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CONTENT

Title and Author/s	Page
1. Extraordinary economy policies amid Covid-19 pandemic crisis: economic growth, labour productivity and elasticity of substitution <i>Ata Ozkaya</i>	95 - 103
DOI: 10.17261/Pressacademia.2022.1618 JEFA- V.9-ISS.3-2022(1)-p.95-103	
2. The relationship between growth and exports: what if the impact is negative? Evidence form Turkey <i>Ekrem Yilmaz, Fatma Sensoy</i>	104 - 112
DOI: 10.17261/Pressacademia.2022.1619 JEFA- V.9-ISS.3-2022(2)-p.104-112	
3. Time-varying dynamic analysis of factors affecting the levels of underpricing, average pricing, and overpricing of the us dollar in global derivatives markets <i>Mehmet Kuzu</i>	113 - 129
DOI: 10.17261/Pressacademia.2022.1620 JEFA- V.9-ISS.3-2022(3)-p.113-129	
4. The impact of foreign aids on poverty reduction: an international literature review <i>Kassim Tafana Kassim, Ertan Beceren</i>	130-144
DOI: 10.17261/Pressacademia.2022.1621 JEFA- V.9-ISS.3-2022(4)-p.130-144	
5. The impact of terrorism on Turkish financial markets: the sectoral approach <i>Onur Seker, Fatih Yilmaz</i>	145-151
DOI: 10.17261/Pressacademia.2022.1628 JEFA- V.9-ISS.3-2022(5)-p.145-151	



EXTRAORDINARY ECONOMY POLICIES AMID COVID-19 PANDEMIC CRISIS: ECONOMIC GROWTH, LABOR PRODUCTIVITY AND ELASTICITY OF SUBSTITUTION

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ABSTRACT

Purpose- This study investigates current financial, fiscal and monetary policies implemented to enhance growth rate in developed economies. First main theoretical findings of neoclassical growth theory are reconsidered. Second, current economy policies from the perspectives of Central banks and Treasury departments are analyzed. Finally, the relationship between these two is investigated and whether the policies are adequate to theoretical findings is examined.

Methodology- From the perspective of descriptive statistics, first; time evolution of labor's share of output from 1947Q1 through 2016Q3 is analyzed. Second, time evolution of percentage change in labor productivity with respect to real hourly compensation are considered from 1948Q1 through 2022Q1. In addition, to identify the accelerating gap between labor productivity and compensation over recent decades, annual index levels from 1973 to 2022 for labor productivity with respect to real hourly compensation are taken into account. Third, the phase-space representation of rate of real growth for output per capita is developed. In methodological perspective, both time-space and phase-space analyses on output per capita, labor productivity and labor compensation clear the way to establish a theoretical model, which explains the interaction between these variables based on constant elasticity of substitution production function.

Findings- For case of elasticity of substitution lower-than-unity, the relationship between rate of real growth for marginal productivity and average productivity of labor is obtained and is used to enlighten current U.S. monetary and fiscal policy implementations.

Conclusion- The results demonstrate that amid Covid-19 pandemics, U.S. fiscal policy and monetary policy do not optimally match and hence the fiscal policy should be calibrated. U.S. fiscal policy increased minimum wages and U.S. monetary policy addressed tighter and perfectly competitive labor market. These two policies do not coincide in terms of efficiency. In other words, simultaneous application of these two policies will not give desired compound result.

Keywords: Economic growth, labor productivity, fiscal policy, labor compensation, monetary policy

JEL Codes: E62, O40, O41,

1. INTRODUCTION

Following the declaration of COVID-19 pandemics (World Health Organization, 2020/03/11), in the mid-March 2020, to restrain and control spread of the novel coronavirus governments around the world adopted rigid measures to lock down countries and major trade hubs. These are suspending trade and travel, closing borders, shutting manufacturing units, touristic places, schools and imposing physical distance among people. These necessary measures deeply impacted the global economic activity and led to a "great lockdown" according to the International Monetary Fund (IMF).

In April 2020, from the perspective of monetary policy, the Federal Reserve Open Market Committee (FOMC) was in line with Treasury department's view and had observed that the shocks were amplifying in financial system, weighed on economic activity and disrupted the supply chains (minutes of the FOMC, April, 28-29, 2020 <https://www.federalreserve.gov/monetarypolicy/fomcminutes20200429.htm>). The FOMC employed expansionary monetary policy and doubled the portfolio as the Central bank snapped up the assets to stabilize markets and the economy.

In September 2020, the perspective of fiscal policy in U.S. has been announced by Treasury Secretary Steve Mnuchin. In the face of increasing concerns on slowing economic activity, the secretary explained Congress that lawmakers should not worried about increasing deficit of the national budget or the increasing size of Federal Reserve's balance sheet to delay additional Covid-19 relief.

Inherently, the expansionary fiscal and monetary policies resulted with booming demand. On August, 27, 2021 FOMC announced that *“Booming demand for goods and the strength and speed of the reopening have led to shortages and bottlenecks, leaving the COVID-constrained supply side unable to keep up. The result has been elevated inflation in durable goods—a sector that has experienced an annual inflation rate well below zero over the past quarter century.”*

On November 3, 2021, FOMC declared that supply and demand imbalances related to Covid-19 pandemic and reactivation of economy have continued to support elevated levels of inflation.

On February 2022, the US government realized an increase in minimum federal wage rate by 50 %, which signals the increase in marginal product of labor and expectations on increase in growth rate. The executive order of that policy had already been released as *“...Today, President Biden is issuing an executive order requiring federal contractors to pay a \$15 minimum wage to hundreds of thousands of workers who are working on federal contracts.”* (Statement, April 27, 2021). These facts reveal that beginning from 2021Q4 US Government had predicted a considerable increase in economic activity and hence in real GDP.

Over the period from April 2020 to June 2022, these policies and their mixed effects have strictly influenced the US economy and other developed countries. Beginning from January 2022, inflation level has surged and reached historically high levels. Russian invasion of Ukraine has initiated worldwide oil shocks¹ and energy supply bottlenecks for European Union countries. A measure specifying that an oil shock occurs when oil prices exceed its 3-year peak is accepted in the literature (Lee et al. 1995, Hamilton,2003). U.S. government released White House Inflation Plan on May, 10, 2022.

The plan aims at lowering food prices by helping domestic farmers grow more, and compete more effectively, and at lowering the cost of everyday goods by repairing infrastructure, supply chains, and manufacturing. For reducing oil prices, US government employs international relations, especially with Saudi government. Even though in long-term this plan can be realized, the probability of success in short-term is nearly zero. The fiscal policy continues to be expansionary. On the other hand, the Fed is going to unwind more than 8,7 trillion US Dollar of Mortgage based securities (MBS) and Treasury securities. In May 2022, the Fed began to increase interest rates and clarified the path for interest rates. However, in the eye of inflationary pressures, investors are keen to know what the policy rate level would be at the end of 2022. This fiscal and monetary policy mix indeed aimed at increasing growth rate for US economy. Moreover, this has been also true for other governments across the world. However, now, main concern in financial markets is to understand below which level the mixing of expansionary fiscal policy and contractionary monetary policy will weaken economic growth or is to estimate the probability of a recession.

The purpose of this study is to investigate the consistency of financial, fiscal and monetary policies addressing higher real growth rate for economic output. To do this, first we reconsider main findings of economic growth theory, and then we analyze whether the policies are adequate to theoretical findings.

This research is important because in perspective of policy making, it is crucial to find cutting-edge remedies to boom growth rate of economy, to recover price stability and to accelerate labor compensation of the output. If these remedies are not based on productivity increasing, then compound effect will probably be inflation augmenting.

The study is organized as follow. The section 2 explains the stylized facts about labor productivity, labor compensation and real wages in US economy. This section reveals the discrepancy between recent observations and theoretical background. Section 3 introduces theoretical analysis, findings and results of the study. This section aims at aligning the recent observations with growth theory. Last section tabulates conclusion and introduces discussion for the results.

2. DESCRIPTIVE ANALYSIS AND PRELIMINARY ISSUES

Economic theory suggests that firms pay workers according to their productivity. That is, workers' compensation reflects the value of the goods and services they produce. Figure 1 depicts the time evolution of labor share of output in nonfarm business sector. In last two decades, the decreasing process is accelerated. One might then wonder whether the slow growth in labor compensation is simply due to slow growth in labor productivity.

¹ As an example, the price of Saudi crude has gone from \$3.01/barrel on 10.15 to \$11.65 in 01.10.1974. In August 2022, it is expected that the price hike would drive prices close to record high levels, \$9.35/barrel. Recent movements in oil prices can be accepted as an oil shock.

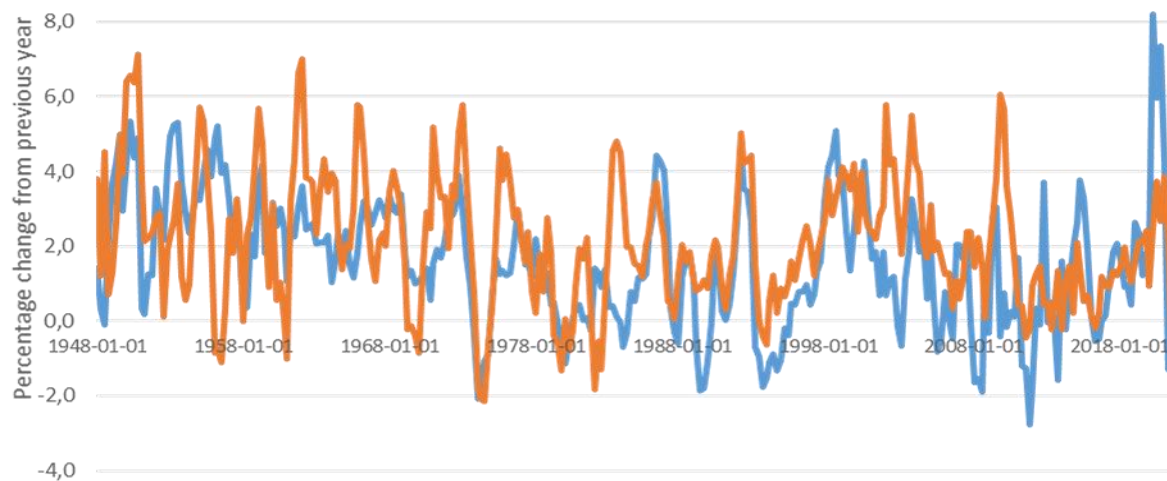
Figure 1: Labor's Share in U.S. Economy, first quarter 1947 through third quarter 2016



Source: U.S. Bureau of Labor Statistics, Nonfarm Business Sector: Labor Share for All Employed Persons [PRS85006173], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/PRS85006173>.

When we compare labor compensation and labor productivity² during the same period, we observe that real growth rate for labor productivity and average wages are partially related.

Figure 2: Labor Productivity and Real Hourly Compensation, first quarter 1948 through first quarter 2022



Source: U.S. Bureau of Labor Statistics, Nonfarm Business Sector: Labor Productivity (Output per Hour) for All Employed Persons [OPHNFB], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/OPHNFB>. Labor productivity, or output per hour, is calculated by dividing an index of real output by an index of hours worked of all persons, including employees, proprietors, and unpaid family workers. U.S. Bureau of Labor Statistics, Nonfarm Business Sector: Real Hourly Compensation for All Employed Persons [COMPRNFB], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/COMPRNFB>.

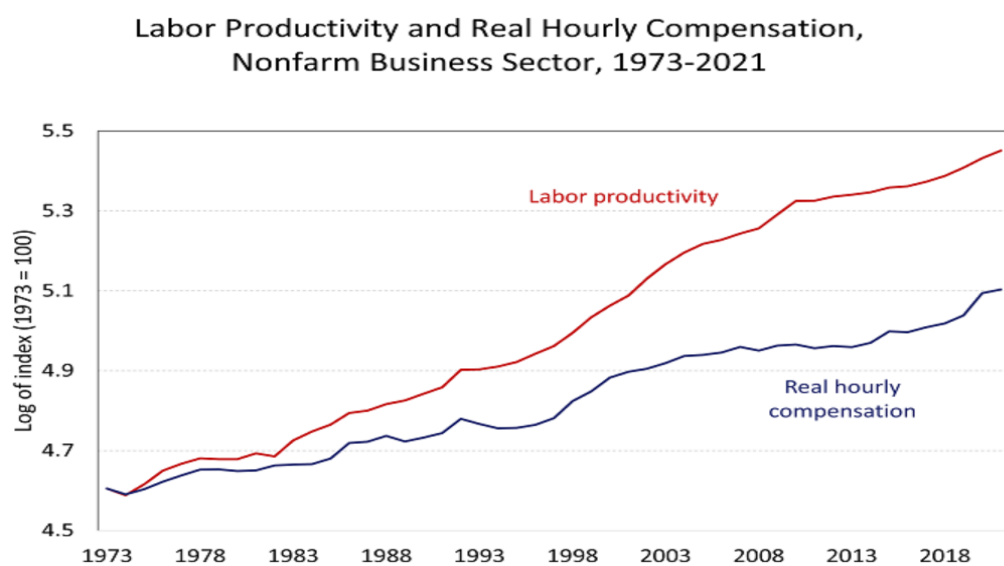
² Labor productivity is measured as real total output divided by total hours worked and labor compensation as real total labor compensation divided by total hours worked.

Figure 2 depicts the time-evolution of percentage changes in average productivity and average wages, respectively. The labor productivity is measured in terms of average product of labor. The data is seasonally adjusted. Particularly, the orange-line depicts the time evolution of percentage change in average product of labor from quarter one year ago. On the other hand, blue-line shows the time evolution of percentage change in average wages from year ago. The relationship between productivity and earnings can be seen in Figure 2, which depicts real rate of growth for labor productivity and real rate of growth for (consumer price index-adjusted) hourly compensation. During some periods wage growth rate correlates closely with productivity growth rate, but during some other periods, it does not likely correlate with productivity growth rate. Specifically, over the 1948-1971 period the growth rate for wage has been equal to growth rate for labor productivity and each has reached 2.7 percent. After then, a continual gap has persisted between two series and, in last two decades the two series significantly diverged.

According to the literature of Economic theory, it is known that in a perfectly competitive labor market, labor should be paid according to its marginal product. The last workers to be hired by a firm should earn pay that is equal to their contribution to the output of that firm.

Unfortunately, there is no data on the marginal product. But, we can measure average product. Although it's not a certainty given in the literature, these two products *should* be correlated. The labor market could be less than perfectly competitive or the theory could be revised or reinterpreted. Proposing a perspective different from percentage changes shown in Figure 2, Figure 3 depicts the level for labor productivity and real hourly compensation. Figure 3 clarifies that the gap between labor productivity and compensation has been widening for the past four decades (Domenech, 2015, Fleck, Glaser, & Sprague, 2011). The slower growth in labor compensation relative to labor productivity during last two decades is part of this long-term trend (Ravikumar & Shao, 2016).

Figure 3: Labor Productivity and Real Hourly Compensation, in index levels

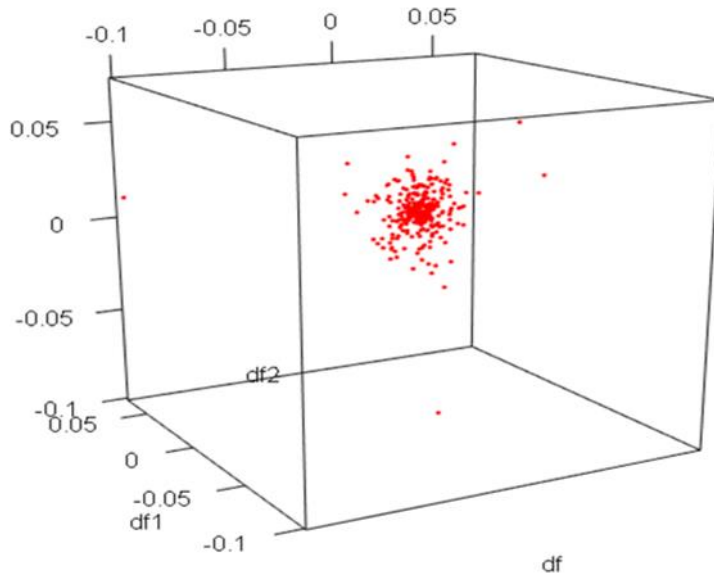


Source: U.S Bureau of Labour Statistics, <https://www.bls.gov/productivity/graphics/2022/graphic-4.htm>

In addition, we propose Figure 4. Figure 4 depicts the phase-space representation³ of $\frac{\dot{f}}{f}$, real growth rate of output per capita. X-axis plots time series, y-axis plots one-iterated time series, and z-axis plots two-iterated time series. As it can be seen, most of the duration the process is steadily around 0.2%. $f(k)$ is real gross domestic product per capita, chained 2012 Dollars, quarterly, seasonally adjusted annual rate. The data covers the period from 1947/1/1 to 2022/1/1.

³ For the theoretical framework of Phase-space representation see Eckmann et al (1987), Marwan et al (2007).

Figure 4: Phase-Space Representation of Real Growth Rate of Output per Capita



Source: Author. Data: Federal Reserve, St.Louis database ,<https://fred.stlouisfed.org/series/A939RX0Q048SBEA>

4. FINDINGS AND DISCUSSIONS

Arrow et al. (1961) defined constant elasticity of substitution function as given below.

$$Y = F(K, L) = \gamma[\delta \cdot K^{-\rho} + (1 - \delta) \cdot L^{-\rho}]^{-\frac{1}{\rho}}, \text{ where } \rho = \frac{1}{\sigma} - 1 \text{ and } \sigma \text{ signifies elasticity of substitution.}$$

In this setting the distribution parameter (δ) and the efficiency parameter (γ) are arbitrarily free parameters. Indeed, these parameters are integration constants which are derived from second-order differential equation defining the elasticity of substitution. However, In the related literature these parameters are introduced as arbitrarily free constants. Based on the studies Barelli & Abreu Pessôa (2003) and Litina & Palivos (2008), Ozkaya (2021) proposed a general solution to so-called differential equation and exactly determined what those integration constants are and what their economic implications are. The analysis in this section is based on the result in Ozkaya (2021). We determined that the distribution parameter (δ) and the efficiency parameter (γ) are components of the initial-terminal conditions of the marginal products. In the economy, capital services are K_t and labor hours are L_t at a given time t . For the notational easiness, we drop time notation.

Whenever $\sigma > 1$, the production function is:

$$F(K, L) = \left((F_K(K, 0) \cdot K)^{\frac{\sigma-1}{\sigma}} + (F_L(0, L) \cdot L)^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}} \tag{1}$$

The production function in case of $\sigma > 1$ depends on initial condition (state) for marginal products, $F_K(K, 0)$ and $F_L(0, L)$.

For $\sigma < 1$, the production function should be defined as in (2).

$$F(K, L) = \left((F_K(K, \infty) \cdot K)^{\frac{\sigma-1}{\sigma}} + (F_L(\infty, L) \cdot L)^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}} \tag{2}$$

The production function in case of $\sigma > 1$ depends on terminal condition (state) for marginal products, $F_K(K, \infty)$ and $F_L(\infty, L)$.

For case $\sigma < 1$, the relationship between marginal product of labor and average product of labor should be as given in (3). In (3), the constant term $F_L(\infty, L)$ is maximum marginal product of labor.

$$F_L(K, L) = \left(\frac{F(K, L)}{L} \right)^{\frac{1}{\sigma}} \cdot F_L(\infty, L)^{\frac{\sigma-1}{\sigma}} \tag{3}$$

For case $\sigma < 1$, Proposition 1 determines the relationship between change in marginal product of labor with respect to time (w.r.t time) and change in average product of labor w.r.t time.

Proposition 1. The relationship between time evolution of marginal productivity of labor and time evolution of average productivity of labor.

$$\frac{dF_L(K,L)}{dt} = \frac{(1-\pi)}{\sigma} \cdot \frac{d(F^{(K,L)}/L)}{dt} \quad \text{where } 1 - \pi = \frac{L F_L(K,L)}{F(K,L)} \text{ is the labor share of output.} \quad (4)$$

(4) shows that as long as $\frac{(1-\pi)}{\sigma} > 1$, then change in marginal product of labor w.r.t time will be greater than change in average product w.r.t time. On the other hand, if $\frac{(1-\pi)}{\sigma} < 1$, then change in marginal product will be lower than change in average product. Note that $\frac{dF_L(K,L)}{dt} > 0$ denotes growth, whereas $\frac{dF_L(K,L)}{dt} < 0$ stands for decay.

Proof 1: Derivation of both sides of (3) w.r.t time gives the desired result.

Proposition 1 implies that if marginal product of labor and average product of labor are initially assumed to be equal to each other, then through time evolution average product should overwhelm. The reason is that: even though theoretically it is possible $\frac{(1-\pi)}{\sigma} > 1$, the empirical evidence from the literature certainly suggests that $\frac{(1-\pi)}{\sigma} < 1$ is observed over last two decades. The main findings in the literature are summarized below.

The recent estimates of the elasticity of substitution in US economy at aggregate level is shown to fluctuate between 0.4-0.6 interval (Herrendorf et al., 2015, Chirinko & Mallick, 2017, Knoblach et al., 2020). The US economy historically has elasticity of substitution level lower-than-unity. A recent survey in Chirinko (2008) suggests that most evidence favors elasticities ranges of 0.4–0.6 for the United States. More recently, Knoblach et al (2020) estimate a long-run meta-elasticity for the aggregate economy in the range of 0.45–0.87 and conclude that “*Estimates of σ at the aggregate or manufacturing level of the U.S. economy are characterized by large heterogeneity. Although the range of estimates is wide, the majority of the empirical evidence suggests that σ is below the Cobb–Douglas value of unity*”. Given this fact, the analysis focuses on the case $\sigma < 1$.

