R^2 = 0.9701; MAPE = 9.80%), but its economic interpretation is different. The coefficient of Nimp is positive (0.0909), indicating that the expansion of the number of recorded operations is associated with higher import value. The positive structural-shift coefficient (0.7669) is consistent with a strengthened and more formalized supply channel after 2022. Importantly, the model does not rely on the mixed-unit volume variable as its principal predictor; the number of operations better captures the regularity of Chinese supply to Kyrgyzstan.

The models should be treated as exploratory for three reasons. First, six annual observations cannot support a fully specified causal model with many predictors. Second, physical volumes combine heterogeneous reporting units, so volume coefficients partly reflect composition. Third, high product concentration means that a single dominant commodity can influence the entire dependent variable. Nevertheless, the models are analytically useful because they formalize the central difference between the two directions: exports are structurally fragile and sensitive to a regime shift, while imports grow through the expansion of an operationally stable channel.

The evidence does not support the conclusion that Kyrgyzstan lacks an agricultural export base. The National Statistical Committee reports that the gross output of agriculture, forestry, and fisheries reached KGS 395,637.1 million in 2024, including KGS 45,627.1 million in grains and legumes, KGS 41,136.7 million in vegetables, KGS 19,521.5 million in fruit, and KGS 193,110.9 million in livestock production [11]. China’s import capacity is much larger: the General Administration of Customs reported USD 207,408.8 million of agricultural imports in 2025, including USD 23,149.4 million of meat and edible offal, USD 19,436.5 million of fresh and dried fruits and nuts, and USD 59,690.6 million of cereals [9]. The problem is therefore a conversion gap between production resources, admissible products, export-ready batches, and stable commercial supply.

The most realistic diversification portfolio is selective rather than universal. Honey has already demonstrated commercial access and can be scaled through laboratory testing, producer registration, packaging, traceability, and regional branding. Beans and pulses correspond to Kyrgyz regional specialization and should be organized through sorting, grading, storage, and batch consolidation, particularly in Talas. Dried fruits and nuts have potential for higher value added but require controlled drying, moisture management,

calibration, packaging, and stable wholesale contracts. Wool, cashmere, and hides can serve as an initial livestock-related direction because primary classification and processing may be less technically demanding than direct exports of meat and poultry. Corn, flour, and fodder crops require large consolidated batches, price competitiveness, and predictable quota and logistics conditions. Processed foods represent a longer-term direction that depends on labeling, food safety, packaging, and distributor access.

Table 4. Priority product groups and measures for converting potential into regular exports

Product group	Empirical basis	Main bottleneck	Priority intervention
Honey	China is an established and growing destination	Fragmented supply, testing, branding	Certified export line, producer registry, repeat contracts
Beans and pulses	Regional specialization and protocol-based access	Sorting, grading, batch size	Talas consolidation cluster and buyer linkage
Dried fruits and nuts	Pilot shipments and fruit-growing base	Moisture, uniformity, packaging	Controlled drying, calibration, wholesale contracts
Wool, cashmere, hides	Resource base and emerging market access	Quality classification and processing	Collection centres and primary processing
Poultry and meat	Large Chinese demand but strict controls	Veterinary SPS and cold chain	Approved facilities, traceability, staged entry
Corn, flour, fodder	Production base and quota-sensitive demand	Volume, price, transport predictability	Producer aggregation and quota planning
Processed foods	Potential for higher value added	Labeling, safety, distribution	Packaging standards and Chinese distributor contracts

The institutional filter is decisive. A product should be considered export-ready only when five elements operate together: an approved access category or protocol; a registered producer or processor where required; laboratory evidence of safety and quality; a traceability record covering the batch; and a predictable logistics route. The World Bank estimates that BRI transport projects could reduce Kyrgyz shipment time by approximately 13% and trade costs by about 7%, while the effect on exports can be materially stronger when infrastructure is accompanied by border-efficiency reforms [13]. The policy implication is that roads, railways, warehouses, laboratories, digital permits, and customs procedures should be designed as one export chain rather than as disconnected infrastructure projects.

