

Logistics Performance Index: A Catalyst for International Trade Growth - An Applied Study on Global Economies

مؤشر الأداء اللوجستي: حافز لنمو التجارة الدولية - دراسة تطبيقية عن الاقتصادات العالمية

نهى سمير شوال محمد ابوزيد

مدرس بقسم الاقتصاد والتجارة الخارجية-كلية التجارة وإدارة الاعمال -جامعة حلوان

مي إبراهيم حسن

مدرس بقسم الاقتصاد والتجارة الخارجية-كلية التجارة وإدارة الاعمال - جامعة حلوان

Abstract:

Logistics and trade are integral components of global commerce, each playing a crucial role in exchanging goods and services across various markets.

The logistics sector is important in addressing transportation challenges, optimizing storage capabilities, enhancing competitiveness, and facilitating trade. With the advent of technology and digitalization, there is a growing need to improve logistics performance to support the movements and flows of commercial transactions.

The research problem of this study is to what extent logistics performance (LP) affects trade outcomes in the context of a dynamic global environment. The hypothesis states that there is a significant relationship between Logistics Performance Index and Merchandise Trade Outcomes.

This study examines the relationship between the logistics performance index (LPI) and international trade, focusing on a sample of 77 countries worldwide in 2022. The research adopts a deductive approach using an empirical analysis, utilizing LPI and macroeconomic indicators such as foreign direct investment, GDP, exchange rate, and merchandise trade as a percentage of GDP extracted from the World Development Indicators, World Bank.

This study offers novelty by including a larger sample of countries than previous research, which often focuses on a limited number of countries or regions.

The analysis employs ordinary least squares (OLS) regression, contrasting with the prevalent use of gravity models in similar studies. By incorporating these unique features, this study provides valuable insights into the relationship between logistics performance and international trade.

Key Words: Logistics; Logistics Performance Index; International Trade, Efficiency.

المستخلص:

اللوجستيات والتجارة عنصران لا يتجزأ من التجارة العالمية، ويؤدي كل منهما دورا حاسما في تبادل السلع والخدمات عبر مختلف الأسواق. لقطاع اللوجستيات أهمية في التصدي لتحديات النقل، والاستفادة المثلى من قدرات التخزين، وتعزيز القدرة التنافسية، وتيسير التجارة. مع ظهور التكنولوجيا والرقمنة، هناك حاجة متزايدة لتحسين الأداء اللوجستي لدعم تحركات وتدفقات المعاملات التجارية.

تتمثل مشكلة البحث في هذه الدراسة في مدى تأثير الأداء اللوجستي (LP) على نتائج التجارة في سياق بيئة عالمية ديناميكية. تنص الفرضية على وجود علاقة مهمة بين مؤشر الأداء اللوجستي ونتائج تجارة البضائع.

تبحث هذه الدراسة في العلاقة بين مؤشر الأداء اللوجستي (LPI) والتجارة الدولية، مع التركيز على عينة من ٧٧ دولة حول العالم في عام ٢٠٢٢. يعتمد البحث نهجًا استنتاجيًا باستخدام تحليل تجريبي، باستخدام مؤشرات أسعار المستهلكين ومؤشرات الاقتصاد الكلي مثل الاستثمار الأجنبي المباشر والنتائج المحلي الإجمالي وسعر الصرف وتجارة البضائع كنسبة مئوية من الناتج المحلي الإجمالي المستخرج من مؤشرات التنمية العالمية، البنك الدولي.

تقدم هذه الدراسة حادثة من خلال تضمين عينة من البلدان أكبر من الأبحاث السابقة، والتي غالبًا ما تركز على عدد محدود من البلدان أو المناطق. يستخدم التحليل أقل المربعات العادية (OLS) الانحدار، على النقيض من الاستخدام السائد لنماذج الجاذبية في دراسات مماثلة. من خلال دمج هذه السمات الفريدة، توفر هذه الدراسة رؤى قيمة للعلاقة بين الأداء اللوجستي والتجارة الدولية.

الكلمات المفتاحية: اللوجستيات؛ مؤشر الأداء اللوجستي؛ التجارة الدولية، الكفاءة.

1- Introduction:

Logistics and trade are integral components of global commerce, each playing a crucial role in exchanging goods and services across various markets.

(Childerley, A. 1980) defined Logistics as a comprehensive approach to effectively managing the distribution process. It encompasses various activities, such as the physical transportation of raw materials or finished goods inventory, from the origin point to the use or consumption point.