On the other hand, the recent studies report that estimates of labor share in US economy is shown to lie between 0.55 and 0.6 (Lawrance 2015, Giandrea & Sprague 2016). The labor share $(1 - \pi)$ is the percentage of economic output that accrues to workers in the form of compensation. It is calculated by dividing the compensation earned during a certain period by the economic output produced over the same period. Labor compensation is a measure that includes wages and benefits. The official data released from the U.S. Bureau of Labor Statistics (BLS) suggest that, while the labor share had already fluctuated over the period from 1960 to 2000, the fastest decline occurred in last two decades—from 63.3 percent in 2000 to 56.7 percent in 2016 (Giandrea & Sprague, 2016, Lawrance, 2015; Elsby, Hobijn, & Şahin, 2013; Karabarounis & Neiman, 2012). The time evolution is plotted in Figure 1.

One may consider that both labor share and elasticity of substitution may change over time. This is true. Empirical evidence suggests that whereas labor share is decreasing over time, elasticity of substitution is increasing in the same period. Oberfield & Raval (2014) and Cantore et al (2017) report evidence that the elasticity of substitution for the U.S. economy is rising over time. Consequently, decreasing labor share and increasing elasticity of substitution yield $\frac{(1-\pi)}{\sigma} < 1$ over the period under examination.

Relating theoretical framework to the empirical measurements, ILO states that “*Labour productivity is an important economic indicator that is closely linked to economic growth, competitiveness, and living standards. Labour productivity represents the total volume of output (measured in terms of Gross Domestic Product, GDP) produced per unit of labour (measured in terms of the number of employed persons or hours worked) during a given time reference period.*”

The data observed in Figure 2 relates percentage change in average product of labor and percentage change in average wages. Examining average annual change, Sprague (2021) finds that “*The rate of output growth during the 2005–18 slowdown period (2.1 percent) is a historically weak growth rate. Not only does this rate pale in comparison to the 3.7-percent growth of the speedup period, but it also represents a historically slow rate for the entire post-WWII period, well below the historical average growth rate of 3.4 percent.*” The quarterly data in Figure 2 is consistent with this finding.

Eq.(4) enables to establish the relationship between percentage change in average product of labor and percentage change in marginal product of labor. Dividing both sides with $F_L(K,L) \cdot (F^{(K,L)}/L)$ and rearranging expression (4) yields (5).

$$\frac{dF_L(K,L)/dt}{F_L(K,L)} = \frac{1}{\sigma} \cdot \frac{d(F^{(K,L)}/L)/dt}{(F^{(K,L)}/L)}, \text{ for notational easiness let us introduce (5).}$$

$$\mu = \frac{\theta}{\sigma} \quad (5)$$

where μ is real growth rate for marginal product, and θ is real growth rate for average product. The parameter, θ also corresponds to the rate of real growth for labor productivity of the economy.

Since $\sigma < 1$, rate of real growth for marginal product should be greater than rate of real growth for average product. Therefore, for case $\sigma < 1$, it is also true that percentage change in marginal product of labor is greater than percentage change in average product of labor.

(5) enables to distinguish between labor's marginal productivity growth rate and labor's average productivity growth rate. In the literature the labor productivity growth is defined to be sum of multifactor productivity growth, contribution of capital intensity and contribution of labor composition. Marginal productivity growth can be assimilated to multifactor productivity growth. Sprague (2021) already defined that multifactor productivity growth (MFP) corresponds to the share of output growth which is not explained by capital growth and labor growth, but stems from other factors. Innovative capacity of firms' R&D departments advances in cutting-edge knowledge and technology in the production process, organizational development and efficiency, reallocation of factors toward higher productive industries. Therefore, MFP growth can be measured by subtracting labor growth and capital growth from overall growth, which can be considered as a residual.

In order to explain (5), one should rely on this decomposition. As elasticity of substitution increases, real growth rate for marginal productivity decreases.

The last two decades cover the period where real growth rate of average product is relatively reducing, and elasticity of substitution is increasing. Therefore, (5) implies that real growth rate of marginal labor productivity should gradually weaken in this period.

As a result, as labor market becomes perfectly competitive, -since marginal product and marginal price should converge- then the marginal price for labor should be eroded.

This finding is consistent with empirical result given in Sprague (2021). The author concludes that the deceleration in MFP growth, which is the largest contributor to the slowdown explains 65 percent of the slowdown in labor productivity growth.

This result implies that Central bank policy to make labor market perfectly competitive is not best policy choice, unless evolution of elasticity of substitution is significantly estimated and controlled.

On the other hand, fiscal policy designed to augment hourly wages from \$10 to \$15- a 50 percent increase in minimum marginal price of labor- will influence earnings of a partition of nonfarm business sector and other sectors. Therefore, this policy causes an increase in average hourly wages in labor market. According to expression (1), in a perfectly competitive economy an increase in minimum marginal product of labor coincides with an increase in minimum marginal price of labor. Therefore, the expectation of policy makers that the rate of growth for economy would increase, makes them to employ an increase in minimum wages. However, we have already explained that the U.S. economy historically has elasticity of substitution level lower-than-unity, which theoretically makes U.S. economy sensitive to maximum marginal product of labor. Expression (2) deals with the case of $\sigma < 1$ and thus we focus on (2) to solve this inconsistency.

For $\sigma < 1$, an increase⁴ in maximum marginal product of labor, $F_L(\infty, L)$ causes an increase or a decrease in the growth rate of income per capita, which depends on certain conditions. Derivation of real growth rate for output per capita with respect to maximum marginal product gives the following result. In order to obtain output per capita function, one may divide (2) with labor, L .

$$\frac{\partial}{\partial b} \left(\frac{f}{f} \right) = \frac{(\sigma-1)}{\sigma \cdot b} (1 - \pi) \pi \left(\frac{sf}{k} \left(1 + \frac{\sigma \pi}{(\sigma-1)(1-\pi)} \right) - n \right) \text{ where } b = F_L(\infty, L). \text{ It is straightforward that}$$

$$\frac{\partial \left(\frac{f}{f} \right)}{\partial b} > 0 \text{ if } \frac{1-\pi}{\sigma} < 1. \text{ From Proof 1, we have already shown that } \frac{1-\pi}{\sigma} < 1 \text{ is valid through US economy.}$$

This result implies that as long as labor productivity slows down, the growth rate of output per capita decreases. Therefore, a fiscal policy addressing an increase in maximum marginal product of labor will be growth enhancing. Taken inversely, if maximum marginal product is observed to be increasing, then an adequate policy would be to augment average wages. The minimum wage has been increased in Federal contracts and it triggered approximately 5 % annual increase in private sector average wages. To what extent an increase in minimum wage will cause an increase in maximum wage, and hence average wage? Under the circumstances where labor productivity is decreasing, a fiscal policy aims at pushing up average wages will eventually result with inflationary pressures. Thus, the U.S. fiscal policy is addressing the "wrong layers" in determinants for labor productivity.

⁴ The increase in maximum marginal product is considered as a result of policy making (Peretto & Seater, 2013).

5. CONCLUSION AND IMPLICATIONS

Following Covid-19 vaccine production success across the developed countries, “normalization” process of the economic activity has scheduled. US fiscal policy increased minimum wages and US monetary policy addressed tighter and perfectly competitive labor market. These two policies do not coincide in terms of efficiency. In other words, simultaneous application of these two policies will not give desired compound result. Contractionary monetary policy will increase competitiveness whereas increasing minimum wage does influence average wages, which causes an additional inflation. The reason is that marginal labor productivity has been slowing down, resulting with a decrease in real growth rate for output per capita. Moreover, real growth rate for wages (marginal price) will get slower.

Since the elasticity of substitution between input factors is shown to be augmenting, but is staying lower-than-unity, real growth rate of marginal productivity is decelerating w.r.t real growth rate of average labor productivity. As long as U.S. labor market becomes perfectly competitive, the labor compensation should decrease. Taken inversely, the reason that labor share’s deceleration may be decrease in real growth rate for marginal productivity of labor through last two decades. Moreover, in last two decades growth rate of labor productivity decreased faster than observed in previous decades. Therefore, it is plausible to suggest that deceleration in growth rate for marginal productivity is speeded up.

This policy measure would be better one given the substitution elasticity level higher-than-unity. Therefore, given the results of present study, increasing maximum marginal product of capital would be a better policy choice in terms of fiscal approach. Our results demonstrate that amid Covid-19 pandemics, US fiscal policy and monetary policy do not optimally match and hence the fiscal policy should be calibrated. Secondly, monetary tightening will influence unit labor costs in certain sectors. In this vein, future studies may focus on the evolution of linkage between labor productivity and unit labor costs in subsectors.

More generally, the effect of elasticity of substitution on economic growth depends strictly on the level of elasticity with respect to the unity. Therefore, the fiscal and monetary policies should be diversified in countries with elasticity of substitution level lower-than-unity w.r.t the countries where elasticity of substitution stays higher-than-unity. Whereas elasticity of substitution is lower-than-unity then automation (Aghion et al., 2019) and factor-eliminating process should be imposed (Peretto & Seater, 2013).

REFERENCES

- Aghion, P., Jones, B.F. & Jones, C.I. (2019) Artificial Intelligence and Economic Growth, in *The Economics of Artificial Intelligence: An Agenda*. Edited by Ajay Agrawal, Joshua Gans, and Avi Goldfarb. <https://www.nber.org/system/files/chapters/c14015/c14015.pdf>
- Arrow, K.J., Chenery, H.B., Minhas, B.S. & Solow, R.M. (1961). Capital-labor substitution and economic efficiency. *Review of Economics and Statistics*, 43(3), 225–250.
- Barelli, P., & Abreu Pessôa, S.(2003). Inada conditions imply that production function must be asymptotically Cobb–Douglas. *Economics Letters*, 81, 3,361-363, [https://doi.org/10.1016/S0165-1765\(03\)00218-0](https://doi.org/10.1016/S0165-1765(03)00218-0).
- Cantore, C., Ferroni, F. & Le’ on-Ledesma, M.A. (2017) The dynamics of hours worked and technology. *Journal of Economic Dynamics and Control*, 82, 67–82
- Chirinko, R.S. (2008). σ : The long and short of it. *Journal of Macroeconomics*, 30(2), 671–686.
- Chirinko, R.S. & Mallick, D. (2017) The substitution elasticity, factor shares, and the low-frequency panel model. *American Economic Journal: Macroeconomics*, 9(4), 225–253.
- Eckmann, J.-P., Kamphorst, S.O., & Ruelle, D.(1987). Recurrence plots of dynamical systems. *Europhysics Letters*, 4 (9), 973-984.
- Elsby, M.W.L., Hobijn, B. & Şahin, A. (2013). The decline of the U.S. labor share. *Brookings Papers on Economic Activity*, 1–63.
- Giandrea, M.D., & Sprague, S.(2017). Estimating the U.S. labor share. *Monthly Labor Review*, U.S. Bureau of Labor Statistics, <https://doi.org/10.21916/mlr.2017.7>
- Herrendorf, B., Herrington, C. & Valentinyi, A. (2015) Sectoral technology and structural transformation. *American Economic Journal: Macroeconomics*, 7(4), 104–133.
- Karabarbounis, L., & Neiman, B. (2014). The global decline of the labor share. *Quarterly Journal of Economics*, 129(1), 61–103.
- Knoblauch, M., Roessler, M. & Zwerschke, P. (2020). The elasticity of substitution between capital and labour in the US economy: A meta-regression analysis. *Oxford Bulletin of Economics and Statistics*, 82(1), 62–82.
- Lawrence, R.Z.(2015). Recent declines in labor’s share in U.S. income: a preliminary neoclassical account. NBER Working Paper, 21296 (Cambridge, MA: National Bureau of Economic Research), <http://www.nber.org/papers/w21296.pdf>
- Litina, A., & Palivos T. (2008). Do Inada conditions imply that production function must be asymptotically Cobb–Douglas? A comment. *Economics Letters*, 99, 498-499.
- Marwan, N., Romano, M.C., Thiel, M., & Kurths, J. (2007). Recurrence plots for the analysis of complex systems. *Physics Reports*, 438 (5), 237-329.

Oberfield, E. & Raval, D. (2014). Micro data and macro technology. NBER Working Paper No. 20452.

Ozkaya, A. (2021). Inada conditions asymptotically transform production function into the Cobb–Douglas. *Economics Letters*, 109786.

Peretto, P.F. & Seater, J.J. (2013). Factor-eliminating technical change. *Journal of Monetary Economics*, 60 (4), 459-473.

Ravikumar, B., & Shao, L. (2016). Labor Compensation and Labor Productivity: Recent Recoveries and the Long-Term Trend. *Economic Synopses*, 16, <https://doi.org/10.20955/es.2016.16>

Sprague, S. (2021). The U.S. productivity slowdown: an economy-wide and industry-level analysis. *Monthly Labor Review*, U.S. Bureau of Labor Statistics, <https://doi.org/10.21916/mlr.2021.4>.

Temple, J. (2012). The calibration of CES production functions. *Journal of Macroeconomics*, 34(2), 294-303, <https://doi.org/10.1016/j.jmacro.2011.12.006>.

World Health Organization, 2020/03/11, https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200311-sitrep-51-covid-19.pdf?sfvrsn=1ba62e57_10



THE RELATIONSHIP BETWEEN GROWTH AND EXPORTS: WHAT IF THE IMPACT IS NEGATIVE? EVIDENCE FROM TURKEY

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ABSTRACT

Purpose- The effect of economic growth on exports in Turkey and the direction of the relationship have been determined. The data were obtained from the World Bank data system and TUIK (Turkish Official Statistics Institute, 2021 data were obtained from here) and annual data for the period 1961-2021 were used. Analyzed with Auto Regressive Distrubuted Lag Models (ARDL) bounds test approach and Toda&Yamamoto Causality Test.

Methodology- The data set was created using annual data and analyzed in this way. Then Vector Autoregressive Model-VAR was created. Then, Toma&Yamamoto causality test and ARDL were applied. In addition, Breusch-Godfrey Autocorrelation LM Test, Breusch-Pagan-Godfrey Heteroskedasticity Test, unit root test, normality test and CUSUM tests were applied to verify the accuracy of the output.

Findings- It is concluded that there is a long-term relationship between the ARDL Bounds test approach and the variables where economic growth affects exports negatively in the long run, and a 1% increase in economic growth causes a decrease of 1.18 million dollars in exports in Turkey. The error correction term, which is calculated export in the long run, shows that the imbalances that may occur in the short run are corrected in the long run. According to the results of Toda-Yamamoto causality analysis, a causal relationship was found from Growth to Export.

Conclusion- The aim of this article is to find the causal relationship between Growth and Export in Turkey in the widest possible range and with the most up-to-date data and to reveal the extent of the causal relationship between them. As a result, although there is a causal relationship from Growth to Exports, this relationship is negative in the long run. This result has not been included in the Turkish literature before.

Keywords: Economic growth, exports, VAR, Toda&Yamamoto, causality, ARDL

JEL Codes: B41, F14, F43

1. INTRODUCTION CONCEPTUAL FRAMEWORK

The relationship between exports and economic growth is one of the important topics of discussion in the theoretical and applied economics literature. This situation can be explained by the role played by exports in the historical experiences of the economies that are now called developed. The effect of exports on economic growth is also known in the development literature as export-oriented growth. Export-oriented growth is an export-oriented development strategy and is used as a synonym for free trade or openness (Sannasse et al., 2014). In this context, export-oriented growth is one of the biggest instruments for the integration of countries into world markets (Mandel & Müller, 1974).

The phenomenon of globalization has significantly increased the foreign trade potential between countries by shortening the distances between world economies. In particular, this phenomenon has contributed significantly to the increase in economic growth by increasing the opportunities for trade in developing countries. The effect of foreign trade on growth has started to be discussed with the classical macroeconomic thought system, and the debate is still up-to-date today when Neo-Liberal economic policies are valid (Acet et al., 2016).

Theories from the classical growth theory to date have explained growth with different variables. However, among all these variables, wages, interest rates, savings level, human and physical capital, technological development, and natural resources

emerge as determinants of growth (Rebelo, 1991). In addition to all these variables, it has been reflected in the literature as an undeniable fact that export is one of the most effective factors in the growth of a country.

It is seen that the relationship between economic growth and exports is among the topics that are frequently discussed in the Turkish economic literature. In the literature, there are different studies for Turkey that both support and reject each other. Simdi and Seker (2018) examined the 1998-2016 period and found a long-term relationship between exports and growth, and found that they were affected by both national and international crises. Yurdakul and Aydin (2018), in their study with both nominal and real values, concluded that the import-led growth hypothesis is valid in nominal terms and the export-led growth hypothesis is valid in real terms for the 2003-2016 period. Ozcan and Ozcelebi (2013), on the other hand, found evidence for the export-led growth hypothesis in their study, in which they examined the relationships between exports, imports, industrial production index and real exchange rate for the 2005-2011 period. In their study, Saglam and Egeli (2015) argued that for the period 1999-2013, the relationship was bidirectional in the short term and from the direction of growth only in the long term. On the other hand, Temiz (2010), in his study covering the period 1965-2009, argued that there is no relationship in the short run, and that there is a relationship between real exports and growth in the long run.

As can be seen from above, although the relationship between export and growth has been the subject of many studies until today, different results have been obtained in different studies. Since both variables contain different components, these differences should be considered natural. For example, while the GDP values, which are the basis for the calculation of growth, consist of the sum of the added values, the export figures include the values of some imported goods in addition to the share of domestic production. If most of the exports consist of imported goods, it would be an incomplete evaluation to talk about the export-led growth phenomenon (Takim, 2010).

The causality relationship between exports and economic growth in an open economy has been established in four different ways (Taştan, 2010):

The first is the hypothesis that expresses a unidirectional causality relationship between exports and growth. In the "ELG-Export-Related Growth" hypothesis, it is thought that exports are a part of income and have a positive effect on economic growth indirectly, in addition to the multiplier effect. As a result of the increase in exports, resources will be shifted from inefficient non-trading sectors to the export sector, and efficient use of resources will lead to productivity gains and economic growth. The increase in exports will increase productivity by creating pressure through international competition, leading to the search for new technologies, intensification of research and development, more effective management techniques and entrepreneurial activities, learning by doing and the development of skills. As a result, economic growth will increase (Berg & Lewer, 2007). In addition, the increase in exports will contribute to economic growth by increasing the import capacity and facilitating the import of capital and intermediate goods, especially needed in the production of industrial goods.

The second hypothesis is the hypothesis that predicts a causal relationship between economic growth and exports. In this hypothesis, also called "Growth-Oriented Exports", it is thought that economic growth facilitates the adoption of new technologies, leads to productivity gains, and ultimately increases the country's exports by gaining a comparative advantage in international markets (Giles & Williams, 2010).

The third hypothesis is that there is a two-way causality relationship between economic growth and exports. While an increase in exports leads to economic growth, higher income levels can also lead to increased trade, leading to bilateral interactions. Finally, there may not be a causal relationship between economic growth and exports (Taştan, 2010).

Apart from the approaches mentioned above, there are almost no different approaches. Apart from these approaches, which we can say gathered under the general heading according to the results of the studies in the literature, our research results say something completely different.

This study was prepared to investigate the causality relationship between export and growth using annual data sets for the years 1961-2021 in Turkey and to decide whether this causality relationship is positive or negative. In the analyzed period, whether there is a causal relationship between export and growth variables in Turkey and if there is a causal relationship, the direction of this causality has been determined. Thus, this causality relationship will be determined in the widest possible range and with the most up-to-date data and will be brought to the literature. In addition, long- and short-term relationships between variables were determined with the help of ARDL Bounds Test and error correction models. In line with the results, a result that has not been seen before in the literature has emerged.

There are studies in which causality tests and cointegration tests have been applied many times before. The results of these studies confirm the above approaches. The literature review section will not be within the scope of our research, as this result is a first in Turkey and this is the first time it has been reached in this way, although similar methods have been followed, as it has been said before.

In the second part, econometric methods and analysis results are given. In the last section, there is a comment section on the findings of the outcome analysis. In addition, all models in this study were determined according to the Schwarz Information Criteria and will not be consistently specified in further testing.

