

THE IMPACT OF FOREIGN DIRECT INVESTMENT ON MANUFACTURING INDUSTRY EXPORTS

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Abstract

The study aims to assess the impact of foreign direct investment (FDI) on manufacturing exports in four post-Soviet countries: Georgia, Armenia, Azerbaijan, and Belarus. The theoretical foundation of the study is based on the works of Kojima, MacCussen, Helpman, and other scholars who have analyzed the role of FDI in international trade and economic development. Using panel data from 2000 to 2023, regression analysis reveals a negative relationship between FDI and manufacturing exports—a one-percentage-point increase in FDI is associated with a 1.01 percentage point decrease in manufacturing exports.

Additionally, the study identifies a significant positive relationship between manufacturing exports and key factors such as gross capital formation (coefficient: 0.94), labor force participation (1.24), and trade openness (0.24).

A cross-country analysis highlights different trends. In Georgia, high FDI inflows have not resulted in a proportional increase in manufacturing exports, necessitating further investigation. In Armenia, despite moderate FDI levels, manufacturing exports have grown significantly. In Azerbaijan, periods of high FDI inflows have not coincided with manufacturing export growth. Meanwhile, in Belarus, manufacturing exports remain high despite low FDI levels.

The findings suggest that foreign investment in the region is predominantly directed toward non-export sectors, indicating the need for policy adjustments. To enhance manufacturing exports, it is recommended to channel more FDI into export-oriented industries and strengthen local production capacity. The high explanatory power of the model ($R^2 = 0.47$) and its statistical significance ($F\text{-stat} = 10.53$) confirm the reliability of the research results.**

Keywords: foreign direct investment, manufacturing, exports, post-Soviet countries, regression analysis, economic policy.

Introduction

In the modern global economy, foreign direct investment (FDI) plays a crucial role in the economic development of countries. For developing economies, including post-Soviet states, FDI serves not only as an essential source of capital but also as a mechanism for the transfer of technology, knowledge, and managerial expertise.

The significance of this study stems from the fact that, despite years of efforts to attract FDI, most post-Soviet countries continue to face substantial challenges in enhancing their export potential. The manufacturing sector, a key driver of high value-added production and,

consequently, economic growth, remains particularly problematic.

The dynamics of manufacturing exports vary across the four post-Soviet countries analyzed. Belarus has the highest share, ranging from 48% to 57%, though it declined to 38% in 2021. In Georgia, manufacturing exports have followed a downward trend, decreasing from a peak of 50% in 2012 to 29.6% in 2023. Conversely, Armenia has experienced significant growth, with its share doubling over the past two years, from 19% to 48%. Azerbaijan, meanwhile, exhibits consistently low manufacturing export levels (2–5%), although with a slight upward trend.

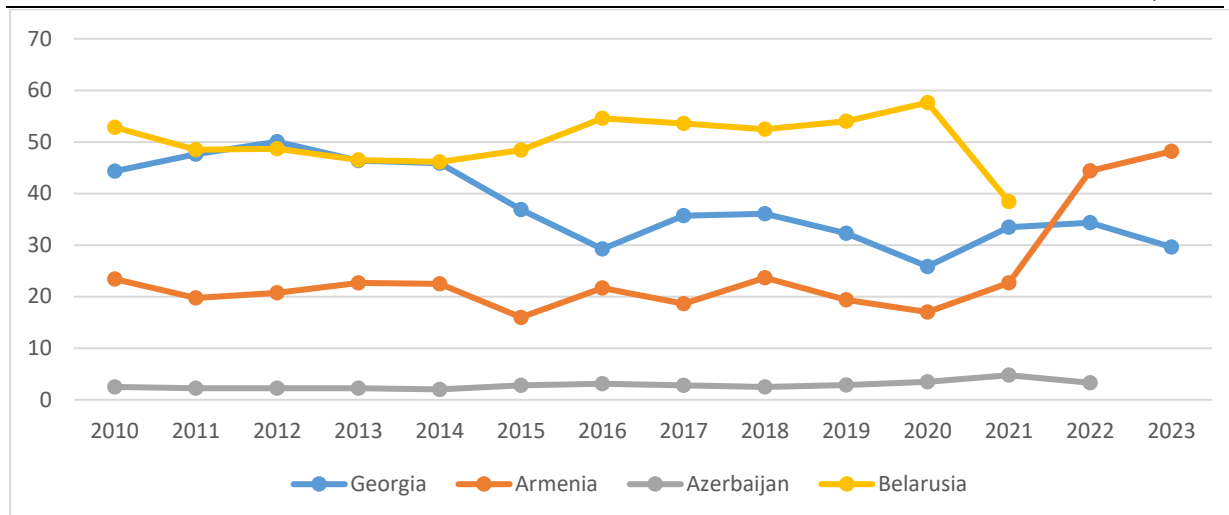


Figure 1. Manufacturing Exports (or Exports of Manufactured Goods)⁸

Thus, the primary objective of this study is to examine the impact of foreign direct investment (FDI) on manufacturing exports in four post-Soviet countries: Georgia, Armenia, Azerbaijan, and Belarus.

