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Department of Sociology, Economic
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38.04.01 Economics
International Economics and Business

GRADUATION THESIS
on
Global development of international coffee market

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ASSIGNMENT
FOR THE GRADUATION THESIS OF

Master's degree student Feng Chenkai, group 24ЭЭВам1, full-time mode of study

1 The topic of the graduation thesis: "Global development of international coffee market"

was approved by the university order
dated «____» _____ 20__ no. _____

2 The deadline for the Master's degree student to complete the graduation thesis is 15.06.2026.

3 The input data for the graduation thesis is the regulatory and legal framework, scientific literature and reference books, and Internet data.

4 The list of issues to be studied includes the Global development of international coffee market.

5 The list of visuals contains tables and figures.

6 The date of setting the assignment is 8.10.2024.

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The assignment was accepted by Master's degree student _____ / Feng Chenkai/
(signature) (full name)

Schedule for completing the graduation thesis

№ п/п	Content of the thesis	Deadline for completion	Due date, signature of the academic adviser
First year of study			
1	Substantiating of the research topic and methodology, subject and object of research	1.09.2024 – 31.10.2024	
2	Framing the scientific concept of research	1.11.2024 – 18.12.2024	
3	Collection of scientific literature for the thesis	19.12.2024 – 15.01.2025	
4	Substantiating the relevance, concept, and novelty of the research	16.01.2025 – 19.02.2025	
5	Framing of a detailed plan and layout of the research	20.02.2025 – 12.03.2025	
6	Studying new literature sources within the topic of the thesis	13.03.2025 – 26.03.2025	
7	Conducting theoretical research within the first chapter of the thesis	27.03.2025 – 30.04.2025	
8	Preparing the first chapter of the thesis	1.05.2025 – 30.06.2025	
Second year of study			
9	Conducting analytical research within the second chapter of the thesis	1.09.2025 – 22.10.2025	
10	Preparing the second chapter of the thesis	23.10.2025 – 24.12.2025	
11	Conducting analytical research within the third chapter of the thesis	25.12.2025 – 25.02.2026	
12	Preparing the third chapter of the thesis	26.02.2026 – 21.04.2026	
13	Preparing the introduction and conclusion	22.04.2026 – 12.05.2026	
14	Completing the graduation thesis	13.05.2026 – 27.05.2026	
15	Handing in the thesis for compliance control and antiplagiat	28.05.2026 – 11.06.2026	
16	Getting acquainted with the feedback and review	13.06.2026	
17	Presenting the written thesis	15.06.2026	

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The assignment was accepted by Master's degree student _____ / Feng Chenkai /
(signature) (full name)

Summary

The graduation thesis comprises 82 pages, 3 chapters, 3 figures, 5 tables, 61 sources.

INTERNATIONAL COFFEE MARKET, GLOBAL VALUE CHAIN, BENEFIT DISTRIBUTION, PRODUCTION STRUCTURE, POWER RESTRUCTURING, AGRICULTURAL TRADE, SUSTAINABLE DEVELOPMENT

The target of research is the international coffee market and its whole industrial value chain system covering global production, cross-border trade, consumption and value governance.

The goal of work is to study its historical evolution, structural changes and value distribution rules, and find ways for coffee-producing countries to escape low-end lock-in.

The methodological framework of the paper is formed by the complex of theoretical and practical methods such as international trade theories, global value chain theory, document review, statistical data analysis and comparative structural analysis.

The results of research include: four-stage division of the global coffee market from 1945 to 2023. Five interrelated lock-in mechanisms leading to unequal value distribution;

Eastward shift of global coffee consumption centre and dual-variety production structure.

Critical assessment of the limited fundamental effect of fair-trade certifications.

The recommendations on disseminating and applying the results are as follows: promote local deep processing and independent regional brands in producing countries; boost South-South coffee trade cooperation to reduce dependence on Western multinationals; combine digital traceability with certification systems to cut farmers' compliance costs; optimize global coffee industry governance to balance value allocation.

The theoretical relevance of the thesis is established by enriching the application of global value chain theory to cash crops and supplementing research on North-South trade inequality and industrial low-end lock-in.

The target of research can be further explored through quantitative analysis of carbon tariff impacts, empirical tests of coffee price transmission and long-term research on digital transformation in Asia-Pacific emerging coffee markets.

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Introduction

Relevance of the research. Coffee is one of the most traded economic crops globally, playing a central role across agricultural production, industrial processing, cross-border trade, and final consumption. The market dynamics, price trends, industrial chain specialization, and international trade patterns of this commodity have consistently been key topics in agricultural economics, international trade studies, and global value chain research. Over the nearly eight decades since World War II, the global coffee market has undergone profound transformations: from government-regulated quota systems to market liberalization, from homogeneous bulk commodities to premium differentiated products, and from traditional offline channels to digital omnichannel platforms. At the same time, the issue of uneven benefit distribution along the global value chain remains prominent, with major coffee-producing countries persistently locked into low value-added segments, while multinational corporations and consuming countries capture the vast majority of industry profits. The emergence of new consumption markets in the Asia-Pacific region, the proliferation of sustainability and fair-trade certifications, and the accelerating impact of climate change and digital technologies further complicate the market landscape. These developments raise urgent theoretical and practical questions about how the international coffee market functions, why value distribution remains so skewed, and what pathways exist for producing countries to upgrade their position. Addressing these questions is not only academically relevant but also of great practical importance for the sustainable development of the global coffee industry.

Problem statement is despite the existence of extensive literature on coffee production, trade, pricing, and consumption, significant research gaps remain. Existing studies often focus on isolated aspects-such as price volatility, certification impacts, or the competitiveness of individual countries-without providing an integrated analysis of the market's phased evolution, the structural drivers of production and consumption changes, and the mechanisms behind value chain power asymmetries. Moreover, there is no consensus on the actual effectiveness of fair trade and other certifications in fundamentally altering the low-end lock-in situation of producing countries. The role of emerging markets

as a demand-side force, the concrete countermeasures adopted by major producing countries, and the future trajectory of global value chain reconfiguration have not been systematically examined. Therefore, the central research problem of this thesis is: What are the historical development patterns, structural characteristics, and value distribution mechanisms of the international coffee market, and how can producing countries overcome low-end lock-in to achieve a more balanced position within the global value chain?

Object and subject of research is the object of research is the international coffee market as a complex economic system, including its production, trade, consumption, and value chain governance. The subject of research is the evolution of the market's structure, the dynamics of value distribution along the coffee value chain, and the mechanisms that perpetuate or challenge the low-end lock-in of producing countries.

Degree of scientific elaboration the academic literature on coffee markets is rich and multidisciplinary. International organizations such as the International Coffee Organization continuously monitor global supply-demand dynamics and price trends. Among domestic and international scholars, Gu Xiaoling and Sun Jihua have compiled core data on global coffee production and trade [25, p. 33]; Sun Juan and Cheng Zenan focused on price fluctuation mechanisms [49, p. 22]; Sun Juan also analyzed the international competitiveness of China's coffee industry [48, p. 4]; Chen Yu and Liu Yangjie examined global production and sales patterns along with China's response strategies [15, p. 33]; Hu Ying and Xiong Xianxin used China's coffee industry as a case to explore pathways for breaking low-end lock-in in global value chains [28, p. 68]; and Gao Niede evaluated the global competitiveness of the coffee industry [21, p. 4]. International contributions include the seminal work of Daviron and Ponte, which highlighted the persistent imbalance between booming retail markets and poverty among smallholder farmers [18, p. 68]; Greeff and Kozakiewicz's global value chain theory [22, p. 16]; Kaplinsky's low-end lock-in theory [32, p. 16]; and more recent empirical studies by Méndez et al. on certification impacts [38, p. 28], by Grabs on fair trade meta-analysis [23, p. 28], and by Neilson on digital platforms [42, p. 68]. These studies provide a solid theoretical and empirical foundation. However, as noted above, existing research lacks a systematic periodization of market development since 1945, a comprehensive analysis of the five lock-in mechanisms as an interdependent system,

and an updated assessment of how emerging markets and digital transformation are reshaping power relations. This thesis aims to fill these gaps.

The novelty of this research lies in the following aspects it proposes a clear four-stage periodization of the global coffee market from 1945 to 2023 international agreement regulation, market liberalization with supply surplus, specialty coffee and consumption upgrading, and digital transformation with sustainable development restructuring, each stage characterized by distinct institutional environments, production structures, trade models, and value chain governance.

It systematically identifies and analyses five mutually reinforcing lock-in mechanisms technology, standards, distribution channels, branding, and pricing that trap producing countries at the low-end of the global value chain, moving beyond a single-factor explanation.

It integrates the latest market data up to 2025 and incorporates the emerging role of the Asia-Pacific region, particularly China, as a structural driver of consumption shift and value chain rebalancing.

It critically evaluates the controversies surrounding fair trade and other certifications, concluding that while they offer partial relief, they cannot fundamentally alter the power structure of the value chain.

It provides an original synthetic framework combining international trade theory, global value chain theory, futures pricing theory, and institutional economics to explain the unique economic characteristics of the coffee market.

Practical and theoretical significance. Theoretically, this study enriches the application of global value chain theory to agricultural commodity markets and contributes to the literature on North-South trade imbalances and low-end lock-in. Practically, the conclusions offer actionable insights for industrial upgrading in major coffee-producing countries, for the development of China's coffee industry, and for improving global coffee governance systems. The findings can inform policy decisions on value addition, brand building, South-South cooperation, and the design of more effective certification schemes.

Structure of the thesis. The remainder of this thesis is organized as follows. Chapter 1 provides a literature review and theoretical framework, discussing international trade

theories applied to agricultural product markets, the unique economic characteristics of the coffee market, and the controversies surrounding fair trade certification. Chapter 2 presents a historical evolution and structural analysis of the global coffee market, dividing the development from 1945 to 2023 into four distinct stages and examining dynamic changes in production structure as well as shifts in consumer behavior. Chapter 3 focuses on the reconfiguration of power within the global coffee value chain, analyzing the structural imbalance in value distribution, the five mechanisms behind long-term worsening of trade conditions and low-end lock-in, and the resulting regional and micro-level disparities. Finally, the Conclusion summarizes the main findings, discusses theoretical and practical implications, and points out limitations and directions for future research.

Chapter 1 Literature review and theoretical framework

1.1 Agricultural product markets from the perspective of international trade theory

International trade theory has evolved through classical, neoclassical, new trade, and neo-new trade theories, ultimately giving rise to the Global Value Chain Theory—a comprehensive analytical framework encompassing causes of division of labor, trade patterns, market structures, value distribution, and industrial upgrading. Coffee exhibits characteristics of agricultural products, commodities, fast-moving consumer goods, and cultural products; thus, no single theory can fully explain its operational mechanisms, necessitating interdisciplinary analysis integrating multiple theoretical approaches. This section synthesizes existing domestic and international literature, employing comparative advantage theory, factor endowment theory, economies of scale and product differentiation theory, global value chain theory, commodity futures pricing theory, and institutional economics theory to examine both universal principles of agricultural markets and the unique features of the coffee market. It elucidates how international trade theory applies to coffee cultivation, trade, consumption, and value chain governance, laying a solid theoretical foundation for subsequent research on market historical evolution, structural analysis, and power restructuring.

Classical and Neoclassical Trade Theories. The theory of comparative advantage serves as the theoretical foundation for specialized coffee production. The theory of comparative advantage proposed by David Ricardo argues that the basis of international trade lies not in absolute cost differences but in relative cost differences. Countries should specialize in producing and exporting goods where they have a comparative advantage, while importing goods where they are at a comparative disadvantage, thereby enhancing overall social welfare through international division of labor. This theory is a classic tool for interpreting the global coffee production landscape and aligns with existing research findings that "coffee production and consumption are highly concentrated in tropical countries." Coffee cultivation imposes stringent requirements on climate, soil, and altitude,

allowing it to grow only within the "coffee belt" between the Tropic of Cancer and the Tropic of Capricorn; these natural endowments determine the geographical limitations of global coffee production. Major consuming countries such as those in Europe and North America face significant climate constraints, making large-scale coffee cultivation challenging, thus placing them at an absolute comparative disadvantage in coffee production. In contrast, tropical and subtropical regions like Brazil, Vietnam, Colombia, Indonesia, and Yunnan in China possess favorable natural conditions for coffee growth, establishing notable comparative advantages in this sector. Sun Juan and Xiong Huibo, in analyzing the global coffee production and consumption pattern, noted that coffee production is highly concentrated in developing countries with matching resource endowments, while consumption is primarily concentrated in developed nations, a division of labor model that closely aligns with the core logic of comparative advantage theory [50, p. 33]. Gu Xiaoling and Sun Jihua, utilizing data from the International Coffee Organization, confirmed that countries such as Brazil, Vietnam, and Colombia hold an absolute dominant position in global coffee production: producing countries focus on coffee cultivation and primary processing, while consuming countries control roasting, brand management, and retail operations, forming a typical vertical division of labor system [25, p. 33]. From a cost structure perspective, coffee cultivation is a labor-intensive industry. Developing countries benefit from low labor costs, which further reinforces their comparative advantage; in contrast, developed countries face higher labor costs, making independent coffee cultivation associated with substantial opportunity costs. Therefore, abandoning coffee cultivation and focusing on high-value-added segments fully aligns with the principle of comparative advantage. Driven by this principle, producing countries have continuously expanded cultivation scales and deepened specialization, leading to periodic oversupply in the international coffee market. However, the theory of comparative advantage can only explain the fundamental trade pattern of coffee being produced in the south and sold in the north, but fails to address issues such as two-way trade among coffee varieties, product differentiation, and imbalances in value distribution along the value chain, requiring additional theoretical frameworks for elaboration.

