Czech University of Life Sciences Prague

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Department of Trade and Finance

Bachelor Thesis

Analysis of Determinants of Exports of Kyrgyzstan

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BACHELOR THESIS ASSIGNMENT

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Business Administration

Thesis title

Assessment of Determinants of Exports of Kyrgyzstan

Objectives of thesis

The prime objective is to analyze the effect of macroeconomic facets that fundamentally shape the export trajectory of the Kyrgyz economy.

This thesis embarks on a comprehensive exploration of the intricate factors steering the export dynamics of Kyrgyzstan, with a specific concentration on macroeconomic determinants. The overarching goal is not confined to a mere identification of these determinants but extends towards a detailed analysis that seeks to unveil their quantitative impact

Methodology

At the forefront of this research is the in-depth examination of macroeconomic variables, encompassing a broad spectrum of economic indicators operating at the national level. These variables serve as the fundamental pillars through which the thesis endeavors to comprehend the broader economic landscape governing Kyrgyz exports. Integral to this exploration is a focused investigation into the multifaceted relationships that macroeconomic factors, such as exchange rate, inflation levels, political unrest and the price of gold, maintain with the export performance of Kyrgyzstan.

The methodology of the thesis is represented by the quantitative approach, where the emphasis is put on the linear regression estimation of the OLS kind. The data used covers the time span of 23 years (2000-2022), which is explained by the data availability. At last, the source of data is the World Bank.

The proposed extent of the thesis

40-50 pages

Keywords

Kyrgyzstan, exports, foreign trade, macroeconomics, competitiveness.

Recommended information sources

Allayarov, P., Mehmed, B., Arefin, S., & Nurmatov, N. (2018). The factors affecting Kyrgyzstan's bilateral trade: a gravity-model approach. The Journal of Asian Finance, Economics and Business, 5(4), 95-100.

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Declaration

I declare that I have worked on my bachelor thesis titled "Analysis of Determinants of Exports of Kyrgyzstan" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break any copyrights.

In Prague on 15.03.2024 _____

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Analysis of Determinants of Exports in Kyrgyzstan

Abstract

The thesis is concerned with the identification of the main determinants of Kyrgyz exports, where the emphasis is put on macroeconomic variables. In addition to the identification of determinants, their quantitative effect is estimated and studies. The methodology of the thesis is represented by the quantitative approach, where the emphasis is put on the linear regression estimation of the OLS kind. The data used covers the time span of 23 years (2000-2021), which is explained by the data availability. At last, the source of data is the World Bank. It is concluded that the price of gold is the most important determinant of Kyrgyz exports.

Keywords: Kyrgyzstan, exports, foreign trade, macroeconomics, competitiveness

Analýza determinantů vývozu v Kyrgyzstánu

Abstrakt

Práce se zabývá identifikací hlavních determinantů kyrgyzského exportu, kde je kladen důraz na makroekonomické proměnné. Kromě identifikace determinantů se odhaduje a studuje jejich kvantitativní účinek. Metodologii práce představuje kvantitativní přístup, kde je kladen důraz na lineární regresní odhad druhu OLS. Použitá data pokrývají časové rozpětí 23 let (2000-2021), což je vysvětleno dostupností dat. Zdrojem dat je konečně Světová banka. Dospělo se k závěru, že cena zlata je nejdůležitějším determinantem kyrgyzského vývozu.

Klíčová slova: Kyrgyzstán, vývoz, zahraniční obchod, makroekonomie, konkurenceschopnost

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USD	United States Dollar
OLS	Ordinary Least Squares
KGS	Kyrgyzstani Som
CIS	Commonwealth of Independent States
EAEU	Eurasian Economic Union

1 Introduction

The global economic landscape has undergone significant transformations in recent decades, marked by increased interconnectedness, globalization, and the proliferation of international trade. Within this dynamic context, nations around the world are continuously seeking to enhance their economic performance and competitiveness through strategic policy interventions. For countries like Kyrgyzstan, situated in Central Asia with a rich historical and cultural tapestry, navigating the complexities of the global marketplace is both an opportunity and a challenge.

The purpose of this bachelor thesis is to undertake a comprehensive analysis of the determinants of exports in Kyrgyzstan. Exports play a pivotal role in the economic development of any nation, serving as a key driver of growth, job creation, and overall prosperity. In the case of Kyrgyzstan, a landlocked country with a diverse economic structure, understanding the factors influencing its export performance is critical for policymakers, researchers, and business stakeholders alike, especially given the fact that the country is often seen as an export-oriented one.

Kyrgyzstan, a former Soviet republic that gained independence in 1991, has embarked on a path of economic reform and liberalization. As part of this process, the country has sought to integrate into the global economy and diversify its export base beyond traditional sectors. This thesis seeks to unravel the multifaceted determinants that shape Kyrgyzstan's export dynamics, examining both internal and external factors that influence the country's ability to participate effectively in international trade. To frame this analysis, it is imperative to recognize the significance of exports in the context of Kyrgyzstan's broader economic objectives. Exports not only contribute to foreign exchange earnings but also foster innovation, technology transfer, and the development of a competitive industrial base. Moreover, a robust export sector enhances a nation's resilience to economic shocks, as it diversifies revenue streams and minimizes dependency on a narrow range of industries.

The research methodology employed in this study combines quantitative and qualitative approaches to provide a comprehensive understanding of the determinants of exports in Kyrgyzstan. By drawing on a rich dataset that spans multiple years, encompassing

trade statistics, economic indicators, and policy variables, this thesis aims to shed light on the intricate interplay of factors that shape the country's export performance.

In conclusion, this bachelor thesis embarks on a journey to unravel the intricate web of determinants that shape the export dynamics of Kyrgyzstan. By combining a nuanced understanding of the external and internal factors influencing the country's export performance, the study aspires to contribute valuable insights to academic discourse, policy formulation, and strategic decision-making. As Kyrgyzstan continues its trajectory of economic development and global integration, a deeper comprehension of the forces driving its export sector is indispensable for realizing the nation's full potential on the international stage.

2 Objectives and Methodology

2.1 Objectives

This thesis embarks on a comprehensive exploration of the intricate factors steering the export dynamics of Kyrgyzstan, with a specific concentration on macroeconomic determinants. The overarching goal is not confined to a mere identification of these determinants but extends towards a detailed analysis that seeks to unveil their quantitative impact. The prime objective is to analyze the effect of macroeconomic facets that fundamentally shape the export trajectory of the Kyrgyz economy.