The practical mechanism should be product-specific. For honey, the chain should connect apiaries, batch numbers, residue testing, origin labeling, certified packaging, and Chinese buyers. For beans and dried fruits, it should connect producer groups with sorting, moisture control, warehouse consolidation, and phytosanitary certification. For meat and poultry, it should include veterinary supervision, approved processing facilities, cold-chain monitoring, and enterprise registration. The aim is to lower the fixed cost of entering the Chinese market for small producers through cooperatives and specialized export-support services. Formal market access becomes economically meaningful only when it produces a repeat shipment, a repeat shipment becomes a contract, and a set of contracts becomes a stable product line.

The practical recommendations derived from the results should be organized as an integrated export-capacity programme rather than as a general declaration of support for agriculture. The first institutional step is to establish a product-specific roadmap for each priority group. Such a roadmap should identify the access status in China, the responsible public authority, the required SPS or veterinary protocol, the laboratory tests, the registration procedure for the producer or processor, the packaging and labeling requirements, the consolidation point, the logistics route, and the type of Chinese buyer to be targeted. This approach reduces uncertainty for enterprises and allows public support to be linked to observable stages of export readiness. It

also makes it possible to distinguish a product that is merely permitted from a product that is actually capable of generating regular export revenue.

The second step is to classify enterprises and producer groups according to their readiness. The first category should include exporters that have already completed the relevant registration and have a record of accepted shipments. The second should include near-ready enterprises that possess production capacity but require laboratory testing, packaging, documentation, or buyer linkage. The third should include potential suppliers whose production base is promising but whose batch consolidation and compliance systems are not yet developed. This classification is preferable to uniform subsidies because the fixed costs of export entry differ by product. Honey, pulses, and dried fruits may require relatively rapid progress in testing and packaging, while meat and poultry require more demanding investments in veterinary control, processing facilities, cold storage, and traceability.

The third step concerns the geographic organization of the supply chain. Talas can function as a consolidation and grading centre for beans and pulses; fruit-producing regions can be linked to controlled drying, packaging, and storage facilities; livestock regions can be connected with wool, hide, and cashmere classification; and Chui and Bishkek can perform a coordinating role through laboratories, certification, customs brokerage, and logistics services. Regional specialization is not a return to narrow mono-specialization. On the contrary, it creates the territorial infrastructure through which several product lines can be standardized and connected to one external market. Without such organization, small farms remain unable to form export-ready batches and each enterprise bears the full fixed cost of compliance alone.

The fourth step is to create a monitoring system that evaluates real trade effects. The number of signed protocols or public announcements is not enough. The relevant question is whether the product appears in repeated annual shipments, whether more than one enterprise can supply it, whether the share of the dominant export group falls, and whether import coverage improves. The monitoring architecture should combine trade outcomes with institutional indicators: enterprise registration, certification time, the share of batches accepted without correction, the use of digital permits, average border-crossing time, and the share of exports moved through organized warehouses or cold-chain facilities. The World Bank's recommendations for Kyrgyzstan similarly emphasize improving trade statistics, accredited quality infrastructure, trade facilitation, and export-promotion monitoring [14].

Table 5. Proposed indicators for monitoring export-capacity development

Indicator	Current analytical reference	Desired direction	Policy meaning
Import coverage by exports	2.52% in 2025	Increase	Measures whether export earnings begin to compensate for imports
Export HHI	5884.85 in 2025; 6774.44 for 2020–2025	Decrease	Measures reduction of concentration risk
Regular product groups	To be established from annual shipment records	Increase	Distinguishes repeat export lines from pilot shipments
Active registered exporters	To be established from enterprise registers	Increase	Measures the institutional depth of supply
Certification and border time	Not contained in the six-year value series	Decrease	Measures predictability of market access
Repeat-contract share	To be established from commercial records	Increase	Measures sustainability of demand and buyer integration

The final component is statistical reconciliation. Because the bilateral relationship includes transit, re-export, warehousing, and different reporting practices, national and mirror statistics should be compared before policy targets are set. The comparison should be performed at the HS group and product level, with explicit

identification of re-export components, product classification changes, and differences between customs value and transaction value. This procedure is not a technical formality. If the baseline is overstated, the expected export reserve may be exaggerated; if the baseline is understated, effective interventions may be directed toward the wrong product or corridor. A reliable monitoring system should therefore publish both the headline indicator and the method used to construct it.