The factor endowment theory, also known as the Heckshel-Olling model, explains the factor-driven mechanisms of coffee trade. As the core of neoclassical trade theory, this theory posits that differences in a country's factor endowments are the fundamental cause of international trade. A nation should export products manufactured using its abundant factors and import those produced with scarce factors. This theory closely aligns with the factor structure characteristics of the coffee industry and corroborates existing literature findings regarding "rigid primary processing and inflexible value chain division." The core inputs for coffee production are land, labor, and natural climate, making it a land-labor intensive industry; whereas deep processing, branding, and distribution channels represent capital-technology intensive stages. Developing countries generally possess abundant land resources and low labor costs, giving them comparative advantages in coffee cultivation and primary processing; developed nations, with their strong capital, advanced technology, and robust marketing capabilities, excel in coffee roasting, grinding, brand building, and retail operations. After comparing the status of primary processing between Yunnan and Brazil, Bi Xiaofei, Hu Guangfeng, and others found that both major coffee-producing countries primarily focus on primary processing tasks such as washing, drying, and shelling, while lacking strong deep-processing capabilities, a clear outcome of factor-endowment disparities [7, p. 4–46]. In analyzing China's coffee industry development strategy, Chen Shu noted that the sector's long-term reliance on primary product exports and absence of high-value-added segments stem from relative deficiencies in capital and technology [13, p. 14–46]. From a category structure perspective, Arabica coffee requires extremely stringent growing conditions, including high altitudes, suitable temperature variations, and meticulous cultivation practices; it is a land-and skill-intensive product primarily produced in countries with optimal factor endowments such as Colombia and Ethiopia. Robusta coffee exhibits strong resistance to pests and diseases along with high yields, making it a land-and labor-intensive product mainly grown in countries with abundant labor resources like Vietnam and Indonesia. Sun Juan's research on the international competitiveness of China's coffee industry demonstrates that differences in factor endowments directly determine the distribution of coffee varieties and trade structures across nations [48, p. 4]. While the factor endowment theory elucidates the factor-based foundations of international division of labor

in the coffee industry, it fails to explain market patterns dominated by multinational corporations, economies of scale, or power dynamics within global value chains; thus, an integrated analysis incorporating new trade theory and global value chain theory is necessary.

New Trade Theory: Imperfect Competition and Economies of Scale in the Coffee Market. The theory of economies of scale explains the causes of coffee industry agglomeration and oligopolistic structures. Traditional trade theory, premised on perfect competition and constant returns to scale, fails to account for the reality of a coffee industry dominated by a few multinational corporations with highly concentrated production. The new trade theory incorporates economies of scale, imperfect competition, and product differentiation, becoming a core tool for analyzing coffee market structure. Economies of scale are divided into internal economies of scale and external economies of scale, both of which collectively shape the competitive landscape of the coffee industry (table 1).

Table 1 – Production Data of Major Global Coffee Producing Countries [45, p. 11]

Production data for the major coffee-producing countries worldwide for the 2024/25 fiscal year			
ranking	Country/Region	Production (in millions of 60 kg bags)	Global Share
1	Brazil	64.70	37.0 %
2	Vietnam	29.00	16.6 %
3	Columbia	13.20	7.6 %
4	Indonesia	10.70	6.1 %
5	Ethiopia	10.63	6.1 %
6	Uganda	6.70	3.8 %
7	India	6.20	3.6 %
8	Honduras	5.52	3.2 %
9	Peru	3.88	2.2 %
10	Mexico	3.87	2.2 %
	The total global production volume is as follows	154.40	88.4 %

Internal economies of scale manifest as follows: when enterprises expand their production scale, unit production costs decline, thereby enhancing market competitiveness. The coffee roasting, branded retail, and instant coffee production segments exhibit

significant characteristics of internal economies of scale. Large multinational corporations such as Nestlé and Starbucks achieve scale expansion through global procurement, standardized production, and comprehensive marketing, reducing unit costs and ultimately forming an oligopolistic structure. Existing literature also corroborates this phenomenon: Wang Lili noted that international companies leverage their scale and brand advantages to dominate the China coffee market [54, p. 56]; Chen Liting and Chang Jing separately analyzed Starbucks' competitive strategies and value chain advantages, confirming that economies of scale are a source of core competitiveness for multinational firms [12, p. 62].

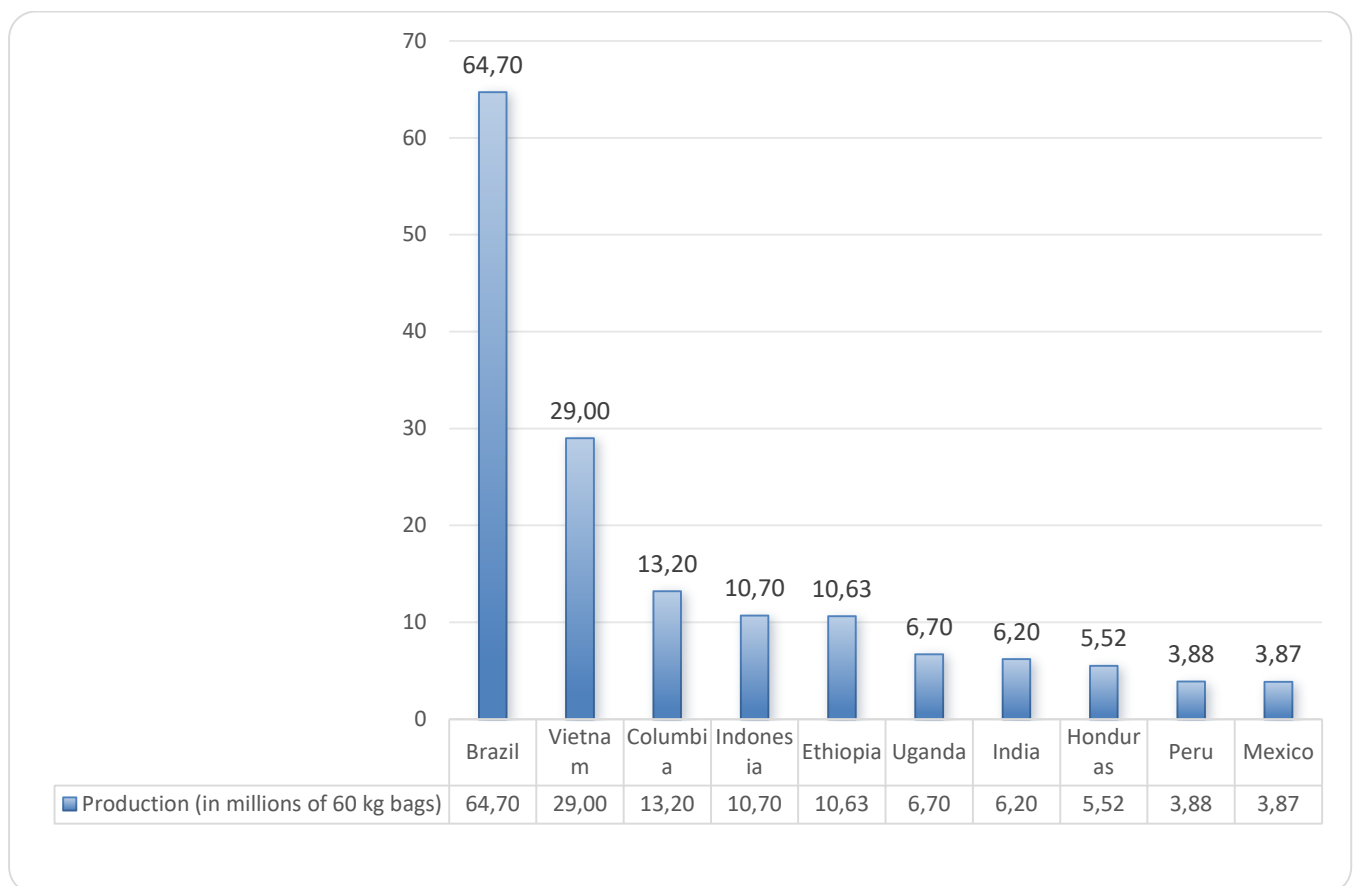


Figure 1 – Production volumes of major coffee-producing countries [27, p. 67]

Figure 1 shows us the external economies of scale are reflected in how industrial agglomeration drives overall regional cost reductions. Major producing countries such as Brazil and Vietnam have established integrated industrial clusters encompassing coffee cultivation, primary processing, and logistics transportation, lowering raw material procurement, logistics, and transaction costs while further intensifying production agglomeration. According to USDA data for the 2024/25 season, the top five coffee-

producing countries account for over 75 % of global output—a concentration driven by external economies of scale. The theory of economies of scale explains this high level of industry consolidation, addressing a key limitation of traditional trade theory.

Traditional coffee trade primarily involved homogeneous raw beans and fell under inter-industry trade, consistent with classical trade theory; modern coffee markets have developed a differentiated division of labor: Arabica versus Robusta coffee, specialty coffee versus commercial coffee, freshly ground coffee versus instant coffee, and coffee from different regions coexist, with intra-industry trade expanding steadily. After analyzing recent international coffee consumption trends, Wang Ting concluded that coffee consumption is shifting toward higher quality and diversification [55, p. 33]; Pan Qiang and Wang Jinyin explored pathways for high-quality development in the specialty coffee industry, confirming that product differentiation is the key driver of industrial upgrading [44, p. 33–56]; Bu Lan and Zhou Caiyan argued that the widespread adoption of specialty coffee and reduced competition within the sector fundamentally result from product differentiation replacing price-based competition [8, p. 33]. Product differentiation has created a dual-layer structure in the coffee market: the upstream raw bean market exhibits high homogeneity and intense competition, while the downstream retail market features significant product differentiation and pronounced monopolistic characteristics. This dual structure leads to asymmetric price transmission; as studied by Sun Juan and Cheng Zenan, price volatility in the coffee market partly stems from price rigidity in differentiated retail segments [49, p. 4–22]. The product differentiation theory clarifies the underlying causes of coffee consumption upgrading, market stratification, and intra-industry trade, providing a theoretical framework for interpreting changes in consumption patterns.

Global Value Chain Theory: Power Dynamics and Value Distribution in the Coffee Industry's Division of Labor. The core framework of global value chain theory and its applicability in the coffee industry. The global value chain theory proposed by scholars such as Griffin and Kaplinsky states that the production, processing, sales, and R&D stages of a product are distributed across various countries worldwide, forming a transnational value chain system; there are significant disparities in added value and bargaining power across

different stages, with leading enterprises controlling high-value-added segments and value chain governance rights. This theory serves as a key tool for analyzing the "smiling curve," low-end lock-in, and power restructuring in the coffee industry, and aligns closely with existing research directions on value chains. Griffin and Kozeniwitz's commodity chain theory categorizes value chains into "producer-driven" and "purchaser-driven" types [22, p. 16]. The coffee industry exhibits both characteristics: the upstream cultivation stage is geographically dispersed and highly competitive, falling under the producer-driven category [10, p. 35]; whereas downstream aspects such as branding, distribution channels, and standards are dominated by multinational buyers, constituting the purchaser-driven category. Kaplinsky's low-end lock-in theory precisely explains the long-standing developmental challenges faced by coffee-producing countries, which remain trapped in primary processing with extremely low product added value [32, p. 16]. In existing literature, Hu Ying and Xiong Xianxin have examined structural dependencies within the global coffee value chain based on market scale [28, p. 4–68]; Zhou Juan and Li Yongqian have studied the embedding patterns of Yunnan's coffee industry from a value chain perspective [60, p. 62]; and Wu Jingwei has analyzed the value chain of China's coffee industry [58, p. 4–62] all employing global value chain theory as their core analytical framework.

The imbalance in value distribution and low-end lock-in within the global coffee value chain. The global coffee value chain exhibits a typical "smiling curve" pattern: upstream cultivation and primary processing generate the lowest added value, midstream trade accounts for moderate added value, while downstream roasting, brand management, and retail represent the highest added value. This value distribution model has been validated by numerous studies: according to the latest research data from the United Nations Conference on Trade and Development and Oxfam International in 2025, upstream cultivation and primary processing contribute only 10 % of the value, midstream trade and warehousing logistics account for 15 %, downstream roasting, grinding, and brand marketing make up 45 %, and final retail and services account for 30 %, with production-related revenues accounting for less than 10 %, highlighting severe low-end lock-in issues. Dawilong and Ponte point out in their book *The Coffee Paradox* that the more prosperous

the global coffee market becomes, the higher the end-user prices rise, exacerbating poverty among farmers in producing countries [18, p. 28–68]. A comparison of primary processing industries in China's Yunnan Province and Brazil reveals that most producing countries remain confined to basic stages such as washing, drying, and shelling, lacking advanced processing technologies and robust brand development. The value distribution imbalance stems from five key lock-in effects: technology, standards, distribution channels, branding, and pricing; producing countries lack access to advanced processing technologies, certification standards, effective sales channels, or high-end international brands, forcing them to passively accept pricing set by futures markets and multinational buyers, thereby perpetuating a cycle of "high yields without increased income, poor harvests leading to greater poverty." Hu Ying et al. explicitly propose that leveraging local market scale to break free from low-end lock-in is the core pathway for coffee-producing countries to achieve industrial upgrading [24, p. 4–68].

Table 2 – Value Distribution Ratios Across Different Segments of the Global Coffee Value Chain [23, p. 61]

Proportion of value distribution across each segment of the global coffee value chain	
Value Chain Segment	Value Ratio
Upstream cultivation and primary processing	10.0 %
Midstream International Trade and Warehousing Logistics	15.0 %
Downstream processes include baking, grinding, as well as brand marketing.	45.0 %
Downstream terminal retail and services	30.0 %
amount to	100.0 %

Pricing Theory for Commodity Futures and Institutional Economics. The commodity futures pricing theory serves as the theoretical foundation for understanding coffee price fluctuations. As a typical agricultural product, coffee's price formation mechanism adheres

to both commodity cycle theory and futures pricing theory, making it a specialized tool for analyzing price volatility. The International Coffee Organization, along with scholars such as Gu Xiaoling and Sun Jihua, has conducted long-term tracking of coffee price data [25, p. 4–33]; researchers including Sun Juan and Cheng Zenan have focused on studying global coffee market price fluctuations [49, p. 4–22]; Indonesia even predicted an 40 % increase in international coffee prices [31, p. 22–46], these studies and forecasts provide empirical support for the theory (figure 2).