At the forefront of this research is the in-depth examination of macroeconomic variables, encompassing a broad spectrum of economic indicators operating at the national level. These variables serve as the fundamental pillars through which the thesis endeavors to comprehend the broader economic landscape governing Kyrgyz exports. Integral to this exploration is a focused investigation into the multifaceted relationships that macroeconomic factors, such as exchange rate, inflation levels, political unrest and the price of gold, maintain with the export performance of Kyrgyzstan.

2.2 Methodology

The methodology adopted for this thesis is anchored in a robust quantitative approach, with a particular emphasis on employing linear regression estimation of the Ordinary Least Squares (OLS) variety. This deliberate focus on quantitative methodologies reflects the commitment to a rigorous and empirical analysis that seeks to uncover the intricate relationships between variables shaping Kyrgyzstan's export dynamics. The chosen methodological framework, centring around linear regression, facilitates the quantitative estimation of the effects of macroeconomic determinants on Kyrgyz exports, providing a systematic and statistical examination of these relationships.

The temporal scope of the data utilized spans a substantial 27-year period, encompassing the years from 1994 to 2021. This temporal span is dictated by the availability of relevant data and is deemed essential for capturing the dynamic evolution of Kyrgyz exports over a sufficiently extended timeframe. By incorporating data over this extended

period, the thesis aims to provide a comprehensive analysis that considers long-term trends, cyclical patterns, and potential structural shifts in the export dynamics of Kyrgyzstan.

The primary source of data for this research is the World Bank, renowned for its comprehensive and reliable datasets covering a myriad of economic indicators on a global scale. Leveraging the World Bank as the source of data adds a layer of credibility and ensures the robustness of the empirical analysis. The utilization of data from a reputable international institution enhances the reliability and validity of the findings, underscoring the commitment to sound empirical research practices.

3 Literature Review

3.1 Kyrgyz Economy

The Kyrgyz Republic, situated in Central Asia, has experienced a dynamic economic landscape shaped by historical, geopolitical, and cultural factors. Analyzing the Kyrgyz economy necessitates an exploration of its historical background, economic structure, key sectors, challenges, and future prospects (Namazie & Sanfey, 2001).

Historically, Kyrgyzstan's economy has been influenced by its nomadic heritage and geographical location along the Silk Road. The region's economy thrived on trade and agriculture, with a nomadic lifestyle that fostered a strong connection to the land. However, the Soviet era drastically transformed the economic landscape, imposing a centralized economic model that prioritized heavy industry and collectivized agriculture. Following the dissolution of the Soviet Union in 1991, Kyrgyzstan, like many other former Soviet states, faced the challenge of transitioning to a market-oriented economy (Schmidt & Sagynbekova, 2008).

Figure 1, Kyrgyzstan on the world map

Source: Natural History, 2023

The economic transition in Kyrgyzstan has been characterized by a series of reforms aimed at liberalizing markets, privatizing state-owned enterprises, and fostering a competitive business environment. However, the transition process has not been without

challenges. Economic shocks, political instability, and external pressures have tested the resilience of Kyrgyzstan's economy. The country's reliance on remittances from overseas workers, particularly in Russia, has added another layer of complexity to its economic dynamics (Pelkmans, 2005).

Agriculture has historically been a vital sector in the Kyrgyz economy, providing livelihoods for a significant portion of the population. The country's diverse topography and climatic conditions support the cultivation of a variety of crops, including grains, vegetables, and fruits. Livestock farming, including sheep and cattle rearing, also plays a crucial role in the rural economy. However, the agricultural sector faces challenges such as outdated farming practices, inadequate infrastructure, and vulnerability to climate change (Light, 2007).

Industry and mining have become increasingly important components of the Kyrgyz economy. The country possesses significant mineral resources, including gold, which has attracted foreign investment in the mining sector. The Kumtor Gold Mine, operated by the Canadian company Centerra Gold, stands out as a major contributor to Kyrgyzstan's export revenues. While the mining industry has brought economic benefits, it has also sparked environmental concerns and social tensions, highlighting the delicate balance between economic development and sustainable practices (Temurshoev, 2004).

The services sector, including trade, finance, and tourism, has witnessed growth in recent years. Bishkek, the capital city, serves as a hub for commerce and administration. The development of the financial sector, including banking and microfinance, has played a crucial role in supporting economic activities. Tourism, with its potential to showcase Kyrgyzstan's natural beauty and cultural heritage, has gained attention as a promising sector for future development. However, challenges such as inadequate infrastructure and limited marketing efforts need to be addressed to unlock the full potential of the tourism industry (Akramov & Omuraliev, 2009).

Figure 2, the share of Kyrgyz sectors
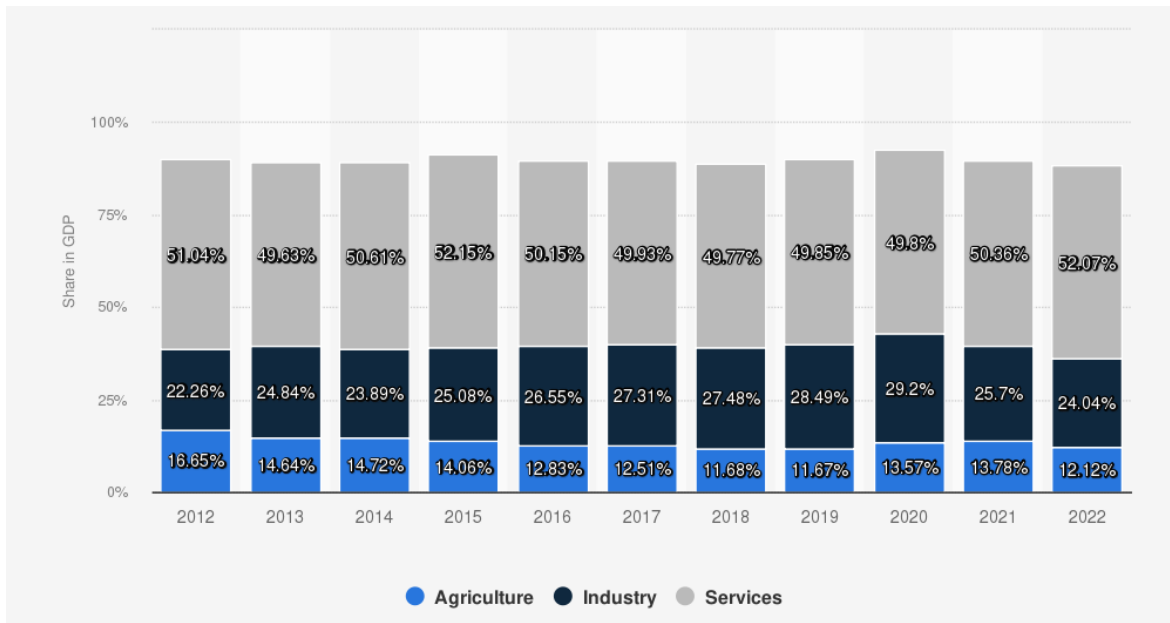
Source: Statista, 2023

One of the persistent challenges facing the Kyrgyz economy is its vulnerability to external shocks, including fluctuations in commodity prices and remittance flows. The reliance on remittances from Kyrgyz migrants working abroad, particularly in Russia, exposes the economy to the economic conditions of those host countries. Global economic downturns or geopolitical tensions can impact the well-being of Kyrgyz households, emphasizing the need for diversified economic strategies (Akmoldoev & Budaichieva, 2012).