The central issue addressed in this research is that, despite the theoretical consensus on the positive impact of FDI on export potential, empirical evidence suggests that this relationship is not straightforward. This is particularly evident in post-Soviet countries, where the share of manufacturing in GDP and industrial exports has not demonstrated significant growth despite efforts to attract foreign investment.

Literature Review

A substantial body of empirical and theoretical research confirms the significant impact of foreign direct investment (FDI) on the export potential of host countries. This effect is particularly evident in developing economies, where foreign investment serves as a crucial driver of technological advancement and access to international markets.

Kojima's (1982) theoretical framework is particularly relevant, as it provides a detailed analysis of the bidirectional impact of FDI on trade flows. One key aspect of this framework concerns changes in export volumes from the host country to the source country, which is especially relevant in the context of modern global value chains.

In the case of vertical FDI, the positive impact on exports can be attributed to several factors: Increased production efficiency – Foreign companies often introduce advanced technologies and management practices, leading to improved productivity. Access to global markets – Multinational corporations' established distribution networks facilitate the export of products manufactured in the host country. Improvement in quality standards – The stringent quality requirements imposed by foreign firms incentivize local producers to enhance product quality. Technological spillovers – The transfer of knowledge and technology from foreign investors to local firms strengthens their export potential.

These positive effects are particularly pronounced in sectors where the host country possesses a comparative advantage (e.g., low-cost labor or natural resources) but lacks the necessary capital or technology to fully leverage these advantages.

The impact of FDI on exports has been widely studied in international economics (**Chaisrisawatsuk & Chaisrisawatsuk, 2007; Liu, Wang, & Wei, 2001**). **Chaisrisawatsuk and Chaisrisawatsuk (2007)** examine 29 OECD and six ASEAN countries using an extended gravity model to analyze the relationship between trade and FDI. Their findings indicate that while FDI increases exports from the host country to the investor country, it may reduce exports to other destinations. Similarly, **Liu, Wang, and Wei (2001)** employ Granger causality tests to investigate the causal relationship between trade and FDI in China. Their study is particularly significant as it moves beyond correlation to establish causality between these two economic variables in the context of a rapidly expanding economy.

The role of foreign direct investment (FDI) is particularly significant for emerging economies in Asia. Xuan and Xing (2006), using Vietnam as a case study, demonstrate that FDI significantly enhances exports to source countries, particularly in the long run.

Vietnam, like China, is a rapidly growing Asian economy where FDI plays a crucial role in both exports—by increasing production capacity and driving technological modernization—and imports—by facilitating access to high-tech equipment and high-quality raw materials. The researchers argue that FDI is not only a source of capital but also a key instrument for enhancing export potential in emerging Asian economies.

According to **Markusen's (1984)** theoretical framework, **horizontal FDI** primarily aims at market penetration, leading to the development of local production and the substitution of foreign trade. In contrast, the **vertical FDI** model presented by Helpman (1984) focuses on efficiency gains by leveraging cross-country differences in production factor costs, thereby stimulating trade through the expansion of intra-firm

⁸ <https://www.geostat.ge/ka>

and intermediate trade. In practice, firms often adopt investment strategies that integrate elements of both models.

New trade theory examines the relationship between FDI and international trade from two perspectives. Markusen (1984) argues that horizontal FDI is driven by market expansion and tends to replace trade by fostering domestic production. Meanwhile, Helpman (1984) contends that vertical FDI, based on factor price differences, complements trade by facilitating the development of global value chains and increasing intra-firm trade.

Krugman and Obstfeld (2005) differentiate between **inter-industry trade**, which is based on comparative advantage, and **intra-industry trade**, which is driven by economies of scale. Cheng and Kierzkowski (2001) further suggest that intra-industry trade involves the fragmentation of production, leading to a complementary relationship between FDI and trade. Similarly, Markusen (2000) finds that vertical multinational enterprises (MNEs) dominate when there are significant differences in production factors between countries, whereas horizontal MNEs are more prevalent when countries are similar in size and resource endowment, with moderate to high trade costs.

Empirical studies present mixed evidence on the relationship between FDI and exports. Camarero and **Tamarit (2003)**, using a panel cointegration method across a broad set of developed economies, find a complementary relationship between FDI and exports. However, **Payne and Wakelin (1998)** report varying results: while FDI complements exports in most OECD countries, it plays a substitutive role in Japan, Italy, and Denmark.

Majid and Ahmadi's (2008) study of 49 developing countries (covering 1970–2004) underscores the crucial role of FDI in enhancing export potential, which is particularly vital for developing economies.