Logistics has been integral to warfare, with a focus on the management of material flows and stocks. It has evolved from the Middle Ages to the present, affecting various aspects of military operations. (Roland, A. 1993)

(Burda, A. 2015) logistics involves overseeing the flow of goods, enabling the quick delivery of products to customers, and supporting economic transactions. Logistics helps in facilitating international trade, as trade can only exist with efficient logistics, and poor logistics often result in poor trade results. (Arvis, J. et al. 2016).

It is an essential priority for different countries, whether developed or developing, as it helps mainly in the facilitation of trade and transport, which is the essential core for the economic development of countries. Inefficient logistics services discourage trade by imposing an extra cost in terms of time and money.

It also includes various activities beyond transportation, such as warehousing, brokerage, express delivery, terminal operations, and related data and information management. (Arvis, J. et.al. 2018)

The close relationship between logistics and trade is evident as logistics plays a critical role in supporting and enabling the smooth flow of goods and services across borders. Efficient logistics systems are essential for reducing transportation costs, minimizing delays, optimizing inventory management, and enhancing overall supply chain performance. (Hausman, W. et al. 2013)

(Eyob, E. & Kahasi, M. 2019) Mentioned that the logistics performance index (LPI) is a measure that assesses the effectiveness of countries in various logistics activities, thereby influencing trade efficiencies. Essential factors in logistics are closely tied to the LPI, reflecting their significance in improving trade-related operations.

The Logistics Performance Index (LPI) serves as a metric for evaluating the connectivity of countries to international logistics networks. It plays a crucial role in assisting countries in identifying areas for improvement in their trade logistics performance. (World Bank, 2023)

The LPI is derived from a comprehensive global survey conducted among various stakeholders and operators involved in logistics operations, the LPI provides information regarding logistics and feedback on the logistics readiness of the countries where the operators do business and those with which they trade. (Arvis, J. et al. 2016)

LPI comprises six significant elements: customs, infrastructure, ease of arranging shipments, quality of logistics services, timeliness, and tracking and tracing. These six integrated elements can support the improvement of logistics performance as they provide numerical evidence on how easy or hard it is in these countries to transfer manufactured products in unitized form. (Arvis, J. et al. 2018)

2- Description of Logistics Performance Index (LPI):

LPI components were chosen based on the recent practical experience of logistics professionals and recent theoretical and empirical evidence involved in international freight forwarding. It includes:

- **Customs:** It includes data regarding the efficiency of customs and border management clearance, including factors such as speed, simplicity, and predictability of customs agencies.
- **Infrastructure:** It focuses on assessing the caliber of a country's transportation and telecommunications infrastructure. It examines the efficiency and effectiveness of the procedures involved in the movement of goods from producers to the final consumers, as well as how organizations leverage the available facilities. The LPI serves as a determinant of whether these factors act as advantages, facilitating competitiveness, or as obstacles hindering competitiveness.
- **Ease of arranging shipments:** Where refers to the ease with which shipments can be arranged at competitive prices.
- **Quality of Logistics Services:** Refers to how parties act regarding customer service quality and how to optimize the relationships between organizations and consumers.
- **Tracking and tracing:** This refers to how efficiently tracking shipments is, knowing exactly where the shipment is and the routes it is moving in until it finally reaches the customer; it enhances the efficiency of the trading procedures and increases the availability of information.
- **Timeliness:** It measures punctuality, which refers to the time when a shipment reaches its destination within a specific schedule.

Within the LPI framework, six core indicators are given equal weights. However, experts widely acknowledge that infrastructure holds the highest significance in determining logistics performance, as it carries a weight of 0.24 within the index. (Rezaei, J. et al. 2018)

LPI uses standard Methods for consolidating the data into a unified indicator that enables comparisons between countries. (Arvis, J. et al. 2018)

The indicators have been combined and assigned weights, resulting in a scoring system ranging from 1 to 5, with higher values indicating improved logistics activity. These components encompass different aspects that constitute the LPI and have been demonstrated to have a greater influence compared to distance and transport costs. (Korinek, J. & Sourdin, P. 2011).

