

MARKET STRUCTURE, COMPETITIVENESS AND TRADE FLOW OF SUDANESE GUM ARABIC IN THE INTERNATIONAL MARKET

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**MASTER OF SCIENCE IN AGRIBUSINESS
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RINGKASAN

ETHAR HASSAN MOHAMMED. Struktur Pasar, Daya Saing dan Arus Perdagangan Gum Arab Sudan di Pasar Internasional. Dibimbing oleh NETTI TINAPRILLA dan RITA NURMALINA.

Gum arab merupakan produk hutan non-kayu dari getah Acacia senegal dan Acacia seyal yang menjadi komoditas strategis bagi perekonomian Sudan sejak dekade 1960-an. Meskipun memiliki endowment ekologis tak tereplikasi di sabuk gum arab, Sudan menghadapi kesenjangan membesar antara keunggulan komparatif alami dan kinerja ekspor aktual akibat konflik berkepanjangan, variabilitas iklim, infrastruktur lemah, serta defisit sertifikasi. Penelitian ini bertujuan menganalisis: (1) struktur pasar global dan konsentrasi pasar; (2) evolusi daya saing Sudan melalui RCA dan DRCA; serta (3) determinan arus perdagangan bilateral dan potensi perluasan pasar menggunakan model gravitasi pada periode 2012–2024.

Berdasarkan tujuan pertama, analisis struktur pasar menunjukkan transformasi fundamental dari oligopoli terkonsentrasi menjadi pasar terfragmentasi. Herfindahl-Hirschman Index (HHI) anjlok dari 2.869,34 pada 2016 menjadi 922,68 pada 2024, sementara Concentration Ratio empat eksportir teratas (CR4) turun dari 76,80 % menjadi 41,50 %. Penurunan konsentrasi ini bukan disebabkan oleh masuknya pesaing baru yang sehat, melainkan oleh destruktif de-konsentrasi pasca-konflik April 2023 yang memecah rantai pasok formal dan mengalihkan perdagangan ke saluran informal serta penyelundukan melalui Chad dan Mesir. Prancis tetap mendominasi sebagai eksportir terbesar menurut nilai (USD 254,5 juta pada 2024) berkat penguasaan pengolahan lanjutan, sedangkan Chad dan Mali muncul sebagai Rising Stars di bawah integrasi AfCFTA, mengancam pangsa pasar Sudan secara permanen.

Berdasarkan tujuan kedua, evaluasi daya saing mengungkap paradoks kompetitivitas yang serius. Indeks Revealed Comparative Advantage (RCA) Sudan secara konsisten melampaui 1.000 sepanjang periode, dengan puncak 2.583,83 pada 2016, menandakan spesialisasi ekstrem yang jauh melampaui pesaing terdekat. Namun analisis Dynamic RCA (DRCA) menunjukkan lintasan fluktuatif: Falling Star (2012–2015) ketika instabilitas politik merusak momentum; Lost Opportunity (2015–2018) saat krisis moneter menghalangi pemanfaatan permintaan global; Leading Retreat (2018–2021) ketika revolusi dan kolaps nilai tukar memperburuk kinerja ekspor; serta Rising Star (2021–2024) yang mencerminkan pemulihan rapuh didorong oleh permintaan sektor farmasi dan pangan, bukan perbaikan struktural. Temuan ini membuktikan bahwa keunggulan komparatif alamiah tidak cukup untuk kinerja kompetitif berkelanjutan ketika kerapuhan institusional menghancurkan rantai pasok dan akses pasar.

Berdasarkan tujuan ketiga, estimasi model gravitasi Poisson Pseudo-Maximum-Likelihood (PPML) mengidentifikasi determinan utama arus perdagangan bilateral. Koefisien tarif signifikan negatif ($-0,1674$; $p < 0,01$), menunjukkan bahwa kenaikan tarif 1 poin persen menurunkan nilai ekspor 0,167 persen. Koefisien harga ekspor positif ($0,7417$; $p < 0,05$) mencerminkan permintaan inelastis terhadap komoditas diferensiasi tinggi, sementara RCA positif ($0,2067$; $p < 0,05$) memvalidasi bahwa akumulasi spesialisasi meningkatkan kinerja. Secara

mengejutkan, Logistics Performance Index tidak signifikan ($p = 0,721$), mengindikasikan bahwa hambatan regulasi bukan infrastruktur fisik telah menjadi penghalang utama. Analisis Trade Potential Ratio (TPR) mengidentifikasi India sebagai potensi tak tersentuh terbesar (TPR ≈ 83 , kesenjangan $> \text{USD } 10,5$ juta), disusul Amerika Serikat ($\approx 4,3$) dan Italia ($\approx 7,2$). Sebaliknya, Prancis mencatat over-performance (TPR = 0,232) yang mencerminkan ketergantungan berisiko pada hub perantara kolonial-era.