Studies on Thailand reveal contrasting findings regarding the FDI-export relationship. Pufave and **Pusarsri (1994)**, employing Granger causality tests, confirm a positive impact of FDI on exports. Tumbunlertchai (2009), through a microeconomic analysis of the textile, food, and electronics sectors, highlights the export advantages of foreign firms. However, Johnson (2006) presents opposing results, indicating a negative impact of FDI on exports.

These varying findings suggest that the impact of foreign direct investment (FDI) on exports is influenced by multiple factors, including the structure of the economy, sectoral characteristics, and the time period under consideration. In this context, Leontief's

perspective is particularly relevant. He argues that FDI is a complex package encompassing not only capital flows but also managerial expertise, technological advancements, and access to international markets. According to Leontief (1953), the quality of investment and its capacity to generate a multiplier effect in the local economy are crucial. However, he also emphasizes the importance of maintaining a balance between foreign investment and the sustainable development of the domestic economy.

Drawing on the existing literature, this study examines the relationship between FDI and manufacturing exports in four post-Soviet countries: Georgia, Armenia, Azerbaijan, and Belarus.

Research Methodology

The analytical framework of this study assesses the impact of foreign direct investment (FDI) on manufacturing exports using a dataset from four post-Soviet countries: Georgia, Armenia, Azerbaijan, and Belarus. The model incorporates key factors that are expected to significantly influence industrial exports.

Based on a review of theoretical and empirical studies, the following main determinants have been identified:

- Gross capital formation – Represents investments in fixed capital, infrastructure development, and technological modernization.
- Trade liberalization and economic openness – Reflects the degree of integration into international trade, the presence of trade barriers, and the utilization of export potential.
- Exchange rate dynamics – Includes currency stability, foreign trade competitiveness, and the influence of international price fluctuations.
- Labor resources – Encompasses workforce qualifications, labor productivity, and employment structure.
- Inflation rate – Measures price stability, the effectiveness of monetary policy, and the predictability of the economic environment.

These factors collectively determine the growth of manufacturing exports, with their degree and direction of influence varying based on a country's economic structure and level of development.

By incorporating these determinants into the regression analysis model, the study evaluates both their individual and combined effects on manufacturing exports.

The variables used in the regression model are defined as follows:

Table 1

Variables Used in the Model			
Variables	Simbol	აღწერა	Sources
Exports of Manufactured Goods (% of Merchandise Exports)	MEXP	Manufactured goods include products classified under the following Standard International Trade Classification (SITC) sections: Section 5: Chemical products, Section 6: Basic manufactured goods, Section 7: Machinery and transport equipment, Section 8: Miscellaneous manufactured goods (excluding Division 68—non-ferrous metals)	World Bank Group https://data.worldbank.org/
Economic Growth	GDPGR	Economic growth is measured by the annual percentage change in real Gross Domestic Product (GDP).	World Bank Group https://data.worldbank.org/
Gross Fixed Capital Formation (GFCF)	GFCF	Gross fixed capital formation, expressed as a percentage of GDP, includes expenditures on fixed assets such as machinery, production equipment, industrial buildings, and infrastructure projects (e.g., railways and roads).	World Bank Group https://data.worldbank.org/
Inflation	INFL	Inflation is measured as the annual growth rate of the Consumer Price Index (CPI), serving as an indicator of macroeconomic stability.	World Bank Group https://data.worldbank.org/
Trade Openness	Trade	Trade openness, or trade liberalization, is measured as the ratio of total trade (sum of exports and imports) to GDP, expressed as a percentage. This indicator reflects the extent of a country's integration into the global economy and is calculated using the following formula: Trade Openness=(GDPExports+Imports)×100%	World Bank Group https://data.worldbank.org/
Exchange Rate	RER	The real exchange rate is calculated by adjusting the nominal exchange rate for price level differences between countries. It is obtained using the following formula: Real Exchange Rate=Local CPINominal Exchange Rate×US CPI	World Bank Group https://data.worldbank.org/
Labor Force	LF	Labor force growth is measured as the annual percentage change in the working-age population.	World Bank Group https://data.worldbank.org/

Regression models take the following form.

$$\text{MEXP}_t = \gamma_0 + \gamma_1 \text{FDI}_t + \gamma_2 \text{GDPGR}_t + \gamma_3 \text{GFCF}_t + \gamma_4 \text{INFL}_t + \gamma_5 \text{Trade}_t + \gamma_6 \text{RER}_t + \gamma_7 \text{LF}_t + \mu_t$$

Where

- $\gamma_0, \gamma_1, \gamma_6$ represent the parameters to be estimated.
- t (T_1) denotes the time period in years.
- u represents the white noise error term, where $u_t \sim N(0, \sigma^2)$

Research Results

First, we analyze the data for all four countries from 2000 to 2023 based on the variables included in the model. Then, using a regression equation, we establish the causal relationship between foreign direct investment (FDI) and manufacturing exports.

