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# A Quantitative Study on the Interactive Changes Between China's Final Demand Structure and Forestry Industry Production Structure

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**Abstract**

The effects of changes in China's final demand structure on its forestry sector and associated supply chains have not been thoroughly examined. This study aims to provide a detailed analysis of the quantitative relationships and underlying mechanisms between these interactive changes. Using China's 153-sector input–output tables from the National Bureau of Statistics and applying a Leontief-based input–output model, we conducted scenario simulations through three distinct schemes, generating both quantitative and qualitative results. Our findings indicate that (1) For China's forestry sector and its entire value chain to thrive, policymakers should boost consumer demand. This can better stimulate the development of forestry and the "agriculture-forestry-animal husbandry-fishery services" sector and related service industries; (2) Increased investment demand effectively stimulates the development of tertiary industries and secondary industries within the forestry supply chain and boosts the demand and production of intermediate products; (3) Changes in net exports have a significant impact on forestry and the forestry industry chain. To reduce dependence on foreign timber resources, China should strategically expand commercial plantation development; (4) Regarding intermediate product production, investment has a more pronounced effect on increasing total volume compared to consumption. Additionally, the Sino–US tariff disputes negatively impact the forestry industries of both countries. China needs to accelerate import substitution strategies for timber products, adjust international trade markets, and expand domestic consumption and investment to ensure the healthy and stable development of its forestry sector.

**Keywords:** final demand structure; forestry industry; forestry industrial chain; input–output analysis; scenario simulation analysis; policy recommendations

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## 1. Introduction

Forestry encompasses economic activities and social initiatives that are based on forest resources, including forest cultivation, protection, management, utilization, and associated ecological services. Its core components are forest cultivation, resource conservation, sustainable use, and ecological services. Forestry serves as a vital sector with ecological, economic, and social functions. It is a key component of terrestrial ecosystems and an essential industry for sustainable economic development.

In 2023, China's GDP (gross domestic product, a concept introduced by Simon Smith Kuznets in 1934 [1]) increased by 5.20%, which is below the average growth rate of 6.60% between 2016 and 2019 and significantly lower than the 10.60% growth rate in 2010. Meanwhile, the total output value of China's forestry sector grew by 2.72%, trailing behind the average growth rate of 6.69% between 2016 and 2019 and the 3.50% growth rate in 2010.

The reasons are complex, but from the perspective of demand, the slowdown is primarily due to insufficient demand for economic development [2]. The three main drivers of economic growth—investment, consumption, and net exports—have all encountered problems. These include declines in external demand and investment due to changes in the global economic environment, relatively low consumption levels among urban residents, and suboptimal investment returns. Meanwhile, on the production front, China's position as the world's second-largest economy contrasts with pervasive domestic industrial overcapacity and deepening structural imbalances across manufacturing sectors.

We must closely link the adjustment of the industrial production structure with the changes in the three key drivers of demand: investment, consumption, and net exports. Understanding the dynamic interplay and underlying mechanisms between these two aspects is crucial. Statistical analysis should be used to examine how shifts in investment, consumption, and net exports influence the restructuring of industrial production. This process also highlights the necessity for optimizing and upgrading the industrial production structure to meet the evolving demands of investment, consumption, and net exports. Similarly, by analyzing the patterns of change between these factors, we can explore the quantitative relationships and intrinsic mechanisms governing the interactive changes between China's final demand structure and the forestry industry production structure. To achieve this, we will design three scenarios for simulation analysis, derive conclusions, and propose targeted strategies. This approach is of great theoretical and practical significance for strategically adjusting the production structure of China's forestry and forestry industry chain as well as for effectively regulating the structure of investment, consumption, and net exports.

The conceptual distinction between final and intermediate products, foundational to modern GDP accounting, originated with American economist Simon Smith Kuznets' 1930s national income accounting framework design, which explicitly segregated these categories to accurately capture national economic output and aggregate demand [3]. Building on this foundation, Paul A. Samuelson's seminal textbook *Economics* systematically operationalized these concepts, defining final products as goods and services directly consumed or invested for end-use (e.g., automobiles purchased by consumers) versus intermediate products, which serve as production inputs (e.g., tires sold to automakers), thereby crystallizing analytical boundaries essential for macroeconomic measurement [4]. Tang Wenli asserts that demand factors in national economic operations constitute a central focus of macroeconomic research. Demand growth drives production expansion through multiplier effects, functioning as the primary engine for economic development. From the expenditure perspective, GDP reflects the summation of final demand components—consumption, investment, and net exports. Hence, economists metaphorically term these three elements as the three engines propelling GDP growth, vividly encapsulating fundamental growth mechanisms. The balance of their proportional relationships critically determines economic stability and sustainable development [5]. The American development economist Hollis Chenery (1975) applied a structuralist analytical approach, proposing a dynamic interdependence among investment, consumption, and economic growth throughout the industrialization process. Through comparative studies of developmental trajectories across nations, he demonstrated that during industrialization, the investment rate undergoes a cyclical evolution: initially rising from low to high, subsequently declining from the peak, and eventually stabilizing.

For the majority of countries, upon attaining middle-income status, accelerated upgrading of consumption structures coupled with rising consumption rates transforms consumption into the primary engine propelling economic growth [6]. Li Zhanfeng et al. posit that both input–output analysis and the demand-pull theory fundamentally demonstrate an intrinsic linkage between demand and economic growth, wherein demand stimulation serves as a viable catalyst for economic growth under specific conditions. Regarding the dynamic interactions among investment, consumption, and net exports, their research reveals a short-term trade-off: increases in investment typically result in contractive pressures on consumption, while increased consumption simultaneously generates inhibitory effects on investment. Over extended periods, however, investment growth exhibits cumulative effects—not only stimulating expansion in both consumption and net exports but also establishing a self-reinforcing cycle where increased consumption and export surpluses reciprocally drive further investment demand [7]. Han Wenxiu argues that despite the substantial scale of consumption in China, its share in the national economy and aggregate demand remains relatively low, lagging approximately 20 percentage points behind that of developed countries [8]. Li Chunding and colleagues' analysis of the tripartite demand composition in the United States reveals three structural characteristics: Consumption demonstrates service dominance, with nondurable goods expenditures marginally exceeding durable goods. Investment exhibits private-sector predominance, where private capital formation substantially outweighs public investment. Exports maintain stable merchandise trade leadership. Among these demand components, consumption constitutes the largest GDP share. However, growth contribution rankings present a paradox: export expansion surpasses consumption in driving economic growth, which in turn exceeds investment's developmental impetus [9]. Hor et al. analyzed Cambodia's import demand, identifying final consumption expenditure and export volume as significant determinants of import levels in both short- and long-term frameworks [10]. Ivanova et al. employed a vector error correction model (VECM) to examine Bulgarian import behavior, establishing causal relationships among consumption, investment, and import demand driven by exports [11].