Political instability has also played a role in shaping the economic landscape of Kyrgyzstan. The country has experienced political transitions and social unrest, impacting investor confidence and policy continuity. The intersection of political and economic factors poses a challenge for long-term economic planning and development. Over the course of its short independence course, the country was caught in 3 revolutions – one happening in 2005, the other taking place in 2010 and the final breaking out in 2020, thus making the country to stand out of the crowd of other post-Soviet republics (Ivanov, 2022).

Figure 3, Kyrgyzstan infographics

Source: HKTDC, 2023

Addressing economic challenges in Kyrgyzstan requires a multi-faceted approach. Strengthening institutions, improving governance, and enhancing the rule of law are essential for creating a conducive business environment. Investing in education and skills development is crucial for fostering human capital, driving innovation, and diversifying the economy. Infrastructure development, particularly in rural areas, can unlock the full potential of the agricultural sector and improve connectivity (Yuldashev & Sahin, 2016).

Environmental sustainability must be a key consideration in economic development plans. The mining sector, while providing economic benefits, should be managed responsibly to mitigate environmental impacts. Sustainable agricultural practices and climate-resilient infrastructure are essential for building a robust and environmentally conscious economy (Sagynbekova, 2017).

International cooperation and partnerships play a vital role in supporting Kyrgyzstan's economic development. Engaging with regional organizations, neighboring countries, and international financial institutions can provide access to expertise, technology, and financial resources. Bilateral and multilateral collaborations can contribute to the stability and resilience of the Kyrgyz economy in the face of global challenges. As a matter of fact, the country is an active participant of the CIS (Commonwealth of Independent States) and the EAEU (the Eurasian Economic Union), where both organizations are mainly driven by the will of the Russian Federation, thus potentially marking Kyrgyzstan as the sphere of Russian influence (Kurylev & Malyshev, 2022).

Figure 4, the map of the EAEU

Source: GMF, 2023

3.2 Resource-focused Economies

Resource-based economies, often characterized by a heavy reliance on the extraction and export of natural resources, are subject to a unique set of challenges and opportunities that shape their economic trajectories. These economies, commonly associated with sectors such as mining, oil, and agriculture, experience boom-bust cycles driven by the inherent volatility of commodity prices and the external demand for their primary exports (Ross, 1999).

The boom phase of a resource-based economy is marked by a surge in commodity prices and a subsequent influx of revenue. During this period, countries benefit from increased export earnings, higher government revenues, and enhanced economic growth. The extraction and export of natural resources contribute significantly to employment and infrastructure development, fostering a sense of prosperity within the nation (Ross, 2015).

However, the boom phase also presents risks and challenges. Resource-dependent economies often become susceptible to the "resource curse," a phenomenon where the abundance of natural resources fails to translate into broader economic development. Countries may experience over-reliance on a single or limited set of commodities, leading to vulnerability when global market conditions change (Davis & Tilton, 2005).

The bust phase follows the boom when commodity prices decline or face significant fluctuations. This downturn can be triggered by global economic recessions, shifts in consumer demand, or geopolitical factors. The sudden drop in revenue poses serious challenges to resource-dependent economies, impacting government budgets, trade balances, and overall economic stability. During bust periods, resource-based economies often face fiscal and monetary challenges. Governments, accustomed to high revenues during the boom, may have expanded public spending and invested less in diversifying their economies. As commodity prices fall, these governments are left with budgetary shortfalls, hindering their ability to maintain public services, fund infrastructure projects, and address social needs (Frankel, 2010).

Employment patterns are also affected during bust cycles, as industries dependent on resource extraction may witness layoffs and reduced economic activity. This, in turn, contributes to social and economic disparities, creating challenges in maintaining social stability. The boom-bust cycles in resource-based economies underscore the importance of effective resource management and economic diversification. Governments must use the revenue generated during boom periods to invest in infrastructure, education, and other sectors that contribute to long-term economic development. This strategy helps mitigate the impact of downturns by creating a more diversified and resilient economy (Mehlum et al., 2006).

In addition to economic diversification, sovereign wealth funds can play a crucial role in smoothing out the impact of boom-bust cycles. These funds accumulate revenues during periods of high commodity prices and can be utilized to stabilize the economy during downturns. By investing in a diversified portfolio of assets, countries can shield themselves from the volatility of commodity markets (Ploeg, 2011).

Furthermore, sound governance and institutional frameworks are essential in resource-based economies. Transparent and accountable institutions help manage revenues effectively, reduce corruption, and ensure that benefits from resource extraction are distributed equitably. These measures contribute to the sustainable development of the economy, reducing the susceptibility to boom-bust cycles. Global cooperation is also significant, as resource-based economies often navigate the complexities of international markets and geopolitical dynamics. Collaborative efforts with other nations and international organizations can provide support during challenging times and foster economic resilience (Ross, 2018).

Figure 5, the boom-bust cycles

Source: Medium, 2017

In addition, it is also wise to specify one of the key phenomena that are inevitably linked to both boom-bust cycles and resource-based economies. The phenomenon known as the Dutch disease is a well-documented challenge that often accompanies resource-based economies, exacerbating the impact of boom-bust cycles. The term originated during the Netherlands' experience in the 1960s when the discovery and subsequent exploitation of vast natural gas reserves led to a surge in export revenues. Paradoxically, this newfound wealth had adverse effects on other sectors of the economy, particularly manufacturing and agriculture. As revenues from natural gas exports increased, the Dutch guilder appreciated, making non-resource sectors less competitive in international markets. This currency appreciation, combined with the lure of higher wages in the booming resource sector, led to a decline in manufacturing and agriculture, creating a skewed economic structure (Bruhmbhatt et al., 2010).