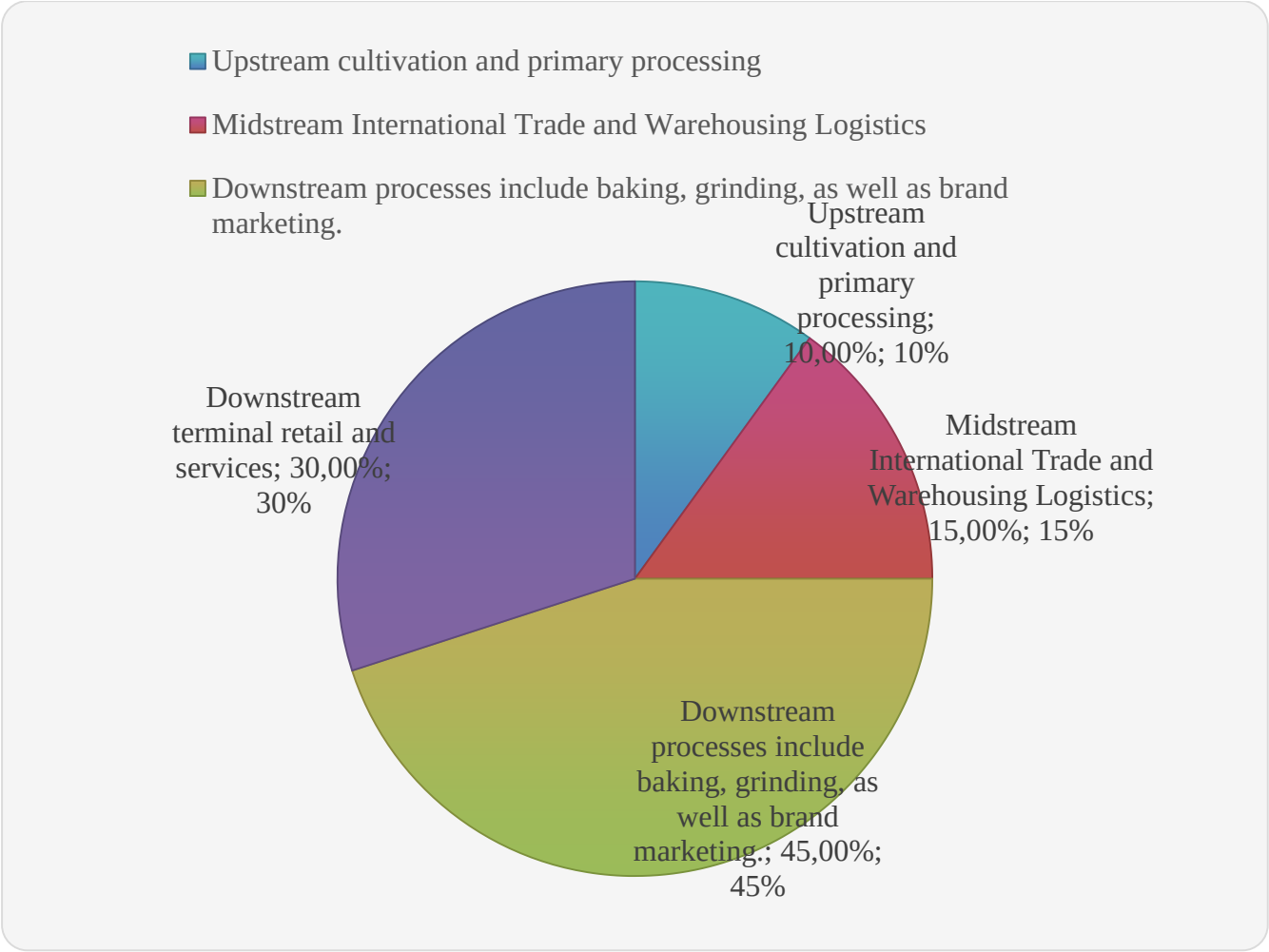


Figure 2 – Value distribution proportions across each segment of the global coffee value chain [14]

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The institutional economics certification framework, transaction costs, and coffee trade regulations form the foundation of new institutional economics, which examines how property rights, contracts, transaction costs, and institutional arrangements influence market dynamics, providing a theoretical framework for analyzing fair trade certification, sustainability certifications, and trade policies. Fair Trade Certification and Rainforest Alliance Certification remain key research focuses in existing literature: Mendes and Grables investigated the impact of certification systems on smallholder incomes, while Davilon and Ponte proposed the "Coffee Paradox" all studies employing institutional economics as their analytical perspective (table 3).

Table 3 – Trends in the Comprehensive International Coffee Price [32, p. 18]

International Coffee Price Trends from 1990 to 2025		
a particular year	International Coffee Comprehensive Price (cents per pound)	Year-over-year increase/decrease percentage
1990	134.00	
1995	143.00	6.7 %
2000	101.00	-29.4 %
2005	124.00	22.8 %
2010	175.00	41.1 %
2015	132.00	-24.6 %
2020	111.00	-15.9 %
2023	158.00	42.3 %
2025	220.00	39.2 %

Coffee cultivation requires extended growing cycles with extremely low short-term supply elasticity, while climate conditions, inventory levels, policy factors, and speculative capital collectively drive significant cyclical price fluctuations. The New York Mercantile Exchange and London Futures Exchange have become the primary pricing centers for Arabica and Robusta coffee respectively, establishing a globally authoritative price framework. While futures markets facilitate price discovery and risk hedging, they also amplify short-term price volatility. Traditional trade theories fail to explain coffee's dramatic price swings, whereas commodity futures pricing theory clearly elucidates the root causes of price risks and unstable returns for producing countries. According to the International Coffee Organization's annual average price data from 1990 to 2025, international coffee prices exhibit significant cyclical fluctuations: in 2000, due to oversupply, prices fell to 101 cents per pound, a decrease of 29.4 % compared to 1995; in 2010, driven by improved supply-demand conditions, prices rose to 175 cents per pound, an increase of 41.1 % from 2005; in 2020, affected by the pandemic, prices declined to 111 cents per pound; and in 2025, impacted by extreme weather events such as frost in Brazil and drought in Vietnam, prices surged sharply to 220 cents per pound, up 39.2 % from 2023 levels (figure 3).

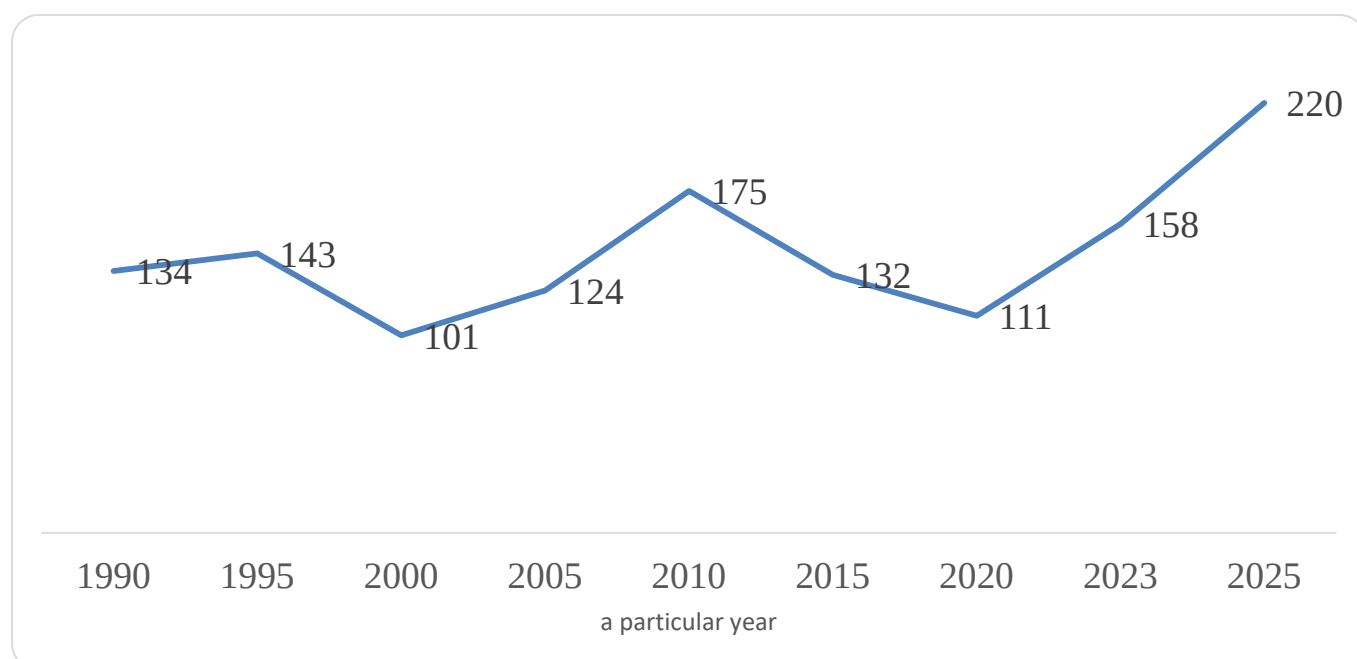


Figure 3 – Comprehensive International Coffee Price from 1990 to 2025 [45, p. 68]

As institutional arrangements, certification systems can reduce information asymmetry and enhance product value, yet they also increase compliance costs and create

trade barriers. Hu Ying et al. argue that certification systems cannot fundamentally alter power dynamics within value chains but serve merely as auxiliary optimization tools, aligning with institutional economics' core tenet that "institutional effectiveness depends on governance structures." [28, p. 68] Transaction cost theory explains why small coffee farmers rely on intermediaries and suffer from lengthy distribution chains, while also providing theoretical support for cost-reduction strategies such as digital traceability and direct sourcing from origin regions.

Comprehensive Application of International Trade Theory and Summary of Literature Support. In summary, the operational dynamics of the coffee market result from the combined effects of multiple theories: comparative advantage and factor endowment theory establish the fundamental division of labor behind coffee's "production in the south and consumption in the north"; new trade theory explains market agglomeration, economies of scale, and product differentiation; global value chain theory reveals issues of value distribution imbalance and low-end market lock-in; commodity futures theory analyzes price fluctuation mechanisms; while institutional economics elucidates the practical roles of certification systems and various institutional arrangements.

1.2 The unique economic characteristics of the coffee market

Coffee is one of the most representative economic crops and agricultural products globally. Its production structure, product characteristics, demand patterns, value distribution, market landscape, and institutional constraints differ significantly from those of major agricultural commodities such as wheat, corn, soybeans, and cotton. These distinctive attributes determine the operational logic, price formation mechanisms, trade models, and value chain governance frameworks of the international coffee market, making it a prime case study for international trade theory, agricultural economics, and global value chain research. Based on existing literature, the core economic attributes of the coffee market can be categorized into six major types, each supported by substantial empirical evidence and academic justification.

Coffee cultivation exhibits remarkable geographical concentration and extreme climate sensitivity, requiring stringent growing conditions that allow it to thrive only in tropical and subtropical regions between the Tropic of Cancer and the Tropic of Capricorn. This inherent limitation directly results in a highly concentrated global distribution of coffee production, which constitutes its most fundamental economic characteristic. According to data from the International Coffee Organization, Gu Xiaoling and Sun Jihua noted that only approximately 70 countries worldwide meet the necessary conditions for coffee cultivation, with fewer than 30 achieving large-scale production [25, p.33]. The latest USDA 2024/25 statistics indicate that Brazil, Vietnam, Colombia, Indonesia, and Ethiopia collectively account for over 75 % of global output-Brazil contributing 37.0 % and Vietnam 16.6 % creating a highly monopolistic production landscape. Research by Chen Yu, Liu Yangjie, Sun Juan, Xiong Huibo, and others confirms that coffee-producing nations are predominantly located in the Global South, while consumer markets remain concentrated in developed economies like Europe and North America, solidifying a long-standing "South produces, North consumes" trade pattern [50, p. 33]. Additionally, coffee demonstrates exceptional sensitivity to climate change, with supply elasticity significantly lower than that of other agricultural products. Coffee plants have strict requirements regarding temperature, precipitation, sunlight, altitude, and soil quality; factors such as frost, drought, flooding, hurricanes, and pests can severely impact yields. Studies by Li Zhongxian et al. revealed that coffee plants exhibit extremely low tolerance to extreme temperatures during critical growth stages, making climate fluctuations highly likely to cause yield reductions or complete crop failures [34, p. 33]. The International Coffee Organization's 2025 Market Report indicates that Brazil experienced frost damage and Vietnam suffered droughts between 2024 and 2025, leading to a contraction in global coffee supply and a price increase of nearly 40 %. This outcome aligns with Indonesia's prediction of a significant rise in coffee prices in 2015 [31, p. 46]. Coffee plants require 3 to 5 years after planting to reach peak production, with an economic lifespan extending up to 20 years; short-term supply elasticity is virtually nonexistent, and supply adjustments lag significantly behind price signals, resulting in coffee prices exhibiting far greater cyclical volatility than those of other agricultural commodities. Sun Juan, Cheng Zenan, and others explicitly stated in their study

on coffee price fluctuations that climate shocks are the primary exogenous factor causing coffee prices to deviate from equilibrium levels—a characteristic uncommon among food crops [49, p. 22]. The combination of concentrated production and climate sensitivity has characterized the international coffee market with supply fragility, risk concentration, and severe price volatility, thereby contributing to unstable incomes for producing countries and persistent deterioration in trade conditions.