2. METHOD

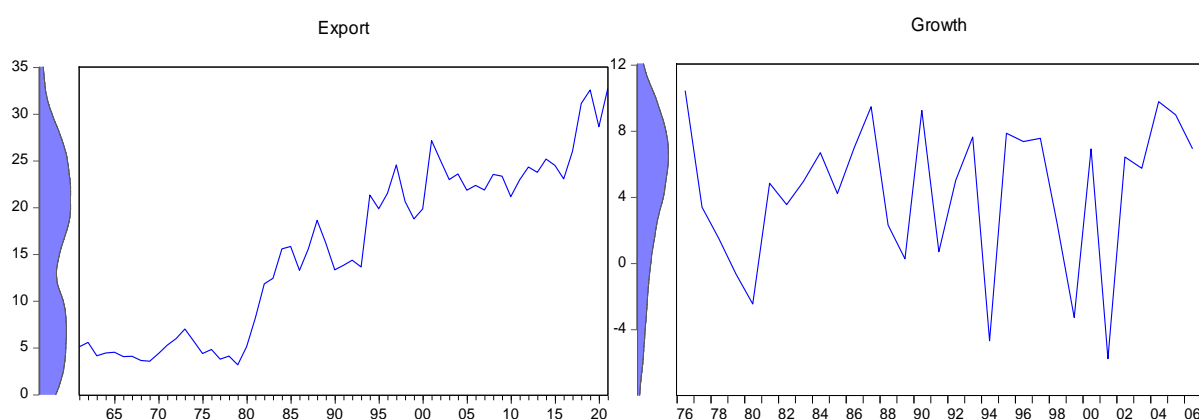
2.1. Datasets

In this study, the relationship between Export and Economic Growth in Turkey was investigated using annual data for the period 1961-2021. In the study, the variables Growth representing economic growth and Export representing export were used. Data for "GDP growth (annual %)" and "Exports of goods and services (current US\$)" are from the World Bank Databank for 1961 to 2020. The year 2021 was withdrawn from TUIK. The stationarity of the series is disrupted by the trend and seasonal element with different wave intensity. For this reason, the logarithms of the observation values must be taken to make the series stationary. With this transformation, the wave intensity of the seasonal effect becomes constant and the invariance of the variance is ensured. Then the differences need to be taken if necessary. These operations, in turn, ensure that the series is freed from the influence of the trend and seasonal factors, that is, the series is freed from the elements that disrupt the stagnation (Box & Jenkins, 1970). Therefore, the logarithms of the series are taken. All data have been obtained from the official database of the "World Bank" and "TUIK (Turkish Official Statistics Institute)". Table 1 and below contain descriptions of the Export and Growth variables in the model and some descriptive statistics:

Table 1: Disclosures and Descriptive Statistics

	Export	Growth	Descriptions
Mean	15.60325	4.761497	Export: Real export figures (Million USD)
Median	15.86072	5.043508	
Maximum	32.76394	11.21282	
Minimum	3.218027	-5.750007	
Std. Dev.	9.023335	3.948139	Growth: Economic growth rates compared to the previous year (%)
Skewness	0.008443	-0.714147	
Kurtosis	1.681580	3.276675	
Jarque-Bera	4.418732	5.379622	
Probability	0.109770	0.067894	TUIK (Turkish Official Statistics Institute, 2021 data were obtained from here)
Sum	951.7982	290.4513	
Sum Sq. Dev.	4885.235	935.2681	
Observations	61	61	

Figure 1: Graphs of Variables



Note: Plot, Raw Data, Kernel Density, Growth: Real Economic Growth Figures, Export: Export real values (Million Dollars), 1961-2021 period.

2.2. ADF Unit Root Test and Results

The stationarity tests of the series are carried out through unit root tests. Stationarity refers to the situation where the mean, variance, and covariance of a series do not change over time (Gujarati & Porter, 2009). In this study, the stationarity test of Export and Growth variables was determined by the Augmented Dickey&Fuller (Dickey & Fuller, 1979, 1981). Stability test results are demonstrated in the Table 2 below:

Table 2: ADF Test Results

Variable	Lag Length	ADF t-value	Test critical values			MacKinnon (1996) one-sided p-values
			1%	5%	10%	
Growth	$I(0)$	-7.59780*	-3.544.063	-2.910.860	-259.309	0.0000
Export	$I(0)$	0.039625*	-3.548.208	-2.912.631	-259.402	0.9581
Growth	$I(1)$	-8.644941*	-3.548.208	-2.912.631	-2.594.027	0.0000
Export	$I(1)$	-7.28098*	-354.820	-2.912.631	-259.402	0.0000

* The lag length of the ADF test was determined according to Schwarz Information Criteria.

According to the ADF unit root test, the null hypothesis demonstrates that the series contains a unit root and is not stationary. The alternative hypothesis states that the series does not contain a unit root, so it is stationary. According to the ADF test results (Table 2), the fact that the absolute value of the test statistics in the Table 2 is greater than the critical value indicates that the series does not contain a unit root, that is, it is stationary. Since the test statistic value is greater than the absolute critical value in both variables, Export is stationary at the first difference and without taking the Growth difference.

2.3. Toda&Yamamoto Causality Test

In order to apply this test, the Vector Autoregressive Model (VAR) must be established and the delay length (K) must be determined. Then, the highest degree of integration $dmax$ is added to the lag length K . Knowing these two values allows the model to be estimated correctly, preventing data loss and allowing more successful results at the level. The test model is as follows:

$$Growth_t = \vartheta + \sum_{i=1}^{K+dmax} a_{1i} Growth_{t-1} + \sum_{i=1}^{K+dmax} a_{2i} Export_{t-1} + \mu_{1t} \quad (1)$$

$$Export_t = \vartheta + \sum_{i=1}^{K+dmax} \beta_{1i} Export_{t-1} + \sum_{i=1}^{K+dmax} \beta_{2i} Growth_{t-1} + \mu_{1t} \quad (2)$$

The hypotheses for the equation denoted as (1) are:

$$H_0 : \text{Export is not Granger cause of Growth}$$

$$H_1 : \text{Export is Granger cause of Growth}$$

The hypotheses for the equation denoted as (2) are:

$$H_0 : \text{Growth is not Granger cause of Export}$$

$$H_1 : \text{Growth is Granger cause of Export}$$

2.3.1. Toda-Yamamoto Causality Test Results

With the traditional Granger (1969) Causality Test, the causality relationship between the variables is possible if the series are stationary and contain a cointegration relationship (Granger, 1969). With the Toda-Yamamoto causality test, it is not taken into account whether the series are stationary or whether they have a cointegration relationship. Since in the Toda-Yamamoto causality test, the same level of stationarity or cointegration of the series does not prevent the validity of the test, it is an advantage of this test that it prevents data loss if the series are made stationary by taking the difference as in the Granger causality test (Toda & Yamamoto, 1995: 225-250). The point to be considered in this test is that the maximum degree of integration ($dmax$) of the variables should not be greater than the appropriate lag number (K) of the model.

In order to apply the Toda-Yamamoto test, first of all, the VAR model must be established and the appropriate lag length must be determined. The Table 3 below contains the results for determining the appropriate lag length.

Table 3: VAR Lag Length Result

Lag	LogL	LR	FPE	AIC	SC	HQ
0	35.781.878	NA	1306.261	12.85067	12.92300	12.87871
1	28.172.760	144.0297	99.52781	10.27599	10.4929*	10.36012
2	27.870.027	5.514073	103.1231	10.31072	10.67239	10.45094
3	26.981.783	15.54426	86.76698	10.13635	10.64269	10.33266
4	26.082.342	15.0977*	72.8095*	9.95797*	10.60899	10.2103*
5	25.851.184	3.715030	77.70131	10.01828	10.81395	10.32676

Note: LR: Likelihood Rate Test Statistics; FPE: Final Prediction-Error Criteria; AIC: Akaike Information Criteria; SIC: Schwarz Information Criteria; HQ: Hannan-Quinn Information Criteria.

According to the results in the Table 3, the lag number of the model is 1 according to the SC (Schwarz Information Criterion) criterion. It is 4 according to FPE (Final Prediction Error) and LR (Sequential Modified LR Test Statistic), AIC (Akaike Information Criterion) and HQ (Hannan-Quinn Information Criterion) criteria. In this study, the appropriate lag length (K) has been determined as the SC (Schwarz Information Criterion) criterion, which includes more information criteria and is a method frequently used in practice. ($K=1$).

Previously, the presence of unit root was tested with the ADF test method and the longest delay was found to be "1". In order to test for causality with the Toda and Yamamoto method, $dmax$ was determined as the degree of the series with the longest delay. In this case, $dmax$ is taken as = 1.

Growth = $I(0)$ and Export = $I(1)$

$K=1$, $dmax=1$ and $1+1=2$ (This means that a Toda&Yamamoto equation with a lag of "2" will be solved.)

Table 4: Toda Yamamoto Causality Test Results

Direction of Causality	Test Statistic	Probability	Result
Growth to Export	7.278.863	0.0263	There is causality from Growth to Export
Export to Growth	1.135.874	0.6003	There is no causality from Export to Growth

According to the results of the Toda-Yamamoto causality test in Table 4, a one-way causality relationship from Growth to Export was determined

2.4. ARDL Bound Test

Tests such as Engle-Granger and Johansen are frequently used in the literature to test the concept of cointegration, which states that there is a stationary combination of at least two series that are not stationary at their levels. In these cointegration tests, there is an assumption that the series whose cointegration relationship is examined are stationary of the same order. This prerequisite has become a situation that is not required by the boundary test approach to cointegration analysis, which was introduced to the literature by Pesaran (1997) and Pesaran et al. (2001). The advantages of the bounds testing approach are:

- It is possible to apply the bounds test regardless of whether the variables to be used in the model are $I(0)$ or $I(1)$. For this reason, it is not necessary to determine the stationarity levels of the variables before applying the bounds test. However, the critical values in Pesaran et al. (2001) are tabulated according to whether the variables are $I(0)$ or $I(1)$. Therefore, the variables should be tested against the possibility of being $I(2)$.
- Since the unrestricted error correction model is used in the ARDL approach, it has better statistical properties than the Engle-Granger test and gives more reliable results in small samples than the Johansen and Engle-Granger tests (Narayan, 2005). The ARDL bounds test approach basically consists of 3 stages. While testing whether there is a long-term relationship between the relevant variables in the first stage, long-term and short-term elasticities are obtained in the second and third stages, respectively, under the condition of the existence of a cointegration relationship (Narayan & Smyth, 2006). The adaptation of the unlimited error correction model used in the first stage of the test to our study is as follows:

$$\Delta EXPORT = a_0 + \sum_{i=1}^k a_{1i} \Delta EXPORT_{t-i} + \sum_{i=0}^k a_{2i} \Delta GROWTH_{t-i} + a_3 EXPORT_{t-1} + a_4 GROWTH_{t-1} + \varepsilon_t \quad (3)$$

Δ in the model (3) shows first-order differences. Bahmani-Oskooee & Goswami (2003) revealed in their study that the F test used for the boundary test is sensitive to the lag length. For this reason, in order to test the existence of the cointegration relationship, first of all, it is necessary to decide on the k value, which shows the lag length of the differential variables used in Model 8. For this purpose, information criteria such as Akaike (AIC) and Schwarz (SIC) are used in the literature.

The diagnostic test results of the ARDL model are given in Table 5:

Table 5: ARDL Model Diagnostic Test Results

Tests	F-Statistics	Prob. Chi-Square
Breusch-Godfrey Autocorrelation LM Test:	2,418173	0,078
Breusch-Pagan-Godfrey Heteroskedasticity Test	2.148.931	0.0639
Normality Test / Jarque-Bera	0,329142	

If the probability value of autocorrelation, varying variance and normality tests is higher than 0.05 significance level, it is stated that there is no autocorrelation, varying variance and normality problem. When Table 5, which includes the diagnostic results of the ARDL model, is examined, it is seen that the probability values are greater than 0.05 in all tests. Therefore, there is no problem of autocorrelation, varying variance and normality. The short-term coefficient relationship between the variables and the long-term relationship depending on the error correction term are estimated by the error correction model in equation (4) based on ARDL:

$$\Delta EXPORT = a_0 + \sum_{i=1}^k a_{1i} \Delta EXPORT_{t-i} + \sum_{i=0}^m a_{2i} \Delta GROWTH_{t-i} + \beta CET_{t-1} + \varepsilon_t \quad (4)$$

In equation (4), the sign Δ represents the difference operator, the sign α the constant term, CET the error term coefficient, and ε_t the error term. The test results of the error correction model based on ARDL are given in Table 6:

Table 6: ARDL Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Probability*
C	2.019.423	0.655662	3079975	0.0033
D(GROWTH)	-0.120082	0.054008	-2223412	0.0306
D(GROWTH(-1))	0.365417	0.071441	5114987	0.0000
D(GROWTH(-2))	0.234595	0.058165	4033251	0.0002
CointEq(-1)*	-0.306431	0.065799	-4657057	0.0000

* All values are significant at the 5% level

If the coefficient value of the error correction term is between 0 and -1, there is a one-way convergence towards the long-term equilibrium value. If the coefficient value is positive or less than -2, it indicates that the equilibrium has been moved away. Finally, if the error correction coefficient value is between -1 and -2, it indicates that the error correction term reaches equilibrium with fluctuations that decrease in size around the long-term equilibrium values (Alam and Quazi, 2003). When Table 6 is examined, the error correction coefficient was found to be approximately -0.3064 and it is significant. Accordingly, in the series, a one-unit deviation in the short term comes to balance in 3.2 years on a yearly basis. In other words, there is a long-term relationship between the variables. These results reveal that economic growth has a negative effect on exports.

Thanks to the error correction model, after the long-term relationship between the variables is found, it will be determined whether there is a cointegration relationship between the variables with the boundary test. $H_0: \beta_1=0$ $H_1: \beta_1 \neq 0$ Here, the null hypothesis, which states that there is no cointegration relationship, is tested against the alternative hypothesis (H1), which states that there is a cointegration relationship. The hypotheses of the cointegration test are written as above. ARDL limit test results are given in Table 7.

Table 7: ARDL Bounds Test Results

	ARDL	F-Statistic
GROWTH	(1,3)	10,63555
Significance level	Lower Boundary	Upper Boundary
10%	5.765	6,5
5%	6.905	7,735
1%	9.585	10,42

Note: k=1 and Finite Sample: n=60

In Table 7, where the ARDL model boundary test results are shown, the F-Statistics value was calculated as 10.63555. H0 hypothesis is rejected because this value is greater than all upper bound values at 1%, 5%, and 10% significance levels. Therefore, there is a cointegration relationship between the series. This also means that there is a long-run relationship between the variables. The ARDL(k, n) model used for the estimation of the long-term coefficients is included in the equation (5):

$$EXPORT = a_0 + \sum_{i=1}^k a_{1i} EXPORT_{t-i} + \sum_{i=0}^k a_{2i} GROWTH_{t-i} + \varepsilon_t \tag{5}$$

In equation (5), the sign α represents the constant term and the sign ε_t the error term. Long-term coefficient results are given in Table 8:

Table 8: ARDL Long-Run and Equality Coefficient Results

Variable	Coefficient	Std. Error	t-Statistics	Prob.
C	2.019.423	0.835708	2.416.421	0.0193*
EXPORT(-1)	-0.306431	0.087981	-3.482.901	0.0010*
GROWTH(-1)	-0.364139	0.129947	-2.802.212	0.0072*
D(GROWTH)	-0.120082	0.062187	-1.930.987	0.0591
D(GROWTH(-1))	0.365417	0.089262	4.093.748	0.0002*
D(GROWTH(-2))	0.234595	0.062942	3.727.146	0.0005*
Levels Equation				
GROWTH	-1.188.323	0.560474	-2.120.210	0.0389*
EC = EXPORT - (-1.1883*GROWTH)				

* Probability values are significant at the 95% level

The results of the CUSUM Test, which expresses whether the error terms in the series meet the stability condition, are as follows:

Figure 3: CUSUM Test

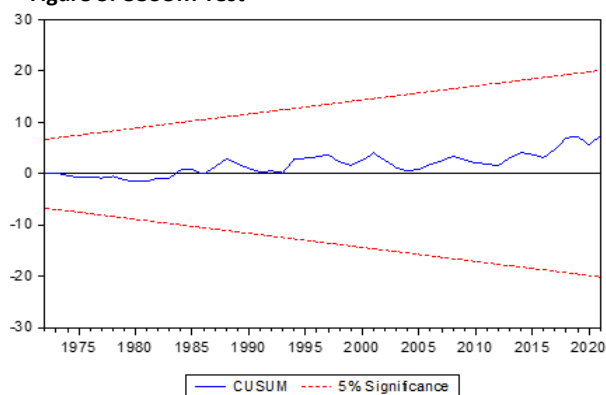
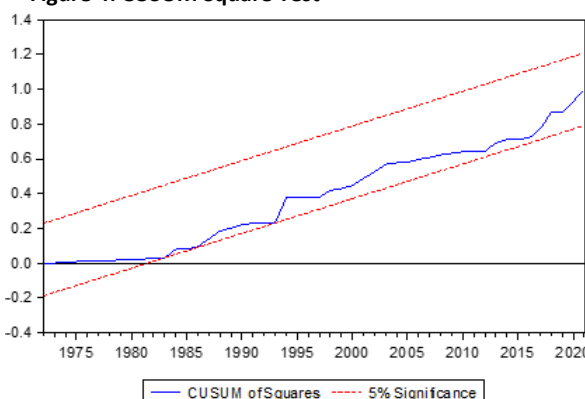


Figure 4: CUSUM Square Test



As it can be seen in the graph where the dashed lines represent the 95% confidence limits and the solid line represents the parameter estimate, it can be said that the stability condition is also met, since the parameter estimate is within the limits. As can be seen from the CUSUM-of-Square test, it can be said that the stability condition is met since the parameter estimation is within the limits, just like in the CUSUM test. In other words, as a result of the CUSUM and CUSUM-of-Square tests, it is seen that the model is stable during the forecast period, that is, there is no structural break.

3. CONCLUSION AND SCOPE FOR FURTHER RESEARCH

The aim of this article is to find the causal relationship between Growth and Export in Turkey in the widest possible range and with the most up-to-date data and to reveal the extent of the causal relationship between them. As a result, although there is a causal relationship from Growth to Exports, this relationship is negative in the long run. This result has not been included in the Turkish literature before.

It has been concluded that there is a long-term relationship between the ARDL Bounds test approach and the variables, that economic growth affects exports negatively in the long run, and a 1% increase in economic growth causes a decrease of 1.18 million dollars in exports in Turkey. The error correction term, which is calculated export in the long run, shows that the imbalances that may occur in the short run are corrected in the long run. According to the results of Toda-Yamamoto causality analysis, a causal relationship was found from Growth to Export. Although the causality relationship between growth and exports is the finding of many articles, the conclusion that growth has a negative effect on exports has not been included in the literature before (in studies on Turkey). However, in the literature before, Helpman & Krugman (1985) had an inference on this subject. Sometimes, as a result of the increase in domestic demand for exportable and non-tradable goods, economic growth may increase while exports may decrease (Helpman & Krugman, 1985).

There is not only one factor that affects exports. In this sense, it is useful to remind that all countries are in competition with other world countries. Of course, economic growth alone has an effect on foreign trade instruments, but this effect may have consequences contrary to theory and literature in the long run. To give an example, if the growth in a country does not trigger development and prevent income inequality, the interest in imported goods will decrease and there will be a demand for the domestic market. This causes an increase in the demand in the domestic market (especially in basic goods) in countries that are not very developed technologically and are dependent on foreign countries. If the goods demanded by other countries are melted down in the domestic market, growth will have no effect on exports, and even negative effects will be in question, as can be seen in the result above.

In this study conducted specifically for Turkey, the result may have been different from the others in terms of both the long time interval selected and the method applied. As we mentioned before, the method applied and the time interval are the determining factors of the result.

As further research opportunities, this issue can be explored further and the reasons for this result, especially in Turkey, can be examined in terms of economy and politics.

REFERENCES

- Acet, H., Eerdoğan, S., & Köksal, M. (2016). İthalat, ihracat ve büyüme arasındaki nedensellik ilişkisi: Türkiye uygulaması. *The Journal of Social Economic Research*, 16(31), 145-161.
- Alam, I., & R Quazi (2003). Determinants of capital flight: an econometric case study of Bangladesh. *International Review of Applied Economics*, 17(1), 85-103.
- Bahmani-Oskooee, M.M., Goswami, G.G. (2003). A disaggregated approach to test the J-curve phenomenon: Japan versus her major trading partners. *Journal of Economics and Finance*, 27, 102–113 (2003). <https://doi.org/10.1007/BF02751593>
- Berg, H. V., & Lewer, J. J. (2007). *International Trade and Economic Growth*. New York: Routledge. doi:<https://doi.org/10.4324/9781315703282>
- Box, G.E.P. and Jenkins, M., 1970, *Time Series Analysis Forecasting and Control*, Holden Day Inc., San Francisco
- Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association*, 74(366), 427-431.
- Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica*, 49(4), 1057-1072.
- Giles, J., & Williams, C. L. (2010). Export-led growth: a survey of the empirical literature and some non-causality results. *The Journal of International Trade & Economic Development*, 9(3), 261-337. doi:[doi:doi.org/10.1080/09638190050086177](https://doi.org/10.1080/09638190050086177)
- Granger, C. W. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica*, 37(3), 424-438.
- Gujarati, D. N., & Porter, D. C. (2009). *Basic Econometrics*. New York: McGraw-Hill/Irwin.