The Dutch disease is characterized by a resource-driven appreciation of the national currency, which negatively impacts the competitiveness of non-resource sectors. In resource-dependent economies, the influx of revenue from commodity exports often leads

to an appreciation of the national currency. This makes domestically produced goods and services more expensive for foreign buyers, hampering the competitiveness of industries beyond the resource sector. As a result, the non-resource sectors face challenges in export markets, leading to a reduced contribution to overall economic output (Matsen et al., 2005).

Addressing the Dutch disease requires a comprehensive economic strategy. Diversifying the economy by investing in non-resource sectors, such as manufacturing, technology, and services, is crucial for mitigating the negative impacts of currency appreciation. Governments must implement policies that encourage innovation, improve infrastructure, and support the development of competitive industries. Furthermore, establishing sovereign wealth funds to manage resource revenues responsibly and prevent excessive currency appreciation can contribute to a more balanced and resilient economy. In this way, countries can navigate the challenges of the Dutch disease and build a sustainable economic foundation that withstands the volatility of resource markets (Bressen-Pereira, 2008).

3.3   Determinants of Exports

The determinants of exports are multifaceted and play a pivotal role in shaping the economic performance of a nation. Understanding these factors is crucial for policymakers, businesses, and analysts seeking to enhance a country's export capabilities and promote sustainable economic growth.

1) Comparative Advantage:
At the core of export dynamics is the concept of comparative advantage. Nations tend to specialize in producing goods and services where they have a relative efficiency or cost advantage. This principle, introduced by David Ricardo, highlights the importance of focusing on industries where a country can produce more efficiently than its trading partners. Identifying and leveraging comparative advantage is a fundamental determinant of a nation's export success (Majeed et al., 2006).

2) Exchange Rates:
Exchange rates play a critical role in shaping a country's export competitiveness. A depreciating currency can make a nation's exports more attractive to foreign buyers,

potentially boosting export volumes. Conversely, an appreciating currency may hinder exports by making them more expensive for international customers. Central banks and policymakers often monitor and manage exchange rates to support the competitiveness of their exports in global markets (Sousa et al., 2008).

3) Trade Policies and Agreements:

The regulatory environment, including trade policies and agreements, significantly influences a nation's ability to export. Free trade agreements, preferential trade arrangements, and tariff reductions can enhance market access and lower trade barriers. Conversely, protectionist measures and trade restrictions can impede export growth. Governments play a crucial role in formulating trade policies that foster a conducive environment for businesses to engage in international trade (Chen et al., 2016).

4) Infrastructure and Logistics:

Efficient infrastructure, including transportation networks, ports, and logistics capabilities, is a key determinant of export success. A well-developed infrastructure reduces transportation costs, facilitates timely shipments, and enhances the overall competitiveness of a country's exports. Investment in modern infrastructure is essential for countries aiming to improve their connectivity and seamlessly integrate into global supply chains (Fugazza & Molina, 2011).

5) Technological Capabilities:

Technological advancements and innovation contribute significantly to a nation's export competitiveness. Countries that invest in research and development, foster a culture of innovation, and adopt advanced technologies often produce high-quality, cutting-edge products that find demand in global markets. The ability to adapt and incorporate technological advancements is a crucial determinant of a country's position in the global export landscape (Katsikeas et al., 1996).

6) Quality Standards and Certification:

Meeting international quality standards and obtaining relevant certifications are imperative for export-oriented industries. Adherence to quality requirements enhances the reputation of a country's exports, instilling confidence in foreign buyers. Regulatory

compliance, quality control measures, and certification processes are essential determinants that influence the market acceptance of a nation's products (Agosin et al., 2012).

7) Global Economic Conditions:

The overall health of the global economy influences a country's export prospects. During periods of economic growth, demand for goods and services tends to rise, presenting opportunities for increased exports. Conversely, economic downturns can lead to reduced demand and challenges for exporting nations. Monitoring and adapting to global economic conditions are vital for navigating the inherent uncertainties in international trade (Agosin et al., 2012).

4 Practical Part

4.1 Variables and Models

The very first part of the practical analysis is dedicated to the description of the main variables that are incorporated into the analysis, as well as to the main justification of the reasons for selecting this particular set of variables. The explanation is presented in individual paragraphs that are presented below in this sub-chapter.

The first variable that was incorporated into the study is the volume of annual exports from Kyrgyzstan overseas in 2015 billion USD. The reason for selecting this specific price level lies in the fact that by focusing on the real GDP as the basis with constant values expressing the value of annual exports, it is possible to discard the potential effect of nominal prices and adjust the indicator to inflation. This is the only dependent variable in analysis and it is the main focus of the bachelor thesis.

The very first determinant that is believed to be influencing the value of real exports of Kyrgyzstan is the price of gold (adjusted to inflation) per ounce. Kyrgyzstan, as it was already mentioned in the theoretical part of the work, is a resource-oriented and resource-abundant country, where gold plays the most crucial part in the structure of the national economy of the country. Therefore, the inclusion of this variable was inevitable as it is supposed that it will produce the highest degree of effect on the exports of the country.

The second hypothesized determinant of Kyrgyz exports is the inflation rate, which is traditionally seen as one of the main driving forces of any trade and country's competitiveness. The inflation rate selected in the analysis follows the CPI logic and it is expressed in percentages indicating the increase in the consumer price index from the previous year in percentages.

The third hypothesized determinant of Kyrgyz exports is the exchange rate. The exchange rate is traditionally seen as one of the most crucial influencers of any exports or trade occurring between states and blocks of states. This is the direct indicator of any country's competitiveness and for this purpose, this variable is incorporated into the study.

The variable is expressed in average annual exchange rate between Kyrgyz Som (KGS) and United States Dollar (USD), where it indicates the direct quote for the US dollar.

The final determinant considered in the analysis is the binary variable that indicates the presence of a revolution. Kyrgyzstan, compared to other post-Soviet countries, stands out from the crows as it is the only country that faced such an unprecedented number of revolutions. There are three years that take the value of one, each representing a revolution happening in Kyrgyzstan. Thus, those years are: 2005, 2010 and 2020. For the other years, the variable takes the value of 0.