The conceptual evolution of industry chains traces back to foundational economic theories. Adam Smith, the British classical economist, pioneered this intellectual trajectory in The Wealth of Nations by demonstrating how specialized labor division enhances productive efficiency, reduces costs, and stimulates economic expansion through coordinated production stages [12]. Albert Otto Hirschman, the German development economist, advanced this paradigm in his 1958 treatise The Strategy of Economic Development, systematically articulating "forward linkages" (output utilization by downstream sectors) and "backward linkages" (input procurement from upstream sectors). His investment prioritization theory posits that strategic capital allocation in pivotal industries catalyzes vertical industrial integration, thereby forming cohesive production chains [13]. Michael E. Porter of Harvard Business School redefined this framework through his 1985 Competitive Advantage introduction of the "value chain" concept, which conceptualizes manufacturing processes as sequential value-adding activities along production networks [14]. Yan Feng et al. argue that the forestry industry chain is a complex and multidimensional system, encompassing various aspects, including technology, economics, and sustainability [15].

According to the Swedish researcher Dick Carlsson, supply chain management and optimization are becoming increasingly crucial in the forestry sector. The entire wood flow starts with standing timber in the forest and progresses through felling, bucking, sorting, and transportation to terminals, sawmills, pulp mills, paper mills, and heating plants. Here, it is converted into products such as pulp, paper, and timber, eventually reaching a diverse range of customers. A multitude of planning challenges emerge along this supply chain, encompassing various time frames. Coordinating this wood flow is a top

priority for many companies [16]. Yang Jiameng and colleagues posit that the evolutionary dynamics of forestry value chains emerge through three interdependent mechanisms: (1) Specialized labor allocation stratifies the chain into germplasm cultivation and silvicultural management (upstream), midstream processing nodes, and downstream logistics and distribution sectors, creating an indispensable symbiotic network. (2) Embedded within market economies, production configurations dynamically reconfigure in response to market demand signals. (3) The biological attributes of forest products necessitate vertically constrained partnerships across the chain, where changes in any node trigger systemic adaptations through tight technological coupling [17]. This study defines the industrial chain as a structured network of intermediate product transactions between upstream and downstream sectors under specific economic and technological conditions, characterized by interdependent supply–demand relationships. The forestry industrial chain specifically embodies this framework through bidirectional market linkages: procuring inputs from external industries for forestry production activities while distributing forest products through downstream channels, forming vertically integrated value-adding pathways.

Methodologically, Áine NíDhubháin (Ireland) conceptualizes input–output models as analytical frameworks structured through tabular data matrices capturing the economic structure of a nation or region at specific points in time. In monetary terms, these matrices quantify the intricate flows of production inputs and corresponding outputs across sectors, thereby explicitly delineating interindustry linkages through rigorous mathematical formalization [18]. F. Duchin's industrial economics paradigm employs multidimensional methodologies to decode complex interactions within industrial ecosystems and their extended socioeconomic–environmental ramifications. Crucially, Duchin advances input–output analysis through dynamic evolutionary modeling, enabling systematic assessment of cumulative economic impacts from industrial transformations across macro systems [19].

Luís Cruz and his colleagues in Portugal have noted that macroeconomic evaluations of forestry generally concentrate on the production, harvesting, and primary processing of wood products. This focus tends to undervalue the full economic impact of forests on regional economies. Their work proposes a broader framework: the forestry product value chain, which takes into account the contributions of downstream activities that rely directly and indirectly on forestry and afforestation. Using a multiregional input–output framework, they applied this approach to the Portuguese economy. Their research findings highlight the significance of eucalyptus in the pulp, paper and cardboard, and paper and hardboard products sectors. The study concludes with an assessment of the wider macroeconomic ramifications of reduced output in these sectors [20].

Shen Lisheng (China) theorizes that the compositional dynamics of final demand (consumption, investment, exports) exhibit intrinsic structural couplings with trisectoral industrial configurations. His framework posits final demand structure as the proximate determinant of industrial structure formation, where demand-side reconfiguration directly propagates structural transformations across production systems. Operationally, input–output models anchored in sectoral transaction tables provide the empirical nexus for analyzing these demand-structure interdependencies [21]. A.V. Cherniavsky has emphasized that the primary use of input-output models lies in analyzing and predicting how changes in the volume and structure of final consumption affect the production structure [22]. Ye Hengjiang et al. utilized the OECD-ICIO (Organisation for Economic Co-operation and Development—intercountry Input–Output) database and applied a set of connected global value chain (GVC) methods to assess the upstream and downstream positions of China's forestry industry [23]. Shuya Wang et al. developed a multi-objective sustainable closed-loop supply chain network planning model to study a real case of the forestry supply chain in Northeast China [24].

In the academic exploration of forestry's contribution to economic development, scholars in China have predominantly concentrated on the multifaceted contributions of the forestry supply chain. Their research underscores the significance of forestry within global value chains, the dynamics of import and export activities, and the refinement of domestic-value-added calculations. Conversely, academic research in the United States has predominantly focused on the role of the US forestry sector within the global supply chain framework. This research stream prioritizes the analysis of trade imbalances and the sustainable management of forest resources. For example, Poudel and Dahal (2025) contend that the US forestry industry has exhibited uneven developmental patterns within the forestry supply chain, highlighting the challenges confronting specific subsectors, such as the decline observed in the wooden office furniture manufacturing industry [25].