- Helpman, E., & Krugman, P. (1985). *Market Structure and Foreign Trade Increasing Returns, Imperfect Competition, and the International Economy*. Cambridge: MIT Press.
- Mandel, M., & Müller, J. (1974). Aims of an export-oriented economic policy. *Acta Oeconomica*, 13(1), 35-47.
- Narayan, P. K. (2005). The saving and investment nexus for China: evidence from cointegration tests. *Applied Economics*, 37(17), 1979-1990.
- Narayan, P. K., & Smyth, R. (2006). What determines migration flows from low-income to high-income. *Contemporary Economic Policy*, 24(2), 332-342.
- Özcan, B. ve Özçelebi, O. (2013). İhracata Dayalı Büyüme Hipotezi Türkiye için Geçerli mi?. *Celal Bayar Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, Yönetim ve Ekonomi*, 20(1), 1-14.
- Pesaran, M. H., & Pesaran, B. (1997). *Working with Microfit 4.0*. Oxford University Press.
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289-326.
- Rebelo, S. (1991). Long-run policy analysis and long-run growth. *Journal of Political Economy*, 99(3), 500-521. doi:<https://doi.org/10.1086/261764>
- Sağlam, Y. ve Egeli, H. A. (2015). İhracata dayalı büyüme hipotezi: Türkiye örneği. *Dokuz Eylül University Journal of Graduate School of Social Sciences*, 17(4), 356-369.
- Sannasse, R. V., Seetanah, B., & Jugessur, J. (2014). Export-led growth hypothesis: a meta-analysis. *The Journal of Developing Areas*, 48(1), 361-385.
- Şimdi, H. ve Şeker, A. (2018). Büyük ihracat pazarları ekonomik büyümeyi etkiliyor mu? Türkiye örneği. *Kafkas Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 9(18), 485-499.
- Takım, A. (2010). Türkiye’de GSYİH ile ihracat arasındaki ilişki: granger nedensellik testi. *Journal of Graduate School of Social Sciences*, 14(2), 315-330.
- Taştan, H. (2010). Türkiye’de ihracat, ithalat ve ekonomik büyüme arasındaki nedensellik ilişkilerinin spektral analizi. *Ekonomi Bilimleri Dergisi*, 2(1), 87-98.
- Temiz, D. (2010). Türkiye’de reel ihracat ve ekonomik büyüme arasındaki ilişki: 1965-2009 dönemi. *Hitit Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 3(1-2), 71-82.
- Toda, H. Y., & Yamamoto, T. (1995). Statistical inference in vector autoregressions with possibly integrated processes. *Journal of Econometrics*, 66(1-2), 225-250.
- Yurdakul, F. ve Aydın, M. (2018). Ekonomik büyüme ve dış ticaret arasındaki ilişki: Türkiye üzerine bir uygulama. *Uluslararası İktisadi ve İdari İncelemeler Dergisi*, 8(1), 23-36.



A TIME-VARYING DYNAMIC ANALYSIS OF FACTORS AFFECTING THE LEVELS OF UNDERPRICING, AVERAGE PRICING, AND OVERPRICING OF THE US DOLLAR IN GLOBAL DERIVATIVES MARKETS

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ABSTRACT

Purpose- The aim of this study is to calculate the coefficient parameters of the factors affecting the pricing in the low, average, and overpricing intervals and points of the US Global dollar index and then to investigate the dynamic historical effects of these parameters.

Methodology in the study, "Quantile Regression" to calculate parameter differences in pricing intervals and "Kalman Filtering" methods to calculate their historical dynamic effects.

Findings- In the design of the study, The intervals are 0.5-0.95 incremental overpricing, 0.5 (Median) average, and 0.05-0.5 (Median) underpricing (low-pricing). The study's results show that model 0.4. quantile has respectively the highest value R2 and adjusted R2 values, approximately 53.2 percent and 49.1 percent. Additionally, the probability value of all 19 estimated models is statistically significant at the 0.05 level. While the coefficients of the Baltic Dry Index (at 5%), the Global gold prices (at 5%), and the US 10-year bond yields (10%) are negative, the coefficients of the Nasdaq (10%) and Vix (5% and 10%) have positive signs. These variables are significant in the underpricing quantiles that conducted interval of the US Dollar index (0.05-0.5) in the research design. The price point that represents the median value yields the same results. From that point of view, only the Vix index is significant and only at a 10% level. The Baltic Dry Index (5%), Bitcoin and Gold prices (5% and 10%), US 10-year interest rates-yields (5%), and CDS premium are among the factors that are relevant in the high-quantile overpricing range of the US Dollar index (0.05-0.5). (5 percent and 10 percent), Although the variables' coefficients are negative, the coefficients for inflation (at 5% and 10%), Nasdaq (at 5%), and the VIX index (10%) are positive. The dynamic coefficients determined historically and dynamically using the Kalman filtering technique in all quantiles have had the same values.

Conclusion- Since Kalman analysis and quantile regression analysis have different theoretical background, parameter differences in underpricing and overpricing periods may be eliminated when historical dynamics are examined. As a result, even though the findings of quantile regression and the results of Kalman analysis were roughly parallel, the predicted parameters for some variables did not closely match the effects of either technique. The literature has noted that research utilizing both methodologies might run into such statements that can be encountered in the study's findings under comparable circumstances (Bernardi v., 2016: 34). Additionally, as the geopolitical risk index conveys countercyclical hazards, the rising geopolitical risks in the historical coefficients raised the US dollar index, according to Kalman's study.

Keywords: Global US dollar index, derivatives markets, exchange rate shocks

JEL Codes: F30, F31, G13.

1. INTRODUCTION

Derivative instruments, in the simplest terms, refer to financial instruments whose financial value is directly dependent on the importance of another financial asset, commodity, or indicator. In this context, the indicators that are the basis of derivative instruments are commodities, securities, exchange rates, interest rates, statistics, indicators, indexes, etc. can be listed as The most basic usage purposes of derivative instruments are; It can be classified as hedging, speculation, and arbitrage.

Hedging; Derivative instruments protect the sides against possible price flux fluctuations to eliminate or manage potential risks in the spot market or by making purchases and sales today against future price changes.

Speculation; It expresses the gains provided by derivative instrument contracts as a result of changes in prices or rates of underlying commodities, financial indicators, etc.

Arbitrage; Investors who make arbitrage transactions aim to make risk-free profits from price imbalances between markets. In arbitrage transactions, if different contracts and transactions are made simultaneously, a certain profit is guaranteed under all conditions by taking advantage of the imbalances in prices or interest rates without taking any risk. In other words, arbitrage is the process of making risk-free profits.

In this context, although futures transactions are generally based on commodities, futures transactions can also be made on some financial indices. Theoretically, the US Dollar index is one of the most prominent of these indices and the one with the highest trading volume.

US Global dollar index calculated by the International Exchange Group, ICE Futures; It is a financial index calculated by weighting the exchange rates of various currencies against the dollar. Both the calculation method of the Global US dollar index and the theoretical interaction of exchange rates with many economic and financial variables indicate that many parameters may affect the US dollar index.

Changes in economic and financial variables can sometimes be relatively high, and in some cases, they can be, defined as close to stationary or static. Financial variables can have volatility effects due to their theoretical and practical structure. For this reason, the excessive growth of the US dollar index affects overpricing and its extreme decreasing effects on underpricing.

The interaction dynamics and coefficients of exchange rates with other economic and financial variables can be found out shocks and near-stationary changes. The model that is used to measure how the independent variables differ against the changes in the dependent variable's different growth points is the Quantile Regression method. For this reason, the Quantile Regression method examines the effect of the Global US dollar index traded in the Global futures markets with the factors affecting underpricing, average, and overpricing.

In the research; US Global dollar index (Dependent Variable); Baltic dry Index, bitcoin, Euro index, international gold prices, US CPI rate, US 10-year bond yields, US 10-year Euro CDS, Nasdaq index, Global geopolitical risk index, and Vix fear-risk appetite indices were chosen respectively as independent variables. Afterward, Kalman filtering analysis was performed to calculate the variable dynamic coefficients according to the historical time. For this reason, 0.05-0.5 quantile intervals for underpricing, 0.5 quantiles for average values, and 0.5-0.95 meanvely extremely overpricing. Nineteen regression equations were estimated for these selected quantiles, and then the historical dynamic parameters of the independent variables used in the study were determined.

Theoretical underpinnings for the Kalman and quantile regression approaches vary. Furthermore, the kalman analysis transforms the static coefficients of the independent variables of the equation derived from the quantile or any other regression method into dynamic coefficients in the observation range where the regression estimation is made. The quantile method measures the parameters at different growth points of the dependent variable. A systematic comparison of the two approaches is provided by the analysis and interpretation of the experimental evidence, which are presented in the study within the context of theoretical expectations about the global dollar index.

2. GLOBAL DOLLAR INDEX

The Global Dollar index refers to an index priced in the futures markets. The type of this futures market is the futures market. The International Exchange group, ICE Futures, calculates this Index, which is traded over the counter in 13 exchanges, including the USA, Europe, Canada, and Singapore. The Global dollar index is an index that is an indicator of US dollar pricing at the worldwide level. The components of the Index, which are traded 21 hours a day on platforms owned by ICE, consist of 6 different currencies. These currencies are expressed together with their weightings (See Table 1).

Table 1: Global US Dollar Index Components and Weights

Euro (EUR): 57.6% (Composed of 24 Different Currency Weights).
Japanese Yen (JPY): 13.6%
British Pound (GBP): 11.9
Canadian dollars (CAD): 9.1%
Swedish Krona (SEK): 4.2%
Swiss Franc (CHF): 3.6%

Source: <https://finanswebde.com/dolar-endeksi/b/5fdf7d6d0f40270039fedcdc>, Date of access, 10.01.2022

Three basic issues should be taken into account in the research design and interpretation of the results in the theoretical and experimental researches on the US global dollar index. While the first index is not a parity like the classical exchange rate; Second, the US dollar is the strongest global reserve currency. The third element is that this index is a financial indicator that can be traded in derivative markets.

In this context, while making comments on the Global dollar, index whose parameters will be estimated, examining the dependent variable as a parity and evaluating it as a local currency traded in the spot market will lead to theoretical and empirical wrong conclusions.

On the other hand, the fact that the US dollar is the strongest reserve currency indicates that the index is an important indicator in explaining commercial and financial flows at global and international level.

3. LITERATURE REVIEW

It has been observed that many studies have been carried out on Global dollar index pricing in recent years. In addition, it is seen that many of these studies were carried out, especially in the post-Covid pandemic period. While examining the subject, method, and findings of the studies selected from the literature, chronological order was followed.

Su (2016); analyzed the spillover effect of quantitative easing policies between metal markets and the US dollar index at a daily frequency (14 January 2002 - 15 November 2012) using GARCH and VAR methods. The findings show the negative correlation between the metal markets and the US dollar index after the quantitative easing has been observed much more clearly. In addition, while quantitative easing reduces the risk premium in the dollar index, the cointegration relationship with metal markets approaches the equilibrium point more rapidly.

Sun et al.(2017); investigated the horizontal correlations between US monetary policies, the dollar index, and crude oil prices. According to the study's results with the data observed at a daily frequency (4 February 1994-29 February 2016), US monetary policy operations have a relatively straightforward horizontal correlation behavior and multifractal effects on the time series of the study.

Fernando Eguren Martin et al., (2017); The panel examined the Global role of the US dollar and its consequences with the help of the VAR model. Contrary to the traditional trade channel hypothesis, the study's results show that the US dollar's rise leads growth outside of the US to decline below average (increasing import demand competition against the USA to boost growth in the rest of the world and reducing export competition demand).

Öner (2018); This research looked at how the three major worldwide financial indices, including the VIX, US dollar, and MOVE (Merrill Lynch Option Volatility Estimate) indices examined currency exchange rates between developed and developing nations. The research involves 1007 participants for this aim. daily observations are from May 1, 2013, to May 11, 2017, and include the VIX, the US dollar, and the MOVE index. are examined for causal relationships with the currency rates of the Euro, Brazil, Indonesia, India, South Africa, Turkey, Russia, Hungary, Poland, and Japan. Granger causality test results show that the VIX index affects the Euro. Japanese yen, the Brazilian real, the Indonesian rupee, and the Polish zloty are all affected by the US dollar index. Indian rupees and Russian rubles are driven by the yen and The MOVE index.

Boz et al. (2018); analyzed the relationship between Global trade and the US dollar at a monthly frequency (1989-2015) using the least-squares method. According to the results obtained from the three-country model, shocks in the monetary policy transmission channels of dollar pricing have an asymmetric effect on the USA and the rest of the world.

Stefan Avdjiev et al. (2018); examined the US dollar as a Global risk factor on investments with a quarterly frequency (2001 Q2-2016 Q4) panel data method. According to the results, the strength of the US dollar affects on low growth and actual investments in emerging market economies, and it seems to be an essential macroeconomic effect in contrast to the standard trade channel approach.

İlalan and Pirgaip (2019); investigated the effects of the US dollar index on stock markets in emerging markets at a daily frequency (22 May 2013-22 June 2017) with Granger causality and Rolling correlation analysis. Researchers have found reason and correlation between stock indices, the dollar index, bond purchase reduction, and investment horizon periods. In addition, the results obtained from both methods are consistent with each other.

Adolfo and Barajas et al. (2020); analyzed US dollar funding as a source of financial vulnerability of Global banks. According to the results, US dollar funding costs of non-US banks increase financial stress in emerging markets.

Kumar and Rabianto (2021); gold prices and the volatility effect on the US dollar index; It was researched on the Shanghai and Mumbai stock exchanges with the GARCH method at a daily frequency (16 June 2019- 17 June 2020). According to the results obtained, a positive effect, that is, the volatile effect, was observed in both markets on gold prices; This effect is more

substantial during periods such as the Covid pandemic. On the other hand, while the volatility effect was observed in emerging markets such as China and India for the US dollar index, this effect was not observed in some markets.

Chaudhry et al. (2021); the impact of the contagion effect of covid 19 on gold, the US dollar on stock prices; analyzed with the GARCH method at a daily frequency (1 December 2019-31 May 2020). According to the results, the contagion effect between the dollar rate and stock returns was insignificant.

Georgiades et al. (2021); analyzed the relationship between Global risk pricing and the US dollar with the Bayesian VAR model by using monthly frequency (February 1990 - December 1999). According to the results obtained, decreasing in economic activities on a Global scale caused the appreciation of the US dollar. Moreover, It was observed that the appreciated US dollar also negatively affected economic activity through the financial channel.

On the other hand, a literature review was conducted regarding the variables selected in the research design. In this context;

Lee and Hogda (2010); researched the several factors affecting the US dollar index. To determine the relationship between the US dollar index and US economic strength, they chose the S&P 500 index as the US macroeconomic indicators and the industry index as the economic health of each US sector. They also developed models to consider the linkages between each sector index and the dollar index. As a primary indication, interest rates are also being studied. The crucial element, "capital flows," which significantly impacts the US dollar index, has been explained.

Black (2012); argued that alternatives, including commodity, currency, and credit default swaps, also result in more precise estimations of the coefficients, α and β .

Azar (2013); investigated the connections between the price of one particular commodity, oil, and US money supply, inflation, and the US currency. One empirical finding is that throughout the sample period, demand shocks from the US and the rest of the world instantly increased oil prices while delaying their impact on consumer prices. This oil price overshooting is anticipated to happen in the near term and to fade when consumer prices adjust entirely in the long term.

Azar (2015); studied US equities, gold, and oil related to the excess dollar Exchange rates; it was shown that US equities, gold, and oil are all subject to the rule of one price. According to this rule, a 1% increase in the value of the US dollar causes a 1% decline in the price of equities, gold, and oil. The intrinsic returns were determined in the next phase. Asset returns that regard the US currency the same as before are referred to as intrinsic returns. Although the US dollar and raw returns had a little negative correlation, intrinsic returns and the US currency were mainly unrelated.

Gurrib and Elshareif (2016); The Euro/US Dollar currency pair was examined in their study due to the increased correlation between the Euro Index and EUR/USD and the Dollar Index and EUR/USD over the past year compared to the previous 15 years. The study also examines the performance of an optimised fractal adaptive moving average strategy over various frequency intervals.

Curcuro et al. (2018); looked at how these two yield components' changes affected changes in exchange rates and foreign bond yields. They discovered that the dollar is more sensitive to anticipated short-term interest rates than to term premia. In addition, the rise in the dollar's sensitivity to monetary policy pronouncements since the GFC is mostly attributable to the currency's greater sensitivity to anticipated interest rates rather than to term premiums. They also found that changes in short rates and term premiums affect international yields in a manner that is comparable. All things considered, our results refute the widely held belief that conventional monetary policies have stronger global spillover effects than quantitative easing. In summary, their results oppose the widely held belief that traditional monetary policies have higher Global spillover effects than quantitative easing.

Yildirim (2019), in his article, found that over the long term, there was a positive correlation between the DAX Volatility Index (VDAX) and the Dollar Index (DXY) and the VIX Index.

Mokni and Noomen (2020); examined the relationship between crypto-currencies and the US Dollar index using the quantile Granger Causality method. The study aims to look into the causal relationship between the top five cryptocurrencies and the US dollar at various levels of the return distribution. We address this issue based on the Granger-causality in quantiles before and during the ongoing COVID-19 health crisis. The Granger causality test in mean reveals a significant causal association between the two markets, most notably during the COVID-19 epidemic.

Liyan et al. (2020); investigated the potential predictive power of the predictive exchange rates of fourteen important currencies relative to the US dollar. Panel regression analysis shows that the BDI offers statistically substantial long-run currency return predictability.

Kumar and Rabianto (2021), a summary of the literature on this study, is explained in the first part of the literature review.

Long et al. (2022); researched the geopolitical risk that affected the cross-sectional price of cryptocurrencies. Coins with the lowest geopolitical beta beat those with the high geopolitical beta, according to their analysis of cryptocurrency exposure to changes in the geopolitical risk index. According to research, risk-averse investors need extra incentives to keep cryptocurrencies with low and negative geopolitical betas. Still, they are prepared to pay a premium for assets with high and positive geopolitical betas. The impact was resistant to various factors and could not be explained by an established return predictor.

4. METHOD AND DATASET

The quantile regression methodology and kalman filtering were chosen as the methods of the study. The quantile regression developed by Koenker and Bassett (1978) aims to expand the estimation of conditional quantile functions. This methodology has adopted a prototype that assigns Tukey's three averages as 0.25, 0.50, and 0.75 quantile values to the quartiles. (Koenker, 1984).

The quantile regression estimates are more reliable than the least-squares method against the presence of outliers in the data set.; The most crucial rationale for using quantile regression; is the ability to measure the relationship between a dependent and independent variable more fully and clearly (Ünvan and Demirel, 2020: 180, Conyon et al., 2017: 3-4).

Estimates made by the least squares method in the regression analysis do not constitute a practical estimation in cases where the assumptions cannot be met. In this case, we need alternative regression models. In parametric models, just as the most appropriate mathematical model is selected, alternative regression models should choose and use the most suitable model. One of the alternative regression models is quantile regression, and as in other regression models, this method aims to explain the relationship between variables. Unlike the least squares method, there is no requirement to provide any assumptions about the homogeneity of error variance and the distribution of errors (Yavuz and Işık: 2017).

The quantile method was developed for selected quantiles of the conditional distribution of the dependent variable. Unlike the classical regression model, it does not make any assumptions about the homogeneity of error variance and the distribution of errors. Because of these situations, it can be considered an flexible approach than linear regression. While classical regression searches for a model for the conditional expected value of the dependent variable,; quantile regression determines the model for the quantiles selected in the conditional distribution of the dependent variable. While classical regression is based on minimizing the conditional mean of the dependent variable and the sum of the residual squares, quantile regression functions are based on minimizing the weighted sum of the absolute residuals. If quantile regression model needs to be expressed (Yavuz and Işık, 2017: 140-141); (See equation 1,2,3,4).

$$y_i = x_i' \beta_\theta + u_{\theta i} \quad (1)$$

It is expressed as. Here, x_i is the $(k \times 1)$ dimensional vector of independent variables and shows the linear regression between the independent variables with the θ th quantile of the conditional distribution of the dependent variable y_i . β_θ is the vector of parameters related to the θ quantile regression. $u_{\theta i}$ is the error vector. The θ , the conditional quantile of y_i ;

$$Q(y_i / x_i) = x_i' \beta_\theta \quad (2)$$

The objective function of quantile regression is weighted sums of absolute deviations. The objective function for θ th quantile regression;

$$\min_{\beta_\theta} \frac{1}{n} \left\{ \sum_{i=1}^n \theta |y_i - x_i' \beta_\theta| + \sum_{i=1}^n (1-\theta) |y_i - x_i' \beta_\theta| \right\} \quad (3)$$

It is expressed as Expressed by the minimization function below; this function is a linear programming representation of quantile regression.

$$\hat{\beta}_\theta = \frac{1}{n} \sum_{i=1}^n \rho_\theta(y_i - x_i' \beta_\theta) = \sum_{i=1}^n \rho_\theta(u_{\theta i}) \quad (4)$$

On the other hand, it is aimed to calculate and interpret the dynamic coefficients of the variables explaining the Global dollar index, which changes over time. For this reason, the Kalman-Filtering method was chosen methodologically in the study. In a linear state-space equation, there are two equations: observation and state. Equations (5) and (6) show the observation and state equations, respectively.

$$y_t = Z \alpha_t + D w_t + \varepsilon_t \quad (5)$$

$$\alpha_t = T \alpha_{t-1} + C w_t + v_t \quad (6)$$

α in Equations A and B; At t time, $m \times 1$ dimensional unobservable state vector T : $m \times m$ dimensional matrix, which is accepted to be known, C : $m \times k$ dimensional coefficient matrix, w_t : $k \times 1$ dimensional extrinsic variables vector at t time, ϵ_t and ν_t represent zero-mean Gaussian distribution vectors. y_t : represents the $N \times 1$ -dimensional observation vector at time t , Z : the matrix that relates the $N \times m$ -dimensional y_t vector to the state vector, and D : the $N \times k$ -dimensional coefficient matrix. Also, m and k represent the number of states and independent variables. (Harvey, 1990).

The variables used in the study were the US Global Dollar Index (Dependent Variable), Baltic Dry Index, Bitcoin, Euro index, international gold prices, US CPI rate, US 10-year bond yields, US 10-year Euro CDS, Nasdaq index, Global Geopolitical Risk Index, and Vix fear-risk appetite indices. The variables were chosen within the framework of the research design and the pertinent literature (See Table 2). Variables were observed at a monthly frequency, with estimation sample 2010.08-2021.12 and access date for all variables; It is 01.03.2022 (See Table2).