The LPI score is broken down into four different categories, and the country is considered either **logistics-unfriendly**, which includes countries that face a lot of logistics constraints as the least developed countries (bottom LPI quintile). However, the **Logistics-friendly** includes top-performing countries, most of which are in the high-income group (top LPI quintile). The third category is **Partial performers**, which includes countries with some logistics constraints. It is often seen in low- and middle-income countries (third and fourth LPI quintiles). Finally, the **Consistent performers**, which includes countries rated better on logistics performance than most others in their income group (second LPI quintile). (Arvis, J. 2018)

In international trade theories, Adam Smith's concept of Absolute advantage (1904) suggests that if a country can find a supplier offering a lower price for a particular product than what it costs to produce domestically, it should consider purchasing that product to maximize benefits, followed by the Heckscher-Ohlin (H-O) theory, based on Ricardo's model, which focuses on why and how a country can produce a specific product more cheaply than another.

The proposed theory suggested that countries export goods produced with relatively abundant resources and import goods produced with relatively scarce resources. The H-O theory assumes that countries have the same technology and demand but differ in labor and capital. (Blaug, M. 1992)

The New Trade Theory, developed by Krugman in 1979, addresses why a country can import and export a specific product type. It highlights the role of economies of scale and monopolistic competition. According to the theory, even if two countries have no differences in opportunity cost, specialization in a specific product can still result in gains from trade.

When a country pioneers and specializes in a particular industry, it can create a form of monopolistic competition, providing a competitive advantage. The theory also emphasizes that firms compete based on branding and quality, not solely on price. (Neary, J. 2009).

Following the global crisis, there has been a significant increase in the total trade volume of goods and services, with a primary focus on physical goods. (Henn, C. et al. 2020) Argue that countries that provide high-quality products can gain a comparative advantage, leading to improved productivity and export revenue. Consequently, many policymakers adopt export-oriented growth policies to leverage this advantage, theory suggests that countries are supposed to specialize in producing goods with a comparative advantage.

It was suggested that reducing transportation costs can lead to an increase in the volume of trade, particularly for intermediated goods. In a scenario involving multiple countries, multiple commodities, and the choice of production techniques, the author

suggests that a decrease in transportation costs can facilitate higher trade volumes for intermediated goods. (Minch, C. 2022)

Gravity Models appeared as a tool to monitor trade flows between two countries influenced by their economic sizes and the distance between them. The underlying idea is that larger economies tend to have more trade interactions due to their greater production capacity and market size. Similarly, proximity or distance plays a crucial role, as closer countries often have lower transportation costs and cultural or historical ties facilitating trade. (Isard, W. 1954).

Linking logistics to trade would only have occurred by introducing the Globalization concept, which many countries are actively pursuing due to the numerous benefits associated with increased integration and interdependence in goods, services, and commodities. (UNCTAD, 2008)

Globalization has dramatically impacted trade dynamics, and logistics has become crucial in shaping the economic landscape. The integration of global markets has created a need for improved logistics systems to enable efficient cross-border movement of goods, highlighting the interdependence of production, trade, and transportation in today's interconnected world.

According to (Coe M. et al.2013), Globalization and logistics are interconnected due to amplified production fragmentation, outsourcing, offshoring, and advancements in transportation and logistics technologies. They highlight the importance of comparative advantage, resource endowments, economies of scale, and monopolistic competition in shaping trade relationships between countries. (Huynh, C. &Huong, T. 2022)

Empirical Evidence:

Logistics and transport play a vital role in international trade relations. The Logistics Performance Index (LPI) is an essential tool that provides valuable insights into the connection between trade and transport facilitation.

The LPI has several significant benefits. Firstly, it enhances awareness of the importance of logistics and transport in facilitating trade. The LPI encourages governments and stakeholders to prioritize improvements in this area by highlighting the impact of efficient logistics systems on trade competitiveness. (Martí, L. et al. 2014).

(Alireza M. et al. 2023) Focused on analyzing the impact of logistics, economic, and demographic variables on seaborne commodity trade between Qatar, Oman, Turkey, Pakistan, and Iran. By utilizing the gravity model, the research findings

indicated that a 1% improvement in the importing country's Logistics Performance Index (LPI) could lead to a 0.8% increase in total trade flows.

The study highlighted two leading solutions, including tariff reduction as an effective solution to promote seaborne trade among the studied countries as by lowering trade barriers through reduced tariffs, it becomes more economically viable and attractive for countries to engage in trade activities, the other key factor was to improve logistics performance index (LPI) through the tracking and tracing of consignments, which can significantly improve logistics efficiency.