An analysis of Georgia's economic indicators for the period 2010–2023 reveals significant trends (Table 2). Economic growth exhibited substantial fluctuations, with a high growth rate in 2010–2012 (6–8%), followed

by a gradual slowdown in 2015–2016 (3.4%). The COVID-19 pandemic led to a sharp contraction in 2020 (-6.29%), although a strong recovery was observed in 2021–2022 (10.6–11%).

The share of manufacturing in GDP remained relatively stable at 8–10%, yet sectoral exports declined significantly—from 50% in 2012 to 29.6% in 2023.

Investment levels, measured by gross capital formation, fluctuated between 18% and 26%, peaking in 2016. GDP growth exhibited high volatility, particularly between 2014 and 2017 (10–11.7%).

Inflation rates varied considerably, with deflation observed in 2012–2013 and elevated inflation in 2010–2011 and 2021–2022 (8–14%). The Georgian lari (GEL) experienced continuous depreciation, weakening from 1.78 GEL/USD in 2010 to 2.63 GEL/USD in 2023.

Trade as a share of GDP showed an overall upward trend, rising from 81% to 117%, despite a sharp decline in 2020 due to the pandemic. Meanwhile, the labor force participation rate slightly declined from 71% to 68%.

Table 2

Economic Indicators of Georgia

Year	Manufacturing Value Added (% of GDP)	GDP Growth (Annual %)	Gross Fixed Capital Formation (% of GDP)	Inflation Rate	Trade (% of GDP)	Real Exchange Rate	Population Growth (Annual %)	FDI growth rate (%)	Exports of Manufactured Goods (% of Merchandise Exports)
2010	9,07	6,25	18,64	14,21	81,67	1,78	71,25	7,41	44,31
2011	9,45	7,93	19,83	9,17	85,47	1,69	72,03	7,56	47,63
2012	9,54	6,58	21,58	0,29	89,73	1,65	73,17	5,73	50,05
2013	9,22	5,13	18,44	-0,65	93,81	1,66	72,84	5,97	46,35
2014	9,21	4,09	21,44	4,59	94,95	1,77	73,49	10,22	45,86
2015	9,24	3,35	23,92	5,38	97,02	2,27	74,75	11,4	36,91
2016	7,78	3,45	26	2,27	94,93	2,37	74,05	10,75	29,22
2017	8,77	5,16	25,14	7,55	102,58	2,51	71,95	11,72	35,67
2018	9,06	6,06	24,79	3,48	109,85	2,53	69,71	7,28	36,09
2019	8,83	5,38	23,96	4	117,81	2,82	68,41	7,85	32,3
2020	9,43	-6,29	22,23	6,85	92,89	3,11	68,68	3,47	25,86
2021	9,92	10,64	20,76	10,23	101,6	3,22	69,33	6,78	33,49
2022	9,72	10,96	19,75	8,14	114,7	2,92	68,6	8,53	34,33
2023	8,26	7,47	21,47	2,48	106,31	2,63		5,82	29,63

An analysis of Armenia's economic performance from 2010 to 2023 reveals significant changes (see Table 3). GDP growth was volatile, improving from 2.2% in 2010 to 7.2% in 2012 before slowing down until 2016 (0.2%). The COVID-19 pandemic led to a sharp economic contraction of -7.2% in 2020, followed by a strong recovery in 2022 (12.6%).

The share of the manufacturing industry in GDP exhibited a steady increase, rising from 9.4% in 2012 to 11.1% in 2023. Industrial exports experienced a sharp surge in 2022–2023, reaching 44.4%–48.2%.

Gross capital formation declined significantly from 39.4% in 2010 to 20.8% in 2023. Inflation remained moderate between 2015 and 2020 (0.3%–2.8%) but rose considerably in 2021–2022 (6.9%–8%).

Trade as a share of GDP doubled, increasing from 64.6% in 2010 to 117% in 2023. The Armenian dram fluctuated within the range of 370–500 per USD, with a strengthening trend observed in 2022–2023. Meanwhile, GDP growth declined from 5.7% in 2010 to 2.4% in 2023, with particularly low growth rates recorded in 2019–2020.