Dual-category Structure. The market segmentation between Arabica and Robusta coffee has established a stable and distinct dual-category structure in the global coffee industry, with both varieties dominating the market concurrently. These two coffee types exhibit complete differentiation in biological characteristics, production costs, quality positioning, consumption scenarios, pricing mechanisms, and trade models, forming unique structural features of the coffee market. Research by Morizhen and Li Xuejun on coffee category characteristics and historical evolution, analysis by Sun Juan on industrial competitiveness, and exploration by Pan Qiang on specialty coffee development pathways have all provided academic support for this phenomenon [40, p. 33]. According to the International Coffee Organization's October 2025 market report, Arabica accounted for 63,4 % of global production in the 2024/25 season, while Robusta represented 36,6 % [30, p. 33]. Arabica is known for superior quality, rich flavor profiles, low caffeine content, and cultivation primarily in high-altitude regions such as Brazil, Colombia, Ethiopia, and Guatemala, targeting premium markets like specialty coffee, freshly ground coffee, and high-end chain coffee brands, with pricing determined by the New York Mercantile Exchange. Robusta coffee demonstrates strong resistance to pests and diseases, high yield, and affordability, mainly grown in low-altitude areas like Vietnam and Indonesia, used primarily in mass-market products such as instant coffee, canned coffee, and blended coffee blends, with pricing regulated by the London Mercantile Exchange. Chen Zhuang's study on Vietnam's Robusta coffee industry expansion revealed that since the 1990s, Vietnam's rise through low-cost Robusta coffee production has fundamentally reshaped the global coffee trade landscape. The dual-category structure of coffee generates three major economic impacts: first, the market naturally divides into a high-end premium segment and a mass-market commodity segment, catering to the needs of different income groups;

second, it establishes two independent yet interrelated pricing systems, increasing price volatility complexity; third, it defines competitive strategies across producing regions-Latin American and East African countries focus on premium products, while Southeast Asian nations adopt economies-of-scale and low-cost approaches. This structure also constitutes the core characteristic that distinguishes the coffee market from other single-crop agricultural markets.

With cross-regional popularity, inelastic demand, and continuous consumption upgrading, coffee has evolved from a regional beverage to a global mainstream drink, enjoying robust demand across diverse cultures, regions, and social strata. Concurrently, rising household incomes have driven significant trends in consumption upgrading. This demand characteristic profoundly influences the global trade landscape and value chain structure. From a demand elasticity perspective, coffee has become a dietary tradition in Europe and America, characterized by stable per capita consumption and low-price elasticity of demand. In emerging markets represented by China, coffee has rapidly transformed from a niche beverage into a daily consumer product, with continuously increasing market penetration. Data from the International Coffee Organization show that global annual coffee consumption exceeds 400 billion cups, reflecting steady demand growth. Chen Haozhi et al., in their study on coffee market challenges, noted that coffee consumption features high-frequency repurchase rates and strong consumer loyalty, demonstrating demand resilience far surpassing that of other non-essential foods [16, p. 56]. Regarding consumption upgrading, global coffee consumption is shifting from "functional drinking" toward "experiential consumption, health-oriented consumption, and social consumption." Pan Qiang et al. proposed that specialty coffee has entered a phase of high-quality development [44, p. 56]; Bu Lan et al. highlighted that industry competition has shifted from price wars to quality competition [8, p. 33]; while Wang Lili observed that the China coffee market exhibits trends toward premiumization, convenience, and diversification [54, p. 14]. Consumption upgrading directly drives the value chain toward higher-value segments and provides a market foundation for producing countries to develop specialty coffee and establish independent brands. Notably, the global coffee consumption center has long exhibited a west-to-eastward shift; the share of consumption in European

and American markets is gradually declining, while the Asia-Pacific region, centered on China, India, and Asean, has become a key growth engine. According to data from the International Coffee Organization and Euromonitor International's 2025 report, between 2015 and 2025, Europe's share of global coffee consumption fell from 32 % to 30 %, North America's share dropped from 20 % to 17 %, while the Asia-Pacific region saw a significant rise from 18 % to 28 %, becoming the primary driver of global coffee consumption growth.

Scholars surnamed Wang and Liu, after studying the transformation of coffee consumption in China, proposed that emerging markets represented by China are moving from the periphery to the center of the market, reshaping the global demand landscape-this represents the most significant structural change in the international coffee market during the 21st century [57, p. 56].

The value chain's "smile curve" is distorted, with a severe imbalance in value distribution. The entire coffee industry chain encompasses cultivation, primary processing, international trade, roasting and grinding, brand marketing, and retail distribution, collectively exhibiting a skewed "smile curve" where value allocation between upstream and downstream segments is extremely uneven-this being the most debated economic characteristic of the coffee industry. Specifically: the upstream cultivation and primary processing stages bear natural risks, price fluctuations, and market uncertainties, contributing only 1 % to 10 % total profits; the midstream trade segment exhibits high concentration, with four major multinational traders controlling over 80 % of raw bean distribution channels and securing stable revenues, accounting for 10 % to 20 % of profits; while the downstream roasting, branding, and retail segments leverage technology, distribution networks, brand equity, and pricing power to capture 70 % to 90 % of added value. Dawdling and Ponte argue in *The Coffee Paradox* that the more prosperous the global coffee market becomes, the higher the retail prices rise, exacerbating poverty among farmers in producing countries [18, p. 28–68]. A comparison of primary processing industries in China's Yunnan Province and Brazil reveals that most producing countries remain confined to basic processes such as washing, drying, and shelling, lacking advanced processing technologies and robust brand development. This value distribution imbalance stems from five key lock-in effects-technology, standards, distribution channels, branding, and pricing:

producing countries lack expertise in deep processing technologies, influence over certification standards, access to premium distribution channels, or partnerships with high-end international brands, forcing them to passively accept pricing set by futures markets and multinational buyers, thereby perpetuating a cycle of "high yields without increased income, or poor harvests leading to greater poverty." Hu Ying et al. explicitly propose that leveraging local market scale to break free from these low-end constraints represents the core pathway for coffee-producing countries to achieve industrial upgrading [28, p. 68].

The commodity futures market coexists with branded retail markets. The coffee market encompasses two distinct market structures operating under fundamentally different mechanisms: while interconnected, their operational models differ significantly, leading to price transmission asymmetry, the most complex economic characteristic of the coffee market. The first tier comprises the raw coffee commodity futures market, characterized by high transparency, intense competition, standardized trading practices, and pricing based on comprehensive benchmarks from international coffee organizations as well as New York and London futures prices, determined by global supply-demand dynamics, inventory levels, climate conditions, and speculative factors. The second tier consists of differentiated branded retail markets dominated by monopolistic competition, featuring substantial brand premiums and non-standardized products, where prices are shaped by brand identity, flavor profiles, consumer experience, packaging design, and marketing strategies. This dual-tier structure directly creates price transmission asymmetry: when raw coffee prices rise, retail brands can absorb costs by reducing profit margins or adjusting formulations, preventing upstream price increases from being fully passed down; conversely, when raw coffee prices fall, retail product price reductions are delayed or absent, allowing brands to further expand profit margins. This asymmetric structure prevents upstream risks from being transmitted downstream while exacerbating downward pressure on downstream profits, thereby perpetuating value distribution imbalances.

The coffee industry exhibits a high dependence on institutional and certification frameworks. As one of the agricultural products with the most comprehensive certification systems and stringent industry standards globally, it demonstrates pronounced institutional complexity. Certifications such as Fair-Trade Certification, Organic Certification,

Rainforest Alliance Certification, UTZ Certification, and Carbon Footprint Certification serve not only as entry requirements for premium markets but also function as non-tariff barriers established by developed countries [11, p. 66]. These certification systems exert dual impacts: on the positive side, they reduce information asymmetry, stabilize production scales, enhance farmers' incomes, and promote sustainable cultivation; on the negative side, they increase compliance costs, raise market access thresholds, often excluding the poorest smallholder farmers, and create new standardization barriers. Hu Ying et al. argue that certification systems cannot fundamentally alter the power dynamics within value chains and should be viewed merely as auxiliary optimization tools [28, p. 4–68]. The United Nations Conference on Trade and Development emphasizes that South-South cooperation can help producing countries reduce reliance on various certifications and strengthen trade autonomy [53, p. 68]. In summary, the coffee market constitutes a complex system characterized by strong natural constraints, highly concentrated production, dual product categories, persistent demand upgrades, distorted value distribution, parallel dual-market structures, and dense institutional frameworks. Its unique economic attributes necessitate the adoption of multi-theoretical analytical approaches rather than relying solely on traditional trade theories to fully explain its operational mechanisms.

1.3 Controversies regarding the economic impact of fair-trade certification

Fair Trade certification is the most representative and widely recognized inclusive trade practice in the global coffee industry, attracting significant academic attention. Since its inception, its economic impacts, social effects, welfare distribution, and policy value have remained central topics of scholarly debate.

Fair Trade certification addresses challenges faced by small coffee farmers, including operational vulnerabilities, imbalances in global value chains, and significant price volatility, by providing a structured solution comprising four key mechanisms. First is the minimum purchase price mechanism: when market prices fall below the minimum protection price, coffee is purchased at a guaranteed price to secure farmers' basic income. Second is the social premium mechanism, which allocates additional funds beyond

transaction prices for public infrastructure development such as community education, healthcare, and water supply. Third is the cooperative organization mechanism, requiring farmers to participate in production and sales through cooperatives to enhance organizational efficiency and bargaining power. Finally, the long-term contract mechanism encourages buyers to sign fixed-term agreements with farmers, mitigating market uncertainties. These mechanisms aim to correct market failures, alleviate information asymmetry, and strengthen producers' bargaining position within the value chain, serving as a complement and refinement to traditional free trade systems.

Fair trade enhances trade conditions, stabilizes incomes for small farmers, and supports research on fair trade certification, primarily grounded in welfare economics, information economics, and inclusive trade theory. Studies confirm that certification yields significant positive economic effects, supported by substantial empirical evidence. First, it stabilizes prices and incomes while reducing volatility risks. The minimum price mechanism under fair trade directly mitigates the impact of dramatic coffee price fluctuations, preventing small farmers from falling into severe poverty. A meta-analysis by Grubb's on global fair-trade coffee revealed that certification significantly reduces income volatility among farmers and improves income stability [23, p. 28]. Data from the International Coffee Organization (2025) shows that during the 2019 to 2020 coffee price downturn, farmers in certified regions earned substantially higher incomes than those in non-certified areas. Second, it strengthens bargaining power and improves trade conditions. Traditional small coffee farmers often operate independently with limited information access and heavy reliance on intermediaries, leaving them with little bargaining power. Fair trade leverages cooperatives for unified sales and direct connections with international buyers, undermining intermediary monopolies. Organizational upgrading represents a core value of fair trade, helping producing countries overcome channel and pricing lock-in issues. Third, it promotes sustainable cultivation and enhances long-term competitiveness. Mendes et al.'s quasi-natural experiment study in Ethiopia demonstrated that Rainforest Alliance certification and fair trade certification significantly increase adoption of eco-friendly farming practices, reduce fertilizer and pesticide misuse, improve coffee quality, and drive sustained industry improvement [38, p. 28]. Pan Qiang et al. emphasized that certification systems are crucial

tools for high-quality premium coffee development [44, p. 33–56]. Fourth, it addresses market failures and fills gaps in public services. The premium funds generated by fair trade are directly allocated to community public services, compensating for insufficient government public investment, enhancing human capital and infrastructure levels, and demonstrating long-term developmental value. From the perspective of international trade theory, fair trade improves trade conditions in developing countries through institutional interventions, rectifies distributional inequalities caused by global value chains, and aligns with the principles of inclusive trade, sustainable trade, and new development concepts.

The critical perspective primarily draws on political economy, transaction cost theory, and global value chain theory, arguing that fair trade fails to address the fundamental contradictions within industries and may even lead to new market distortions. First, premium losses are severe, making it difficult for benefits to reach farmers directly. The substantial premiums paid by consumers are largely captured by certification bodies, intermediaries, brand owners, and retailers, with less than 10 % ultimately reaching small farmers. Davilhon and Ponte sharply point out. The Coffee Paradox that fair trade does not alter the power structure of the value chain; it merely enables multinational brands to earn additional moral premiums while maintaining their original profit models [18, p. 28–68]. Second, certification costs are prohibitively high, excluding the poorest farmers. Certification fees, audit costs, and production modification expenses create significant barriers that low-income small farmers cannot afford, with certification benefits predominantly benefiting middle-income farmers and exacerbating wealth disparities within production regions. Most small coffee farmers in China's Yunnan Province lack the financial capacity to bear certification costs. Third, supply expansion depresses prices of non-certified products, creating new inequities. Certification stimulates production scale expansion; under unchanged total demand, prices of uncertified raw beans decline, further worsening the living conditions of non-certified farmers and fostering internal market discrimination. Fourth, it fails to break free from low-end market lock-in and represents only an improvement-oriented approach. Fair trade does not change the division of labor in producing primary commodities within countries or provide technological, brand, or distribution support, making it insufficient for driving value chain upgrading. Relying solely

on certification cannot overcome low-end market constraints; it must be combined with advanced processing, brand building, and market diversification for comprehensive advancement.