After concluding the description of variables and the main motivation behind selecting them, it is downright crucial to proceed to the formulation of economic and econometric models that will reflect the researcher's logic for the OLS implementation. First, the economic model is constructed, which is represented by the following formula (1):

$$X = f(P_g, i, EXRATE, REV) \tag{1}$$

The economic model reflects the relationship between the introduced set of variables, but it does not really express the structural form of the model that will be estimated using the OLS approach. As a matter of fact, due to the fact that the GDP is traditionally viewed as a variable increasing in the exponential way and the exports is a part of the GDP, according to the expenditure approach, the decision to employ a double-log model was made. On the other hand, the model that will be constructed does not fully follow the logic of double-log models due to the presence of a binary variable. Henceforth, the model is of the mixed kind and it follows the following structure expressed in the formula (2):

$$X_t = \upsilon_0 * P_g^{\upsilon_{1t}} * i^{\upsilon_{2t}} * EXRATE^{\upsilon_{3t}} - \upsilon_4 REV + \varepsilon_i \tag{2}$$

where X is the total value of exports from Kyrgyzstan in billion 2015 USD in year t; $\upsilon_{0...4}$ are parameters to be estimated using the OLS in Gretl; i is the annual inflation rate in Kyrgyzstan in %; $EXRATE$ is the exchange rate between Som and USD; REV is the binary variable indicating the presence of a revolution in Kyrgyzstan and ε_i is the error term.

It is expected that the model will follow the acronym best linear unbiased estimator (BLUE) and it will not suffer from autocorrelation, heteroscedasticity, absence of normality of residuals and multicollinearity. In case of deviations from the aforementioned assumptions, the robust standard errors framework is incorporated in order to tackle the imperfections of the models. Furthermore, it is assumed that the sign of the price of gold variable is positive, the sign of the exchange rate variable is also positive, the sign of inflation is negative and the sign of the binary variable reflecting revolutions in Kyrgyzstan is also negative. The next sub-chapter is focused on the description of data incorporated into the analysis.

4.2 Data Description

Before describing the individual development of variables and drawing the key insights related to the macroeconomic and trade variables, it is crucial to introduce the dataset that is used in the analysis. This is done in Table 1.

Table 1, the dataset for the thesis

Year	Exports, billion 2015 USD	Price of gold, USD	Inflation, %	Exchange rate, som/usd	Revolution
1994	1.82	384.16	40.21	10.84	0
1995	1.50	384.07	52.15	10.82	0
1996	1.60	387.73	31.95	12.81	0
1997	1.94	331.00	23.44	17.36	0
1998	1.77	294.12	10.46	20.84	0
1999	1.58	278.86	37.03	39.01	0
2000	1.75	279.29	18.70	47.70	0
2001	1.69	271.19	6.92	48.38	0
2002	1.83	310.08	2.13	46.94	0
2003	1.93	363.83	2.97	43.65	0
2004	2.18	409.53	4.11	42.65	0
2005	1.94	444.99	4.34	41.01	1
2006	2.11	604.34	5.55	40.15	0
2007	2.65	696.43	10.23	37.32	0
2008	2.90	872.37	24.52	36.57	0
2009	2.86	973.66	6.84	42.90	0
2010	2.53	1226.66	7.97	45.96	1
2011	2.93	1573.16	16.64	46.14	0
2012	2.36	1668.86	2.77	47.00	0
2013	2.66	1409.51	6.61	48.44	0

2014	2.49	1266.06	7.53	53.65	0
2015	2.35	1158.86	6.50	64.46	0
2016	2.26	1251.92	0.39	69.91	0
2017	2.40	1260.39	3.18	68.87	0
2018	2.33	1268.93	1.54	68.84	0
2019	2.71	1393.34	1.13	69.79	0
2020	1.97	1773.73	6.33	77.35	1
2021	2.30	1798.89	11.91	84.64	0

Source: own processing based on The World Bank, 2023

As it can be seen after looking at the original dataset, there are no missing values, which does not anyhow impede the researcher from performing the above-described analysis. Consequently, it is important to proceed first to the descriptive statistics of the sample, which is performed in Table 2.

Table 2, the descriptives of the sample

	Mean	Median	S.D.	Min	Max
Exportsbillion20~	2.190	2.218	0.4244	1.500	2.926
PriceofgoldUSD	869.1	784.4	532.6	271.2	1799
Inflation	12.64	6.878	13.37	0.3888	52.15
Exchangeratesomu~	45.86	46.05	19.63	10.82	84.64

Source: own processing based on The World Bank, 2023

Effectively, after addressing the most important insights of the studied sample, it is crucial to proceed to the description of each variable's behavior over time, which is performed in the following paragraphs. Consequently, the first variable that is discussed is the key variable of the study – the exports, whose time series plot is presented in Figure 6.

Figure 6, the time series plot of exports
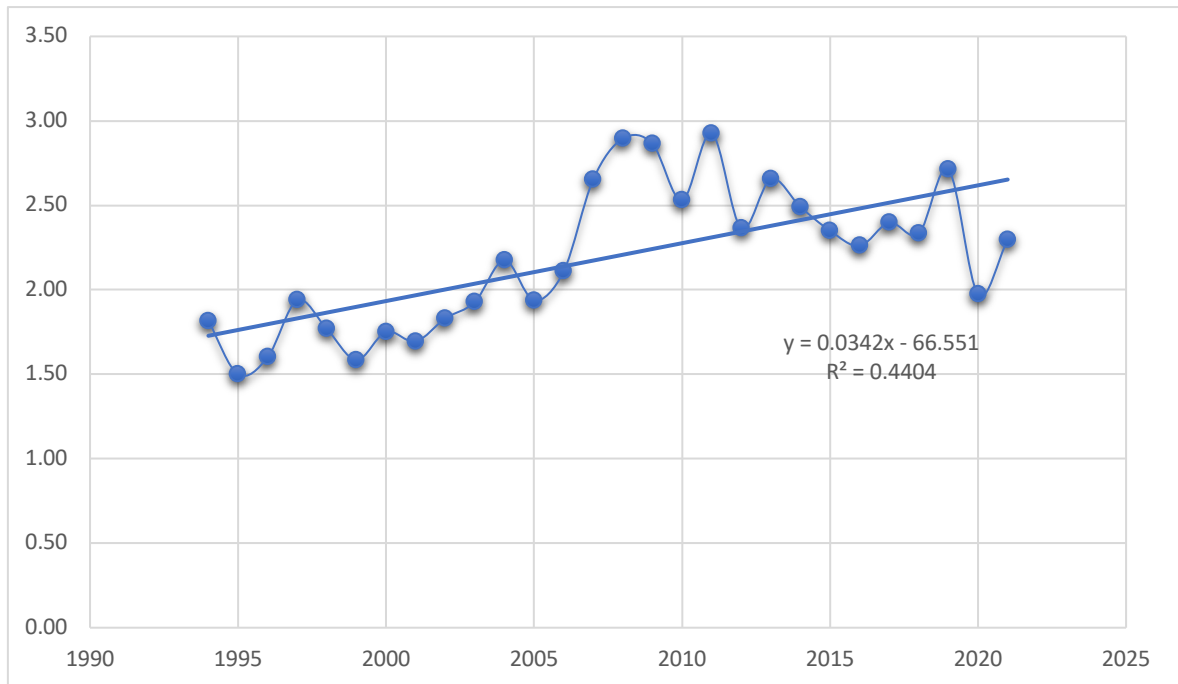
Source: own processing based on The World Bank, 2023