Table 3

Economic Indicators of Armenia

Year	Manufacturing Value Added (% of GDP)	GDP Growth (Annual %)	Gross Fixed Capital Formation (% of GDP)	Inflation Rate	Trade (% of GDP)	Real Exchange Rate	Population Growth (Annual %)	FDI growth rate (%)	Exports of Manufactured Goods (% of Merchandise Exports)
2010		2,2	39,38	7,77	64,64	373,66	69,11	5,72	23,43
2011		4,7	30,74	4,28	69,44	372,5	69,15	6,44	19,74
2012	9,42	7,2	23,6	5,35	75,96	401,76	69,19	4,68	20,77
2013	9,68	3,3	21,21	3,37	77,56	409,63	69,4	3,11	22,68
2014	9,67	3,6	20	2,31	75,78	415,92	69,64	3,5	22,48
2015	9,21	3,2	20,61	1,21	71,68	477,92	69,96	1,74	15,99
2016	10,28	0,2	17,36	0,27	76,08	480,49	70,37	3,17	21,65
2017	10,63	7,5	17,65	2,15	87,2	482,72	70,73	2,19	18,65
2018	11,27	5,2	16,74	2,79	92,47	482,99	71,05	2,14	23,65
2019	11,71	7,6	15,82	1,07	96,11	480,45	72,82	0,74	19,36
2020	12,34	-7,2	17,77	1,81	69,49	489,01	72,36	0,46	16,99
2021	11,03	5,8	21,2	6,9	79,67	503,77	73,39	2,64	22,69
2022	11,31	12,6	20,27	7,99	101,01	435,67	72,72	5,11	44,37
2023	11,11	8,7	20,76	2,83	117,04	392,48		2,4	48,17

The Azerbaijani economy from 2010 to 2022 exhibited several significant trends. GDP growth remained unstable, with two major contractions in 2016 (-3.1%) and 2020 (-4.3%), followed by a recovery in 2021–2022 (5.6% and 4.7%, respectively).

The share of the manufacturing sector in GDP increased slightly from 4.7% to 6.4%, while manufacturing exports fluctuated within a narrow range of 2%–5%.

Gross capital formation initially rose from 18% in 2010 to 28% in 2015, before declining sharply to 12% by 2022. Inflation exhibited significant volatility, with periods of deflation in 2014–2015 and 2019–2020 (reaching a minimum of -8.85%) and a sharp spike in 2022 (37.27%).

Trade as a share of GDP increased from 75% to 91% in 2018 before slightly declining to 87%. The exchange rate depreciated considerably between 2015 and 2017, shifting from 0.8 to 1.7 AZN per USD. GDP

growth fluctuated dramatically, peaking at 11.88% in 2016 before turning negative at -5.68% in 2022. Population growth remained minimal, increasing only slightly from 64.8% to 65.7%.

The growth rate of foreign direct investment (FDI) in Azerbaijan followed an interesting trajectory. Between 2010 and 2012, FDI experienced steady growth from 6.3% to 7.6%. However, in 2013, there was a sharp decline to 3.5%, followed by a recovery phase from 2014 to 2016, during which FDI reached a historical peak of 11.9%. Since 2017, a downward trend emerged, culminating in an FDI decline to 1.2% by 2020. Notably, the last two years marked an unprecedented reversal, with negative FDI growth recorded for the first time: -3.1% in 2021 and -5.7% in 2022, signaling an outflow of investments from the country.

These findings underscore Azerbaijan's high economic vulnerability to external shocks and sharp fluctuations in key macroeconomic indicators.

Table 4**Economic Indicators of Azerbaijan**

Year	Manufacturing Value Added (% of GDP)	GDP Growth (Annual %)	Gross Fixed Capital Formation (% of GDP)	Inflation Rate	Trade (% of GDP)	Real Exchange Rate	Population Growth (Annual %)	FDI growth rate (%)	Exports of Manufactured Goods (% of Merchandise Exports)
2010	4,74	5,05	18,17	13,55	74,99	0,80	64,81	6,34	2,47
2011	3,99	0,10	20,18	22,52	80,51	0,79	64,40	6,80	2,25
2012	4,24	2,17	22,46	2,88	78,26	0,79	64,50	7,60	2,22
2013	4,22	5,81	25,79	0,45	74,68	0,78	64,70	3,53	2,23
2014	4,71	2,75	27,43	-1,28	69,48	0,78	65,10	5,89	2,02
2015	4,99	1,09	27,83	-8,85	72,60	1,02	65,40	7,63	2,82
2016	4,89	-3,10	25,03	14,67	90,08	1,60	66,00	11,88	3,12
2017	4,70	0,20	23,82	16,17	90,40	1,72	66,20	7,02	2,78
2018	4,62	1,50	20,69	12,18	91,67	1,70	66,30	2,98	2,50
2019	5,00	2,50	21,13	-0,24	85,82	1,70	66,50	3,12	2,88
2020	6,10	-4,30	22,67	-7,40	72,02	1,70	66,80	1,19	3,49
2021	6,42	5,62	16,23	21,59	76,29	1,70	67,10	-3,11	4,77
2022	5,28	4,71	12,01	37,27	86,98	1,70	65,70	-5,68	3,32

The Belarusian economy experienced significant fluctuations from 2010 to 2023. The manufacturing sector, despite a decrease in its share of GDP from 26.4% to 23%, maintained a strong export potential, with exports ranging from 45% to 57%.