Table 2: Data Set

VARIABLE and ITS' REFERENCE	CODE	SOURCE
Bitcoin, (Mokni and Noomen, 2020)	Bitcoin	https://tr.investing.com/crypto/bitcoin
Global Dollar Index, (Lee and Hongda, 2010)	GLOBAL_DOLLAR_INDEX	https://tr.investing.com/currencies/us-dollar-index
Fear Index, (Yildirim, 2019)	VIX	https://tr.investing.com/indices/volatility-s-p-500
Baltic Dry Index, (Ilyan et al., 2020)	BDI	https://tr.investing.com/indices/baltic-dry
US 10-year bond yield, (Curcuro et al., 2018)	US_10YEAR_BOND	https://tr.investing.com/rates-bonds/u.s.-10-year-bond-yield
Gold, (Global Derived), (Kumar and Rabianto, 2021)	GOLD	https://tr.investing.com/commodities/gold
Euro index, (Gurrib, and Elshareif, 2016)	EURO_INDEX	https://tr.investing.com/indices/investing.com-eur-index
US CDS, (Black, 2012)	USA_CDS_10_YEAR_EURO	https://tr.investing.com/rates-bonds/united-states-cds-10-years-eur
Geopolitical Risk Index, (long vd,2022)	GPR	https://www.policyuncertainty.com/gpr.html
US CPI, inflation (Azar, 2013)	CPI	https://tr.investing.com/economic-calendar/cpi-733
Nasdaq index, (Azari 2015)	NASDAQ	https://tr.investing.com/indices/nq-100

5. FINDINGS AND DISCUSSIONS

First, the Augmented Dickey-Fuller test was performed to determine whether there is a unit root in the time series of the variables. According to the test results, not all variables are stationary at the same level (See Table 3). However, since all variables in quantile regression analysis should be used in raw data format, level values of time series will be used in quantile regression analysis (Wu and Zhou, 2014).

Table 3: Results of Unit Root Tests

Null Hypothesis: Unit root (individual unit root process)				
Series: GLOBAL_DOLLAR_INDEX, EURO_INDEX, GOLD, GPR, NASDAQ, CPI, US_10YEAR_BOND, USA_CDS_10_YEAR_EUR O, VIX, BDI, BITCOIN				
Date: 05/31/22 Time: 15:16				
Sample: 2010M08 2021M12				
Exogenous variables: Individual effects, individual linear trends				
Automatic selection of maximum lags				
Automatic lag length selection based on SIC: 0 to 6				
Total number of observations: 1452				
Cross-sections included: 11				
Method			Statistic	Prob.**
ADF - Fisher Chi-square			124.094	0.0000
ADF - Choi Z-stat			-5.52322	0.0000
** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.				
Intermediate ADF test results UNTITLED				
Series	Prob.	Lag	Max Lag	Obs
GLOBAL_DOLLAR_INDEX	0.5869	0	12	136
EURO_INDEX	0.0000	1	6	108
GOLD	0.6920	0	12	136
GPR	0.0000	0	12	136
NASDAQ	0.0445	3	12	133
CPI	0.7795	1	12	135
US_10YEAR_BOND	0.0002	1	12	135
USA_CDS_10_YEAR_EURO	0.5444	3	12	133
VIX	0.0002	0	11	134
BDI	0.0328	0	12	136
BITCOIN	0.9681	6	12	130
Null Hypothesis: Unit root (individual unit root process)				
Series: GLOBAL_DOLLAR_INDEX, EURO_INDEX, GOLD, GPR, NASDAQ, CPI, US_10YEAR_BOND, USA_CDS_10_YEAR_EUR O, VIX, BDI, BITCOIN				
Date: 05/31/22 Time: 15:19				
Sample: 2010M08 2021M12				
Exogenous variables: Individual effects, individual linear trends				
Automatic selection of maximum lags				
Automatic lag length selection based on SIC: 0 to 6				
Total number of observations: 1406				
Cross-sections included: 11				
Method			Statistic	Prob.**
ADF - Fisher Chi-square			598.740	0.0000
ADF - Choi Z-stat			-21.0261	0.0000
** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.				
Intermediate ADF test results D(UNTITLED)				
Series	Prob.	Lag	Max Lag	Obs
D(GLOBAL_DOLLAR_INDEX)	0.0000	0	12	135
D(EURO_INDEX)	0.0000	6	6	72
D(GOLD)	0.0000	0	12	135
D(GPR)	0.0000	2	12	133
D(NASDAQ)	0.8963	2	12	133
D(CPI)	0.0000	1	12	134

D(US_10YEAR_BOND)	0.0000	1	12	134
D(USA_CDS_10_YEAR_EURO)	0.0000	2	12	133
D(VIX)	0.0000	0	11	132
D(BDI)	0.0000	0	12	135
D(BITCOIN)	0.0019	5	12	130

In the quantile regression analysis, models and coefficients were estimated for 19 quantile values in the range of 0.05-0.95 within the framework of 20 quantile processes. Pseudo R² and Adjusted R² values were plotted. In addition, at the eighth quantile value of 0.4, the significance level of the models is highest in quantile, and all models are significant at a 0.05 probability level at all quantile levels (See Table 4, Figure 1).

Figure 1: All Quantile Regressions' Values of R Squared and Adjusted R Squared

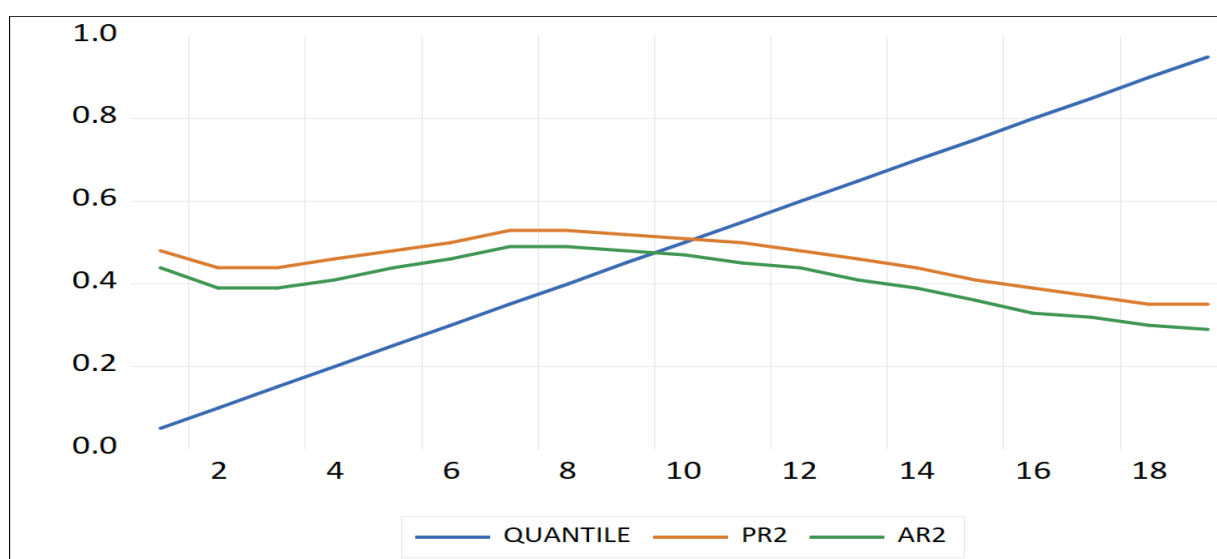
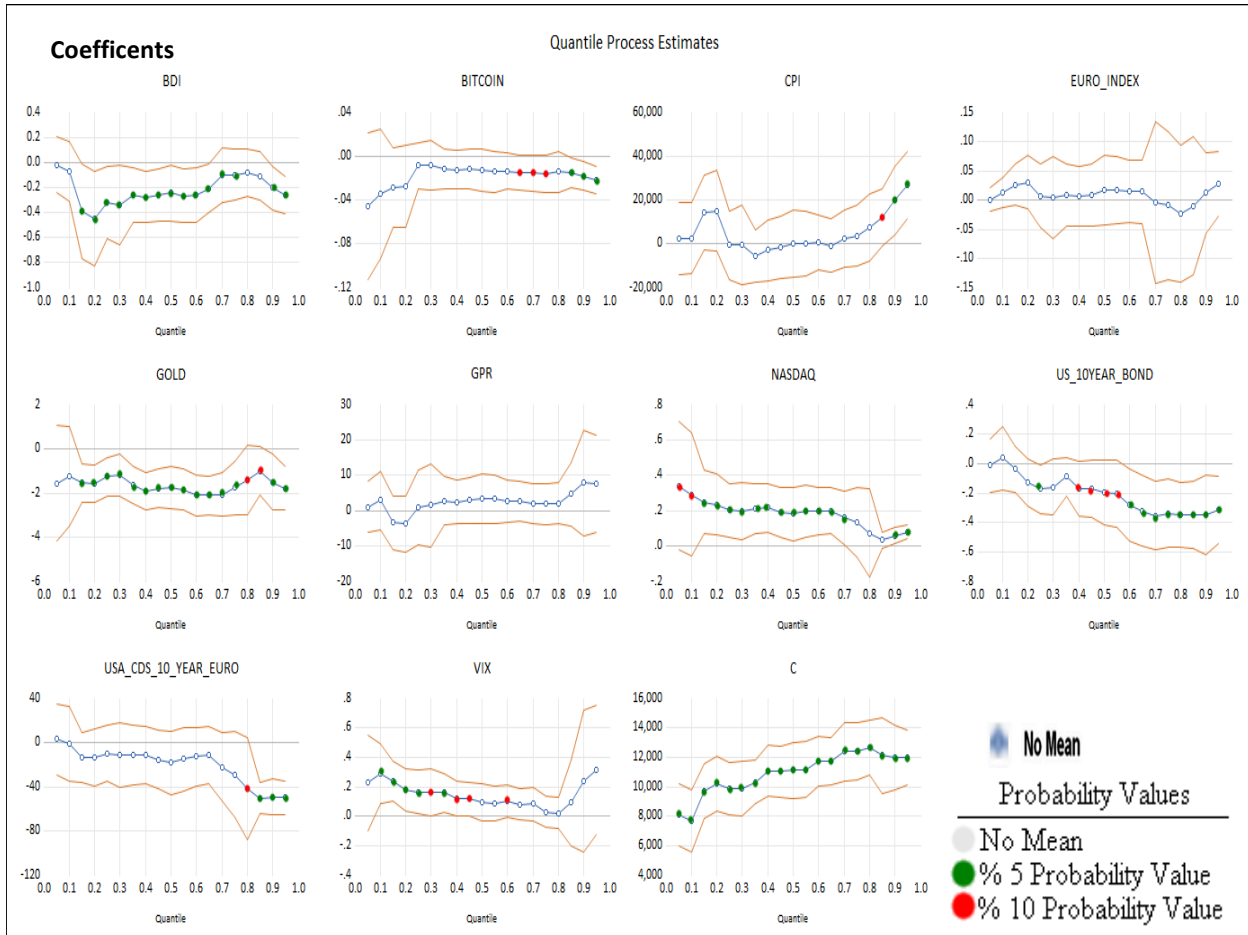


Table 4: Results of Quantile Regression Models

QUANTILE	Pseudo R-squared	Adjusted R-squared	Prob(Quasi-LR stat)
0,05	0.482387	0.437377	0.000000
0,1	0.443051	0.394620	0.000000
0,15	0.439105	0.390332	0.000000
0,2	0.456943	0.409721	0.000000
0,25	0.480758	0.435607	0.000000
0,3	0.503383	0.460199	0.000000
0,35	0.529952	0.489078	0.000000
0,4	0.532368	0.491705	0.000000
0,45	0.524551	0.483208	0.000000
0,5	0.511626	0.469159	0.000000
0,55	0.498418	0.454803	0.000000
0,6	0.481285	0.436179	0.000000
0,65	0.461257	0.414409	0.000000
0,7	0.437808	0.388921	0.000000
0,75	0.412464	0.361374	0.000000
0,8	0.386812	0.333492	0.000000
0,85	0.373308	0.318813	0.000000
0,9	0.352758	0.296476	0.000000
0,95	0.345550	0.288642	0.000000

After testing the significance of the models in 19 different quantiles, coefficient estimation was made. Accordingly, the coefficients of the variables according to 19 quantiles and their significance level at the 5% and 10% probability levels are shown (See Figure 2).

Figure 2: Quantile Regression Coefficient Estimates



- ✓ Coefficients of the BDI variable in all quantiles are negative and significant at the 5% level except for the first 2nd and 17th, and 16th quantiles. In general, the negative coefficients decreased as the quantile level increased. While increases by 0.2 quantiles in the Baltic dry index had the most negative effect on the Global dollar index, this negative effect decreased in the advancing quantiles. Still, it increased again in 0.9 and 0.95 quantiles.
- ✓ Bitcoin prices variable coefficients are negative near zero and 0.65, 0.7, and 0.75. at 10% level. In quantiles; 0.85,, 0.9 and 0.95, It is statistically significant at the 5% level. Excessive increases in Bitcoin prices negatively affected the Global dollar index.
- ✓ US CPI inflation is significant at 0.8 quantile, the at 10% level, at 0.9, and 0.95 quantile at the 5% level, and its coefficient is positive. High-level increases in the inflation variable increase the pricing of the Global dollar index.
- ✓ Although the coefficient of the Euro index variable is positive, it is not significant at any quantile level.
- ✓ The Global gold prices variable is significant in all other quantiles except the first two quantiles. While the significance is 10% at 0.8 and 0.85 quantiles, and it is 5% at other significant quantiles. Since the coefficient is negative, the increase in gold prices decreases the Global dollar index.
- ✓ Geopolitical risk index coefficients are not significant in any quantile.

- ✓ Nasdaq index coefficients are significant in all quantiles except 0.75, 0.8, and 0.85. and the coefficients are positive. As the number of quantiles increases in the Nasdaq index, the effect of the Nasdaq Index on the Global dollar index decreases.
- ✓ While US 10-year bond yield variable coefficient has no mean between at 0.5-2.5 and 0.3 and 0.35 quantiles, it has meaningfulness in all other quantiles. it is significant at the 10% level between 0.4 and 0.55 and the level of 5% for differ meaningfulfull quantiles. The coefficients' signs are negative. In addition, the negative coefficient increases as the number of quantiles increases. Excessive increases in US bond yields reduce the Global dollar index.
- ✓ Euro value of US CDS s' coefficients are negative at quantiles 0.85, 0.9, 0.95 at %10 level. At 0.8 quantile; it is significant at the 5% level, and the coefficients a negative. This negative effect is the most significant negative effect among all other variables.
- ✓ VIX fear index coefficients have meaningfulness between quantiles of 0.1-0.25 and at 0.35. quantile at 5% level. The coefficients have meaningfulness at 0.3, 0.4, 0.45 and 0.6 in quantiles at the 10% level. The coefficient is positive and decreases as the number of quantiles increases.

To summarize the results briefly according to the research design, the quantiles between 0.5-0.05 (Median) indicates underpricing, 0.5-average (Median), and 0.5-0.95 overpricing intervals. According to the study's findings, the model in the 0.4. quatile with the highest R^2 and adjusted R^2 values of approximately 53.2% and 49.1. In addition, all 19 predicted models are statistically significant at the 0.05 level regarding probability value. All the results of the research are summarized in Figure 3 (See Figure 3).

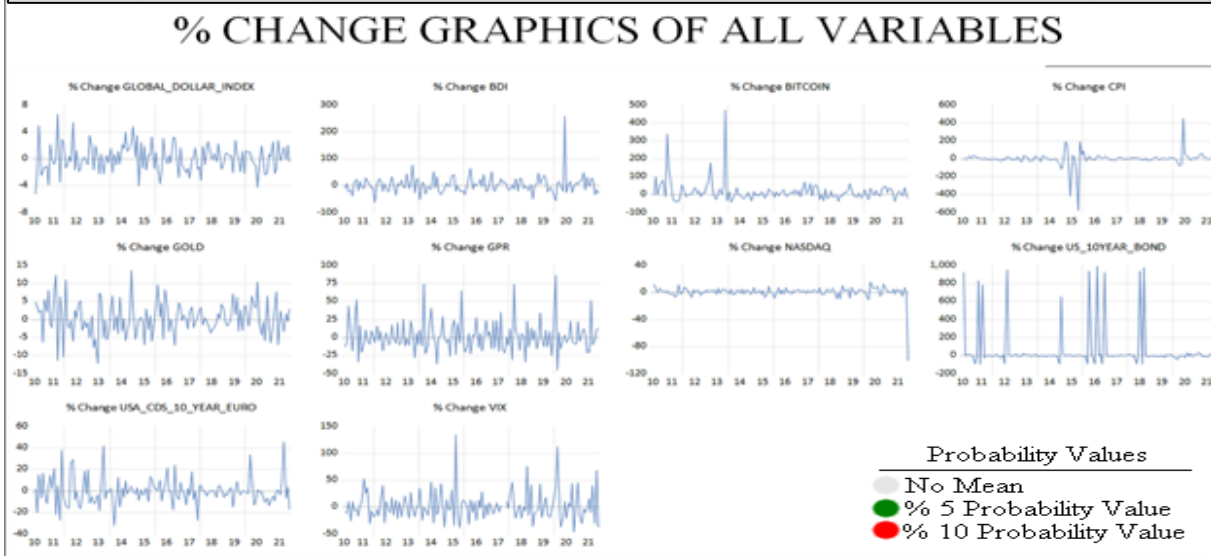
The Baltic dry index and gold prices in the forward markets have negative coefficients at the 5% significance level in the quantile intervals expressing the underpricing interval. The Nasdaq index was significant at the 10% , at the 5% level, and the VIX fear index at the 10% level and the coefficients of these variables were positive. The US 10-year government bond interest rate variable is significant at the 10% level, and its coefficient is negative (see Figure 3).

In the median quantile, which is the mean increase point (0.5), the Baltic dry Index, gold prices, and the Nasdaq index are significant at 5%, and the coefficient signs are respectively; negative, negative, and positive. US 10-year bond yields and VIX index are 10%; coefficients take negative and positive values, respectively (See Figure 3).

In the quantile ranges selected as the over-pricing intervals, Baltic dry index, Nasdaq index, and bond interest rates are significant at 5%, and the coefficients are respectively; negative, positive, and negative. The VIX fear index is significant at the 10% level, and its coefficient has a positive sign. On the other hand, the inflation variable is significant at both 10% and 5% levels in overpricing quantile intervals, and its coefficients are positive signs. Gold and CDS variables are significant at both 5% and 10% levels, and their coefficients are negative (See Figure 3).