Applications of input–output analysis to forestry industrial chains have been limited in prior scholarly research. Jiang Yeheng et al.'s analysis [26] of global input–output data demonstrates that China's forestry sector exhibited the highest upstreamness and downstreamness indices among major economies in 2014, indicating a greater systemic distance from both final demand and primary inputs within the production ecosystem. This dual centrality manifests through two operational dimensions: extensive utilization of forestry outputs as intermediate inputs across industries, coupled with substantial intermediate input absorption from multiple sectors during production processes [26]. In foundational research, Hussain Anwar's 1996 University of Minnesota doctoral dissertation leveraged Minnesota's 1977 and 1990 input–output tables to quantify intersectoral linkages between forest industries and broader economic systems. Through output growth decomposition, the study identified sectoral contributory weights and developed experimental frameworks with variable parameterization, enabling systematic evaluation of economic–environmental trade-offs under alternative forest product demand scenarios [27]. Brian M. Cox and Ian A. Munn (2001) employed the IMPLAN input–output framework to compare the forest industry's economic contributions in the U.S. South and the Pacific Northwest. Their study quantified the overall economic impacts and calculated, per additional dollar of forest-industry output, the marginal effects on regional gross output, employment, personal income, and value added. They further examined how shifts in the demand for timber products influence regional economies, thereby providing a precise assessment of the effects of national timber-harvest policy changes [28].The present study's methodological innovation lies in the systematic integration of final demand composition and industrial structure dynamics, employing structural decomposition analysis to quantify how China's evolving demand structures reconfigure forestry production frameworks and industrial chain architectures. To the best of our knowledge, this represents the first scholarly endeavor bridging these analytical dimensions within forestry economics, constituting a novel inquiry into demand-driven structural changes in silvicultural systems.

Methodologically, this study departs from prior research by grounding its analysis in the theories of interindustry linkages and input–output analysis. Utilizing input–output methods and data, the input and distribution coefficients were calculated for the forestry sector based on the 2018 China Input–Output Table (153 sectors) and other value-based data from the National Bureau of Statistics [29,30]. This approach facilitates an in-depth examination of the forward and backward linkages within China's forestry production. Furthermore, the input–output model was employed to design and simulate three distinct scenarios. The research involved a comprehensive assessment of how structural shifts in consumption, investment, and net export demand compositions reconfigure forestry production and industrial chain dynamics. The article provides a thorough analysis of how shifts in China's demand structure—specifically in consumption, investment, and

net exports—affect the forestry sector and the forestry industry chain, ultimately reaching well-supported conclusions.

Calculations and analyses were carried out to answer the following questions:

(1) Which industrial sectors are encompassed in the backward and forward linkages of China's forestry industry?
(2) How has the quantitative composition of China's final demand evolved?
(3) What is the current state of the production structure within China's forestry industry chain?
(4) How does the production structure of China's forestry industry chain quantitatively respond to shifts in demand structure?
(5) What are the proposed key areas for improvement?

## 2. Materials and Methods

### 2.1. Research Methods

This research primarily employs an input–output methodology for computational analysis.

Firstly, we analyze the input–output linkages within the forestry industrial chain and their macroeconomic implications by calculating sector-specific input and distribution coefficients. The input coefficient methodology is adopted to quantify interdependencies between forestry and related industries. Technically defined input coefficients represent the proportion of intermediate input value procured from specific sectors (including intraindustry purchases) relative to total intermediate inputs in forestry production. This metric effectively measures the forestry sector's dependence on upstream industries for raw materials and energy resources, thereby systematically revealing backward linkage characteristics in its industrial chain. Importantly, the intermediate products in this context encompass all material, auxiliary, and energy inputs required for forestry production, sourced either from related industries or through intra-sectoral supply.

This study employs the allocation coefficient method to analyze forward linkages between forestry and interconnected sectors. The allocation coefficient is operationally defined as the ratio of forestry output allocated for intermediate use across consuming industries (including intrasectoral utilization) to total forest product sales. This metric quantifies the downstream penetration intensity of forestry outputs, thereby delineating forward linkage dynamics across industrial chains. Specifically, the allocated products constitute intermediate inputs subsequently utilized in reproduction processes by downstream sectors or the forestry sector itself [31].

Second, this study primarily utilizes the input–output model and changes in the proportion of China's final products to investigate the impact on the output value and proportion of intermediate products in the forestry and forestry industrial chain. The fundamental horizontal balance relationship in the input–output table is that the sum of intermediate products and final products equals total output (intermediate products refer to products purchased by one industry from other industries for production and products sold by one industry to other industries as raw materials and fuels for production; final products refer to products and services produced within a certain period by a region or industry that do not require further processing and are ultimately used for investment, consumption, and net exports, representing the actual demand for investment, consumption, and net exports in a region or industry). This relationship can be mathematically expressed as follows:

$$\sum_{j=1}^{n} X_{ij} + Y_i = X_i,\ i = 1, 2, \ldots, n$$

Introducing the direct consumption coefficient matrix (the direct consumption coefficient refers to the quantity of intermediate products and services of various industries (such as industry *i*) directly consumed by a certain industry department (such as industry j) in the production process per unit of total output),the equation becomes

$$X = (I - A)^{-1}Y$$

This is the input–output model. On the right-hand side of the equation, $I$ is an identity matrix with diagonal elements of 1 and all other elements being 0. $A$ is the matrix of direct consumption coefficients. $(I - A)^{-1}$ is the Leontief inverse matrix (the Leontief inverse matrix indicates the amount of products from sector i required to produce one unit of final product in sector *j*). $Y$ represents the final products, which is a column vector of final products. It can reflect the actual market demand for final products in a specific country or industry. On the left-hand side of the equation, $X$ represents the total output, which is a column vector of total output. It can reflect the actual production and supply quantities in a specific country or industry. With the final products $Y$ of each sector known, multiplication by the Leontief inverse matrix $(I - A)^{-1}$ allows for the derivation of the total output $X$ for each sector. This process effectively computes the induced amounts (total outputs) across sectors attributable to final demand. In the row model, $Y$ and $X$ are interdependent variables. In the calculations presented in this paper, $Y$ is treated as the independent variable, while $X$ is the dependent variable. The changes in $X$ are observed through the variations in $Y$.

The input–output model integrates final products with total products through the Leontief inverse matrix, thus facilitating the analysis of how fluctuations in final demand influence production dynamics across different industries.

On this basis, we can further quantify how changes in China's final products (including consumption, investment, and net exports) drive shifts in the volume and proportion of intermediate products within the forestry sector and its associated industry chain by leveraging the ratios of intermediate products to total output for each sector [32].

This study initially quantifies the aggregate volume and the national share of intermediate products within the forestry and forestry industrial chain, as influenced by consumption, investment, and net exports in China's final demand for the year 2018. Subsequently, under the condition of a constant total final demand, three distinct hypothetical scenarios are devised for simulation analysis: (1) an expansion of consumption coupled with a reduction in investment, with net exports remaining unchanged; (2) an increase in investment paired with a decrease in consumption, with net exports held constant; (3) an augmentation of net exports in tandem with reductions in both consumption and investment. By manipulating the composition of final demand (the relative proportions of consumption, investment, and net exports), the study assesses the ramifications of shifts in China's final demand structure on the production structure of intermediate products in the forestry and forestry industrial chain. The overarching objective is to elucidate the quantitative patterns of changes in the total volume and proportion of intermediate products in the forestry and forestry industrial chain, as driven by variations in China's final products, and to derive policy-relevant conclusions and recommendations.