GDP growth exhibited instability, beginning with a high growth rate of 7.8%, followed by a recessionary phase in 2015–2016 and again in 2022.

Capital formation nearly halved, dropping from 38.8% to 21.9%, reflecting a sharp decline in investment activity. Inflation was particularly severe in 2011–2012, reaching levels between 71% and 75%, and subsequently remained at a double-digit level

throughout the years. The exchange rate of the Belarusian ruble experienced a tenfold depreciation, from 0.3 to 3.01 against the US dollar.

The Belarusian economy showed high openness, with the share of trade fluctuating between 110% and 157% of GDP. However, GDP growth remained relatively low, staying within the 2%–3% range, except for a one-time peak of 6.5% in 2011. Population growth was moderate but stable, ranging from 74.7% to 79.3%.

Overall, there is a noticeable trend of worsening economic indicators, particularly in the monetary and investment sectors.

Table 5

Economic Indicators of Belarus

Year	Manufacturing Value Added (% of GDP)	GDP Growth (Annual %)	Gross Fixed Capital Formation (% of GDP)	Inflation Rate	Trade (% of GDP)	Real Exchange Rate	Population Growth (Annual %)	FDI growth rate (%)	Exports of Manufactured Goods (% of Merchandise Exports)
2010	22,51	7,8	38,83	11,29	115,92	0,3	74,65	2,43	52,81
2011	26,42	5,38	37,69	71,04	157,97	0,5	75,09	6,48	48,51
2012	24,78	1,69	33,42	75,28	153,09	0,83	75,62	2,23	48,7
2013	22	1	37,19	21,26	119,82	0,89	76,15	2,97	46,52
2014	21,09	1,73	33,22	18,1	110,65	1,02	76,68	2,36	46,14
2015	20,64	-3,83	28,65	16,02	115,91	1,59	77,14	2,93	48,4
2016	20,15	-2,53	25,44	8,34	125,21	1,99	77,55	2,61	54,59
2017	21,63	2,53	26,16	8,62	133,37	1,93	77,93	2,33	53,56
2018	21,26	3,15	26,23	12,14	139,39	2,04	78,15	2,38	52,45
2019	21,64	1,45	27,03	8,58	130,85	2,09	78,35	1,98	54,02
2020	21,49	-0,67	25,37	11,88	118,93	2,44	78,5	2,27	57,62
2021	22,76	2,44	22,57	15,33	136,01	2,54	78,83	1,77	38,43
2022	23,99	-4,66	19,45	14,88	120,02	2,63	79,33	2,19	
2023	23,01	3,89	21,85	7,37	133	3,01		2,88	

The descriptive statistical analysis of data for the South Caucasus countries (Georgia, Armenia, Azerbaijan) and Belarus, presented in Table 6, reveals significant trends.

The average rate of industrial exports (MEXP) is 32.1%, with a median of 33.9%. The maximum rate observed was 71.5%, while the minimum rate was 1.4%. The standard deviation of 20.3 percentage points indicates substantial variation in industrial export performance across the countries. The asymmetry coefficient of -0.14 suggests a slight leftward skew in the distribution.

The average share of foreign direct investment (FDI) in GDP stands at 6.9%, with a median of 4.7%. The maximum rate reached 55.1%, while the minimum was -5.7%. The high standard deviation of 9.1 and the asymmetry coefficient of 3.59 indicate significant rightward skewness and considerable variability in the share of FDI.

Descriptive Statistics

The average GDP growth rate (GDPGR) is 6%, with a median of 5.5%. The maximum growth rate observed was 34.5%, while the minimum was -14.1%. The standard deviation of 6.6 percentage points indicates substantial fluctuations in GDP growth across the countries.

The average rate of gross capital formation (GFCF) is 26.1%, with a median of 24.2%. The maximum value reached 57.7%, while the minimum was 12%. The standard deviation of 8 percentage points reflects considerable variability in capital formation.

The average inflation rate (INFL) stands at 12.4%, with a median of 7.7%. The maximum inflation rate recorded was 185.3%, while the minimum was -18.8% (indicating deflation). The high standard deviation of 23.1 and a skewness coefficient of 5.06 suggest significant right-sided asymmetry, indicating extreme fluctuations in inflation rates.