Based on the time series plot of the variable of the interest, it is possible to say that the exports of the country were following a rather complicated path as the value of exports was constantly fluctuating – increasing during short periods and then abruptly falling again. What is even more noticeable is the fact that the country has barely managed to increase the overall volume of exports from the 90s, which is a sign of a major economic distress.

According to the linear trend (whose quality is far from being perfect mainly due to the very volatile nature of the studies indicator), it is possible to conclude that the overall tendency was still positive with the annual increment of 0.03 billion 2015 USD. The next studied variable is the price of gold, which is more of an international variable within the context of the study. The time series plot for that variable is presented in Figure 7.

Figure 7, the time series plot of the gold price
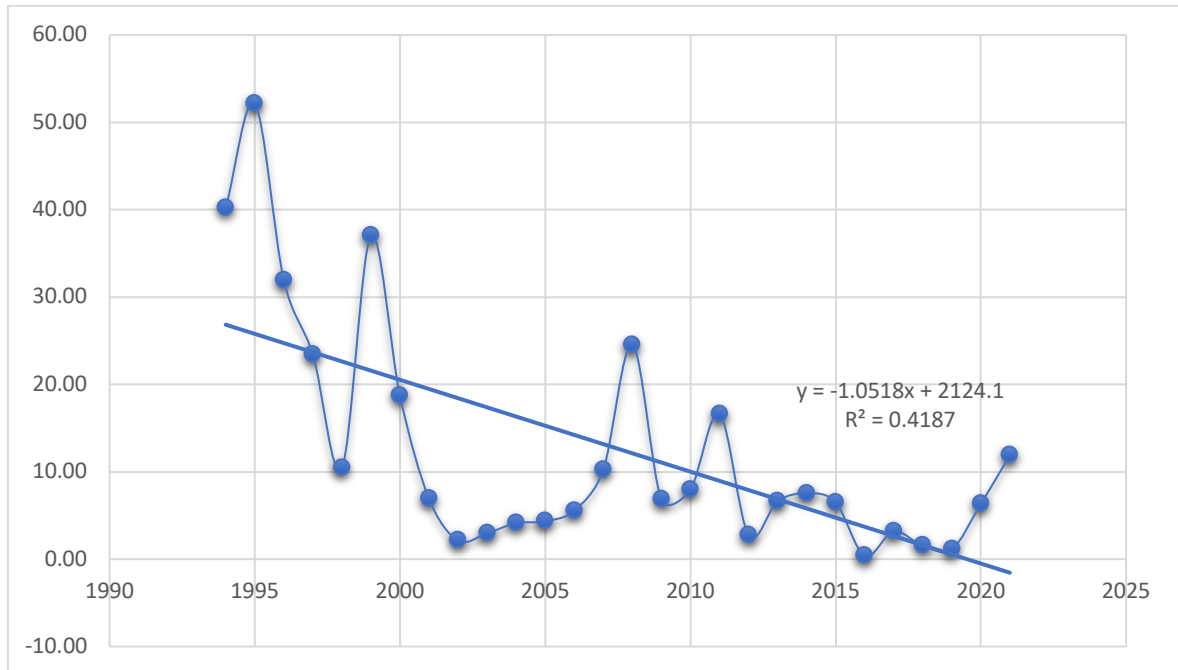

$y = 2E\text{-}64e^{0.0763x}$
$R^2 = 0.7931$
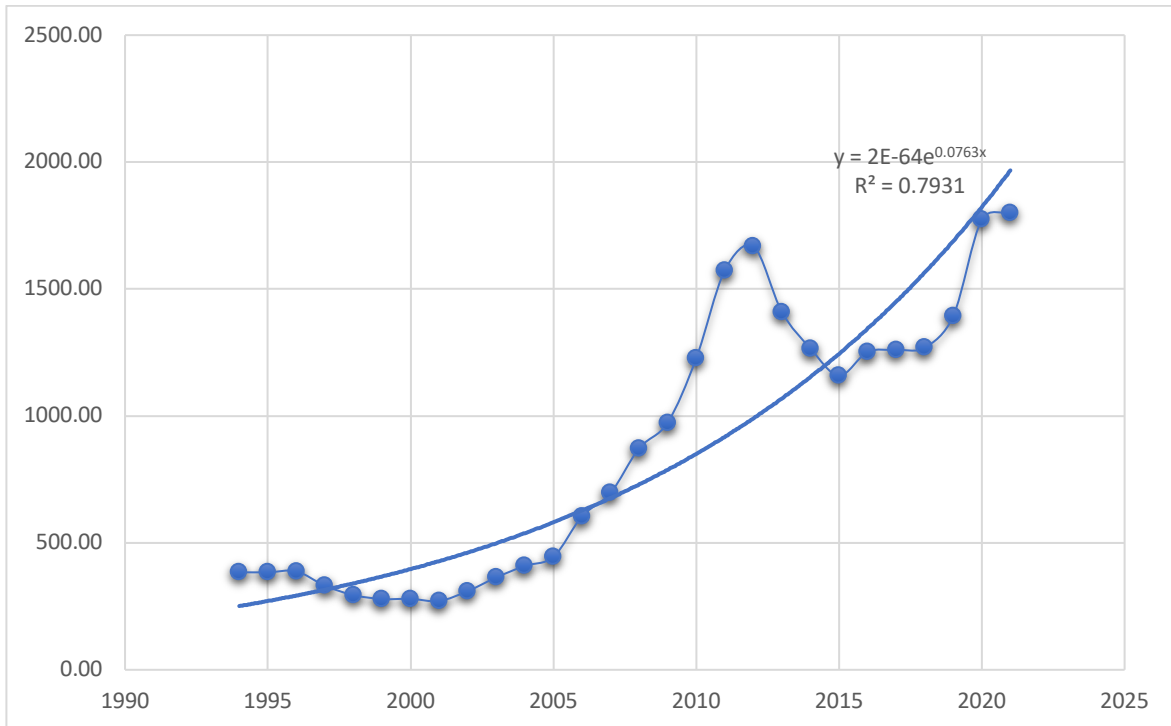
Source: own processing based on The World Bank, 2023

According to the behavior of the variable, it is possible to conclude that the price of the precious metal has substantially increased over the course of the analyzed time period. The commodity has significantly increased its valuation in the period shortly after 2010, but then soon dropped its value until once again starting to rise as a consequence of the manifestation of the COVID-19 pandemic in 2020-2021.