### 2.2. Data Sources

The Chinese government undertakes a biennial national input–output survey, which serves to systematically delineate the domestic industrial structure and the economic and technical interconnections among various sectors. These surveys are esteemed for their scientific rigor and authoritative insights. In 2023, China completed its eighth national input–output survey. However, the official release of the latest data has been delayed due

to the data compilation cycle. Consequently, this study employs data from the seventh national input–output survey for empirical analysis. Specifically, the study is based on the 2018 input–output table officially published by the National Bureau of Statistics, which encompasses 153 sectors [33]. Given that intersectoral economic and technical linkages typically exhibit stable and gradual evolutionary patterns, utilizing data from this period ensures the robustness of the research findings. Additionally, to enhance the timeliness of the analysis, this study incorporates the most recent data from the China Statistical Yearbook (2023) for supplementary evaluation.

## 3. Results

### *3.1. Analysis of Structural Changes in China's Final Demand and Forestry Industrial Production*

#### 3.1.1. Structure of China's Forestry and Its Industrial Chain

The forestry industrial chain is structurally composed of backward and forward linkages, with backward linkages specifically referring to upstream interdependencies formed through the procurement of intermediate inputs during forestry production. China's 2018 sectoral data reveals a well-defined hierarchy of key upstream industries supplying critical inputs to the forestry sector, where industries with input coefficients exceeding 1% demonstrate specialized functional clustering: agricultural support services (31.51%) and silvicultural products (16.52%) constitute the primary material foundations, followed by agrochemicals, including fertilizers (8.03%) and pesticides (6.55%), while specialized machinery (5.31%) and logistics infrastructure comprising road freight transport (4.22%) enable operational continuity. Complementing these are technical intermediary services such as technology promotion (2.30%) and professional expertise (1.62%), financial services encompassing banking (3.26%) and insurance (1.63%), alongside energy inputs, including refined petroleum (1.48%) and commercial distribution channels including wholesale (2.08%) and catering services (1.12%). Collectively, this multilayered industrial architecture accounts for 85.63% of intermediate input procurement in forestry, forming an integrated backward linkage ecosystem that structurally underpins China's forestry production value chain.

The forward-linked forestry industrial chain represents the value-creation pathway, where forestry outputs serve as raw material inputs for downstream production systems. China's 2018 interindustry data reveal a structured hierarchy of principal downstream sectors (allocation coefficients > 1%) that absorb forestry intermediate products: wood processing and botanical fiber products (38.12%) constitute the core processing tier, followed by construction material applications, including residential buildings (14.61%), infrastructure projects such as railways (1.79%), and sports facilities (2.98%). Chemical derivatives encompass rubber products (11.35%) and specialty chemicals (4.46%), while pulp and paper production (8.07%) and furniture manufacturing (4.23%) serves as a key segment of wood processing. Notably, 5.16% of forestry outputs re-enter the sector as intermediate inputs, while architectural services and construction (1.58%) and artisanal crafts (1.50%) round out the demand spectrum. Collectively, these 11 industries absorb 88.69 % of forestry's intermediate-product sales, thereby configuring the operational architecture of China's forward-linked silvicultural value chain through vertically integrated production interdependencies.

As illustrated in Tables 1 and 2, China's forestry GDP reached CNY 364.52 billion in 2018, which is equivalent to approximately USD 55.085 billion (based on the 2018 exchange rate of 1 USD = 6.6174 CNY). This accounted for 0.40% of China's total GDP [34]. The forestry sector uses 31.199 billion yuan worth of products as intermediate goods for its own production, which accounts for 0.02% of the national intermediate products. To produce, forestry purchases intermediate goods from the primary, secondary, and tertiary sectors, amounting to 188.89 billion yuan. These purchases are distributed as follows: 48.03% from

the primary sector, 27.46% from the secondary sector, and 24.51% from the tertiary sector. These purchases represent 0.12% of the national intermediate flows.

**Table 1.** Total GDP, structure, and growth rate of China's forestry industry in 2018.

| Total Forestry GDP (Billion CNY) | Share of Forestry GDP in National GDP (%) | The Proportion (%) of Products Purchased from the Primary, Secondary, and Tertiary Industries by the Forestry Sector as Intermediate Inputs for Production. | | | The Proportion (%) of Forestry Products Sold as Intermediate Inputs for Production Across the Primary, Secondary, and Tertiary Industries. | | | Month-on-Month Growth Rate of Forestry (%) |
|---|---|---|---|---|---|---|---|---|
| | | Primary Industry | Secondary Industry | Tertiary Industry | Primary Industry | Secondary Industry | Tertiary Industry | |
| 364.52 | 0.40 | 48.03 | 27.46 | 24.51 | 5.59 | 93.47 | 0.94 | 2.72 |

Note: The data in this table are sourced from and calculated based on China's 2018 Input–Output Table. The year-on-year forestry growth rate reflects the total output value growth in 2023. All monetary values are in Chinese yuan (Renminbi) and are consistent throughout the text.

**Table 2.** Total volume and structure of intermediate products in China's forestry industry chain, 2018.

| Total Value of Intermediate Products in Backward-Linkage Industrial Clusters of Forestry (CNY 100 Million) | Total Value of Intermediate Products in Forward-Linkage Industrial Clusters of Forestry (CNY 100 Million) | Proportion of Intermediate Products in Backward-Linkage Industrial Clusters of Forestry to the National Total (%) | Proportion of Intermediate Products in Forward-Linkage Industrial Clusters of Forestry to the National Total (%) |
|---|---|---|---|
| 188.89 | 604.66 | 0.12 | 0.38 |

Note: The data in the table are sourced from and calculated based on China's 2018 Input–Output Table.

The forestry sector also sells its products as intermediate goods to the primary, secondary, and tertiary sectors, amounting to 604.66 billion yuan. The sales are distributed as follows: 5.59% to the primary sector, 93.47% to the secondary sector, and 0.94% to the tertiary sector. The products sold to the secondary sector account for 0.38% of the national intermediate products. The proportion of forestry's forward intermediate products (0.38%) is greater than that of its backward intermediate products (0.12%), indicating that the demand for forestry products in the national economy is relatively high.