Table 7**Descriptive statistics**

	MEXP	FDI	GDPGR	GFCF	INFL	LF	RER	TRADE	MVA
Mean	32.09	6.90	5.95	26.05	12.38	70.77	114.2	95.58	12.81
Median	33.90	4.70	5.54	24.22	7.65	69.82	1.78	89.90	9.92
Maximum	71.52	55.07	34.50	57.71	185.2	79.33	578.76	157.97	28.5
Minimum	1.35	-5.67	-14.10	12.01	-18.84	64.40	0.08	54.54	3.98
Std. Dev.	20.34	9.08	6.63	8.03	23.11	3.90	199.82	24.50	7.48
Skewness	-0.13	3.58	0.92	1.51	5.05	0.4	1.26	0.53	0.73
Kurtosis	1.74	18.05	7.35	5.73	35.23	2.33	2.77	2.33	2.08
Sum	3016.4	662.8	571.3	2501.09	1189.38	6582.21	10968.3	9176.40	1076.81
Sum Sq. Dev.	38500.	7832.	4179.0	6135.93	50740.4	1399.84	3793399	57027.8	4645.09
Observations	94	96	96	96	96	93	96	96	84

The average labor force participation rate (LF) is 70.8%, with a median of 69.8%. The maximum participation rate observed was 79.3%, while the minimum was 64.4%. The relatively low standard deviation of 3.9 indicates a stable labor force participation rate across the countries.

The average share of industrial value added (MVA) is 12.8%, with a median of 9.9%. The maximum value reached 28.6%, and the minimum was 4%. The standard deviation of 7.5 percentage points reflects moderate variability in the share of industrial value added.

Table 8**Correlation**

	MEXP	FDI	GDPGR	GFCF	INFL	LF	RER	TRADE	MVA
MEXP	1,00	-0,28	-0,12	0,11	0,37	0,57	-0,15	0,65	0,84
FDI	-0,28	1,00	0,40	0,67	-0,14	-0,13	-0,19	0,01	-0,30
GDPGR	-0,12	0,40	1,00	0,21	0,04	-0,13	-0,09	0,10	-0,12
GFCF	0,11	0,67	0,21	1,00	0,10	0,23	-0,32	0,42	0,28
INFL	0,37	-0,14	0,04	0,10	1,00	0,11	-0,17	0,53	0,48
LF	0,57	-0,13	-0,13	0,23	0,11	1,00	0,02	0,56	0,62
RER	-0,15	-0,19	-0,09	-0,32	-0,17	0,02	1,00	-0,29	-0,11
TRADE	0,65	0,01	0,10	0,42	0,53	0,56	-0,29	1,00	0,79
MVA	0,84	-0,30	-0,12	0,28	0,48	0,62	-0,11	0,79	1,00

Correlation analysis reveals significant relationships between various economic indicators for the South Caucasus countries and Belarus (see Table 8).

Industrial exports (MEXP) exhibit a strong positive correlation with industrial value added (MVA, 0.84) and trade (TRADE, 0.65). Additionally, MEXP shows a moderate positive correlation with labor force participation (LF, 0.57), while demonstrating a weak negative correlation with foreign direct investment (FDI, -0.28). Foreign direct investment (FDI) is strongly correlated with gross capital formation (GFCF, 0.67) and shows a moderate positive relationship with GDP growth (GDPGR, 0.40). However, there is a weak negative correlation between FDI and industrial value added (MVA, -0.30).

Industrial value added (MVA) is strongly positively correlated with trade (TRADE, 0.79) and labor force participation (LF, 0.62), and also demonstrates a moderate positive correlation with inflation (INFL, 0.48). The trade index (TRADE) shows significant positive correlations with most variables, particularly with

MVA (0.79) and MEXP (0.65). The real effective exchange rate (RER) exhibits weak negative correlations with most variables, notably with GFCF (-0.32) and TRADE (-0.29). GDP growth (GDPGR) is moderately positively correlated only with FDI (0.40), while its relationships with the remaining variables are weak.

Inflation (INFL) shows moderate positive correlations with trade (0.53), MVA (0.48), and MEXP (0.37). This analysis suggests that industrial development in the region is strongly linked to trade relations and labor market activity, but exhibits a less pronounced dependency on foreign direct investment.

Results of the Regression Equation

The regression analysis illustrates the relationship between industrial exports (MEXP) and several economic indicators. The model results highlight significant trends and provide valuable insights.

- The coefficient for foreign direct investment (FDI) is -1.01 and is statistically significant ($p = 0.0001$). This suggests that a 1 percentage point increase in FDI is associated with a 1.01 percentage point

decrease in industrial exports, indicating an inverse relationship between FDI and industrial export performance.

- The coefficient for gross capital formation (GFCF) is 0.94 and is statistically significant ($p =$

0.0005). This indicates that a 1 percentage point increase in GFCF is associated with a 0.94 percentage point increase in industrial exports, suggesting that investment in capital formation contributes positively to the growth of industrial exports.