Based on the fitted exponential trend that explains the development of the variable the best, it is possible to say that the price of the commodity was, on average, increasing by 0.076 or 7.6% annually, which is an extremely good sign that must have certainly had its positive effects on the economy of a gold-producing Kyrgyzstan. The third variable whose development over time is analyzed is the inflation rate, which is presented in Figure 8.

Figure 8, the time series plot of inflation

Source: own processing based on The World Bank, 2023

Interestingly enough, despite the fact that the country was not really successful and performing well from the trade perspective (according to the behavior of the exports variable), the same cannot anyhow be said about the country's way of handling price stability. The government was able to significantly decrease the inflation rate, especially when comparing the period after 2000 with the period prior to the year. However, there were still visible surges in the value of the indicator, especially in the periods of economic downturn.

According to the time series plot and the trend constructed based on the behavior of the variable, it is possible to say that the inflation rate was annually decreasing in Kyrgyzstan by 1.051%, which is a good sign. The final variable incorporated into the study is a binary one, so it does not make much sense to comment on its behavior apart from simply mentioning that the revolutions in Kyrgyzstan happened in 2005, 2010 and 2020, where it is assumed that those events had taken a serious toll on the trade performance of the Central Asian state. At last, the verification of the multicollinearity assumption is performed in Table 3.

Table 3, the correlation matrix

```
Correlation Coefficients, using the observations 1994 - 2021
5% critical value (two-tailed) = 0.3739 for n = 28

 l_PriceofgoldU~    l_Inflation l_Exchangerate~     Revolution
        1.0000        -0.3958         0.6136           0.1751  l_PriceofgoldU~
                       1.0000        -0.6765          -0.0600  l_Inflation
                                      1.0000           0.1635  l_Exchangerate~
                                                       1.0000  Revolution
```

Source: own processing based on The World Bank, 2023

According to the results of the construction of the correlation matrix, it is possible to say that there is no such problem as the multicollinearity in the model due to the fact that all correlations are below 0.80, indicating the absence of the multicollinearity problem, which is the first assumption that is verified in the estimation. The following chapter deals with the OLS estimation and the subsequent verification of the remaining assumptions of the OLS model.

4.3 Estimation and Verification

Gretl, as it has already been specified earlier, is used as the main piece of statistical software. The results of the OLS estimation from Gretl are presented in table 4.

Table 4, results

```
File  Edit  Tests  Save  Graphs  Analysis  LaTeX

Model 2: OLS, using observations 1994–2021 (T = 28)
Dependent variable: l_Exportsbillion2015USD
HAC standard errors, bandwidth 2 (Bartlett kernel)

                     coefficient   std. error   t-ratio    p-value
   ------------------------------------------------------------------
   const             -0.730700     0.359456     -2.033     0.0538   *
   l_PriceofgoldUSD   0.211663     0.0391813     5.402     1.73e-05 ***
   l_Inflation       -0.000637430  0.0321291    -0.01984   0.9843
   l_Exchangerateso~  0.0327073    0.0755036     0.4332    0.6689
   Revolution        -0.101699     0.0735442    -1.383     0.1800

Mean dependent var    0.765660    S.D. dependent var     0.196404
Sum squared resid     0.387766    S.E. of regression     0.129844
R-squared             0.627689    Adjusted R-squared     0.562939
F(4, 23)             17.13574     P-value(F)             1.21e-06
Log-likelihood       20.18354     Akaike criterion      -30.36709
Schwarz criterion   -23.70607     Hannan–Quinn          -28.33075
rho                   0.535216    Durbin–Watson          0.934551

Log-likelihood for Exportsbillion2015USD = -1.25494

Excluding the constant, p-value was highest for variable 8 (l_Inflation)
```

Source: own processing based on The World Bank, 2023

According to the output from Gretl, the following model can eventually be constructed. However, before specifying the model that is created, it is at last crucial to comment on the presence of variables in their log-levels. Due to the fact that the estimated model does not have linear parameters, it was important to perform the linearization of parameters that is traditionally performed using the double-log transformation. Hence, the model has the following structure:

$$X_t = e^{-0.73} * P_g^{0.21_1t} * i^{-0.0006_2t} * EXRATE^{0.032_3t} - 0.10REV + \varepsilon_i$$

Consequently, an economic interpretation of the fitted parameters can be constructed:

- Whenever the price of gold increases by 1%, the value of Kyrgyz exports increases by 0.21%. This follows what has been assumed earlier.
- Whenever the inflation rate increases by 1%, the value of Kyrgyz exports decreases by 0.0006%. This follows what has been assumed earlier.
- Whenever the exchange rate depreciates by 1%, the value of Kyrgyz exports increases by 0.032%. This follows what has been assumed earlier.
- Whenever there is a revolution in Kyrgyzstan, the value of exports drops by 0.10 billion 2015 USD.

Overall, the model does possess all hypothesized signs that indicates that the model was constructed in a correct way, so the economic verification is successfully passed. The next verification that is performed in the thesis is the statistical verification, where the F-test is performed, t-tests are performed, and the coefficient determination's value is interpreted.

First, it is important to start with the value of the coefficient of determination, that is equal to 0.62 or 62%. On the other hand, the adjusted coefficient of determination is equal to just 0.56 or 56%, which suggests that the selected set of determinants does not fully explain the variation in the value of exports and there can be other crucial determinants. On the other hand, despite the negative way of portraying the situation, this does not significantly influence the analysis as the researcher was explicitly interested in the significance of selected determinants and also the quantitative effects.

According to the results of the F-test, it is possible to conclude that the whole model is significant at alpha equal to 0.05, but the same cannot be applied to all the selected predictors of Kyrgyz exports, since there is only one for which the P value is smaller than 0.05 and this is the price of gold. Therefore, it is crucial to indicate that the only significant determinant of Kyrgyz exports is the price of gold, while the effect of other ones is insignificant.

Finally, the econometric verification is performed, the results of which are presented in Table 5.