#### 3.1.2. Analysis of the Volume and Structural Shifts in China's Final Demand

From the perspective of total consumption, investment, and net exports, in 2022, China's total consumption amounted to CNY 64,163.30 billion, marking a 1.56-fold increase compared to 2016. Capital formation (investment) reached CNY 52,389.00 billion, 1.65 times the 2016 level, demonstrating sustained growth in both categories. Net exports surged to CNY 3949.40 billion, 2.33 times the 2016 figure, though this component experienced negative growth in 2017 and 2018. Regarding structural shifts in final demand as Table 3, the proportion of consumption in final demand declined by 1.82 percentage points (annual average: −0.30%) between 2016 and 2022, while investment's share rose by 0.82 percentage points (+0.14% annually) and net exports increased by 1.00 percentage point (+0.17% annually). This reflects a slight reduction in consumption's dominance, accompanied by modest gains in investment and net export shares, with the latter exhibiting the fastest relative growth.

**Table 3.** Changes in the structure of China's final demand. Unit: %.

| Year | Consumption | Capital Formation | Net Exports |
|---|---|---|---|
| 2016 | 55.07 | 42.66 | 2.28 |
| 2017 | 55.07 | 43.17 | 1.76 |
| 2018 | 55.27 | 43.96 | 0.77 |

**Table 3.** *Cont.*

| Year | Consumption | Capital Formation | Net Exports |
|---|---|---|---|
| 2019 | 55.78 | 43.07 | 1.15 |
| 2020 | 54.68 | 42.86 | 2.46 |
| 2021 | 54.11 | 43.29 | 2.60 |
| 2022 | 53.25 | 43.48 | 3.28 |

Note: The data in the table are sourced from China Statistical Yearbook, 2023.

#### 3.1.3. Total Volume and Structural Characteristics of Final Demand in China's Forestry and Forest Industry Chain

Our analysis of China's 2018 input–output tables reveals distinct structural patterns across economic sectors as shown in Tables 4 and 5. Nationally, the final demand composition showed consumption (53.77%), investment (45.47%), and net exports (0.76%), forming a "consumption > investment > net exports" hierarchy. In the distribution of final products in China's forestry sector, the total values of consumption, investment, and net exports are 19.82 billion yuan, 25.46 billion yuan, and -96.53 billion yuan, respectively, forming a pattern dominated by investment, followed by consumption, and then net exports. This sector exhibited heavy import reliance, with forestry exports amounting to CNY 1.32 billion, significantly overshadowed by imports of CNY 97.85 billion, resulting in a trade deficit of CNY 96.53 billion. It is evident that China's forestry sector relies heavily on imported raw materials. After processing these imports into forest products, only a small portion is exported, while the majority is used domestically for investment and consumption.

**Table 4.** Total value of final products in China's forestry and forest industry chain in 2018 (baseline scenario). Unit: CNY 10,000.

| Industry | Consumption | Investment | Net Exports | of Which, Exports |
|---|---|---|---|---|
| Forestry | 1,982,338 | 2,545,651 | −9,653,028 | 132,295 |
| Backward industry chain | 714,276,417 | 112,272,631 | 73,707,940 | 145,633,168 |
| Forward industry chain | 40,555,304 | 2,120,457,220 | 28,324,027 | 93,118,472 |
| Total of forward and backward industrial chains | 754,831,721 | 2,232,729,851 | 102,031,967 | 238,751,640 |
| National final products | 4,957,692,537 | 4,192,281,750 | 70,597,435 | 1,756,939,612 |

Note: The data in the table are sourced from and calculated based on China's 2018 Input–Output Table.

**Table 5.** Proportion of final products in China's forestry and forest industry chain in 2018. Unit: %.

| Industry | Consumption | Investment | Net Exports | Total |
|---|---|---|---|---|
| Forestry | −38.68 | −49.67 | 188.35 | 100.00 |
| Backward industry chain | 79.34 | 12.47 | 8.19 | 100.00 |
| Forward industry chain | 1.85 | 96.85 | 1.29 | 100.00 |
| Total of forward and backward industrial chains | 24.43 | 72.27 | 3.30 | 100.00 |
| National final products | 53.77 | 45.47 | 0.76 | 100.00 |

Note: The data in the table are sourced from and calculated based on China's 2018 Input–Output Table.

The total values of consumption, investment, and net exports in the industries involved in the backward linkages of China's forestry sector are 7142.76 billion yuan, 1122.73 billion yuan, and 737.08 billion yuan, respectively, forming a pattern dominated by consumption, followed by investment, and then net exports, with consumption accounting for 79.34% of

the final products. In the industries involved in the forward linkages of China's forestry sector, the total values of consumption, investment, and net exports are 405.55 billion yuan, 21,204.57 billion yuan, and 283.24 billion yuan, respectively, forming a pattern dominated by investment, followed by consumption, and then net exports, with investment accounting for 96.85% of the final products. For the entire forestry supply chain (both backward and forward linkages), the total values of consumption, investment, and net exports are 7548.32 billion yuan, 22,327.30 billion yuan, and 1020.32 billion yuan, respectively, forming a pattern dominated by investment, followed by consumption, and then net exports.

From the perspective of the proportion of total consumption, investment, and net exports used by industries involved in forestry and the forestry industrial chain relative to the national totals, as shown in Table 6, the backward linkage industries associated with forestry and the forestry industrial chain exhibit the highest proportion of consumption relative to national consumption, at 14.41%. In contrast, the forward linkage industries associated with forestry and the forestry industrial chain account for only 0.82% of national consumption. The forward linkage industries associated with forestry and the forestry industrial chain have the highest proportion of investment relative to national investment, at 50.58%, while the backward linkage industries account for only 2.68% of national investment. The backward linkage industries associated with forestry and the forestry industrial chain have the highest proportion of net exports relative to national net exports, at 104.41%, compared to 40.12% for the forward linkage industries. These demand patterns for consumption, investment, and net exports, as well as their distribution, drive the structure of intermediate products across all industries in China, thereby shaping the structure of intermediate products in the forestry and forestry industrial chain.