(Huynh, C. & Huong, T. 2022) It uses the gravity model to analyze the impact of the overall logistics performance index (LPI) and its different dimensions on export flows in 38 developing countries from 2007 to 2018. The results from the fixed effects estimator demonstrate significant positive effects of the overall index of international logistics performance and its five dimensions on export flows.

These dimensions include Customs (C), Infrastructure (I), International shipments (IS), Logistics quality and competence (LQC), and Timeliness (T). Among these dimensions, LQC, T, and C have the most substantial impacts on export flows. The study also suggested that policymakers should consider other factors such as population growth rate, import flows, GDP growth rate, and foreign direct investment (FDI) when formulating policies to promote exports.

(Bugarčić et al.2020) Examined the relationship between logistics performance and trade volume in the Central and Eastern European countries (CEECs) and Western Balkans from 2007 to 2018 by using the gravity model approach and focused on the overall Logistics Performance Index (LPI) and its components.

The results showed positive and significant relationship between logistics performance and bilateral trade among the CEECs; the study suggests that improvements in logistics performance and services favorably impact the volume of international trade. When trading countries enhance their logistics performance, bilateral trade increases, and trade costs are reduced.

(Behar, A. & Manners, P. 2008) They analyzed the relationship between logistics performance and trade using data from various countries. They found a strong positive correlation between logistics performance (measured by indicators like efficiency of customs procedures and quality of trade-related infrastructure) and trade volumes. The results suggested that countries with better logistics performance tend to have higher levels of trade.

Data and Methodology:

The research used a deductive approach using a quantitative analysis, where data as logistic performance index and some macroeconomic indicators including foreign direct investment, GDP, exchange rate, and their relation to merchandise trade as a percentage of GDP are extracted from WDI, World Bank, the study is conducted on 2022 data to cope with the recent updates published by the LPI 2023 report. Moreover, estimate their impact on merchandise trade as a percentage of GDP using the statistical program (Eviews13).

The research used a statistical model based on cross-sectional data, and this is value added to the analysis where most of the economic research depends on the models or data of the sectoral time series or panel data. However, the research captures the changes in 2022 and the latest impact of the logistic performance index on merchandise trade.

A. The Research Sample

The sample used for this research will consist of 77 countries from the world's different continents. These countries were selected according to the data availability for the variables within this research of the Logistics Performance Index by the World Bank reports issued in 2023.

B. Variables of this Study

The researchers identified the variables studied, analyzed their results, and confirmed the impact of the independent variable on the dependent variable, where the independent variable primary variable was the logistics performance index. The study included other control variables such as exchange rate, foreign direct investment, and GDP. In addition to the dependent variable in this study, merchandise trade is used as a percentage of GDP.

In the model, log transformation was used for some variables in the applied econometric model to achieve the goal of reaching normality, stabilizing variance, and reducing skewness. Variables such as LPI, GDP and exchange rate meet these criteria and are suitable candidates for log transformation, while others such as FDI do not meet the criteria of transformation due to the existence of negative output that's why it was left in its original scale.

Where:

- GDP influences merchandise trade by affecting imports and exports, with increases in GDP generally leading to higher imports and sometimes reduced exports. Public spending, terms-of-trade shocks, trade wars, and trade scale can significantly impact this relationship.
- FDI generally promotes merchandise trade by shifting production to exportable manufacturing sectors, enhancing exports, and affecting the balance of payments. However, it can also lead to trade imbalances through transfer pricing, making merchandise exports vulnerable to shifts in FDI inflows.
- Exchange rate volatility can benefit exporting firms by allowing them to adjust export volumes and potentially invest in export production capacity. However, exchange rate volatility can also have a negative impact on trade, especially for developing countries, and currency misalignments may have short-term effects that dissipate over time.

C. Measuring the impact of the Logistics Performance Index on the World Merchandise trade.

OLS methods are valuable in cross-sectional analysis because they enable the estimation of individual coefficients for each cross-section, accommodating the variability in data responsiveness. Additionally, OLS techniques can be modified to handle heterogeneity in dynamic panel data, ensuring consistency with the level of cross-sectional heterogeneity allowed in the research.