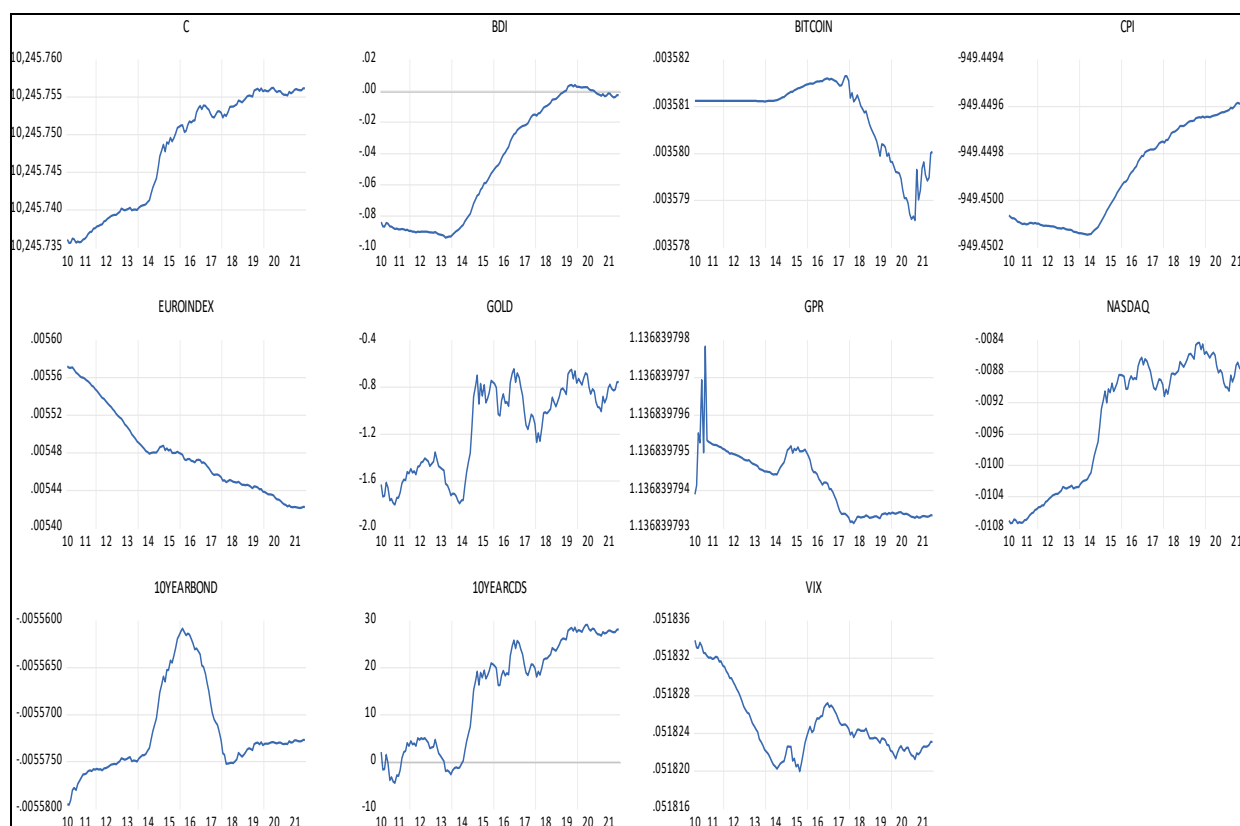
Figure 3: Quantile Regression and Kalman Filtering Combined Results and Data Graphs

	LOW PRICING	AVERAGE PRICING	OVERPRICING
BDI	NEGATIVE VALUE	NEGATIVE VALUE	NEGATIVE VALUE
BITCOIN	NO MEAN	NO MEAN	NEGATIVE VALUE
CPI	NO MEAN	NO MEAN	POSITIVE VALUE
EURO_INDEX	NO MEAN	NO MEAN	NO MEAN
QUANTILE PROCESS			
GOLD	NEGATIVE VALUE	NEGATIVE VALUE	NEGATIVE VALUE
GPR	NO MEAN	NO MEAN	NO MEAN
NASDAQ	POSITIVE VALUE	POSITIVE VALUE	POSITIVE VALUE
US_10YEAR_BOND	NEGATIVE VALUE	NEGATIVE VALUE	NEGATIVE VALUE
USA_CDS_10_YEAR_EURO	NO MEAN	NO MEAN	NEGATIVE VALUE
VIX	POSITIVE VALUE	POSITIVE VALUE	POSITIVE VALUE
	% 5 MEANING	%10 MEANING	
BDI	NO MEAN, NEGATIVE INC. TREND	2012.08-2014.09,NEGATIVE INC. TREND	
BITCOIN	NO MEAN, POSITIVE DEC. TREND	NO MEAN, POSITIVE DEC. TREND	
CPI	ALMOST ALL TERMS, NEGATIVE INC. TREND	ALMOST ALL TERMS, NEGATIVE INC. TREND	
EURO_INDEX	NO MEAN, POSITIVE DEC. TREND	NO MEAN, POSITIVE DEC. TREND	
KALMAN FILTERING			
GOLD	ALL TERMS, NEGATIVE INC. TREND	ALL TERMS, NEGATIVE INC. TREND	
GPR	ALL TERMS, POSITIVE DEC. TREND	ALL TERMS, POSITIVE DEC. TREND	
NASDAQ	NO MEAN, NEGATIVE INC. TREND	NO MEAN, NEGATIVE INC. TREND	
US_10YEAR_BOND	NO MEAN, NEGATIVE INC. TREND	NO MEAN, NEGATIVE INC. TREND	
USA_CDS_10_YEAR_EURO	APP.ONE TO THREE OF ALL TERMS, POSITIVE INC. TREND	APP.ONE TO THREE OF ALL TERMS, POSITIVE INC. TREND	
VIX	ALL TERMS, POSITIVE DEC. TREND	ALL TERMS, POSITIVE DEC. TREND	
Abbreviations	inc.; increasing, dec.; decreasing, app.; approximately		



In the next step, the Kalman filter analysis was used to calculate the time-varying dynamic coefficients expressing historical dynamic effects of the variables on the Global dollar index (See Figure 4). For this, 0.5 quantile, which represents the median value and is a high percentage of model explanation, was used. It was also observed that the same coefficients were estimated for all quantiles by using kalman method.

Figure 4: Kalman Filter Results and Time-Varying Dynamic Coefficients



- ✓ The Baltic dry index coefficient was negative until 2018 and became positive after 2018. It started to decrease positively after 2020 and turned negative again.
- ✓ Bitcoin prices have increased positively until 2017. The coefficient shrank between 2018 and 2021, and the increasing effect of bitcoin prices on the dollar index became more vital in the post-2020 pandemic period.
- ✓ The inflation variable remained negative until 2014, and its negative impact on the dollar index continued to decrease during the post-2014 period of financial fragility risks in Global markets and inflationary pressure caused by the pandemic.
- ✓ The effect of the Euro index decreased, close to zero, in parallel with the quantile regression analysis.
- ✓ The dynamic effect of gold prices continued in a negative and increasing trend.
- ✓ The impact of geopolitical risks has been positively decreasing.
- ✓ The dynamic effect of the Nasdaq index; continued by converging to zero in the increasing trend in the negative.
- ✓ The effect of the US 10-year bond interest rates increased negatively until 2014 and converged to zero.
- ✓ The impact of the US 10-year CDSs turned negative between 2010 and 2011, then positive, but converged to zero in 2014. This effect continued to increase in the following years.
- ✓ The effect of the VIX fear index is positive, converging to zero. However, this effect has shown a decreasing trend over the years.

The coefficients obtained from the estimated dynamic equations were divided by the calculated standard errors, and the “T” statistics values were calculated. Since the degrees of freedom of the data set are 10, to estimate the statistical significance of the dynamic coefficients at the 5% and 10% levels, a comparison was made with the values of 1,372 and 1.833, which correspond to the 10th degree, respectively, in the T table (See Figure 5 and 6).

Figure 5: Kalman Filter Results and Time-Varying Dynamic Coefficients T Statistical Values

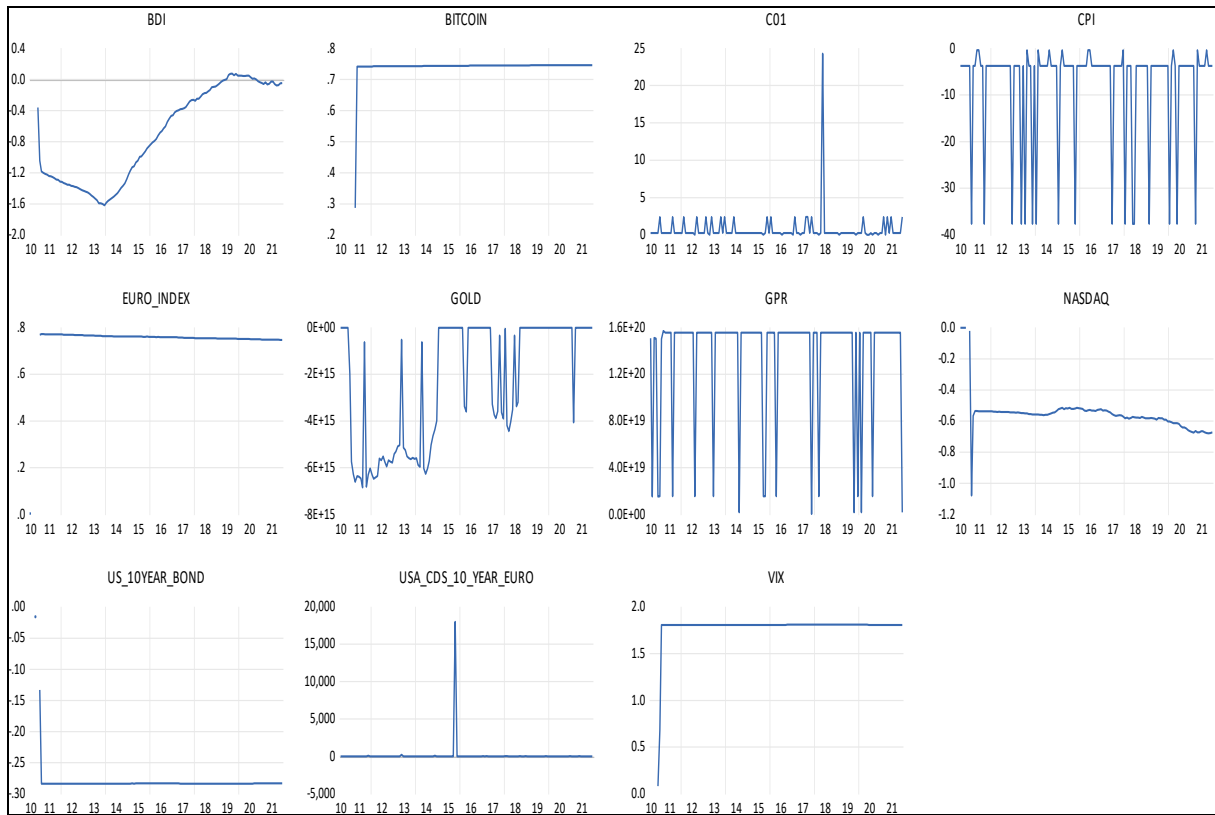
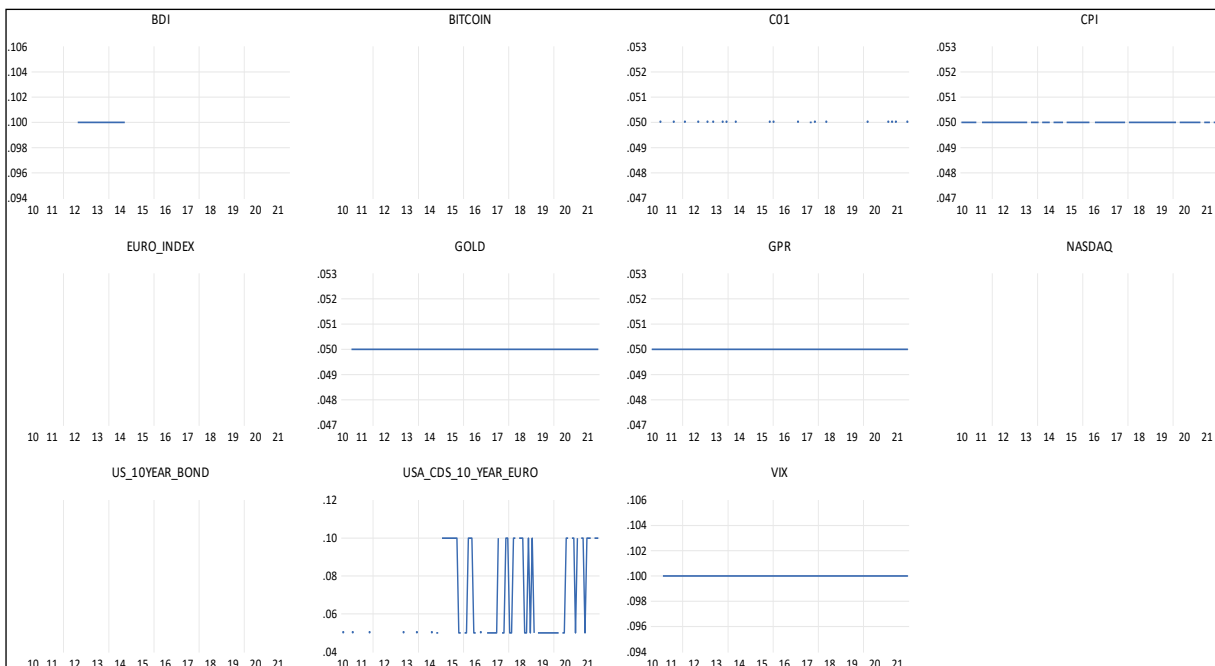


Figure 6: Kalman Filter Results and Time-Varying Dynamic Coefficients T Statistical Values and Significance at 0.05 and 0.1 Levels



6. CONCLUSION

Many economic and financial variables are influential in today's Global economic and financial order and the interaction dynamics of these international structures with local financial markets and systems. Among these variables, some have a secondary effect; some have a primary effect, that is, a determinant effect on all other variables.

In theory, these variables are exchange rates, interest rates, and inflation rates. Systemic, systematic, and non-systematic risks on a country basis are the main parameters that determine the value of the local currency against foreign currencies. Since it is generally acknowledged that the US dollar is the strongest currency in the global system and that it is the most widely used reserve currency of implementation in international commercial and financial flows, its value relative to other currencies is regarded in this context as the leading indicator of exchange rates for other countries. The value of the US dollar can be calculated as an exchange rate for each country's currency and as an index by international financial institutions. One of these indices is the "US Global Dollar Index" calculated by the International Exchange Group (ICE Futures).

Structural shocks or economic-financial recessions in Global and local economies may cause exchange rate pricing to be excessive or very low. Many economic and financial variables affect this pricing. In this context, "Quantile Regression," which provides parameter coefficient estimation in different quantiles. It refers to different growth-increase rates in the dependent variable. Because the method was chosen as one of the methods to be used in the study to estimate how the parameters are affecting the underpricing, average pricing and overpricing in the Global US dollar index, the study's dependent variable of the study.

Another method used in the study is the "Kalman Filtering" method, which is used to calculate time-varying dynamic coefficients historically in the observation-estimation interval of the study in any classical regression equation. In the research; US Global dollar index (Dependent Variable); Baltic dry Index, bitcoin, Euro index, international gold prices, US CPI rate, US 10-year bond yields, US 10-year Euro CDS, Nasdaq index, Global geopolitical risk index, and Vix fear-risk appetite indices were chosen as independent variables. The time series were observed at a monthly frequency. The observation-estimation interval was determined as 2010.08-2021.12. In this context, regression equations and parameter coefficients were calculated for 19 quantile values in the interval of 0.05-0.95 quantiles.

In the next step, to make more meaningfulness of the results obtained in the quantile regression models, the Kalman Filtering method, which is used to calculate the time-varying coefficients, was used. In this method, time-varying dynamic coefficients were calculated in the observation interval of the study from the regression equations calculated for both under, average and over pricing quantiles intervals. However, these coefficients took the same values in all quantiles despite the change in quantile level. Accordingly, dynamic coefficients were calculated with the equations obtained at 0.05, 0.5, and 0.95 quantile levels. The coefficients obtained from the estimated dynamic equations were divided by the calculated standard errors, and the "T" statistics values were calculated. Since the degrees of freedom of the data set are 10, to estimate the statistical significance of the dynamic coefficients at the 5% and 10% levels, a comparison was made with the values of 1,372 and 1.833, which correspond to the 10th degree, respectively, in the T table.

To interpret the Kalman filtering results, which are used to calculate time-varying dynamic coefficients, integrated with quantile regression, combined results from expressing the effects of both methods were prepared (See Figure 6).

The study's data set performed the dynamic analysis at 0.05, 0.5, and 0.95 quantile levels. The technique was done with the Eviews 12 Program. Dynamic coefficients were calculated precisely the same in all three quantiles. This indicates that it can be argued that the parameters that change according to the quantiles of the dollar index value, which are expressed as low or high growth rate, can be eliminated in the historical analysis. On the other hand, being able to more clearly observe the dynamic effects of the Kalman results and the growth rates of the dependent variable in the quantile analysis is essential in achieving the research objectives. Because; If we need to interpret the variables in order, within the framework of the figure whose results express the % changes in the raw data graphs of the variables; (See Figure 6).

The coefficient of the Baltic dry index remains negative, as in the pricing ranges; dynamic coefficients are significant only at the 10% level between 2012.08-2014.09). When we look at the % change graph, it is seen that the growth in the dollar index variable was high in this period.

While Bitcoin prices are not significant at the 5% and 10% levels in the time-varying analysis, the coefficient is increasing positively. In the quantile regression, the coefficient signs take negative values at 5% and 10% in the overpricing range.

The inflation variable coefficient is significant at 5% and 10% over time. In addition, almost all periods, it is in an increasingly negative trend; that is, it approaches zero. With this, in quantile regression, only the overpricing period was significant at both the 5% and 10% levels, and the coefficient took positive values. In other words, the inflation variable coefficient, which approaches zero in the observation interval and is negative, can bring positive values in the overpricing interval.

The Euro index variable was not significant for both analysis methods. With this, The coefficients varied with time, and most of the coefficients in the quantiles were positive.

The gold variable takes negative values in both methods and is significant at the 5% level. It was also significant at the 10% level in overpricing ranges. However, this negative effect increases by approaching zero in coefficients that change over time.

The geopolitical risk index variable is not significant in the selected quantile ranges; partially parallel with this result, it approaches zero in the positive and is significant at the 5% and 10% level in the coefficients varying according to time.

Nasdaq index historical values coefficients are not significant. However, it is statistically significant in the selected pricing ranges (10% in underpricing, 5% in others), and the coefficient has a negative sign in both methods.

The variable of US 10-year bond yields was not significant in kalman analyses. However, its coefficient has a negative sign. It was significant in the quantile intervals, but the coefficient took negative signs as the results of kalman analyses.

In terms of quantiles, US CDSs are significant only at the 5% and 10% levels in the overpricing ranges of the US dollar, with a negative coefficient. With this, in the kalman method, the coefficients at the 5% and 10% are significant in some periods, and it has been observed to increase in the positive.

Although the VIX fear index has positive values in all quantile ranges and is significant at the 5% and 10% levels, this positive effect is the quantiles expressing the pricing intervals. It has been observed to decrease with time-varying coefficients.

Using two methods whose research assumptions differ may reveal the problem of partially one-to-one matching in terms of both approaches' results and theoretical expectations. With this, the study shows that the results of the two methods are similar. Statistical significance tests were conducted to examine the different variables' results better. In this context, the variables whose results are not compatible with each other in terms of both methods; are inflation (partially), geopolitical risk index, Nasdaq index, and US 10-year bond rates. Therefore, clarification of these points theoretically is essential in achieving the research aims. In addition, deepening the analysis of the baltic dry Index will contribute to the purpose of the research.

In this respect, as can be interpreted from the results of the inflation variable, it can be stated that takes positive values in ranges the US dollar index where it is overpriced and negative values in other pricing ranges.

Although the geopolitical risk index is not significant in the selected pricing ranges being substantial and positive in time-varying coefficients, It can be argued that geopolitical risks are because they are countercyclical. As a theoretical expectation, increased risks increase exchange rates. In this context, the time-varying coefficients of geopolitical risks are also positive in parallel.

While the Nasdaq index variable had positive values in quantile intervals, it had negative values in the Kalman analysis; but it is not statistically significant. In this context, by the theory, increasing US stock returns will increase the US dollar index, as it will increase the US dollar's return. In this context, while making theoretical interpretations, the variable used in the study is not parity but an index. In this context, in a two-country model and the other country's currency/US dollar parity, the decrease in the risks of the USA will strengthen the value of the US dollar against the other currency.

Theoretically, increasing interest rates in the US 10-year indicators can increase the value of the US dollar against other countries in terms of parity. With this, As we can define again, the critical point is that since the selected variable is an index value, the degree of divergence of the bond rates of the countries in the Index in terms of US interest rates will determine the direction of the Index. In this context, benchmark interest rates in other countries included in the dollar index were generally above the US indicators. Therefore, the negative coefficient of the variable is in line with the theoretical expectations. In this context, if we need to interpret the results of other variables with academic expectations;

increase in the Baltic dry index; As a result, it shows that volume of international trade and finance flows are higher. Accordingly, the realization of an increase in the Index will reveal more commercial and financial flows and Global movement of the US dollar as a reserve currency outside the USA. In this context, it can be argued that since the currencies constituting the calculation of the US dollar index will gain value against the US dollar, decreases may be observed in the US dollar index. In this direction, if we need to rank the results obtained in the research;

While the Baltic dry index (at 5%), global gold prices (at 5%), and US 10-year bond rates (at 10%) have negative coefficients, the Nasdaq (10%) and Vix (at 5% and 10%) indices have positive coefficients. These variables are significant in the low quantile pricing range of the US Dollar index (0.05-0.5).

The same results are valid for the pricing interval that expresses the median value. Only the Vix index is significant only at the 10% level.

In the high-quantile overpricing interval of the US Dollar index, the Baltic Dry Index (5%), Bitcoin prices (5% and 10%), Gold prices (5% and 10%), US 10-year interest rates (5%), and CDS premium (5% and 10%) are the variables that are significant (0.05-0.5). While these variables' coefficients are negative, the inflation (at 5% and 10%), Nasdaq (at 5%), and Vix index (10%) variables' coefficients are positive.

The dynamic coefficients calculated retrospectively according to the Kalman filtering analysis have historically taken the same values in all quantiles.

For this reason, parameter differences in underpricing and overpricing intervals can be eliminated when retrospectively analyzed. The reason for this can be explained as follows;

The theoretical basis of Kalman analysis and quantile regression analysis is different. Therefore, although the Kalman results broadly estimated parameters parallel to the quantile regression results, the estimated parameters for some variables did not match the effects of both methods to the same extent. In other studies in the literature in which both methods are used, it is observed that situations related to this incompatibility are encountered (Bernardi et al., 2016: 34).

In addition, since the geopolitical risk index expresses countercyclical risks, the increasing geopolitical risks in the dynamic coefficients increased the US dollar index.