**Table 6.** Structure of final products in China's forestry and forest industry chain in 2018. Unit: %.

| Industry | Consumption | Investment | Net Exports | of Which, Exports |
|---|---|---|---|---|
| Forestry | 0.04 | 0.06 | −13.67 | 0.01 |
| Backward industry chain | 14.41 | 2.68 | 104.41 | 8.29 |
| Forward industry chain | 0.82 | 50.58 | 40.12 | 5.30 |
| Total of forward and backward industrial chains | 15.23 | 53.26 | 144.53 | 13.59 |
| National final products | 100.00 | 100.00 | 100.00 | 100.00 |

Note: The data in the table are sourced from and calculated based on China's 2018 Input–Output Table.

Since 2016, changes in China's demand structure have driven adjustments in the industrial structure. From the calculations above, it is evident that the demand structure of investment, consumption, and net exports in China interacts with the production structure of the forestry industry chain. However, the extent of this influence requires further computation and scenario simulation analysis to explore the quantitative boundaries and internal mechanisms of these changes. This will help enhance the alignment and mutual promotion between the two structures.

### *3.2. Interaction and Scenario Simulation Analysis Between China's Final Demand Structure and Forestry Industry Production Structure*

To optimize and upgrade China's forestry industrial structure, it is essential to align the structure of final products with the evolving market demand structure. Within the realm of final products, adjustments can be made to consumption, investment, and net exports. By conducting calculations and analyses on the interactive changes between China's final demand structure and industrial production structure, we can identify the quantitative relationships between the two. Additionally, scenario simulations can be performed to

observe how changes in the distribution of final products impact the transformation of the forestry industrial structure.

#### 3.2.1. Scenario Simulation Design for the Interaction Between Structural Adjustments in Consumption, Investment, and Net Exports Within China's Final Products and the Forestry Industry Production Structure

Taking 2018 as the base year, we initiate our analysis with the demand structure among consumption, investment, and net exports in China's final products. By preserving the technological and economic interdependencies between industries and the aggregate level of final products, we construct three hypothetical scenarios for simulation, as detailed in Table 7.

**Table 7.** Simulation adjustment scheme for total value and structural changes in consumption, investment, and net exports in China's final products.

| Scenarios | Unit | Consumption | Investment | Net Exports | Final Products |
|---|---|---|---|---|---|
| Benchmark Scenario | CNY 10,000 | 4,957,692,537 | 4,192,281,750 | 70,597,435 | 9,220,571,722 |
| | % | 53.77 | 45.47 | 0.76 | 100.00 |
| Scenario 1 | CNY 10,000 | 5,879,749,709 | 3,270,224,577 | 70,597,435 | 9,220,571,722 |
| | % | 63.77 | 35.47 | 0.76 | 100.00 |
| Scenario 2 | CNY 10,000 | 4,035,635,365 | 5,114,338,922 | 70,597,435 | 9,220,571,722 |
| | % | 43.77 | 55.47 | 0.76 | 100.00 |
| Scenario 3 | CNY 10,000 | 4,459,570,037 | 3,770,700,328 | 990,301,361 | 9,220,571,722 |
| | % | 48.77 | 40.47 | 10.76 | 100.00 |

Note: The data in the table are sourced from and calculated based on China's 2018 Input–Output Table.

Scenario 1

As depicted in Table 7, the proportion of consumption in final products is increased by 10 percentage points, while the proportion of investment is decreased by 10 percentage points. The proportion of net exports remains constant at 0.76%. This scenario examines the quantitative impact of an increased consumption share and a decreased investment share on the production structure of the forestry industry chain.

Scenario 2

As shown in Table 7, the proportion of investment in final products increases by 10 percentage points, while the consumption proportion decreases by 10 percentage points. The share of net exports remains unchanged at 0.76 percentage points.

Scenario 3

As shown in Table 7, the proportion of net exports in final products increases by 10 percentage points, with the consumption proportion decreasing by 5 percentage points and the investment proportion decreasing by 5 percentage points.

Since the input–output table aggregates all industry chains within China's economy, changes in consumption, investment, and net exports propagate through the national industry chains and affect the production structure of the forestry industry chain.

#### 3.2.2. Simulation Analysis of the Interaction Between Structural Adjustments in Consumption, Investment, and Net Exports and the Forestry Industry Structure

First, we examine the impact of China's final products on the intermediate product values in the forestry industry chain from both the backward and forward linkage perspectives by presenting three scenario simulations, as detailed in Tables 8 and 9. For the

backward linkage, our calculations indicate that the total value of intermediate products in the forestry backward linkage chain was CNY 188.89 billion in 2018, the base year, which matches exactly with the data published in the input–output table. This alignment confirms the validity of the simulation methodology used in this study. We then proceed to a detailed simulation analysis of how China's final products influence the backward linkage of the forestry industry chain; a similar approach can be extended to the forward linkage.

**Table 8.** Scenario simulation of changes in the output value of forward intermediate products in China's forestry driven by final products. Unit: CNY 10,000.

| Industry | Consumption | Investment | Net Exports | Total |
|---|---|---|---|---|
| Benchmark Scenario | 18,958,163.74 | 47,533,186.86 | −6,025,237.64 | 60,466,112.96 |
| Scenario 1 | 22,484,100.60 | 37,078,661.49 | −6,025,237.62 | 53,537,524.48 |
| Scenario 2 | 15,432,226.89 | 57,987,712.22 | −6,025,237.62 | 67,394,701.49 |
| Scenario 3 | 17,053,348.58 | 42,753,186.44 | −84,518,665.75 | −24,712,130.73 |

**Table 9.** Scenario simulation of changes in the output value of intermediate products in the backward industrial chain of forestry driven by China's final products. Unit: CNY 10,000.

| Industry | Benchmark Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|
| Consumption | 5,922,337.94 | 7,023,804.83 | 4,820,871.05 | 5,327,293.02 |
| Investment | 14,848,885.15 | 11,582,997.53 | 18,114,772.76 | 13,355,661.53 |
| Net Exports | −1,882,223.09 | −1,882,223.08 | −1,882,223.08 | −26,402,773.37 |
| Total | 18,889,000.00 | 16,724,579.28 | 21,053,420.73 | −7,719,818.83 |

Scenario 1 Analysis

Refer to Tables 10 and 11. Consumption's share in final products is increased by 10 percentage points, investment's share is decreased by 10 percentage points, and net exports' share remains constant at 0.76%.