OLS model was selected to test the impact of the logistics performance index on international trade by using merchandise trade as the dependent variable and LPI as the main independent variable; based on this model, all variables are shown in equation 1, data set used can be found in the appendix part.

$$\text{Log mtrade} = \beta_0 + \beta_1 \text{LogLPI} + \beta_2 \text{LogGdpcon} + \beta_3 \text{FDIBOP} + \beta_4 \text{ER} \dots\dots\dots 1$$

$$\text{Log mtrade} = 7.88 + 0.99 \text{LogLPI} + 0.22 \text{Log Gdpcon} - 3.89\text{FDIBOP} + 0.02\text{ER} \dots\dots\dots 2$$

As shown in equation 2, the results of estimating the data for using the OLS model at an explanatory power R² is 74.6 %. The Durbin Watson (DW) statistic, which is a test for autocorrelation in the residuals, will always have a value ranging between 0 and 4, where results ranging between 2 to 2.5 is indicating well fitted model. In our

model, the value of Durbin Watson is around 2.0, with a value of 2.25 indicating that there is no autocorrelation detected in the sample used, the results are detailed in Table1.

Table 1: OLS Regression

Dependent Variable: Log (Mtrade)			
Variable	Coefficient	t-Statistic	Prob.
C	7.885	9.513	0.0000
LOG(LPI)	0.990	2.859	0.0057
LOG(GDPCON)	0.228	5.791	0.0000
FDIBOP	-3.890	-1.878	0.0656
LOG(ER)	0.022	0.961	0.3407
R-squared	0.746		
Adjusted R-squared	0.696		
Durbin-Watson stat	2.258		
F-statistic	8.887		
Prob(F-statistic)	0.000003		

Calculated by the Authors by using Eviews-13 Software

According to the results of the data estimation, it has been found that:

- There is a positive relationship between logistics performance and international trade, where the results showed that a 1% increase in LPI (logistics Performance Index) will lead to around a 10% increase in (Mtrade) merchandise trade. The results match (Hausman W. et al., 2013), who stated that enhancements in logistics performance, including factors such as time, cost, and reliability, can result in a rise in trade volumes. Which in turn enhances a nation's competitiveness within the global economy.
- These results also match with (Sy B. et al., 2020), who mentioned a significant positive correlation between logistics performance and trade value, especially in terms of timely delivery, effective tracking and tracing, and the ease of arranging international shipments. (Riadh, H. 2020) results indicated that enhancing the logistics performance index results in decreased transportation costs and an expansion of trade.

- A positive relationship exists between GDP (GDPCON) in its constant values and international trade represented in merchandise trade, as a 1% increase in GDP will lead to a 2.2% increase in merchandise trade. These results match (Karam et al. 2015), which state that a positive correlation is observed between real GDP and both the trading of goods and services, although the impact on GDP growth is more vital for goods trade compared to service trade when studying trade volumes and economic growth in MENA region.
- FDIBOP, which reflects that foreign direct investment is statistically significant only at the 10% significance level. Also, the results showed an inverse relationship between foreign direct investment and merchandise trade, where an increase in FDI will lead to a decrease in merchandise trade. However, these results do not match the theories and the standard relationship between FDI and merchandise trade, but (Xiao-yin D., 2007) mentioned that FDI can contribute to weakening the exporting competition power of specific industries and merchandise.
- The official exchange rate is shown to be statistically insignificant and has no impact on the amount of merchandise traded. (Madkour, T. et al, 2020) Found that in the context of Africa, the exchange rate variable is an ineffective indicator for influencing trade openness. The impact of exchange rate fluctuations on merchandise trade in Africa is not uniform across the continent. While exchange rate policies may influence trade balances in certain countries, their effectiveness varies due to structural differences, the nature of trade relationships, and the presence of other influencing factors such as terms of trade and exchange rate volatility (Jeanneney, S., & Hua, P. 2015). Some countries may benefit from exchange rate depreciation (Hunegnaw, F., & Kim, S. 2017), while others may not see the desired effects on exports. (Ekanem, N. 2002)

A huge focus should be given to the enhancements in infrastructure and how it affects logistics performance that play a crucial role in the sustainable growth of merchandise trade in different countries, these enhancements add several positive impacts, such as trade facilitation, where efficient infrastructure, including well-maintained roads, ports, and airports, reduces trade barriers and enables the smooth movement of goods and services across borders. This leads to faster clearance times, lower costs, and overall improved trade efficiency. Another factor is the connectivity and market access, as improved connectivity provides businesses with access to larger markets, both domestically and internationally, this enhances infrastructure to attract foreign investment, establish global supply chains, and participate more effectively in regional and global trading networks. This also adds to competitiveness and

productivity, where reliable transportation networks and logistics services enable businesses to optimize their supply chains, minimize stockouts, and improve customer satisfaction, this help in the process of attracting foreign direct investment and enhance the regional integration case scenarios, as infrastructure and logistics improvements support regional integration efforts by facilitating the movement of goods, services, and people across borders within a region and this enable these countries to take advantage of regional markets, expand trade relationships, and achieve economies of scale. (Alassane, Y. et al, 2020)