Table 5, the econometric verification

```
White's test for heteroskedasticity –
  Null hypothesis: heteroskedasticity not present
  Test statistic: LM = 16.3787
  with p-value = P(Chi-square(12) > 16.3787) = 0.174499

Test for normality of residual –
  Null hypothesis: error is normally distributed
  Test statistic: Chi-square(2) = 0.251797
  with p-value = 0.881704

LM test for autocorrelation up to order 1 –
  Null hypothesis: no autocorrelation
  Test statistic: LMF = 10.1548
  with p-value = P(F(1, 22) > 10.1548) = 0.00426396
```

Source: own processing based on The World Bank, 2023

Based on the series of econometric tests, it is possible to indicate that the model does not really suffer from non-constant variance of residuals (residuals are homoscedastic), does not suffer from the absence of normality (the residuals are normally distributed), but there is a problem with the serial correlation. Hence, one of the original assumptions is violated, but it is crucial to highlight that preliminary verifications had already been conducted prior to the estimation and the model had originally used the HAC standard errors, thus accounting for this autocorrelation.

Consequently, it is important to present the visual comparison of the fitted against observed, which is done in Figure 9.

Figure 9, the comparison of fitted values with the observed ones

Actual and fitted I_Exportsbillion2015USD

Source: own processing based on The World Bank, 2023

Effectively, based on the visual comparison between the two, it is visible that the model is far from being accurate, but it still does not create serious obstacles for the formulation of the conclusions and a pertinent discussion that both follow this chapter.

5 Results and Discussion

This section is dedicated to the results and discussion of the thesis. The central objective of this research was to scrutinize the impact of various economic determinants—namely, inflation, exchange rate, the occurrence of revolutions, and the price of gold—on Kyrgyz exports.

The examination of inflation as a potential determinant of Kyrgyz exports did not yield statistically significant results. Fluctuations in inflation rates were not found to have a discernible impact on the country's export performance. This implies that, at least within the scope of this study, inflation may not be a critical factor influencing Kyrgyz export dynamics.

Similarly, the exchange rate did not emerge as a significant predictor of Kyrgyz exports. The regression analysis failed to establish a conclusive relationship between exchange rate fluctuations and the country's export levels. This suggests that other factors may be more influential in shaping Kyrgyz export patterns.

The binary variable reflecting the presence of revolutions also did not exhibit a statistically significant relationship with Kyrgyz exports. While political instability has historically been considered a potential impediment to economic activities, the results suggest that, within the timeframe of this study, revolutions did not exert a measurable impact on the country's export performance.

In contrast to the non-significant findings for inflation, exchange rate, and revolutions, the price of gold emerged as a noteworthy determinant of Kyrgyz exports. The regression analysis revealed a significant positive relationship between the price of gold and the country's export levels. This implies that as the price of gold increased, so did Kyrgyz exports. The gold market dynamics appear to play a pivotal role in shaping the export landscape of the country.

The lack of significance observed in the cases of inflation, exchange rate, and the occurrence of revolutions raises important questions about the conventional wisdom

regarding determinants of export performance. It is plausible that the interaction of multiple factors, both domestic and international, contributes to the export dynamics of Kyrgyzstan, overshadowing the impact of these specific variables within the studied period.

The finding that the price of gold significantly influences Kyrgyz exports suggests a unique economic landscape for the country. The dependence on gold prices implies a vulnerability to global market fluctuations, emphasizing the need for diversified strategies to enhance export stability, thus prompting to indicate that the country is prone to the so-called boom-bust cycles (Tornell & Westermann, 2002). Further research may delve into the specific mechanisms through which gold prices influence Kyrgyz exports and explore potential policy measures to mitigate associated risks.

The observation that Kyrgyz exports exhibited significant fluctuations without substantial progress raises concerns about the overall resilience and sustainability of the country's export sector. Understanding the underlying causes of this volatility is crucial for policymakers to formulate targeted interventions that promote a more stable and upward trajectory in export performance.

The results of this study underscore the importance of nuanced policy approaches tailored to the specific economic context of Kyrgyzstan. Policymakers may need to reevaluate the traditional emphasis on certain determinants and consider a more holistic strategy that accounts for the multifaceted nature of global trade. Additionally, future research endeavors could explore additional factors, such as institutional quality and regional economic dynamics, to provide a more comprehensive understanding of Kyrgyz export patterns.

6 Conclusion

In conclusion, the investigation into the determinants of Kyrgyz exports has provided valuable insights into the deep dynamics of the country's international trade. Through a meticulous analysis of inflation, exchange rate, the occurrence of revolutions, and the price of gold, this study aimed to discern the factors shaping Kyrgyz export performance.

The results revealed that inflation and exchange rate fluctuations did not emerge as significant predictors of Kyrgyz exports during the studied period, which strikes as rather surprising. Likewise, the occurrence of revolutions, a variable often associated with political instability and economic uncertainty, did not exert a measurable impact on the country's export levels. These findings challenge conventional assumptions about the direct influence of these factors on export dynamics, suggesting a need for a nuanced understanding of Kyrgyzstan's economic landscape.

In contrast, the price of gold emerged as a key determinant of Kyrgyz exports, demonstrating a significant positive relationship. This highlights the unique role played by the gold market in shaping the export landscape of the country. The vulnerability to global gold price fluctuations underscores the importance of diversification and strategic planning in enhancing export stability.

The observed significant fluctuations in Kyrgyz exports without substantial progress raise questions about the resilience and sustainability of the country's export sector. Addressing this volatility requires a comprehensive understanding of the underlying causes, which may involve a combination of domestic and international factors. Policymakers must carefully consider these findings to formulate targeted interventions that promote a more stable and upward trajectory in export performance.

The implications for policy suggest a reevaluation of traditional approaches, with an emphasis on holistic strategies that account for the multifaceted nature of global trade. Additionally, future research endeavors may explore additional factors such as institutional quality and regional economic dynamics to further enhance our understanding of Kyrgyz

export patterns. Additionally, it is suggested that the government should explore options to diversify the export of the country in order to decrease the exposure to boom-bust cycles.

In summary, this study contributes to the ongoing discourse on the economic determinants of Kyrgyz exports by providing empirical evidence on the significance of the price of gold and the non-significance of conventional predictors. These findings not only enrich academic discussions but also offer practical implications for policymakers and stakeholders involved in shaping the economic trajectory of Kyrgyzstan. As the country navigates the complexities of the global market, a nuanced understanding of its unique economic dynamics will be essential for fostering sustainable and resilient export growth.

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