In recent years, the academic community has gradually developed a mainstream compromise perspective: fair trade is neither a panacea nor entirely ineffective, but its implementation effectiveness heavily depends on organizational models, product categories, market channels, and policy environments [47, p. 61]. First, it proves more effective in high-end Arabica coffee-producing countries, where regions with high value-added potential, mature cooperative operations, and well-established premium distribution channels demonstrate significant benefits of fair trade; conversely, its impact remains limited in Robusta commodity-producing areas and regions dominated by smallholder farmers. Second, integrating digital technologies with direct sourcing from production sites enhances operational efficiency. Lu Tingger's research on blockchain-based traceability shows that digital technologies can reduce certification costs, improve price transmission efficiency, and diminish intermediaries' influence [37, p. 28]. Third, fair trade must be coordinated with industrial upgrading policies-combining local baking practices, regional brand development, export regulation, and South-South cooperation is essential to transition from "stable income" to "enhanced value addition." In summary, controversies surrounding fair trade certification fundamentally reflect three major tensions: free trade versus government intervention, market efficiency versus social equity, and global division of labor versus local development. While fair trade can alleviate poverty, stabilize incomes, and promote sustainable cultivation, it cannot fundamentally alter the power dynamics and distribution imbalances within the global coffee value chain. For producing countries, a more pragmatic approach involves using certification as a supplementary tool while focusing on advanced processing, brand building, and channel autonomy to achieve industrial breakthroughs.

Chapter 2 Historical evolution and structural analysis of the global coffee market

2.1 Division of development stages in the global coffee market (1945 to 2023)

Over the nearly eight decades since World War II, the global coffee market has undergone a comprehensive transformation driven by multiple factors including adjustments in international systems, restructuring of production patterns, evolving consumer demands, technological innovation, and reforms in global value chain governance. This evolution encompasses shifts from government regulation to market liberalization, from homogeneous bulk commodities to premium differentiated products, from traditional offline channels to digital omnichannel platforms, and from neglect of ecological protection to green sustainable development. This study divides the global coffee market from 1945 to 2023 into four progressively coherent developmental stages: the stage of international agreement-based regulation and price stabilization (1945 to 1989), the stage of market liberalization and supply surplus (1990 to 2005), the stage of specialty coffee emergence and consumption structure upgrading (2006 to 2018), and the stage of digital transformation and sustainable development restructuring (2019 to 2023). Each stage corresponds to distinct institutional environments, production structures, trade models, price formation mechanisms, consumption characteristics, and value chain governance frameworks, comprehensively illustrating the developmental trajectory of the international coffee market while laying a historical foundation for subsequent structural analysis, reconfiguration of value chain power dynamics, and trend forecasting.

Historical Context and Institutional Framework: Following World War II, the global coffee market faced two fundamental challenges. First, supply-demand dynamics were severely disrupted before and during the war, leading to dramatic price fluctuations. Second, major producing countries relied heavily on coffee exports for foreign exchange earnings, making price collapses highly likely triggers of economic and social crises. To restore market stability, producers and consumers reached a consensus to regulate supply and stabilize prices through intergovernmental agreements and export quotas. The core of this

framework lies in the collaborative governance mechanism established by the International Coffee Agreement and the International Coffee Organization. The first International Coffee Agreement was formally signed in 1962, followed by the establishment of the ICO in 1963. The agreement underwent multiple revisions in 1968, 1976, and 1983, ultimately forming a comprehensive global governance system covering major producing and consuming nations. Its primary objectives were to control supply through export quotas, maintain coffee bean prices within reasonable ranges, ensure stable incomes for producers, and guarantee sufficient supply for consumers—a hallmark model of international commodity regulation. Concurrently, the global economic environment supported this framework: the Bretton Woods system stabilized exchange rates, international trade was dominated by goods trade, multinational corporations had not yet formed global monopolies, and agricultural trade was primarily shaped by national policies. Sun Juan and Xiong Huibo noted that during this period, coffee trade exhibited strong political and administrative characteristics, with market mechanisms strictly constrained, resulting in significantly lower price volatility compared to later liberalization phases [50, p. 33].

Latin American countries dominate the coffee market with stable supply and a homogeneous structure, featuring highly concentrated production that is primarily concentrated in the region, where Brazil, Colombia, Guatemala, and Costa Rica hold absolute dominance. African countries have limited production capacity, while Southeast Asian nations have not yet established global influence. Leveraging its climate and land resources, Brazil has long remained the world's largest coffee producer [3, p. 46]; Colombia has built a strong industry reputation through high-quality Arabica coffee. The production model combines smallholder farming with medium-sized plantations, characterized by relatively low overall technical levels, with traditional Arabica coffee being the mainstream variety and Robusta coffee cultivated on very small scales. Due to quota restrictions, expansion of planting areas across countries remains limited, resulting in stable market supply and virtually no widespread oversupply—a stark contrast to the market situation around 2000. Producing countries are solely responsible for cultivation and primary processing, with steps such as washing, drying, and shelling performed locally, while deep processing is largely outsourced to European and American countries.

The vertical division of labor is highly entrenched, with trade primarily focused on raw beans and significant loss of added value. The trade structure exhibits high homogeneity, centered around bulk exports of raw beans, while the trade volume for finished products such as roasted beans and instant coffee remains extremely small. A strict vertical division of labor has emerged across the value chain: producing countries undertake low-value-added cultivation and primary processing, whereas consuming countries monopolize roasting, grinding, brand management, and retail operations. This division aligns perfectly with theories of comparative advantage and factor endowments; however, it also traps producing countries at the lower end of the value chain for extended periods. At this stage, prices are mainly determined through negotiated pricing and quota adjustments, with a minimal role for the futures market, resulting in low price volatility and relatively stable profits for producers. Yet this long-term stability has led to market rigidity: producing countries lack incentives for technological upgrading, quality improvement, or brand development. The market is dominated by homogeneous commercial coffee beans with limited product differentiation, while coffee consumption is predominantly functional-based, lacking emphasis on experiential or cultural attributes.

The market is dominated by Europe and America, where instant coffee has gained popularity but consumption scenarios remain limited. Demand is highly concentrated in the United States and Western European countries, characterized by high per capita consumption and stable demand. During the 1940s to 1960s, instant coffee technology matured and became widespread; companies like Nestlé helped bring coffee to the general public, with convenience becoming the primary consumer priority. Consumption primarily occurs at home and in offices, while café culture has not yet become widespread globally. The product range mainly consists of instant coffee and canned coffee, with freshly ground coffee accounting for a very small share.

The key characteristics of this phase include government regulation, quota-based pricing, monopolies in Latin America, raw coffee trade, vertical specialization, price stability, consumption dominance by Europe and the United States, and a simple market structure. The International Coffee Agreement played a crucial role in stabilizing the market and protecting producer incomes, but it also stifled market vitality and industry innovation,

laying the groundwork for significant market adjustments during the subsequent liberalization phase.

The 1989 International Coffee Agreement expired without renewal, marking the formal end of the export quota system and ushering the global coffee market into a fully liberalized era. Three primary factors led to the abolition of the quota system: consumer countries advocating for free trade, major producing nations such as Brazil refusing to maintain production restrictions, and multinational corporations pushing for global procurement liberalization. Liberalization means prices are entirely determined by market supply and demand, with governments gradually withdrawing from market intervention, propelling the global coffee market into a new phase characterized by full competition, capacity expansion, and significant price volatility.

The rise of Vietnam and the expansion of Robusta coffee cultivation have led to a supply surplus. The explosive growth of Vietnam's coffee industry represents the most transformative change of this period. Following its 1986 reforms, Vietnam leveraged land reform, policy support, and new variety introductions to rapidly expand Robusta coffee cultivation, rising from a marginal producer to the world's second-largest coffee producer within just 15 years-its export volume surpassing Colombia's by 1999. Capitalizing on low costs, high yields, and large-scale farming, Vietnam monopolized the global Robusta coffee market, directly challenging existing pricing mechanisms [52, p. 33]. Coupled with increased production capacity in Brazil and Indonesia, global coffee supply became severely oversaturated, plunging the international market into a state of widespread oversupply by 2000. This prolonged period of low prices exacerbated deteriorating trade conditions for producing countries and significant income declines for small farmers, creating a widespread dilemma where "high yields failed to translate into higher incomes." The product portfolio underwent significant transformation: Robusta coffee's share surged rapidly, evolving from a supplementary category to a mainstream alternative rivaling Arabica coffee, underpinning instant coffee and budget blend coffee markets. Production concentration intensified, with Brazil and Vietnam forming a dual-core structure that weakened Latin America's traditional competitive advantages.

Market liberalization has not promoted equitable value distribution; instead, it has further reinforced the dominance of multinational corporations and traders, exacerbating the issue of lock-in at the lower end of global value chains. Production countries remain confined to primary processing stages, while high-end segments such as roasting, branding, and distribution channels are still controlled by developed nations. Four major multinational trading companies control over 80 % of the global raw coffee bean distribution network, consistently driving down procurement prices to secure stable profit margins [5, p. 4]. Affected by climate variations, speculative capital flows, and inventory cycles, coffee prices experience extreme volatility; production countries lack effective risk hedging mechanisms, resulting in highly unstable income levels. Scholars such as Sun Juan and Cheng Zenan have explicitly identified supply shocks and market liberalization as the core drivers of coffee price fluctuations during this period-indeed [49, p. 22], Indonesia's projected significant price surge in 2015 was precisely based on these prevailing price volatility patterns [31, p. 46].

Instant coffee dominates the market and has become widely consumed globally. It is entering a golden period of development, rapidly penetrating markets in Eastern Europe, Asia, and Latin America thanks to its low cost and convenience, with its consumer base expanding from Europe and North America to worldwide regions. Consumption remains primarily focused on functional beverages, and consumer demand for quality or product differentiation has not yet emerged. The trade structure still relies mainly on raw bean exports, while finished product exports account for a very small share, resulting in significant loss of added value in producing countries.

The main characteristics of this stage include market-based pricing, Vietnam's rise as a coffee powerhouse, the expansion of Robusta coffee cultivation, supply surplus, low prices, a rigid value chain, intensified focus on low-end products, dominance of instant coffee, and widespread adoption in the mass market. While market liberalization has enhanced operational efficiency and supply capacity, it has also led to issues such as imbalanced value distribution, poverty in producing countries, and severe price volatility-a quintessential manifestation of the "Coffee Paradox."

Consumption upgrading drives industrial transformation. Since 2006, rising global per capita income and shifting consumption trends have sparked the third coffee wave, ushering the international coffee market into an era of specialty coffee centered on quality, differentiation, experiential marketing, and regional characteristics. Consumers are no longer satisfied with homogeneous commercial coffee products; they now prioritize factors such as origin, flavor profile, altitude, processing methods, roasting degree, and sustainability, leading to rapid expansion of the specialty coffee market. The third wave emphasizes supply chain transparency, direct sourcing from origins, professional tasting, light roasting, and regional distinctiveness. The Specialty Coffee Association of America established industry standards that drove a comprehensive upgrade in global coffee quality. This shift marks coffee's evolution from a commodity to an experiential and cultural consumer product, with demand-driven changes compelling a full-scale improvement in supply-side capabilities.

The production sector has enhanced quality and efficiency, diversified product offerings, and seen the rise of regional brands. Arabica coffee has regained its premium pricing advantage, with specialty regions such as Ethiopia, Colombia, Panama, and Guatemala commanding high prices through distinctive products; major Robusta-producing countries like Vietnam and Indonesia have also begun optimizing quality by developing premium Robusta varieties and specialized processing techniques. New primary processing methods-including water washing, honey treatment, and anaerobic fermentation-are widely adopted, driving product differentiation. A comparison of primary processing industries between Yunnan and Brazil demonstrates that technological differences directly determine product quality. Some producing countries are now experimenting with local roasting and small-packaged finished exports, gradually moving beyond the limitations of pure primary processing.

The focus of consumption has shifted eastward, with the Asia-Pacific market rising and the China market experiencing explosive growth. The European and American markets have become saturated with slowing growth rates, while the Asia-Pacific region has emerged as the core driver of global consumption growth. The China coffee market has witnessed explosive expansion, maintaining an average annual growth rate in double digits,

transforming coffee from a niche beverage into a mainstream daily consumer product. The vast China market has attracted global enterprises to enter the sector, becoming a pivotal force in reshaping global trade flows. Product offerings have diversified, with instant coffee, roasted beans, freshly ground coffee, and canned coffee developing concurrently, while specialty coffee has become a high-growth, high-premium segment. Consumption scenarios have expanded from homes and offices to "third spaces," with chain coffee shops rapidly proliferating, further highlighting coffee's social and experiential attributes.

Refined development and sustainable certification create opportunities for producing countries to ascend the high end of the value chain. Certification systems such as Fair Trade, Organic, and Rainforest Alliance have rapidly gained traction; relevant research confirms that certification helps stabilize incomes for small farmers and promotes sustainable farming practices. The direct sourcing model from production areas has emerged, shortening distribution chains and increasing producers' profit margins. However, imbalances in value distribution persist: multinational brands continue to monopolize premium profits, while brand building and channel autonomy in producing countries remain in their early stages.

The wave of premium coffee is emerging, the third wave of coffee consumption has arrived, quality has been comprehensively upgraded, origin premiums have become evident, consumer focus has shifted eastward, the China market is rising, product diversity has increased, certification systems have become widespread, and the value chain is entering a period of upgrading opportunities. The trend toward premiumization has not only transformed production and distribution structures but also propelled the global value chain into a new phase of power rebalancing.

External shocks and technological drivers: Since 2019, four major forces-the COVID-19 pandemic, the widespread adoption of digital technologies, intensifying climate change, and stricter green trade policies-have collectively driven a comprehensive transformation of the coffee market. The pandemic accelerated the growth of online consumption, ready-to-drink coffee, and contactless purchasing; blockchain, big data, and live-streaming e-commerce have reshaped the distribution system [37, p. 28]; extreme weather events have promoted the adoption of climate-resilient cultivation techniques [6, p. 68]; and new green regulations such as the EU carbon tariff have redefined trade rules [20, p. 68].