Conclusion:

This study provides valuable empirical evidence on the relationship between logistics performance and international trade. The findings contribute to the existing literature and offer insights for policymakers and stakeholders seeking to enhance trade efficiencies and economic development. This applied case study breaks new ground by utilizing a cross-sectional analysis encompassing a sample of 77 countries worldwide in 2022 to examine the link between the logistics performance index (LPI) and international trade.

Based on OLS regression analysis, the findings highlight the positive link between logistics performance and trade volumes, affirming the importance of time, cost, and reliability in enhancing trade efficiencies. These results align with existing research conducted by (Hausman et al. 2013), (Sy et al. 2020), and (Riadh, H. 2020).

Moreover, the study confirms the positive relationship between real GDP and merchandise trade, emphasizing the role of economic growth in driving trade volumes. Interestingly, the inverse relationship between foreign direct investment (FDI) and merchandise trade challenges conventional expectations. The outcomes align with the perspective of Xiao-yin (2007), who suggests that FDI can weaken the exporting competition power of specific industries, leading to a decrease in merchandise trade. Contrary to expectations, the official exchange rate shows no significant impact on merchandise trade. This finding supports the research of Madkour et al. (2020), highlighting the limited effectiveness of the exchange rate variable in influencing trade openness, particularly in Africa.

By uncovering the significance of logistics performance in facilitating international trade, this study offers important implications for policymakers and stakeholders. Enhancing logistics infrastructure, efficiency, and coordination can improve trade outcomes and economic growth. The findings highlight the need for investments and policy interventions to bolster logistics capabilities, particularly in transportation, warehousing, and supply chain management.

Appendix:

Country	Merchandise trade (% of GDP)	GDP (constant 2015 US\$)	Foreign direct investment, net (BoP, current US\$)	Official exchange rate (LCU per US\$, period average)	Logistics performance index: Overall (1=low to 5=high)
Algeria	51.25733057	1.79602E+11	-5073304.982	141.994975	2.5
Djibouti	281.6982459	3307565405	-187022847.6	177.721	2.7
Bahrain	103.0365074	35915819622	-3457446.809	0.376	3.5
Egypt	28.25162958	4.53827E+11	-11058100000	19.16043974	3.1
Iraq	85.36041504	1.92926E+11	2326500000	1450	2.4
jordan	81.53595608	43915711449	-1152816901	0.71	2.69
Lebanon	113.7219901	..	-460676827	1507.5	..
Oman	91.70874764	86294680435	-4534980494	0.3845	3.3
Saudi Arabia	54.21941576	7.69633E+11	12354882158	3.75	3.4
Tunisia	97.6534145	48116779201	-629784766.1	3.1036	..
UAE	188.0052734	4.31441E+11	..	3.6725	4
Qatar	69.6030565	1.70947E+11	2307692308	3.64	3.5
Morocco	86.53715198	1.25542E+11	-1565281148	10.16066024	..
Kuwait	76.19953915	1.14892E+11	23796283534	0.306250154	3.2
Mauritania	79.97248849	7657463959	-1401620462	..	2.3
Comoros	32.3536194	1140337215	-3839060.116	467.1842612	..
Sudan	29.90965833	78965707790	-573504494.8	546.75885	2.4
Albania	67.17987673	14319794713	-1249848500	113.0416667	2.5
Angola	64.69021129	84884003208	6639719014	460.5675116	2.1
Argentina	26.93044041	5.98313E+11	-13331895896	130.61655	2.8
Armenia	72.4063769	14225451503	-948310487.7	435.6661797	2.5
Australia	42.63257428	1.58617E+12	54258632808	1.441664459	3.7
Bangladesh	31.05793285	3.05523E+11	-1539819465	91.74545444	2.6
Belarus	84.41417956	57251844490	-1430380876	2.6261	2.7
Bolivia	60.67494175	38319728331	-327955400.7	6.91	2.4
Bosnia and Herzegovina	102.3579943	20253843510	-728840784.7	1.859325877	3