Table 9

Results of the Regression Equation (Dependent Variable: MEXP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	-1.01	0.24	-4.11	0.000
GDPGR	0.32	0.26	1.22	0.225
GFCF	0.94	0.25	3.64	0.000
INFL	0.06	0.08	0.76	0.447
LF	1.24	0.58	2.13	0.035
RER	0.01	0.00	1.87	0.064
TRADE	0.24	0.11	2.19	0.030
C	-101.9	35.03	-2.91	0.004
R-squared	0.467			
Adjusted R-squared	0.423			
F-statistic	10.533			
Prob(F-statistic)	0.000			

The regression analysis indicates the relationship between industrial exports (MEXP) and key economic indicators, with the following results:

Foreign Direct Investment (FDI): The coefficient is **-1.01** ($p = 0.0001$), indicating a statistically significant negative relationship. A 1 percentage point increase in FDI is associated with a 1.01 percentage point decrease in industrial exports. **Gross Capital Formation (GFCF):** The coefficient is **0.94** ($p = 0.0005$), showing a significant positive impact. A 1 percentage point increase in GFCF leads to a 0.94 percentage point increase in industrial exports. **Labor Force Participation (LF):** The coefficient is **1.24** ($p = 0.0354$), highlighting a significant positive relationship between labor force participation and industrial exports. A 1 percentage point increase in LF is associated with a 1.24 percentage point increase in industrial exports. **Trade (TRADE):** The coefficient is **0.25** ($p = 0.0308$), confirming a positive influence of trade on industrial exports. A 1 percentage point increase in trade is associated with a 0.25 percentage point increase in industrial exports. **GDP Growth (GDPGR), Inflation (INFL), and Real Effective Exchange Rate (RER):** The coefficients for GDPGR and INFL are not statistically significant at the 5% level. However, the coefficient for RER is **0.018** ($p = 0.0643$), indicating statistical significance at the 10% level. A one-unit increase in RER is associated with a 0.018 percentage point increase in industrial exports, suggesting a relatively weak but notable impact of exchange rate fluctuations on industrial exports. **Coefficient of Determination (R-squared):** The model explains **47%** of the variation in industrial exports, with an adjusted R-squared of **0.42**. **F-statistic:** The model is statistically significant overall, with an F-statistic of **10.53** and a p-value of **0.000**.

These findings highlight the importance of labor force participation and trade as key drivers of industrial export growth in the region, while the effects of FDI and exchange rate fluctuations are more nuanced.

Conclusion and Recommendations

Conclusion:

Based on the findings of this study, several key conclusions can be drawn: Foreign Direct Investment (FDI) and Industrial Exports:

A heterogeneous relationship was observed between foreign direct investment and industrial exports across the region. The regression analysis revealed a significant negative relationship, where a 1 percentage point increase in FDI was associated with a 1.01 percentage point decrease in industrial exports. This suggests that, in many cases, foreign investments are directed more towards non-export sectors rather than contributing to industrial export growth.

Country-Specific Trends: Georgia: High FDI rates did not result in a proportional increase in industrial exports. Armenia: Despite medium-level FDI, there was a notable increase in industrial exports in recent years. Azerbaijan: High FDI periods did not coincide with significant increases in industrial exports. Belarus: Despite lower FDI levels, industrial exports remain high. **Positive Impact of Other Indicators:** The analysis found that gross capital formation (coefficient 0.94), labor force participation (coefficient 1.24), and trade openness (coefficient 0.24) have a significant positive impact on industrial exports.

Model Reliability: The model demonstrates high explanatory power ($R^2 = 0.47$) and statistical significance (F-stat = 10.53), which strengthens the validity

of the relationships identified. However, further research is needed to better understand the disconnect between FDI and industrial export growth. The findings have important implications for economic policy, particularly in terms of investment attraction and industrial development. There is a need to better align foreign investments with export-oriented sectors to maximize their potential.

Recommendations:

Review Investment Policy: A sector-specific, differentiated investment policy should be developed, with a focus on industries with high export potential. Incentives should be introduced for foreign companies that are export-oriented, directing foreign investments towards these sectors.

Strengthen Industrial Policy: Identify priority sectors where the country holds a comparative advantage. Develop programs to create industrial clusters and encourage collaboration between local and foreign companies. This will facilitate technology transfer and integration into global value chains.

Enhance Human Capital Development: Adapt vocational education programs to the evolving needs of modern industries. Partner with foreign companies to offer specialized training programs. Invest in the development of infrastructure, including industrial parks, special economic zones, and logistics systems.

Strengthen Export Support Systems: Expand access to information about international markets. Enhance export financing mechanisms and introduce effective risk insurance systems. Simplify administrative processes for businesses and improve investment dispute resolution mechanisms.

Comprehensive Approach to Implementation: All of the above recommendations should be implemented in an integrated manner with the involvement of all stakeholders. Close coordination among various government agencies and collaboration with the private sector will be crucial to ensuring that foreign investments are effectively channeled into sectors that will contribute to increased export potential.

By adopting this comprehensive approach, countries in the region can strengthen their industrial base, enhance export performance, and attract foreign investments that contribute to sustainable economic growth.

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