Climate adaptation and technological empowerment have exacerbated supply vulnerabilities, with climate change becoming the central influencing factor, accompanied by frequent occurrences of frost, drought, and low-temperature disasters. Research on coffee stress resistance provides technical support for addressing climate risks; climate-friendly cultivation techniques are being rapidly adopted, while new varieties resistant to drought and pests have become a key focus of development. The global production landscape remains dominated by Brazil and Vietnam; however, low inventory levels combined with extreme weather events have increased supply vulnerability and further intensified price volatility, as evidenced by the significant rise in coffee prices during 2024-2025. The share of local roasting and deep processing continues to grow worldwide, reflecting a markedly stronger willingness among producing countries to extend their involvement upstream in the supply chain.

Omnichannel integration has led to a surge in instant coffee consumption, with young demographics becoming the primary consumer group. The deep integration of online and offline channels has facilitated rapid penetration of food delivery services, live-streaming e-commerce, and unmanned retail. Digitalization has lowered channel barriers, creating development opportunities for direct procurement from production sites and small-to-medium brands [42, p. 68]. Instant coffee has experienced explosive growth, becoming the mainstream choice among young consumers. The new generation of consumers has emerged as the market, with preferences focusing on personalization, sustainability, China-fashion styles, and regional characteristics. Current consumption trends exhibit four major directions: premiumization, convenience, health-consciousness, and localization.

With the rebalancing of power dynamics, deepening South-South cooperation, and mandatory certification requirements, producing countries are gradually enhancing their industry influence through advanced processing, regional branding, export regulation, South-South collaboration, and digital traceability. The scale of coffee trade between China and ASEAN, Latin America, and Africa has grown rapidly, while market diversification has reduced reliance on traditional European and American markets. Sustainable certification has evolved from an optional standard into a mandatory barrier to market entry, while carbon footprint requirements and green barriers have profoundly transformed the global trade

landscape. Blockchain-based traceability improves supply chain transparency, undermines the monopoly of intermediaries, and optimizes the efficiency of premium transmission [37, p. 28].

Digital technology empowerment, comprehensive penetration of online channels, the surge in ready-to-drink coffee demand, heightened climate risks, mandatory sustainability certification requirements, carbon tariffs imposing constraints, deepened South-South cooperation, rebalancing of power along value chains, and accelerated eastward shift in consumption focus have collectively propelled the global coffee market into a new phase characterized by simultaneous transformations in institutional frameworks, technological advancements, structural dynamics, and power dynamics.

In summary, the evolution of the global coffee market over the past eight decades is well-defined: from administrative regulation to market freedom, from bulk commodities to premium products, from a single offline channel to digital omnichannel distribution, from neglecting ecosystem sustainability to pursuing green development, and from severe north-south imbalance to gradual power rebalancing. This transformation aligns fully with international trade theory, global value chain theory, and the developmental patterns of agricultural product markets; comparative advantages and factor endowments determine production structures; economies of scale and product differentiation shape market configurations; value chain governance dictates value distribution models; consumption upgrading drives overall industry advancement; and institutional reforms guide industry transformation pathways.

All referenced literature in this paper provides robust data and theoretical support for stage division across multiple dimensions including production, trade, pricing, consumption, value chain, certification, and competitiveness. Historical patterns demonstrate that every major transformation in the international coffee market has resulted from the combined effects of five key forces: institutional frameworks, production practices, consumption patterns, technological advancements, and governance mechanisms, offering a fundamental historical framework for understanding current market structures, value distribution dynamics, and future trends.

2.2 Dynamic changes in production structure

The global coffee production structure is shaped by natural endowments, factor costs, technological levels, industrial policies, and the division of labor within the global value chain, exhibiting five key characteristics: high geographical concentration, coexistence of two coffee varieties, significant supply rigidity, lock-in in primary processing, and high climate sensitivity.

Global coffee production is highly concentrated geographically, representing the most fundamental and stable characteristic of its production structure. Long-term data from international coffee organizations indicate that approximately 70 countries worldwide cultivate coffee, yet fewer than 30 achieve commercial-scale production. According to the latest USDA 2024/25 annual report, Brazil, Vietnam, Colombia, Indonesia, and Ethiopia collectively account for over 75 % of global output—a concentration far exceeding that of staple crops like wheat, corn, or soybeans. Coffee production is predominantly concentrated in tropical "coffee belts," while consumption is primarily concentrated in high-income regions such as Europe, America, and East Asia, forming a fixed division of labor characterized by "production in the Southern Hemisphere and consumption in the Northern Hemisphere." Based on industry scale, competitive advantages, product positioning, and trade models, global coffee-producing countries can be clearly categorized into three tiers. The first tier includes Brazil and Vietnam—the dual-core leaders: Brazil is the only country cultivating both Arabica and Robusta coffee on large scales, boasting extensive planting areas, high mechanization levels, robust logistics systems, and mature industrial infrastructure. In the 2024/25 season, it produced 64.7 million bags, accounting for 37.0 % of global output, maintaining its position as the world's largest producer and serving as a "supply stabilizer" and price benchmark for the global coffee market. Brazil's coffee industry demonstrates significant economies of scale, featuring a coexistence of large plantations and smallholder farms alongside a well-developed primary processing system that enables rapid adaptation to global demand fluctuations [24, p. 46]. Vietnam stands out as a "transformer" in the global coffee market. Since the 1990s, leveraging inexpensive land, low-cost labor, and government industrial support, Vietnam has vigorously developed

Robusta coffee production, rising to become the world's second-largest producer within a decade. During the 2024/25 season, its output reached 29 million bags, accounting for 16.6 % of global production and virtually monopolizing the global supply of Robusta coffee. Vietnamese coffee, characterized by low costs and high yields, primarily serves the instant coffee industry chain. Brazil and Vietnam together account for over 50 % of global production, forming a duopoly that influences worldwide supply, inventory levels, and price trends. The second tier includes traditional specialty coffee regions such as Colombia, Indonesia, Ethiopia, Honduras, and Uganda. Colombia is renowned for its high-quality Arabica coffee, producing 13.2 million bags in the 2024/25 season (7.6 % globally), making it a core supplier with significant influence in setting industry standards, shaping flavors, and building regional brands. Ethiopia, the birthplace of coffee, boasts rich wild genetic resources and unique flavors, producing 10.63 million bags (6.1 %) with strong product premium potential. Indonesia dominates the premium market through niche products like specialty Robusta coffee and cat coffee, yielding 10.7 million bags (6.1 %). Honduras and Uganda have gradually emerged as major suppliers through scale expansion and quality improvement. Although these countries' total production falls short of Brazil and Vietnam's, their product quality, regional distinctiveness, and brand value remain irreplaceable, solidifying their role as key pillars in the specialty coffee market. The third tier comprises emerging premium coffee-producing regions such as Peru, Guatemala, Thailand, and China's Yunnan Province. These regions operate on relatively small scales, focusing on high-quality, organic, and differentiated products that leverage unique ecological environments and processing technologies to establish stable demand in niche markets. A comparison between Yunnan's coffee industry and Brazil's primary processing sector reveals that Yunnan coffee represents a typical emerging production area: its cultivation area has expanded rapidly, reaching 1.8 million mu (approximately 120,000 hectares) by 2025 [7, p. 46].

Table 4 – Production volumes and market shares of major coffee-producing countries worldwide for the 2024/2025 fiscal year [38, p. 50]

Production volumes and market shares of major global coffee-producing countries for the 2024/25 fiscal year				
Ranking	Country/Production Region	Production (ten thousand bags)	Global Share	Equipe Classification
1	Brazil	6,470	37.0 %	First Tier: Countries dominated by dual-core economies
2	Vietnam	2,900	16.6 %	First Tier: Countries dominated by dual-core economies
3	Columbia	1,320	7.6 %	Second Tier: Traditional Premium Coffee Production Regions
4	Indonesia	1,070	6.1 %	Second Tier: Traditional Premium Coffee Production Regions
5	Ethiopia	1,063	6.1 %	Second Tier: Traditional Premium Coffee Production Regions
6	Honduras	580	3.3 %	Second Tier: Traditional Premium Coffee Production Regions
7	Uganda	480	2.7 %	Second Tier: Traditional Premium Coffee Production Regions
8	Peru	420	2.4 %	Third Tier: Emerging Premium Production Regions

Table 4 show as the global coffee market has established a stable dual-category structure, with Arabica accounting for approximately 60 % of total production and Robusta representing about 40 %. This distribution pattern did not emerge naturally but resulted from long-term interactions between ecological conditions, cost-benefit considerations, market demand, and technological advancements. According to the International Coffee Organization's October 2025 market report, Arabica accounted for 63.4 % of global production in the 2024/25 season, while Robusta made up 36.6 % [30, p. 22–33]. Arabica requires stringent growing conditions, thriving only in high-altitude areas with significant temperature variations and fertile soils. Although it exhibits weaker resistance to pests and diseases and lower yields, its rich flavor, smooth texture, and low caffeine content make it ideal for specialty coffee, freshly ground coffee, premium chain cafés, and high-end blended blends. Pricing is determined by the New York Board of Trade, offering substantial price premiums. In contrast, Robusta demonstrates strong environmental adaptability, high

disease resistance, and low cultivation costs, yet features a more bitter profile and higher caffeine content. It is primarily used in instant coffee, canned coffee products, and budget-friendly blends, with pricing set by the London Board of Trade and consistently lower than Arabica prices. This dual-category structure directly creates market segmentation: Arabica targets the premium segment, while Robusta serves the mass consumer market. Countries in Latin America and East Africa focus on specialty Arabica varieties, whereas Southeast Asian nations prioritize large-scale Robusta cultivation. This division of labor has reduced homogeneous competition within the industry while catering to consumption demands across diverse income groups, yet it has widened product value disparities between producing countries: premium coffee regions command substantial price premiums, whereas large-scale production areas rely solely on high-volume sales with thin profit margins. Technological innovation continues to reshape production paradigms: in breeding, new varieties resistant to drought, cold, diseases, and with superior flavor are constantly developed, effectively mitigating yield losses caused by climate disasters; in cultivation, mechanized harvesting, integrated water-fertilizer management, green pest control, and eco-friendly farming techniques have been widely adopted to enhance efficiency and product quality-Brazil's extensive mechanization has significantly reduced labor costs, while emerging regions like Yunnan have implemented refined management practices to elevate product quality; processing innovations such as water washing, honey treatment, anaerobic fermentation, and sun-drying have driven coffee toward differentiation and premiumization, becoming key strategies for producers to increase product value. However, global coffee technology distribution remains highly uneven: developed countries dominate core breeding technologies, advanced processing equipment, quality inspection standards, and flavor development capabilities, while producing nations primarily employ mature techniques in cultivation and primary processing, demonstrating limited technological self-reliance. This technological gap further solidifies the global value chain structure, confining producing countries to low-value-added segments over the long term.

Coffee stands out as one of the agricultural commodities with the lowest short-term supply elasticity, which fundamentally explains its frequent and dramatic price fluctuations. Coffee plants require 3 to 5 years to reach peak productivity after cultivation, with an

economic lifespan exceeding 20 years. Once planted, producers cannot adjust yields based on short-term price changes; current prices only influence planting decisions for the next 3 to 5 years, resulting in a production cycle characterized by long duration, significant volatility, and delayed supply adjustments. The extremely low supply elasticity combined with climate shocks makes coffee prices highly susceptible to sharp fluctuations. Extreme weather events such as frost, droughts, floods, or hurricanes in major producing countries can rapidly reduce supply and trigger substantial price increases. During 2024 to 2025, frost in Brazil and drought in Vietnam caused global coffee shortages, driving prices up by nearly 40 %, a pattern fully consistent with Indonesia's forecast of a price surge in 2015 [31, p. 22–46]. Global inventory cycles further amplify price volatility. Data from the International Coffee Organization shows a strong negative correlation between coffee prices and inventory levels: minor supply disruptions at low inventories trigger price spikes, while stable demand growth at high inventories fails to boost prices. Most producing countries lack effective price risk management tools; small farmers and plantations cannot hedge their revenues through futures contracts, leaving them vulnerable to price fluctuations. «Abundant harvests lead to no income growth, while poor harvests exacerbate poverty» has become the norm. Unlike staple crops like wheat or rice, coffee lacks both price buffers from essential consumption and the flexibility for industrial-scale production adjustments, making it one of the most volatile commodities globally. The unique price formation mechanism determines the vulnerability of coffee cultivation revenues and serves as a key driver of value distribution imbalances in global value chains.

The global coffee processing industry exhibits severe structural fragmentation: producing countries are predominantly confined to primary processing stages, while high-value-added deep processing and brand development remain highly concentrated in developed nations. This pattern reflects the centralized nature of global value chain division at the production level and serves as the root cause of value loss for producers and deteriorating trade conditions. Coffee processing comprises two main tiers: Primary processing, involving steps such as harvesting, sorting, washing, fermentation, drying, shelling, grading, and packaging, characterized by low technical barriers, minimal added value, and high labor intensity, all performed within producing countries. A comparison

between Yunnan and Brazil reveals that even in industrially mature Brazil and rapidly developing Yunnan, processing remains localized with primarily small-to-medium equipment, limited standardization, and exports of raw beans [7, p. 4–46]. Deep processing encompassing high-value activities like roasting, grinding, extraction, formula development, instant coffee production, canning, and branding is technology, capital, and brand-intensive, concentrated in developed economies such as Switzerland, the United States, Germany, Italy, and France. Multinational corporations like Nestlé, Starbucks, and Kraft dominate the global deep-processing and branding markets, capturing the majority of industry profits. Primary processing lock-in brings three major consequences: first, significant loss of added value, with producing countries bearing the costs of cultivation, climate, and environment, while profits account for less than 10 %; second, continuous deterioration of trade conditions, characterized by persistently low raw bean prices and rising costs of production inputs such as fertilizers, pesticides, and processing equipment, leading to a sustained decline in the actual purchasing power of producing countries; third, a narrow path for industrial upgrading, constrained by limitations in technology, standards, distribution channels, and branding, making it difficult to break through the existing landscape. In recent years, countries such as Brazil, Vietnam, and Yunnan in China have begun attempting to expand local baking capacity and promote localized deep processing. However, due to constraints in brand recognition, distribution channels, technological capabilities, and market acceptance, their overall scale remains small and their influence limited, failing to challenge the dominance of developed countries in deep processing. Primary processing lock-in is essentially the result of cumulative disparities in technology, capital, standards, channels, and branding, and represents the core obstacle preventing producing countries from overcoming the challenges at the lower end of the value chain.