REFERENCES

- Avdjiev, S., Bruno, V., Koch, C. and Shin, H.S, (2019). The dollar exchange rate as a global risk factor: evidence from investment. *IMF Economic Review*, 67(1), 151-173.
- Azar, S. (2013). Oil prices, US inflation, US money supply and the US dollar. *OPEC Energy Review, Organization of the Petroleum Exporting Countries*, 37(4), 387-415.
- Azar, S. (2015). The relation of the US Dollar with Oil Prices, gold prices, and the US stock market. *Research in World Economy, Research in World Economy, Sciedu Press*, 6(1), 159-171.
- Bernardi, M., Casarin, R., Maillat, B., & Petrella, L. (2016). Dynamic Model Averaging for Bayesian Quantile Regression. *arXiv: Statistics Theory*. February, 1-45. DOI: 10.48550/arxiv.1602.00856
- Black, K. (2012). The role of credit default swaps and other alternative betas in hedge fund factor analysis. *Journal of Derivatives & Hedge Funds*. 18(3), 201–222. DOI: 10.1057/jdhf.2012.9
- Chaudhry, N. Asad, H.; Abdulghaffar, M.; Amir, M. (2021). Contagion effect of COVID-19 on stock market returns: Role of gold prices, real estate prices, and US dollar exchange rate. *Pakistan Journal of Commerce and Social Sciences*, 15(3), 614-635
- Conyon, M.J., & He, L. (2017). Firm performance and boardroom gender diversity: A quantile regression approach, *Journal of Business Research*, 79(C), 198-211, <https://EconPapers.repec.org/RePEc:eee:jbrese:v:79:y:2017:i:c:p:198-211>.
- Curcuru, S. & Kamin, S. & Li, C. & Rodriguez, M. (2018). International Spillovers of Monetary Policy: Conventional Policy vs. Quantitative Easing, No 1234, *International Finance Discussion Papers, Board of Governors of the Federal Reserve System (U.S.)*, <https://EconPapers.repec.org/RePEc:fip:fedgif:1234>.
- Georgiadis, G. & Müller, G.J. & Schumann, B. (2021). Global risk and the dollar. Working Paper Series 2628, European Central Bank.
- Gurrib, I. & Elshareif, E. (2016). Optimizing the Performance of the Fractal Adaptive Moving Average Strategy: The Case of EUR/USD. *International Journal of Economics and Finance*, 8(2) 171-178.
- Han, L. & Wan, L. & Xu, Y.. (2020). Can the Baltic Dry Index predict foreign exchange rates?. *Finance Research Letters*. 32(1), 101-157. DOI: 10.1016/j.frl.2019.04.014.
- Harvey, A.C. (1990), "Forecasting, Structural Time Series and the Kalman Filter", Cambridge University Press.
- <https://finanswebde.com/dolar-endeksi/b/5fdf7d6d0f40270039fedcdc>, date of Access, 10.01.2022
- <https://tr.investing.com/commodities/gold>, date of Access, 01.03.2022
- <https://tr.investing.com/crypto/bitcoin>, date of Access, 01.03.2022
- <https://tr.investing.com/currencies/us-dollar-index>, date of Access, 01.03.2022
- <https://tr.investing.com/economic-calendar/cpi-733>, date of Access, 01.03.2022
- <https://tr.investing.com/indices/baltic-dry>, date of Access, 01.03.2022
- <https://tr.investing.com/indices/investing.com-eur-index>, date of Access, 01.03.2022
- <https://tr.investing.com/indices/nq-100>, date of Access, 01.03.2022

<https://tr.investing.com/indices/volatility-s-p-500>, date of Access, 01.03.2022

<https://tr.investing.com/rates-bonds/u.s.-10-year-bond-yield>, date of Access, 01.03.2022

<https://tr.investing.com/rates-bonds/united-states-cds-10-years-eur>, date of Access, 01.03.2022

<https://www.policyuncertainty.com/gpr.html>, date of Access, 01.03.2022

Ilalan, D. and Pirgaip, B. (2019). The Impact of US Dollar Index on Emerging Stock Markets: A Simultaneous Granger Causality and Rolling Correlation Analysis, Biswas, R. and Michaelides, M. (Ed.) *Essays in Financial Economics (Research in Finance, Vol. 35)*, Emerald Publishing Limited, Bingley, pp. 145-154. <https://doi.org/10.1108/S0196-382120190000035007>

Koenker, R. (1984). A Note on L-estimators for Linear Models. *Statistics & Probability Letters*, 2, 323-325.

Kumar, J., & Robiyanto, R. (2021). The Impact of Gold Price and Us Dollar Index: The Volatile Case of Shanghai Stock Exchange and Bombay Stock Exchange During the Crisis of Covid-19. *Jurnal Keuangan dan Perbankan*, 25(3), 508-531. doi:<https://doi.org/10.26905/jkdp.v25i3.5142>

Lee, D. & Liu. (2010). An Analysis of Several Factors Affecting the U.S. Dollar Index. DOI: 10.17863/CAM.1346

Long, H. & Demir, E. & Bedowska-S., Barbara & Zaremba, A. & Shahzad, S. (2022). Is Geopolitical Risk Priced in the Cross-Section of Cryptocurrency Returns? (May 13, 2022). Available at SSRN: <https://ssrn.com/abstract=4109293>, DOI: 10.2139/ssrn.4109293

Martin F.E, Mukhopadhyay M. and Hombeeck C, (2017). The Global role of the US dollar and its consequences. *Bank of England Quarterly Bulletin* 2017(4), 1-11, <https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/2017/the-global-role-of-the-us-dollar-and-its-consequences.pdf>, Date of Access, 10.03.2022

Mokni, K., & Ajmi, Ahdi N.. (2020). Cryptocurrencies vs. US dollar: Evidence from causality in quantiles analysis. *Economic Analysis and Policy*, 69, 238-252. DOI: 10.1016/j.eap.2020.12.011.

Öner, H. (2018). Uluslararası Finansal Endekslerin Döviz Kurları Üzerine Etkileri: Ampirik Bir Analiz. *Selçuk Üniversitesi Sosyal Bilimler Meslek Yüksekokulu Dergisi*, 21(2), 173 - 185.

Plagborg-Møller M. & Gopinath G. & Boz E. (2017). Global trade and the dollar. National Bureau of Economic Research, Inc., NBER Working Papers 23988, 1-66,

Seneviratne D. & Xu Y. & Raddatz C. & Xie P. & Deghi A. & Barajas A., (2020). Global Banks' Dollar Funding: A Source of Financial Vulnerability, *International Monetary Fund IMF Working Papers* 2020(113), 1-50.

Su, J. B. (2016). How the Quantitative Easing Affect the Spillover Effects between the Metal Market and United States Dollar Index?. *Journal of Reviews on Global Economics*, 2016(5), 254-272.

Sun, X., Lu, X., Yue, G., & Li, J. (2017). Cross-Correlations Between the US Monetary Policy, US Dollar Index and Crude Oil Market. *Physica A*, 467, 326-344. DOI: 10.1016/j.physa.2016.10.029

Ünvan, Y. A. & Demirel, O. (2020). Ekonomik Büyüme Oranını Etkileyen Faktörlerin Kantil Regresyon ile İncelenmesi: Türkiye Örneği. *Anemon Muş Alparslan Üniversitesi Sosyal Bilimler Dergisi*, 8, 175-188. DOI: 10.18506/anemon.712323

Wu, W. and Zhou Z. (2014). Structural Change Detection For Regression Quantiles Under Time Series Non-Stationarity University of Toronto Works, September 15, 2014, 1-39.

Yavuz, A.A., & Aşık, E.G. (2017). Quantile Regression. *Uluslararası Mühendislik Araştırma ve Geliştirme Dergisi*, 9(2), 138-146.

Yıldırım, H.. (2019). The Long-Term Relationship of Fear Index With Dollar Index, Dax Volatility Index and Crude Oil Prices: Ardl Bound Test. Editör. Çürük, T. *Economics and Administrative Publisher: Akademisyen Kitabevi A.Ş.* 47-58

THE IMPACT OF FOREIGN AIDS ON POVERTY REDUCTION: AN INTERNATIONAL LITERATURE REVIEW

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ABSTRACT

Purpose- Lately after the occurrence of the Covid-19, there has been a substantial wave of the foreign aid funds from developed to developing economies aimed to back up the most effected countries. The concept of the foreign aids with the primary goal to eradicate poverty is not new to economy and social development scholars since it has been researched for decades.

Methodology- The poverty eradication was adopted from what so called the Millennium Development goal (1990-2015) and Sustainable development goal that is expected to come to an end in 2030. This study qualitatively accesses the impact and the effectiveness of the foreign aid given to most developing countries with the aim to eradicate the poverty level.

Findings- The main objective of this paper is having an empirical conclusion on the effectiveness of the foreign aid through the critical empirical reviews of the both quantitative and qualitative works done by different scholars in different countries.

Conclusion- The study concluded that quantitatively it is illogical to conclude weather the foreign aid really contributes to poverty reduction in recipient's country or not. This backed up by the presence of both empirical studies both in favour and against of foreign aids. The study further revealed that the effectiveness of the foreign aid toward eradication of poverty depend on many factors on both recipients' and donor countries. Those factors include conditions attached to aids, allocation of the aids to targeted areas, authority of the states in decision making related to foreign aid and political influence. Finally, the study suggested that for efficient use the foreign aids countries should have a clear stipulated goals and area of prioritization. The countries also should have a clear monitoring mechanism to supervise the progress of the funds expenditure over time

Keywords: International review, foreign aid, millennium development goals, poverty reduction, qualitative analysis.

JEL Codes: F35, I30, I32

1. INTRODUCTION

Foreign aid has been used as the tool to improve life and eradicating poverty since the beginning of the post-colonial era, although its effectiveness is still under discussion. As result recently, number of researches has been done focusing on apprehending the impact and the effectiveness of the foreign aid to economic growth and poverty reduction (Calderón et al., 2006). The discussion about the subject matter goes long way down the history and a lot of researches have been conducted to address the issues. Generally the conclusions of scholars fall under one of the three schools of thoughts. The first school of thought believes that foreign aids definitely guarantee the eradication of poverty in developing countries. The second school of thought contend that the foreign aid is ineffective in eradicating poverty and generally leads to endless cycle of poverty and slow economic growth. The Third school of thought argues that foreign aid is only effective in poverty reduction under certain conditions (Mahembe & Odhiambo, 2019). The conditions that assure the effectiveness of the foreign aids include approaches and methods used by donors to allocate foreign aid to qualified recipient countries. Normally approaches may be determined by looking at term of the governance of the aid, commitment toward the aids, ownership of schemes funded by the aid and institutional capacity of the recipient countries (Riddell, 2014).

The poverty eradication problem is very interesting problem facing the world. To address this issue the international communities and organization through the United Nation came up with the development agenda so called the Sustainable Development Goals (SDGs) which started in 2015 replacing the old development agenda called the Millennium Development Goals (MDGs). The Millennium Development Goals (MDGs) come to an end in 2015 and Sustainable Goals (SDGs) is expected to be concluded in 2030 (Alkire et al., 2021). The persistence of the poverty problem over the decades, made the researchers and scholars to research on possible variable that could be the solution to poverty problem. The economic variables

researched by the scholars depend on the researchers' interest, and differ from region to region, low to middle-income regions. Foreign aid and remittance inflows are one of those crucial variables that seem to play a significant role in helping countries to eradicate and reduce poverty over time (Fayissa & El-Kaissy, 1999).

One among the sources of the economic growth and development in most developing countries and growing economies is foreign aid. Foreign Aid is considered as flow of foreign exchange revenues directed to infrastructural and social development and projects. Basically, some studies argue that foreign aids have positive impact in economy, capital accumulation, human, and welfare of the recipient economies. Foreign aids are vital for developing economies through better utilization of domestic resources and the gap between savings and foreign exchange created due to lack of foreign currency. Therefore one may say that it is proponent believed that, foreign aid has positive effects and helps the developing economies by minimizing the investments and saving gap to achieve economic growth. Normally, foreign aid is expected to enhance economic welfare and support economic growth, however, its effectiveness toward the economic growth is questionable and debatable (Khan et al., 2022).

1.1. Overview of Poverty

Defining the term poverty is very controversial issue. Scholars have tried to define this term in different perspectives in order to provide a clear understanding of the concept. Spicker in his work named as Definitions of Poverty, came up with the twelve clusters of meaning defined the term poverty in twelve angle based on how the concept described by different scholars. These clusters of poverty definition show how diverse the concept of poverty is. Some scholars define the term poverty definitions as a material concept. In this way scholars categorize people as poor because of lacking something they need, or simply by not having resources to enable them to get things they need. This definition poverty focuses on material goods such as food, shelter, clothing, fuel or other needs. Apparently, it should be noted that, these individual material needs tend to change from time to time and from place to place (George, 1988).

Some scholars see the poverty as a pattern of deprivation. In this perspective of defining poverty, the poverty is said to refer not just to lack of material needs, but also deprivation of experienced over a period of time. Under this perspective the particular kinds of deprived needs like hunger and homelessness is considered to be important by some scholars while some scholars focus on the seriousness of the deprivations or lack of these needs. For example, while the food and shelter are often considered to be important than entertainments and transport, in some societies deprivation or lack of access to entertainments and transport may be considered as poverty (Spicker, 1998).

The term poverty can also be defined as the situation in which individuals lack resources, income or wealth needed to secure and consume stuffs they need. In this regard, poor people are considered to have sufficient, but not sufficient enough resources to afford what considered being a decent and independent life. Therefore an individual is considered to be poor when his life means of earning is insufficient to afford a normal standard of life with reference to his community (Fried & Elman, 1969).

The idea of poverty sometimes is perceived as a lack of resources in economic terms. It is one of the most common used approaches to describe the notion of poverty. In this perspective the poverty is describe in term of the income measures to the point where some social scientists believe wrongly that poverty is just having low income (Pascall, 2020).

The concept of poverty may also be described as a standard of living. In this perspective of definition of poverty, the focus is on whether the individual or family level of life in term of consumption and income is below or above particular standards. Again, this perspective too is based on the concept of needs that are defined as material things considered to be vital and necessary to people (Rodgers, 1995).

The poverty as inequality, considers some individuals to be poor compared to other individuals in society. The essence of being unequal doesn't necessary means it is poverty, but to a certain degrees of inequality may be considered to be below the minimum standards that is acceptable in community and hence poverty. Basically, most scholars focused much and seem to be concerned with the level of income required to allow access and attain the minimum standards of living that is considered acceptable in that society at particular time. As a result of that, it can be generalized that, there is a direct relationship between poverty and inequality. In simple words that is to say, if the economic inequality is beyond the minimum level, then that situation is considered as poverty (O'Higgins & Jenkins, 1990).

Some scholars also describe the concept of poverty as economic position. In this perspective of understanding the concept, considers poverty as a 'class' of people or group of people that is identified by their economic situation or position in particular society. The presence of class indicates the inequality. It should be noted that, the inequality represented by class is a matter of the social structure, not of the inequality based on resources or consumption. This is because resources and consumption are not good and worth in indicating social position (Spicker, 1998). The fact is that, the poor people represent the working class in society are identified overtly in terms of classes, based on the lowest wage rates paid to their work people and not based on what so called the 'poverty line' which also measures and indicated the poverty (Fried & Elman, 1969).

The term poverty some time is described in term of social circumstances which is closely related that of social class. In describing the concept of poverty as the social class, scholars identify economic and socio economic status that directly link people classes with their social and occupational roles. The poverty as concept social class and social circumstances commonly used both as the basis for empirical research on the distributive implications of policy and as a means of conceptualizing the position held by the poor people in structural terms (Edgell, 2008).

The poverty phenomenon also described as a state of being dependent. Poor people can be defined as dependent people and therefore receive social assistances to fulfil some of their needs. In this perspective it insisted that, poor people should not be confused with people with inadequate or low incomes. This means people with low income will only be considered to be poor if they are dependent. Therefore, for a person to be poor he should receive a social assistance to fulfil his or her needs. Some scholars in this perspective of defining poverty describe the poverty as structural exclusion and elimination a citizen can experience from certain social participation, which may normally results into a state of being dependence (Spicker, 1998)

The concept of poverty also is described in term of lack of the basic security. In this standpoint, poverty is described as lack of basic securities. It is a state of susceptibility to social threats. By the term the basic securities, it simply means human basic needs (Duffy, 1995). People with certain hardship to obtain their daily necessities are echoed as poor, whereas people that live in a state of chronic and extremely hardship are considered to be very poor people (Fried & Elman, 1969). In this way of understanding the concept of the poverty, the chronic poverty occurs when individual lack basic security and at the same time affects several aspects of individual's life, long enough to be so serious and compromises individual's chances to regain their fundamental rights and responsibilities in the near future. Therefore, state of being poor is identified as a 'lack of basic security', which may be described as factors that enable individuals to fulfil their basic responsibilities and to enjoy their basic rights (Duffy, 1995).

Apart from the concept of poverty being translated in term of deficiency of securities, it can also be defined as lack of entitlement or rights. In this point of view the poverty is defined as both deprivation and lack of resources that in the long run leads to lack of entitlements, and not just the lack of essential needs. For example, being in a homeless situation is a result of not having an access to housing or land, not from lack of housing. Or, famines, is not a result of not having access to food, but it's a result of individual inability to buy the food that available in the market. Therefore, the lack of entitlement is fundamental idea behind concept of the poverty condition, and therefore people who have the necessities and required entitlements are not considered as poor (Drèze, J., & Sen, 1989).

The concept of poverty as the exclusion also is the dominant paradigm in describing the concept of the poverty in most of the European countries to avoid some controversial political ideas. Describing the poverty in perspective of social exclusion may have impacts on groups of people, individuals, and even the geographical areas. The poverty as social exclusion can be in form of access to services, education, health, or even housing and not just in levels of income. In this regard therefore, problems related to social exclusion include that of homelessness, ethnic tension, urban crises, rising long term unemployment, and persistent of poverty level (Tiemann, 1993).

Some scholars as well, describe the concept of poverty as the issue that depends on moral judgment. According this perspective, poverty situation consists severe of deprivation, and individuals are considered to be poor when their material circumstances are considered to be morally unacceptable. Poverty involves not just any kind of hardship, but unacceptable hardship. The term poverty, imply moral and social need that something should be done to adjust it (Piachaud, 1981).

1.2. Measurement of Poverty and its Importance

Evaluating poverty correctly is very important in measuring how big the poverty problem is and facilitating effective formulation of policies and monitoring their implications. However, measuring the poverty is as challenging as defining the concept itself. Therefore, primarily there are differences in motivations and perceptions of scholars who define the concept of poverty and measuring it, although there is some consensus. It is very important to measure the poverty level in order to identify and have a proper records of poor people, identify appropriate programs and interventions against the poverty, being able to evaluate and monitor poverty related projects and policy and last but not least to evaluate how effective the local and international institutions are in coordinating and monitoring policies and projects aimed at eradicating poverty (Haughton & Khandker, 2009). Among the commons measures of poverty include the following:

The Foster-Greer-Thorbecke (FGT) is one among the famous poverty measures commonly known among scholars. It is a generalized poverty measure that was initially developed by Erik Thorbecke, followed by Joel Greer, and James Foster. It involves measures such as the Headcount index (P0), the Poverty Gap index (P1) and the squared poverty gap index (or the Poverty Severity Index, P2). The headcount index (P0) actually measures relatively the proportion of the population that is considered to be poor in society. This measure is the most popular because it is easy to be understood and to be measured. Despite being common and easy to be understood this measure does not indicate extent of poverty a society or an individual has (Haughton & Khandker, 2009).

The Poverty Gap Index (P1) is described as per capital measure of the gap in the welfare of the poor individual from the poverty line. This kind of measure normally is expressed as a ratio of the poverty line. Some scholars consider it to be the per capital cost to be incurred if at all relative poverty is to be eradicated. On the other hand, the Squared Poverty Gap index (P2) is just the averages squares of the poverty gaps relative to the poverty line of the country. It is also called the poverty severity index. It measures how severe the poverty is in a country. By squaring the poverty gap for each household or individual, the squared poverty gap index assumes greater weight to individual that fall far below the poverty line compare to individual that are closer to the poverty line (Haughton & Khandker, 2009).

Another poverty measure is called the Sen-Shorrocks-Thon index. The Sen-Shorrocks-Thon (SST) index is an index of poverty intensity that is also called the modified Sen Index of poverty intensity. This index was named after the scholar who at particular point in time tried analysed the poverty problem. In 1995 Sen-Shorrocks-Thon index was proposed by Shorrocks as an extension of the Sen Index which initially was introduced in 1976. Again it was revised by Zheng in 1997 and came up with the index that was consistent with the limit of another index proposed by Thon in 1979 (Xu, 2020).

Sen-Shorrocks-Thon Index measures the depth of the poverty, the proportion of poor people (poverty incidence), and the distribution of welfare among the poor people in population. These three variables allow grouping the poverty into three components and determining whether there are more poor societies, weather the poor are poorer, and if there is higher inequality among the poor. It is one of the common and widely used measures of poverty by intellectuals (Haughton & Khandker, 2009).