Discussion. The empirical findings support the trade-cost and export-diversification perspective developed in the literature. The BRI creates a plausible opportunity for Kyrgyz agricultural trade because improved corridors can reduce time and transaction costs, which is particularly important for perishable, semi-perishable, and quality-sensitive goods [5; 13]. However, the results show that connectivity alone has not corrected the asymmetry. The post-2021 export collapse, the coverage ratio of 2.52% in 2025, and the export HHI of 6,774.44 indicate that the binding constraint is located in the organization and admissibility of supply. The finding is consistent with the literature on SPS and technical measures, which treats standards as determinants of market participation rather than as purely administrative additions [7; 8]. In the Kyrgyz case, the resource base and Chinese demand are present, but the institutional bridge between them remains incomplete. Consequently, the BRI should be interpreted as a platform whose benefits are conditional on quality infrastructure, traceability, enterprise readiness, and buyer integration.

The study also refines the interpretation of diversification. A simple increase in the number of products admitted through protocols would not be sufficient if new items appear only in isolated pilot shipments. Genuine diversification requires repeated exports, several active suppliers, a measurable share of annual value, and a declining dependence on dominant positions. This conclusion follows from the observed shift from tobacco to beverages: the export HHI fell after the original dominant group weakened, yet the basket did not become structurally resilient because another narrow core replaced it. The recommended portfolio of honey, pulses, dried fruits, livestock raw materials, corn, and selected processed products is therefore a staged institutional strategy rather than a list of commodities. The principal limitation is the short annual series and the mixed-unit structure of physical quantities; the regression results are accordingly exploratory. Future research should integrate customs microdata, enterprise-level SPS readiness, border-crossing time, product-specific prices, and mirror-statistics reconciliation in a longer panel or gravity framework.

Conclusion. The article demonstrates that agricultural trade between Kyrgyzstan and China underwent a structural reversal during 2020–2025. Kyrgyz exports were relatively high in 2020–2021 but collapsed after 2021 and did not recover to their previous scale. Chinese imports expanded steadily, producing a deficit of USD 66.792 million and an import coverage ratio of only 2.52% in 2025. The asymmetry is therefore both quantitative and organizational: China supplies Kyrgyzstan through a more regular operational channel, while Kyrgyzstan has not yet created an equivalent export system for the Chinese market.

The central structural problem is excessive and unstable concentration. The five largest Kyrgyz export groups generated 97.58% of export value, the leading product represented 79.20%, and the aggregate export HHI reached 6,774.44. The dominant group changed from tobacco in 2020–2021 to beverages and vinegar in 2023–2025. This pattern shows that lower concentration in particular years may reflect substitution of one dominant group for another rather than durable diversification. In contrast, the Chinese import basket, although concentrated, had a broader supporting structure and a lower HHI of 3,860.75.

The hypothesis is supported: sustainable export growth depends on the interaction of market demand, lower trade costs, corridor connectivity, and institutional readiness. The priority policy is to move from episodic shipments to product-specific export lines. This requires accredited laboratories, SPS roadmaps, enterprise registration, batch traceability, cooperatives for consolidation, appropriate packaging, cold-chain and warehouse systems, digital border procedures, and repeated contracts with Chinese buyers. Honey, beans and pulses, dried fruits and nuts, wool, cashmere, hides, corn, and selected processed foods should be developed in stages according to their technical and regulatory requirements.

The practical implication is that the BRI should be treated not only as a transport corridor, but as an integrated export-modernization mechanism. Infrastructure can reduce time and cost, but it creates sustainable agricultural exports only when goods enter the corridor already sorted, tested, documented, registered,

traceable, and commercially contracted. If these conditions are coordinated, Kyrgyzstan can convert its resource base and geographical proximity into a more diversified and resilient agricultural export position in China. If they remain fragmented, formal access and infrastructure improvements will continue to coexist with a narrow export basket and a growing bilateral deficit.

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