Global coffee production is predominantly driven by smallholder farmers, a organizational structure that further exacerbates their disadvantaged position in the supply chain. Data shows that over 70 % of global coffee is produced by smallholders cultivating less than 2 hectares of land. Smallholder farming is characterized by fragmented operations, limited scale, low organizational capacity, weak information access, and insufficient bargaining power. While offering advantages such as strong ecological adaptability and

employment generation potential, smallholder farmers occupy the most vulnerable position in the global value chain: they face capital shortages, inadequate technical support, poor quality control, limited market information access, heavy reliance on middlemen for procurement, and profit erosion at every distribution stage. Existing research identifies these challenges as core pain points in the coffee industry: decentralized production leads to inconsistent product quality that fails to meet premium market standards; limited financial capacity hinders certification costs and technological upgrades, preventing entry into high-value markets; price volatility severely impacts household incomes, weakening industry resilience; and insufficient organization impedes equal negotiation with multinational buyers. Cooperatives represent a crucial solution to these issues, yet most in producing countries suffer from poor management, funding constraints, and limited coverage, limiting their effectiveness. The smallholder-dominated production structure contrasts sharply with the multinational-driven downstream market, forming the micro-level basis of the "coffee paradox": the more prosperous the global market and the higher end prices, the lower the relative income of upstream smallholders becomes. To address the challenges faced by small farmers, it is essential to simultaneously advance organizational upgrading, technological empowerment, financial support, direct channel connectivity, and certification assistance—these constitute the core direction of industrial policies in producing countries.

2.3 Changes in the Structure of Consumer Behavior

The global coffee consumption landscape is undergoing its most profound transformation in a century, characterized by four key trends: a shift in consumption focusses toward the East, diversified product offerings, integration of online and offline channels, and a trend toward premium and health-conscious consumption.

The global coffee consumption landscape is undergoing a historic transformation, with the consumption center continuously shifting from traditional mature markets in Europe and America to emerging markets in the Asia-Pacific region centered on China. This represents the most significant structural change in the international coffee market during the 21st century. Under the traditional pattern, the EU accounted for approximately 31 % of

global consumption, the United States for about 18 %, and the combined share of Europe and America approached 50%, long dominating global consumption trends. In recent years, per capita consumption in European and American markets has approached saturation, with growth rates slowing 1 % to 3 %. The Asia-Pacific region, encompassing China, India, Japan, South Korea, and Asean, has become the absolute driver of global consumption growth, maintaining sustained growth rates of 8 % to 15 %, far exceeding the global average. According to data from the International Coffee Organization and Euromonitor International's 2025 report, between 2015 and 2025, Europe's share of coffee consumption declined from 32 % to 30 %, North America's from 20 % to 17 %, while the Asia-Pacific region's share surged from 18 % to 28 %, solidifying its position as the primary driver of global coffee consumption growth (figure 4).

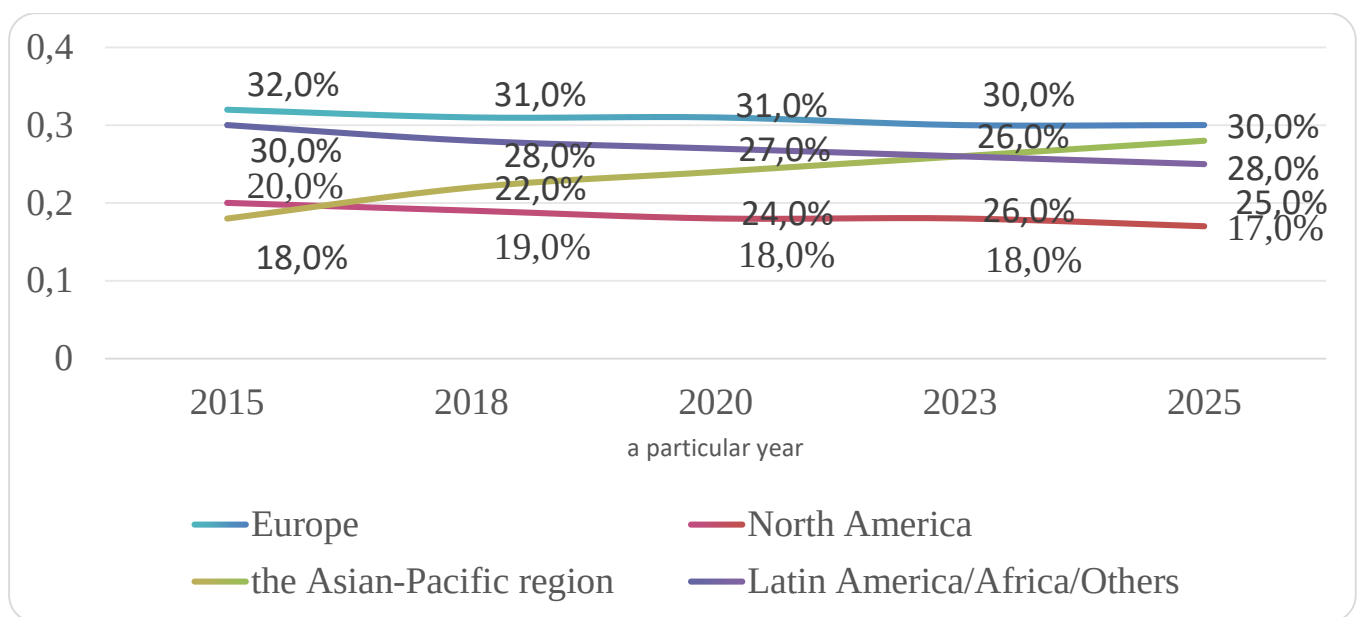


Figure 4 – Changes in Regional Distribution of Global Coffee Consumption [40, p. 19]

The rise of the China coffee market carries iconic and disruptive global significance. Coffee has rapidly evolved from a niche beverage into a mainstream daily consumer product, characterized by a younger consumer base, diversified consumption scenarios, continuously rising market penetration rates, and rapid overall expansion in scale. The vast China market has attracted global enterprises to compete for entry, enabling China to gradually move from the periphery to the center of the global coffee market. The

consumption preferences, product formats, distribution channels, and pricing strategies of the China market are fundamentally reshaping the production, trade, processing, and product design logic of the global coffee industry chain, becoming key variables influencing global supply-demand dynamics and price trends.

Table 5 – Changes in Regional Distribution of Global Coffee Consumption [21, p. 69]

Changes in the regional distribution of global coffee consumption from 2015 to 2025				
a particular year	Europe	North America	the Asian-Pacific region	Latin America/Africa/Others
2015	32.0 %	20.0 %	18.0 %	30.0 %
2018	31.0 %	19.0 %	22.0 %	28.0 %
2020	31.0 %	18.0 %	24.0 %	27.0 %
2023	30.0 %	18.0 %	26.0 %	26.0 %
2025	30.0 %	17.0 %	28.0 %	25.0 %

The eastward shift in consumption focus has brought three profound impacts: first, it alters the direction of global trade, shifting the export focus of major producing countries from Europe and America to the Asia-Pacific region; second, it forces product structure adjustments, leading to an increasing number of products tailored to Eastern tastes—those with low bitterness, mild flavors, rich fruit aromas, and integrated tea-coffee profiles; third, it restructures the value chain landscape, enhancing the bargaining power and standard-setting influence of emerging consumer markets, thereby facilitating market diversification among producing countries [57, p. 56].

A diversified portfolio of instant coffee, roasted beans, ready-to-drink coffee, and specialty coffee coexists in the global coffee market, which has evolved into four distinct categories with clear hierarchies and continuous evolution. These categories—including instant coffee, roasted beans/powder, ready-to-drink coffee, and specialty coffee—coexist synergistically, catering to diverse consumption scenarios, income levels, and preferences. Instant coffee, known for its affordability and ease of storage, remains the primary

application of Robusta coffee, achieving high penetration rates in developing countries across Southeast Asia, Eastern Europe, and Latin America as a foundational product for mainstream consumers. Despite slowing growth, its substantial market size forms the cornerstone of global coffee consumption. Ground coffee primarily serves household and office settings, maintaining stable demand in mature markets like Europe and America while experiencing rapid growth in emerging markets across Asia-Pacific, serving as the core distribution channel for Arabica coffee and reflecting upgraded consumption standards. Ready-to-drink coffee experienced explosive growth post-pandemic, gaining popularity among younger demographics through innovations in cold chain logistics, packaging, and flavor profiles, making it one of the fastest-growing coffee categories globally and embodying convenient consumption trends. Specialty coffee emphasizes origin authenticity, flavor complexity, craftsmanship, roasting techniques, sustainability principles, and transparent supply chains, offering the strongest premium appeal, fastest growth rate, and highest added value-representing the core direction of consumption upgrading. This transformation marks coffee's evolution from a functional beverage to an experiential, cultural, and social consumer product. The essence of this structural upgrade stems from rising incomes, shifting consumption attitudes, and a younger consumer base, driving shifts in demand from "affordable access" to "high-quality, healthier, and personalized experiences," thereby propelling the global coffee value chain toward higher-value segments.

The integration of online and offline channels, coupled with diversified consumption scenarios, digital transformation, omnichannel strategies, and scenario-based approaches, constitutes the core characteristics of global coffee distribution channel evolution. Traditional offline channels continue to develop steadily while online channels rapidly expand their presence, shifting from a single model to a multi-channel collaborative ecosystem and transitioning from purely offline operations to deep online-offline integration. Established offline channels-including chain coffee shops, independent stores, convenience stores, and supermarkets-still dominate the market. Brands like Starbucks have created "third-space" consumption environments; convenience store coffee has gained popularity due to its cost-effectiveness and accessibility; while supermarkets provide stable

supply for household consumption. Online channels remain the most dynamic growth driver, with e-commerce platforms, live-streaming sales, food delivery services, unmanned retail, and private brand management becoming widespread. Digitalization has significantly lowered entry barriers and shortened supply chains. This digital transformation manifests in three key aspects: first, the rise of direct sourcing models from production sites, creating opportunities for small and medium-sized brands as well as specialty coffee products; second, shortened distribution chains that reduce intermediary monopolies; third, expanded consumption scenarios covering home, workplace, outdoor, and mobility settings. The adoption of digital technologies and the emergence of younger consumer demographics serve as primary drivers of this transformation. The omnichannel model integrating online and offline channels has become the mainstream paradigm for global coffee consumption.

Population structure, income, and consumption culture are the three core drivers behind the growth of coffee consumption, collectively driving sustained expansion in demand scale and continuous improvement in product quality. First, the consumer base is becoming younger. Millennials have emerged as the primary consumers, with a lower age range for consumption, increased purchase frequency, greater emphasis on personalization, aesthetics, sustainability, and social attributes, and high acceptance of new products and consumption scenarios-making them the key demographic driving coffee market growth. Second, rising per capita income promotes consumption stratification. Consumption has shifted from instant coffee to freshly ground coffee, from commercial beans to specialty beans, and from affordable products to mid-to-high-end offerings; price elasticity of demand has gradually declined, while consumers' willingness to pay premium prices for brand and quality has steadily increased. Third, consumption culture is undergoing localization and integration. Coffee culture is shedding Western labels and deeply blending with local culinary traditions: China has seen tea-coffee blends and neo-Chinese coffee; Japan and South Korea have developed distinctive local coffee categories; Southeast Asia has pioneered localized sweet coffee. These localized innovations lower the consumption barrier and continuously expand the consumer base.

Chapter 3 The Reconfiguration of Power within the Global Coffee Value Chain

3.1 The Reconfiguration of Power within the Global Coffee Value Chain

The imbalance in value distribution represents the most fundamental, persistent, and contentious structural issue within the global coffee value chain, serving as a key factor in understanding the operational dynamics of the international coffee market, the developmental challenges faced by producing countries, and the evolution of power structures. This chapter provides a comprehensive analysis of value distribution disparities across the global coffee value chain from five perspectives: the smile curve and profit distribution; deteriorating trade conditions and low-end market lock-in mechanisms; geographical imbalances between the North and the South; the micro-level causes of these imbalances; and their consequent impacts.