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Botswana	80.64634206	17511419430	-258792562.9	12.36880833	3.1
Brazil	32.62238305	1.90146E+12	-53889962101	5.163970291	3.2
Bulgaria	119.8589825	61747770025	-2130770000	1.860141667	3.2
Cambodia	177.1811639	24964207156	-3428345015	4102.037865	2.4
Cameroon	31.39029089	40247035778	-898335371.2	623.7597009	2.1
Canada	54.63807942	1.7611E+12	29407630389	1.301554775	4
Chile	67.46223257	2.81423E+11	-8089288410	873.3141895	3
China	35.12561246	1.63251E+13	-30474555668	6.737158112	3.7
Costa Rica	58.39815492	69549856034	-3060056477	647.1358176	2.9
Croatia	97.21641303	64042742435	-3942140588	7.1597415	3.3
Czechia	164.5779506	2.15975E+11	-7283234220	23.357	3.3
Denmark	64.13819073	3.56222E+11	-1742978010	7.076151863	4.1
Dominican Republic	39.21175972	98050971574	-4010400000	55.14099167	2.6
Fiji	81.36579604	4939873229	-86910439.14	2.201406987	2.3
Finland	64.84808245	2.59985E+11	7378497425	..	4.2
Georgia	77.20092531	20190828886	-1766267912	2.9162	2.7
Ghana	43.53628659	68003831000	-1472569630	8.2724	2.5
Hong Kong	355.0144589	3.18598E+11	-14087861364	7.831416667	4
Hungary	178.0977587	1.57531E+11	-3886946396	372.5958333	3.2
Iceland	60.50341869	21556161805	-992663000.7	135.279902	3.6
India	34.35653152	2.96152E+12	-35408008686	78.60449058	3.4
Indonesia	40.13538864	1.12229E+12	-14816422520	14849.85394	3
Japan	38.62789783	4.52985E+12	1.27879E+11	131.4981404	3.9
Kazakhstan	59.53489382	2.2155E+11	-8024009043	460.165	2.7
Korea, Rep.	84.52960624	1.74087E+12	48411600000	1291.446667	3.8
Liberia	64.63308278	3428189417	-960192468.7	152.9337568	2.4
Madagascar	59.35729594	13439517646	-325831200.6	4096.116184	2.3
Malaysia	158.9062353	3.86875E+11	-3967084186	4.401076345	3.6
Mauritius	69.48173547	13345493636	-1060541203	44.182775	2.5

مجلة كلية السياسة والاقتصاد - العدد الثاني والعشرون - أبريل ٢٠٢٤

Mexico	82.17168467	1.28491E+12	-21864136780	20.12735	2.9
Moldova	93.42217151	9094802867	-541080000	18.89718962	2.5
Namibia	110.2909352	11508641306	-1026638769	16.35585833	2.9
Pakistan	27.22410381	3.99949E+11	-258000000	204.8671875	..
Panama	58.18810563	67839490713	-2678600227	1	3.1
Paraguay	61.86140973	41995687742	-222840894.4	6982.752378	2.7
peru	50.39204021	2.23194E+11	-11296201999	3.835181375	3
Philippines	55.60368916	4.0769E+11	-5379698122	54.47778584	3.3
Poland	107.7898621	6.3029E+11	-25652000000	4.457758333	3.6
Romania	76.22367464	2.32157E+11	-9254795831	4.688475	3.2
Russian Federation	38.77308981	1.47154E+12	26967700000	68.48494167	2.6
Rwanda	42.66991216	12955125583	-398599354.8	1030.3083	2.8
Serbia	110.4503517	49937794676	-4500108361	111.6621833	2.8
Singapore	212.3831576	3.79709E+11	-90055705996	1.378666667	4.3
Sweden	67.60025929	5.87578E+11	13430735731	10.11425128	4
Switzerland	92.64166709	7.90319E+11	-16905526798	0.9548325	4.1
Tajikistan	69.66178084	13499137004	-162320707.2	11.031075	2.5
Thailand	119.1423473	4.50139E+11	-3717019036	35.06135021	3.5
Turkiye	68.11712512	1.1944E+12	-8166000000	16.54886042	3.4
Ukraine	62.063116	71962895140	-213000000	32.3423016	2.7
United Kingdom	43.83703854	3.2095E+12	80704411997	0.811301716	3.7
United States	21.38428126	2.09268E+13	38173000000	1	3.8

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