Untuk menutup kesenjangan tersebut, Sudan disarankan: (i) memperoleh sertifikasi internasional (FSSC 22000, organik) dan membangun sistem ketertelusuran nasional; (ii) mendirikan perwakilan komersial langsung di India dan Uni Eropa guna mengurangi ketergantungan pada perantara Prancis; (iii) meningkatkan kapasitas pengolahan domestik (spray-drying, enkapsulasi) untuk menangkap nilai tambah hilir; serta (iv) memanfaatkan preferensi tarif AfCFTA dan GSP untuk diversifikasi pasar. Keberhasilan intervensi ini akan menentukan apakah Sudan dapat mengubah keunggulan komparatif ekologisnya menjadi keunggulan kompetitif berkelanjutan.

Kata kunci: gum arab, HHI, CR4, model gravitasi, potensi perdagangan, Sudan



SUMMARY

ETHAR HASSAN MOHAMMED. Market Structure, Competitiveness and Trade Flow of Sudanese Gum Arabic in the International Market. Supervised by NETTI TINAPRILLA and RITA NURMALINA.

Gum arabic, a non-timber forest product exuded by *Acacia senegal* and *Acacia seyal*, has anchored Sudan's rural livelihoods and macroeconomy since the 1960s. Despite possessing an irreplaceable ecological endowment across the gum belt, Sudan faces a widening gap between its natural comparative advantage and actual export performance due to prolonged conflict, climate variability, poor infrastructure, and certification deficits. This study aims to analyze: (1) the global market structure and concentration; (2) the evolution of Sudan's competitiveness through RCA and DRCA; and (3) the determinants of bilateral trade flows and market expansion opportunities using a gravity model over 2012–2024.

Addressing the first objective, the market structure analysis reveals a fundamental transformation from concentrated oligopoly to fragmented competition. The Herfindahl-Hirschman Index (HHI) collapsed from 2,869.34 in 2016 to 922.68 in 2024, while the four-firm Concentration Ratio (CR4) fell from 76.80 % to 41.50 %. This de-concentration reflects destructive fragmentation caused by the April 2023 conflict, which diverted formal supply chains into smuggling routes through Chad and Egypt rather than signaling healthy competitive entry. France consolidated its dominance as the leading exporter by value (USD 254.5 million in 2024) through advanced processing, while Chad and Mali emerged as "Rising Stars" under AfCFTA integration, threatening permanent market share loss for Sudan.

Addressing the second objective, the competitiveness assessment exposes a severe competitiveness paradox. Sudan's Revealed Comparative Advantage (RCA) remained extraordinarily high, consistently exceeding 1,000 and peaking at 2,583.83 in 2016, indicating extreme specialization unmatched by competitors. However, the Dynamic RCA (DRCA) trajectory reveals a turbulent path: "Falling Star" (2012–2015) as political instability eroded momentum; "Lost Opportunity" (2015–2018) when macroeconomic crisis prevented capitalization on surging global demand; "Leading Retreat" (2018–2021) as revolution and currency collapse accelerated export contraction; and a fragile "Rising Star" recovery (2021–2024) driven by resilient pharmaceutical demand rather than structural improvements. These findings demonstrate that natural comparative advantage is insufficient for sustainable competitive performance when institutional fragility disrupts supply chains and market access.

Addressing the third objective, the PPML gravity estimation identifies precise determinants of bilateral trade flows. The tariff coefficient is significantly negative (-0.1674 ; $p < 0.01$), indicating that a one-percentage-point tariff increase reduces export value by 0.167 %. The export price coefficient is positive (0.7417 ; $p < 0.05$), signaling inelastic demand for this high-value differentiated commodity, while the RCA coefficient (0.2067 ; $p < 0.05$) validates that accumulated specialization enhances performance. Notably, the Logistics Performance Index is statistically insignificant ($p = 0.721$), confirming that regulatory trade barriers not physical infrastructure has become the binding constraint. The Trade Potential Ratio analysis

identifies India as the largest unrealized opportunity (TPR \approx 83, a gap exceeding USD 10.5 million), followed by the United States (\approx 4.3) and Italy (\approx 7.2). France, conversely, exhibits over-performance (TPR = 0.232) reflecting risky dependence on colonial-era re-export channels.

To close these structural gaps, Sudan is recommended to: (i) secure international certifications (FSSC 22000, organic) and build a national traceability system; (ii) establish direct commercial representation in India and the EU to bypass French intermediaries; (iii) expand domestic spray-drying and encapsulation capacity to capture downstream value; and (iv) leverage AfCFTA and GSP tariff preferences for market diversification. The successful implementation of these measures will determine whether Sudan converts its ecological comparative advantage into durable competitive performance or continues toward marginalization in the global market.

Keywords: gum arabic, gravity model, HHI, CR4, Sudan, trade potential.





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MARKET STRUCTURE, COMPETITIVENESS AND TRADE FLOW OF SUDANESE GUM ARABIC IN THE INTERNATIONAL MARKET

ETHAR HASSAN MOHAMMED

Thesis
as part of the requirements for obtaining a Master of
Science degree
in
Agribusiness

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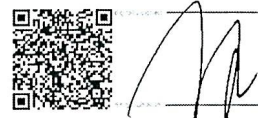
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FOREWORD

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It is my hope that this thesis will contribute meaningfully to the development of the global gum arabic trade and serve as a useful reference for future research in agribusiness.

Bogor, June 2026

Ethar Hassan Mohammed

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