**Table 10.** Scenario simulation of changes in the proportion of output values of intermediate products in the backward industrial chain of forestry driven by China's final products. Unit: %.

| Industry | Benchmark Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|
| Consumption | 100.00 | 118.60 | 81.40 | 89.95 |
| Investment | 100.00 | 78.01 | 121.99 | 89.94 |
| Net Exports | 100.00 | 100.00 | 100.00 | 1402.74 |
| Total | 100.00 | 88.54 | 111.46 | −40.87 |

**Table 11.** Scenario simulation of changes in the output value structure of backward intermediate products in forestry driven by China's final products. Unit: %.

| Industry | Benchmark Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|
| Consumption | 31.35 | 42.00 | 22.90 | −69.01 |
| Investment | 78.61 | 69.26 | 86.04 | −173.00 |
| Net Exports | −9.96 | −11.25 | −8.94 | 342.01 |
| Total | 100 | 100 | 100 | 100.00 |

The shift in final product demand structure under Scenario 1 correspondingly alters the volume and structure of intermediate products in the backward linkage of China's forestry

industry chain. Compared to the baseline year, boosting consumption's share in final products by 10 percentage points can spur an 18.60% rise in intermediate products within the forestry backward linkage chain. This suggests that a 1% increase in consumption's share can drive a 1.86% increase in intermediate products, raising the proportion of consumption-driven intermediate products in the total intermediate products by 10.65%. An increase in China's total consumption volume will be transmitted through the complex web of supply chains, prompting the forestry sector to expand production. This expansion, in turn, will lead to an increased demand for intermediate products required in forestry production.

Conversely, reducing investment's share in final products by 10 percentage points can lead to a 21.99% drop in intermediate products within the forestry backward linkage chain. Specifically, a 1% decrease in investment's share can result in a 2.20% decline in intermediate products, reducing the proportion of investment-driven intermediate products in the total intermediate products by 9.35%. The decline in investment would also cause the forestry industry chain to purchase fewer products from the secondary sector. Since the net exports' share remains unchanged, the intermediate products driven by net exports in the forestry backward linkage chain stay constant. However, their proportion in the total intermediate products will decrease by 1.29%. Overall, Scenario 1 would lead to an 11.46% reduction in the total value of intermediate products in the forestry backward linkage chain. This indicates that a 1% increase in consumption's share can cause a 1.15% decrease in intermediate products. Under this scenario, the total volume of intermediate products in the forestry backward linkage chain would decline, resulting in reduced purchases from upstream industries by the forestry industry chain.

Scenario 2 Analysis

As shown in Tables 9–11, the proportion of investment in final products is increased by 10 percentage points, while the proportion of consumption is decreased by 10 percentage points. The proportion of net exports remains unchanged at 0.76%.

Under the conditions set in Scenario 2, compared to the baseline year, increasing the proportion of investment in final products by 10 percentage points can drive a 21.99% increase in intermediate products within the forestry backward linkage chain. This means that a 1% increase in investment's proportion can lead to a 2.20% increase in intermediate products, raising the share of investment-driven intermediate products in the total intermediate products by 7.43%. Conversely, decreasing the proportion of consumption in final products by 10 percentage points can result in an 18.60% decrease in intermediate products within the forestry backward linkage chain. Specifically, a 1% decrease in the proportion of consumption can lead to a 1.86% decline in intermediate products, reducing the share of consumption-driven intermediate products in the total intermediate products by 8.45%. Since the proportion of net exports remains unchanged, the intermediate products driven by net exports in the forestry backward linkage chain stay constant. However, their share in the total intermediate products will increase by 1.02%. Overall, Scenario 2 would lead to an 11.46% increase in the total value of intermediate products in the forestry backward linkage chain. The increase in investment-driven intermediate products would facilitate greater sales from the secondary sector to the forestry industry chain. Under this scenario, the total volume of intermediate products in the forestry backward linkage chain would rise, resulting in increased purchases from upstream industries by the forestry industry chain.

Scenario 3 Analysis

As indicated in Tables 9–11, the share of net exports in final products is raised by 10 percentage points, while the share of consumption is lowered by 5 percentage points and the share of investment is similarly reduced by 5 percentage points.

Under the conditions set in Scenario 3, compared to the baseline year, a 5-percentage-point decrease in the proportion of consumption in final products leads to a 10.05% decline in intermediate products within the forestry backward linkage chain. This implies that a 1% decrease in consumption's share results in a 2.01% reduction in consumption-driven intermediate products. Similarly, a 5-percentage-point decrease in the proportion of investment in final products also causes a 10.06% decline in intermediate products within the forestry backward linkage chain, meaning that a 1% decrease in investment's share leads to a 2.01% reduction in investment-driven intermediate products. Meanwhile, a 1-percentage-point rise in net exports' share of final products can reduce the net-export-driven forestry backward supply chain's intermediate goods by 130.27%.

Under this hypothetical scenario, the structure of forestry intermediate products driven by various final products undergoes significant changes, with net-export-driven intermediate products becoming highly negative and having a large absolute value. Overall, Scenario 3 would turn the total value of intermediate products in the forestry backward linkage chain from positive to negative, with a decrease of 40.87% compared to the baseline year. This indicates that under conditions of decreased consumption and investment and substantial growth in exports, the forestry backward linkage chain would experience a rapid decline in intermediate products. This scenario would lead to reduced purchases from upstream industries by the forestry industry chain, significantly impacting the production of the forestry backward linkage chain.

## 4. Discussion

The structure of final demand shapes the production structure of industries. Investment changes can spur capital formation and technological upgrades across sectors, expand upstream industry chains, and boost employment and income levels, which in turn indirectly stimulate consumer demand and production. However, such changes may also lead to overcapacity and misallocation of resources, thereby reducing economic efficiency.

Variations in consumption directly drive the expansion of production scales. Upgraded consumption patterns can facilitate structural optimization and drive economic development from the demand side. Conversely, weak consumption can negatively impact production development.

An increase in exports can directly expand domestic production scales, while an increase in the import of raw materials or components can ensure the stability of domestic production chains and drive domestic economic development through external demand. However, negative shocks can occur; for example, the US–China trade war may restrict imports and exports, thereby disrupting the smooth operation of industry chains.

In light of these dynamics, we should optimize and adjust China's final product structure in response to changes in market demand to promote the development of forestry production. Final demand structures fundamentally shape industrial production patterns, necessitating strategic alignment of China's final goods composition with evolving market demand to drive socioeconomic development.

First, consumption exerts a slightly weaker influence on forestry output than investment. A rise in consumption increases demand for forestry intermediates, benefiting the agriculture-forestry-animal-husbandry-fishery services sector and the broader forestry industry. Although the marginal effect of consumption is smaller—evidenced by differing intermediate-goods elasticities (a one-percentage-point increase in the consumption share lifts forestry-chain intermediates by 1.86%, compared with 2.20% under an equivalent investment expansion)—this differential explains the divergent outcomes for intermediates: contraction under the consumption-oriented Scenario 1 and expansion under the investment-driven Scenario 2.