The global coffee value chain exhibits a severely distorted "smiling curve," serving as a prime example of imbalance in agricultural product value distribution worldwide. The entire chain comprises three key segments: upstream cultivation and primary processing, midstream trade, storage, and logistics, and downstream roasting, grinding, branding, marketing, and retail distribution. Risks, input factors, value creation, and actual profits across these segments are highly disproportionate. According to the latest 2025 research by the United Nations Conference on Trade and Development and Oxfam International, upstream cultivation and primary processing account for only 10 % of total value; midstream trade and logistics contribute 15 %; downstream roasting, grinding, branding, and marketing make up 45 %; while retail and services represent 30 % [53, p. 68]. Even Brazil, with its robust industrial foundation, struggles to overcome the challenges associated with low-value-added primary processing. Value distribution shows clear tripartite differentiation: upstream segments bear multiple risks-including climate disasters, price volatility, market fluctuations, and ecological damage-while investing critical resources like land, labor, water, and ecological capacity, yet generating merely 1 % to 10 % profit. A cup of freshly ground coffee priced at ¥30 typically yields farmers 'actual income below ¥1.5, sometimes even under ¥0.8 in certain regions. Midstream operations-including international trade,

storage, grading, and quality control-are dominated by a few multinational traders who enjoy high information barriers and strong bargaining power, capturing 10 % to 20 % of profits. Downstream segments-covering roasting, branding, distribution channels, and retail services-rely on technological expertise, standards, brand influence, and pricing power to capture 70 % to 93 % of total added value, making them the industry's most lucrative segment. In. The Coffee Paradox, Davidson and Ponte summarize that the more prosperous the global coffee market, the higher the retail prices, and the larger the industry scale, the lower the relative income of upstream producers and the more challenging it becomes to alleviate poverty [18, p. 28–68]. This paradox is prevalent across major coffee-producing countries-including Brazil, Vietnam, Colombia, Ethiopia, and Indonesia-which account for over 75 % of global production yet capture less than 10 % of industry profits; while nations like Switzerland, Germany, the United States, and Italy, which hardly cultivate coffee, derive the majority of added value from roasting, branding, and trade. Since coffee market liberalization in 1990, this imbalance has not only persisted but intensified. From a factor-income perspective, value distribution within the coffee supply chain completely deviates from principles of contribution and risk-sharing: upstream producers bear multiple natural, market, and ecological risks while receiving minimal returns, whereas downstream multinational corporations virtually avoid production and environmental risks yet reap excessive profits through capital, technology, brands, and distribution channels. This distribution model violates both the comparative advantage principle of classical trade theory and the trend toward equalized factor incomes in neoclassical trade theory, and contradicts concepts of global value chain upgrading and inclusive development. It represents a structural distortion stemming from extreme market power asymmetry, monopolistic governance, standard hegemony, and price concentration.

3.2 Five Mechanisms Behind the Long-Term Worsening of Trade Conditions and Low-End Lock-in

Coffee-producing countries generally face persistent deterioration in trade conditions, which represents a concentrated manifestation of value distribution imbalances at the macro

level. Research on price fluctuations indicates that over the three-decade period from 1990 to 2025, the actual prices of coffee beans overall declined; even short-term price increases triggered by climate shocks failed to reverse the long-term trend of declining purchasing power in producing nations. The rise in bean prices has consistently lagged behind increases in production inputs such as fertilizers, pesticides, agricultural machinery, processing equipment, and refined oils, creating a "low-cost raw materials versus high-priced finished products" gap that traps countries in a vicious cycle where increased exports lead to deeper poverty. The root cause of this trade condition deterioration lies in producers being firmly locked into the lower tiers of global value chains, trapped within five self-reinforcing mechanisms: first, technological lock-in due to deficiencies in core technologies and advanced processing capabilities. High-value-added technologies-including coffee breeding, green pest control, intelligent roasting, quality assessment, extraction methods, and functional product development-are predominantly controlled by enterprises and research institutions in developed European and American countries. Producing nations primarily possess only traditional cultivation and basic processing techniques, relying on rudimentary equipment, inadequate standardization, and poor-quality consistency, making it difficult to access high-end processing stages. A comparison between Yunnan's and Brazil's processing industries reveals that despite Brazil's advanced mechanization, its core roasting equipment, quality control systems, and deep-processing technologies remain heavily dependent on imports; Yunnan's coffee processing focuses mainly on washing, drying, and shelling, with deep processing accounting for less than 20 % of total output, highlighting severe technological underdevelopment. These technical shortcomings are the primary reason for value-added loss in producing countries; meanwhile, adherence to certification standards dominated by developed nations creates non-tariff barriers. High-end market access standards such as organic certification, fair trade requirements, Rainforest Alliance compliance, UTZ certification, and carbon footprint assessments are all established, certified, and audited by developed countries. Enterprises and small farmers in producing regions must bear substantial costs for certification, audits, and production upgrades, creating significant barriers to entry. The most impoverished small farmers, unable to afford these expenses, are completely excluded from premium markets, further

widening wealth disparities within coffee-producing areas. New regulations like green certifications and carbon tariffs continue to reinforce standardization dominance; distribution channels remain heavily reliant on multinational buyers, lacking independent retail networks. Most producing countries lack direct global sales channels, with over 80 % of raw coffee beans purchased by four major international traders and leading brands, leaving producers passive recipients of buyer-set prices [5, p. 4]. Higher dependence on international channels correlates with lower value contributions to the supply chain. Export clients are highly concentrated, eroding local producers' market influence and reducing their status to mere "standardized raw material suppliers" in global supply chains. The absence of globally recognized premium brands dilutes the value of local coffee origins—there are virtually no top-tier brands from developing countries in the global market. International giants like Starbucks, Nestlé, Yili Coffee, and Lavaasa leverage global marketing strategies to build brand barriers, converting premium regional resources into brand profits. The value of high-quality coffees from Ethiopia's Yergaxuefi, Colombia, and Yunnan ultimately flows to international brands. Brand monopolies serve as the core barrier sustaining premium pricing and profitability; pricing power remains controlled by futures markets and traders, leaving producers vulnerable to price fluctuations. Global coffee pricing authority rests with financial exchanges in New York and London and multinational trading entities. Production countries and small farmers rarely engage in futures hedging, leaving them fully exposed to price volatility risks. The futures market and inventory cycles amplify price fluctuations; only multinational corporations can utilize futures to hedge risks, while production countries are forced to passively endure price swings. These five lock-in effects reinforce each other, trapping coffee-producing countries in a vicious cycle characterized by low-priced raw material exports, loss of added value, low incomes, inability to invest in technology and brand development, and continued low-price exports. This perfectly aligns with Kaplinsky's low-end lock-in theory: within buyer-driven global value chains, developing countries that rely solely on resources and labor for division of labor are highly susceptible to being confined to low-value-added segments and struggle to achieve independent upgrading [32, p. 16].

3.3 Regional Imbalance, Value Distribution Imbalance, and Further Value Distribution Imbalance

The value gap between the Global South and the Global North: The imbalance in value distribution along the coffee value chain is essentially a microcosm of the global trade imbalance between agricultural products from the North and the South, characterized by pronounced regional disparities. The Global South comprises producing countries such as Brazil, Vietnam, Colombia, Ethiopia, Indonesia, and China's Yunnan Province, which provide land, labor, water resources, and ecological carrying capacity while bearing ecological costs like soil erosion, biodiversity loss, fertilizer pollution, and carbon emissions, while also creating jobs and maintaining social stability-yet they receive only 1 % to 10 % of the industry's profits. These countries suffer from a single economic structure, weak fiscal capacity, inadequate social security, and severe poverty among small farmers. Coffee exports serve as a vital source of foreign exchange but fail to translate into development dividends. The Global North consists of consuming and rule-dominant nations such as Switzerland, Germany, the United States, Italy, and France, which hardly cultivate coffee domestically yet control core technologies, brands, standards, financial pricing power, and global distribution channels. They avoid production risks and ecological costs while capturing 70 % to 93 % of added value. Multinational corporations repatriate global profits to their home markets, maintain competitive advantages through standard-setting, and influence price trends via futures markets, establishing a hegemonic pattern of "not producing coffee but controlling it and profiting from it." This regional imbalance stems from historical colonial division of labor, contemporary global governance systems, and trade rule hegemony, rather than being solely determined by market efficiency [53, p. 68]. Throughout centuries of coffee trade history, producing countries have been consistently positioned as raw material suppliers, while consuming countries monopolized processing and end markets; this dynamic has further solidified under the global value chain framework following market liberalization. The United Nations Conference on Trade and Development report on South-South cooperation in coffee explicitly states that coffee trade exemplifies the inequities inherent in North-South trade: Southern countries export low-value raw beans

while importing high-value finished products, creating a vertical trade structure with continuously deteriorating terms of trade. This regional imbalance leads to three major consequences: first, the development gap continues to widen, making it difficult for producing countries to achieve industrialization and modernization through the coffee industry, resulting in a "resource curse"; second, poverty perpetuates across generations among small farmers, characterized by low incomes, inadequate healthcare and education, and weak resilience to risks; third, excessive ecological exploitation occurs to maintain production levels and low prices, manifesting as over-cultivation, pesticide abuse, and deforestation, thereby entrenching a vicious cycle of "poverty-ecological degradation".

Global coffee production is predominantly driven by smallholder farmers, a micro-level organizational structure that exacerbates value distribution imbalances. Data from the International Coffee Organization and Mendes et al. indicate that over 70 % of global coffee is produced by smallholders cultivating less than 2 hectares of land [38, p. 28], characterized by fragmented operations, minimal scale, weak organizational cohesion, limited information access, and poor bargaining power. The developmental challenges faced by these smallholders represent the core bottleneck hindering coffee industry upgrading. Five key micro-level factors contribute to their disadvantaged position in the value chain: First, information asymmetry-these farmers lack knowledge of international prices, futures trends, quality standards, and consumer preferences, forcing them to passively accept middlemen's quotes; Second, low organizational capacity-fragmented operations prevent unified pricing power, often leading to price-cutting competition; Third, financial constraints-the absence of credit facilities, insurance, or risk-hedging tools leaves them vulnerable to price and climate risks; Fourth, inconsistent product quality due to poor standardization, making it difficult to meet premium market demands and forcing sales at low prices; Fifth, lengthy distribution chains with multiple intermediaries adding markups, leaving farmers with negligible profits. These dispersed smallholders' struggle against monopolistic multinational corporations forms the micro-level basis of the "Coffee Paradox": the more prosperous the market and higher the final prices, the lower the relative income of upstream smallholders. Davidson and Ponte explicitly argue that market liberalization has not improved smallholder

conditions but rather weakened producers' bargaining power and exacerbated poverty issues [18, p. 28-68].

The structural imbalance in value distribution has exerted multifaceted impacts on the global coffee industry and provides crucial insights for international trade, agricultural economics, and global value chain studies. First, there is insufficient momentum for industrial upgrading. Producing countries receive meager returns, making it difficult for them to invest in breeding programs, technological innovation, advanced processing, brand development, or marketing channels, thereby remaining trapped in primary production stages. Their low positioning within the value chain remains the core constraint on enhancing competitiveness. Second, price volatility has intensified and market fragility has increased. Meager upstream profits and weak risk resilience mean that climate shocks and price fluctuations easily lead to reduced yields, crop abandonment, and poverty, further amplifying supply instability and creating a vicious cycle of "volatility poverty renewed volatility." Third, this situation hinders sustainable development. Small farmers struggle to adopt eco-friendly cultivation practices, organic management, or low-carbon production methods to sustain livelihoods, resulting in ecological damage, declining biodiversity, and increased carbon emissions—all contrary to global sustainability goals. Only by optimizing value distribution can green production be genuinely promoted. Fourth, global governance mechanisms have proven ineffective. The current system dominated by developed nations and multinational corporations overlooks the interests of producing countries and small farmers, while reforms such as fair trade initiatives and certification systems yield limited results. Relying solely on certifications cannot break the cycle of low-end dependency; a fundamental restructuring of governance frameworks is imperative. Theoretically, this value chain imbalance challenges the traditional trade theory's notion of "mutually beneficial division of labor," demonstrating how comparative advantage-based specialization under conditions of imperfect competition, economies of scale, and monopolistic standards/channels inevitably leads to polarization and low-end lock-in. These research findings provide empirical support for global value chain theory, buyer-driven governance theory, and development economics, while also offering practical insights for formulating policies on agricultural trade, South-South cooperation, and industrial upgrading. In

summary, the imbalance in value distribution within the global coffee value chain represents a stable pattern shaped by long-term interactions among institutional, market, technological, standardization, and power-related factors. The distorted smile curve, persistently deteriorating terms of trade, five mechanisms of low-end market lock-in, geographical disparities between developing and developed regions, and the micro-level vulnerabilities of small farmers collectively constitute a self-reinforcing system that is difficult to overcome. Producing countries bear the greatest risks and costs yet derive the least benefits; meanwhile, developed nations and multinational corporations avoid production and ecological risks while capturing the majority of added value-thus giving rise to the "coffee paradox."

Conclusion

This study comprehensively explores the development trajectory, structural changes and value chain dynamics of the global coffee market from the perspectives of international trade and global value chain theories. Combining literature review, structural analysis and case study, it systematically sorts out the market evolution from 1945 to 2023, analyzes the characteristics of production and consumption structures, and deeply reveals the root causes of value imbalance and low-end lock-up in the coffee industry. The research verifies that traditional trade theories, together with futures pricing and institutional economics, can effectively interpret the operational logic of this typical agricultural commodity market.

The research finds that the global coffee market has experienced four distinct development stages, shifting from government-led regulation to market liberalization, and further evolving toward premium consumption, digital transformation and sustainable development. Geographical concentration, dual varieties of Arabica and Robusta, rigid supply and prominent primary processing lock-up have become typical features of global coffee production. Meanwhile, the consumption center is gradually moving from Europe and America to the Asia-Pacific region, with diversified products and omnichannel sales becoming mainstream trends. Most notably, the distorted smile curve of the coffee value chain leads to severe unequal value distribution. Five interlocking mechanisms including technology, standards, channels, brands and pricing keep major producing countries trapped in low-profit links.

This paper also clarifies the long-standing academic disputes over fair trade certification. Such measures can stabilize farmers' income to a certain extent but fail to fundamentally reshape the unequal power structure of the value chain. To break the current dilemma, coffee-producing countries need to promote deep processing, build independent brands and strengthen South-South cooperation.

Admittedly, this research mainly focuses on macro and industrial-level analysis, lacking empirical tests on price transmission and consumer demand. For future research, scholars can conduct quantitative analysis on carbon tariffs, digital traceability and

emerging market demands. Overall, this study provides theoretical references and practical enlightenment for the high-quality development of the global coffee industry and the upgrading of China's coffee sector.

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