Rising consumption also reinforces the tertiary sector's dominance within the forestry value chain (the primary, secondary tertiary sectors accounting for 2.75%, 5.12%, and 92.13% of total consumption demand). Respectively, and spurs the growth of agriculture-forestry-animal-husbandry-fishery services. Structurally, consumption acts as both a market activator for forestry products and a catalyst for tertiary industries, even though it is less potent than investment in directly expanding intermediate output. This underscores the need for balanced demand-side optimization strategies.

Second, investment exerts a slightly stronger influence on forestry production than consumption. An increase in investment raises output of forestry-chain intermediates, with the tertiary sector experiencing the largest impact, the secondary sector a moderate one, and the primary sector the smallest (the primary, secondary and tertiary sectors account for 2.27%, 14.64% and 83.09%, respectively, of total investment demand within the forestry value chain). Thus, additional investment disproportionately benefits tertiary-sector production across the forestry chain; from the narrower perspective of forestry's own product output, it also boosts secondary-sector production.

Thirdly, changes in net exports have a relatively significant impact on the forestry industry and its supply chain. As illustrated in Scenario 3, the assumption of constant total final product volume in this study implies that a substantial expansion in the trade surplus. Driven by declines in consumption and investment, will inevitably lead to a significant reduction in intermediate products within the forestry supply chain and substantial changes in their structure. This outcome reflects declines in consumption and investment, together with a marked expansion of the trade surplus, will inevitably reduce the volume of intermediate products in the forestry supply chain and substantially alter their composition. It represents a scenario where external demand grows while domestic demand falls. This highlights that an increase in China's trade surplus can only positively impact the production of the forestry sector and its supply chain if it is supported by growth in consumption and investment. Otherwise, it may result in negative consequences.

China is a major forestry country, however, in terms of the national economy's demand for forest products, the domestic production of forest products is still far from sufficient, necessitating large-scale imports of forestry raw materials annually. In 2018, China was still in a net export deficit position, although the deficit has been gradually decreasing annually. China's forestry sector is heavily reliant on imports due to a combination of factors: the scarcity of domestic forest resources, the substantial demand from industries such as industrial materials, furniture manufacturing, and papermaking, which exacerbates the supply–demand imbalance; the implementation of environmental policies that restrict logging in natural forests, leading to a significant decline in domestic timber supply, while most plantations are dominated by fast-growing species that fail to meet the demand for high-quality timber; and the encroachment on forestry land due to industrial expansion, urban sprawl, and rural construction [35]. The import of forest products is a double-edged sword. While it can fulfill the raw material requirements for forestry and the forestry industry chain, thereby boosting both the national and forestry economies, it can also stifle the production and development of domestic forestry products. In extreme cases, it may result in an overdependence of the national economy on imported forest products [36].

In recent years, significant events such as the Sino–US trade friction, the COVID-19 pandemic, and the Russia–Ukraine conflict have had a major impact on global supply chains. In particular, this year, the Sino–US trade war has disrupted China's supply chains, including those in the forestry sector [37]. If the trade war continues, it will directly impact forestry trade between the two countries and could potentially break the long-established pattern of China's forestry supply chain, which is characterized by "global raw material procurement—domestic processing—supply to both domestic and international markets."

In terms of China's global forestry trade, the trade volume between China and the US has long been the highest. The US trade volume accounts for about 13.31% of China's total forestry trade, but both the trade volume and its share are declining. China mainly exports wooden furniture, paper and paper products, and wood-based panels to the US, while it imports forestry raw materials such as wood pulp, logs, and lumber from the US [38].

The Sino–US tariff war has affected both sides. It has impeded China's forestry exports to the US, highlighting the need to diversify export markets and expand domestic demand to absorb the surplus. China's retaliatory tariffs have also increased the cost of importing wood, which is detrimental to meeting the intermediate product needs of the forestry supply chain. Given the significant impact of forestry product imports on the development of China's forestry supply chain, it is imperative to expedite import substitution strategies and adjust international import markets. The pressure from the US will inevitably lead to increased timber imports from forest-rich countries such as Russia. In summary, both export restrictions and rising import costs negatively affect the production of China's forestry supply chain, highlighting the need to diversify international markets.

The China-US tariff war will also affect domestic consumption and investment in China. Since the data on consumption and investment includes portions allocated to imported products, domestic and international supply chains are interwoven and mutually influential. As previously discussed, forestry production is directly proportional to consumption and investment. Therefore, expanding domestic consumption and investment is crucial for the development of forestry.

## 5. Conclusions

To ensure the healthy development of China's forestry sector and its associated industry chain, it is essential to expand consumer demand, which can effectively drive the growth of forestry and related tertiary industries such as agriculture, forestry, animal husbandry, and fishery services. Increasing investment demand can further boost the development of secondary and tertiary industries within the forestry chain. Given that fluctuations in China's net exports significantly impact forestry and its industry chain, it is crucial to accelerate the diversification of international markets. China needs to expand the cultivation of economic forests to reduce its dependence on imported forest products.

In the current context, importing forest products based on the needs of national economic development can facilitate the smooth functioning of the forestry industry chain and the broader economy. From the standpoint of intermediate product production, investment proves to be more potent than consumption in scaling up the total output of intermediate products within the forestry industry chain. Imports supply the essential forestry intermediate products that China's forestry industry chain urgently needs. At the same time, the government can develop policies to support innovation and take measures to reduce dependence on imports [39]. These measures encompass augmenting subsidies for forest cultivation and technological Research and Development prioritizing the development of planted forests and forestry infrastructure, boosting the automation level of wood processing, propelling the development of innovative products such as bamboo-based materials, fully leveraging new technologies such as blockchain and artificial intelligence, and integrating them into the management of wood supply chain processes [40]. At the same time, efforts should be made to improve the quality of export products and increase the added value of forest products [41].

This study's in-depth analysis of how China's demand structure influences the production structure of forestry and its industry chain is beneficial. It provides a reference for policymakers to adjust final demand structures and enables relevant industries to anticipate and respond to macroeconomic shifts, thereby fostering sustainable forestry development.

While this paper primarily relies on input–output analysis, future research will incorporate a broader range of methods and data to offer a more comprehensive perspective.

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