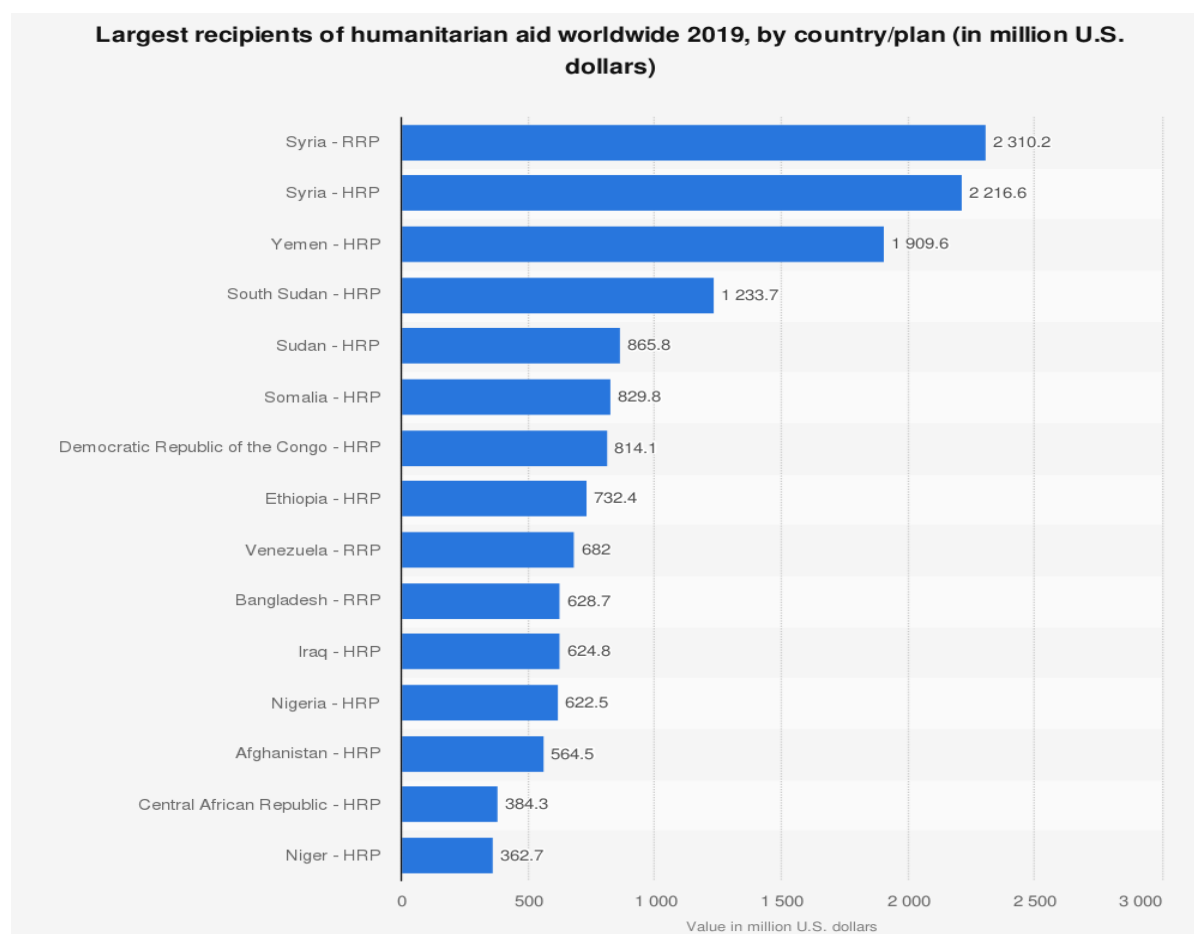
The Sen-Shorrocks-Thon index (SST) index of poverty intensity mathematically is calculated as the product of three poverty measures during a certain period of time which include poverty rate, average poverty gap, and 1 plus Gini coefficient of poverty gaps for the population in particular society (Osberg & Kuan, 2000).

1.3. Overview of Foreign Aid

Foreign aid has been important component of the global development discussion on international economic after the Second World War period. It is claimed that, foreign aid had a significant contribution to the development of the developing countries and establishing good relationship between the developed and developing countries in 1980's (Pankaj, 2005). Most economists started to be interested in foreign aid in 1950s, although the concept of the foreign aid was fairly new concept and economic issue. The concept of the Foreign aid and its importance was officially formalized in 1947 despite the fact that there were not enough empirical studies toward the impact of foreign aid until 1950s (Feeny, 2007).

By definition the foreign aid simply is any transfer of resources or flow of capital made from one country to another country normally from developed to developing countries voluntarily due to having a small robust industrial base followed by having low Human Development Index (HDI). Under normal circumstances, the foreign aid can be in the form of a grant, loan soft or hard loan. If a foreign aid requires repayment in foreign currency, then the foreign aid will be considered as a hard loan, and if the repayment requires domestic or home currency, the foreign aid is considered as a soft loan. The World Bank (WB) usually gives foreign aid in hard loans, while other international organizations provide soft loans (Thapa, 2020).

The distribution of the official development assistance commonly known as foreign aid started after the World War II (Feeny, 2007). The donors or providers of the aid principle motives behind the provision of foreign aid include the aim to provide or fulfill humanitarian needs, help poor countries to achieve economic growth and poverty eradication, bring unity and solidarity, countries political and economic strategic interest, long term and short term commercial and trade interest, reinforcing historical background, and promoting and protecting human rights (Riddell, 2014).

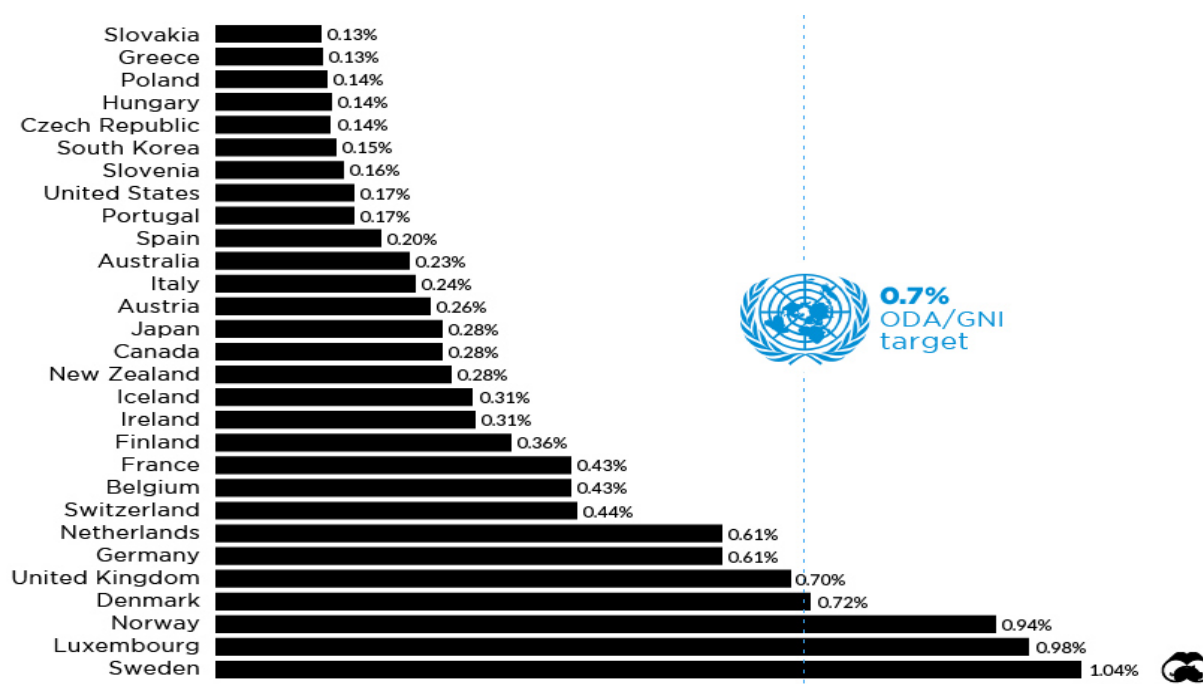
Figure 1: The Largest Recipients of the Aid in 2019

Source: (Statista, 2019)

The figure 1 above demonstrates the countries that have received large amount of foreign aid fund in us dollars in 2019. For 2019 the countries that have received the large portion of foreign aid is Syria followed by Yemen and South Sudan. All these countries have been experiencing chaos for the past few years and needed humanitarian needs. Niger and Central Africa Republic are the last two countries in this chart which counted as recipients of large amount of foreign aid funds. For 2019 Niger was counted to receive approximately 362.3 million US dollar as foreign aid followed by Central Africa Republic which received almost 384.3 million US dollar. This is considerably a small amount compared to the amount received by Yemen which is approximately 2,310.2 mil US dollar. This is because probably for past recent years these two nations have been able to maintain peace and security and therefore able to focus more on production and other economic activities.

The figure: 2 below shows the largest donors of the foreign aid as the percentages of the donor country Gross National Income for the year 2019. 0.7% ODA/ GNI is simply a percentage proposed by United Nation for Developed countries to contribute as Foreign aid from their Gross National income. So far in 2018 based on the **figure 2** only three developed countries managed to reach the 0.7 ODA/GNI target. These countries include Sweden which managed to contribute 1.07% of it GNI, Luxembourg contributed 0.98% and Denmark 0.94% of its GNI.

Figure 2: ODA Grant Equivalent as % of Gross National Income (2018)



Source: (Routley, 2020)

2. LITERATURE REVIEW

2.1 Foreign Aid and Poverty - Theoretical Review

There are a lot of theories that explain the relationship between the foreign aid and poverty reduction or the importance of foreign aid toward the eradication of poverty in the world. It should be noted that some of these theories practically has been used in estimation of the total amount of the foreign aid needed and how effective should the foreign aid should be allocated to insure the poverty is reduced (Mahembe & Odhiambo, 2017). Some of these theories include the following:

Big push theory - According to Big Push theory, in order for a country to move from poverty to development, it requires massive investments in two main sectors which include the infrastructure and education sector. Big push theory focuses on policies related to minimum investment level needed to eradicate poverty and initiate development in evolving nations. The main idea behind the pig push theory is that, only a huge and wide investment projects can encourage and stimulate economic development. That is, definite amount of resources should be allocated and dedicated for development programs for an economy to take off (Umoru, 2018).

On additional to that, the Big Push theory emphasizes that saving and capital is very essential in promoting economic growth and that people are poor because of the vicious circle of poverty. According to the Big Push theory in order to break the vicious circle of poverty, foreign aid is needed to help poor countries escape from common problem known as the poverty trap (Temple, 2010).

Two gap theory - Two Gap theory tries to identify indispensable conditions needed for industrialization development and sustainable economic growth to take place. Essentially, this theory is another common model used to justify the requisite of the foreign aid in eradicating poverty. It focuses on the limited economic growth caused by domestic savings and foreign currency reserves. The first gap described by this theory is the savings gap. The savings gap is the gap between the required investment needed to achieve a certain level of growth and domestic saving. The second gap is foreign currency gap which is literally the gap between the import level required to achieve certain production level and foreign exchange earnings. According to the Two Gap theory, what fills the savings gap and foreign currency gap at any moment in time is foreign aid (Papers & Bender, 2005).

2.2. Empirical Review

Ugwuanyi et al., (2017) researched on the impact of official aid on poverty reduction by using the empirical data in Nigeria from 1981 to 2014. The study used the autoregressive distributed lag (ARDL) and bound test to come to conclusion with the aim of assessing the impact of official foreign aid on poverty reduction in concerned area. The results of the study concluded that, official foreign aid has insignificant positive influence on poverty reduction. The study recommended that for the foreign

aid to be successful, the donors and international aid organizations should target specific area to allocate their aids followed by appraisal and implementation reports.

Okoronkwo et al., (2016) researched on the nature of the foreign aid and its strategies toward poverty reduction in Lagos State Nigeria. Researchers used the explanatory study to examine and investigate how foreign aid contributes to poverty eradication programs. The study focused on the primary data sources that were collected through interview and reviewing government documents and other secondary data that was collected from journal articles textbooks and library. The results of the study concluded that the foreign aid essentially don't reach the intended goal of eradicating poverty due several challenges. Those challenges include misappropriation of foreign aid funds and lack of information on whom or which sector should benefit with the funds. In order for the foreign aid funds to achieve the intended goal of eradicating poverty the researchers recommended that the government should strengthen the institutional capacity for monitoring and establish the training programs for staffs monitoring the progress and the application of the funds.

Shitile & Sule (2019) researched on the efficacy of foreign aid and grants toward poverty reduction by using time series data from 1999 to 2017 in Nigeria. For the analysis purpose the study used the autoregressive distributed lag (ARDL) bounds testing approach. The study collected foreign aid data related to official development assistance (ODA), technical cooperation grants (TCG), and other grants. The results of the study concluded that, in the short-term official development assistance and technical cooperation grants have positive but insignificant impact on eradicating poverty at national level. However, in the long-term, the impact of these variables is negative. This implies that, poverty reduction impact of the policies based on external and foreign aid and grants is debatable and asserts that externally imposed solutions in form of foreign aid and grants do not really solve local poverty problems in a country.

Calderón et al., (2006) researched on the effects of foreign aid on poverty reduction and income inequality from 1971-2002. The study used dynamic panel data techniques to come to conclusion. The study concluded that foreign aid has weak contribution to the income distribution and poverty reduction. The researchers further concluded that the finding of their study was consistent with other recent empirical research on foreign aid and its effectiveness in achieving economic growth and promoting democratic institutions.

Tsaurai (2021) did a research about the impact of foreign aid on poverty reduction in the Middle East and North African (MENA) Region. The aim of the study was to investigate the effects of foreign aid and examine the influence of the human capital development through foreign aid toward poverty reduction in the concerned region. The study used panel data ranged from 2007 to 2018 and analysed the data by using both econometric estimation methods of fixed effects and dynamic generalized methods of moments (GMM). The results of this study concluded that foreign aid and the human capital development through foreign aid has positive influence and contributes to the reduction of poverty in the Middle East and North African (MENA) Region.

Khan et al., (2022) due to the rise in labour immigration and significant amount of foreign aid, researched on the relationship between economic growth, inequality, poverty, remittances, and foreign aid in the Middle East and North Africa (MENA) region. The aim of this study was to examine the relationship between economic growth, poverty, inequality, remittances, and foreign aid in the Middle East and North Africa (MENA). The study used ordinary least square (OLS) regression and panel random-effect models, and system-GMM with panel data from 1991 to 2019 and findings revealed that, foreign aid, remittances, and economic growth play a substantial role in poverty reduction in Middle East and North African (MENA) Region.

Farahmand (2021) conducted a research about the relationship between economic growth and foreign aid in Afghanistan. The study used time series data of official development assistance and economic growth from 1986 to 2018 as variables. The study used Augmented Dickey–Fuller test (ADF) and Phillips-Perron (PP) unit root tests to determine the stability of the series, the Johansen co-integration test to determine whether concerned variables have long run relationship and the Granger causality test based on the error correction model was used to test the causality between variables. The results of the study revealed that, there is a positive relationship between the foreign aid and economic development and that foreign aid contributes positively in eradicating the poverty.

Mahembe & Odhiambo (2021) conducted a research about the effect of foreign aid on extreme poverty in Sub-Saharan African countries from 1981 to 2013. The study used dynamic panel estimation techniques to come to conclusion. Mahembe and Odhiambo concluded that foreign aid statistically have a significant poverty reduction effects in sub-Saharan African countries and insisted on the importance of foreign aid volume and its allocation for it to be effective.

Nur (2015) did a research on impact of foreign aid on poverty reduction in urban areas of Mogadishu, Somalia. The study used both qualitative and quantitative approaches and collect data from sample size of 242 respondents from Wardhiigley, Hodan and Xamarwayne cities. The study revealed that, despite large amount of foreign aid funds from developed countries to urban areas of Mogadishu Somalia, the poverty level was high as compared to other cities in Africa. Therefore the researchers concluded that there were minimum changes on the poverty level as an impact of the foreign aid.

Akobeng (2020) did a research on the relationship between foreign aid, institutional democracy and poverty level. The main objective of this study was to explore the direct effects of the foreign aid on poverty and quantifies the role of democracy in relation to foreign aid toward the reduction of poverty in Sub-Saharan Africa (SSA). The methodology used to examine the relationship between poverty and foreign aid variable was the two-stage least squares instrumental variable estimator which used Gross Domestic Product (GDP) per capita of the top five Organization for Economic Co-operation and Development countries (OECD) that donate foreign aid to Sub-Saharan Africa countries. The results of the study revealed that, foreign aid reduces poverty level. The study also revealed that, different types of foreign aid have different effects toward poverty level. In that case, grant and multilateral foreign aid kinds of foreign aid are likely to be more effective in poverty reduction compare to bilateral foreign aid and loans.

Farah et al., (2018) did a research on how foreign aid affects developing countries, a case study of Ethiopia. The main objective of this study was to identify the impact of foreign aid to socio-economic development in Ethiopia. The study used time series data collected from World Bank Database, Transparency International and Freedom House and evaluated by using regression analysis. The results of the study indicated that foreign aids don't have a major impact on GDP growth, but it has a substantial influence on unemployment rate and foreign direct investment (FDI) in Ethiopia. Therefore despite the fact that Ethiopia has been receiving a considerable amount of foreign aid it is still poor and it is one of the most authoritarian and corrupt countries in Africa.

Seedee (2018) did a research on the impact of foreign aid on extreme poverty in Liberia. The main objective of the study was to explain ways in which foreign aid contributes to poverty rather than alleviating it. The study used the interdisciplinary research methodology to examine difficulties facing donors in deciding the appropriate kind of development assistance required in Liberia and other West African countries. The results of the study concluded that, despite considerable amount of foreign aid provided, the poverty level in Liberia is not reduced as expected and hence foreign aid don't really achieve the intended goal of eradicating the extreme poverty. The study further revealed that among the reasons leading to the failure of the foreign are not really direct related to foreign aid. These reasons include issues such as the abuse human rights, corruption, and inequalities.

Boye (2019) researched on the impact of foreign aid on poverty reduction in Ghana. The main objective of the study was to examine the trends of foreign aid and determine whether foreign aid funds given to Ghana had any impact on poverty eradication. The study used the time series data from 2008 to 2018 collected from Ministry of Finance and the World Bank (WB). The stationarity of variables was tested and the analysis was done by co-integration to determine the long-run relationship between the variables. The findings of the study concluded that, foreign aid got no significant effects on poverty eradication in Ghana. The study further suggested that developing countries like Ghana instead of depending on foreign aid should focus on trades and foreign direct investments, improve capital markets and strengthen local institutions and individual skills required for poverty reduction.

Ugwuanyi et al., (2017) conducted a research about the impact of official aid on poverty reduction in Nigeria. The main aim of this study was to assess the impact of foreign aid on eradication of poverty in Nigeria from 1981-2014. The study used the Autoregressive-Distributed Lag Regression (ARDL) model and the Error Correction Model (ECM) to estimate the short-run and long-run and dynamics and Bound test to determine the long-run relationship between variables. The results of the study revealed that foreign aid has significant positive impact on poverty reduction within duration under the study.

Feeny (2007) did a research on the impact of foreign aid on the rural sector in Melanesia. The study aimed at examining the effectiveness of the foreign aid in Melanesian countries which involve countries like Papua New Guinea, Fiji, Vanuatu, the Solomon Islands, and New Caledonia. The study used data collected about the foreign aid allocated to the rural sector from 1980 to 2001 and used the econometric analysis to come up with the conclusion. The results of the study concluded that foreign aid has been effective at driving economic growth and hence poverty reduction in Melanesian countries. Therefore the researched concluded that the foreign aid has a positive impact on poverty reduction.

Wrangberg (2018) researched with the aim to explore the relationship between foreign aid and poverty level. The study used the sample size of 31 countries with data set ranging from 1987 to 2010 and used a fuzzy regression discontinuity design and robustness tests to come to conclusion. The results of the study revealed that there was no any significant relationship between foreign aid and poverty. Therefore researcher concluded that foreign aid significantly doesn't have any impact on poverty level of the 31 countries under study.

Charles & Nicholas Attamah (2009) examined the impact of foreign aid on poverty reduction in Nigeria for 36 years from 1981 to 2017. The main objective of this study was to determine the impact of foreign aid and the causal relationship between foreign aid and poverty reduction in Nigeria. The study used the time series data that was collected from Central Bank of Nigeria and the World Bank Development Indicator (WDI) on foreign aid, poverty reduction, trade openness, foreign remittances, and inflation and analysed by autoregressive distributed lag (ARDL) model to reach the conclusion. The results of the study revealed that foreign aid had significant impact on poverty reduction in Nigeria over the studied period.

Bahmani-Oskooee & Oyolola (2009) conducted a study on poverty and foreign aid with the purpose of examining the impact of foreign aid on poverty across countries as the area of interest after the adoption of the Millennium Development Goals

introduced by the UN to the international community. The study used 2SLS panel estimation techniques, pooled time-series and cross sectional data from 49 developing countries. The findings of the study showed that the foreign aid is effective in reducing poverty and further suggested that growth promoting policies intended to reduce inequality are also effective in reducing poverty.

Kabir (2020) researched on the effectiveness of foreign aid: evidence from panel data analysis. This study aimed at investigating the effectiveness of foreign aid in reducing income inequality of the developing countries, sub-samples of countries from Africa, South Asia, and South America, which have socioeconomic and geopolitical similarities. The study used the panel data from eight sub-samples, and used the fixed and random effect estimation to come to conclusion. The study concluded that statistically significant but marginally, foreign aid is effective in reducing the income inequality in most developing countries. The study further suggested that the effectiveness of foreign aid tend to diminish when institutional quality is low.

Alvi & Senbeta (2014) conducted a research on foreign aid, growth, and poverty relationship. The main aim of this study was to examine the relationship between the aid, growth, and poverty by using quantile regression by estimating the impact of growth and growth enhancing policies at different quantile conditional distribution of poverty. The finding of the study concluded that growth in average income and other growth enhancing policies have heterogeneous impact on poverty.

Abiola & Olofin (2008) researched on foreign aid, food supply and poverty reduction in Nigeria. The study aimed at examining the relationship between the foreign aid, food supply and poverty reduction in Nigeria. The researchers used secondary data covered from 1975 to 2005. With the use of econometric analysis the study specified structural model that examines the determinants of poverty reduction. The study concluded that multilateral aid, food supply, public sector spending on health care and education are the major determinants or have impact on of poverty reduction in Nigeria. The researchers insisted that, the effectiveness of foreign aid by its nature depends on the notions and targets of the donors. This implies that foreign aid is not a reliable means of financing food supply and poverty reduction programs.

Edmore & Odhiambo (2018) conducted a research asking whether the foreign aid reduce poverty in Sub-Saharan Africa countries. The main objective of this study was to examine the effects of foreign aid on poverty in Sub-Saharan Africa (SSA) region from 1981 to 2011. The study used dynamic panel estimation techniques, including the ones that deal with endogeneity and simultaneity concerns. The results of the study concluded that foreign aid has statistically significant poverty reduction effects.

Yontcheva & Masud (2005) conducted a research asking whether foreign aid reduce poverty. The study aimed at assessing the effectiveness of foreign aid in reducing poverty by using infant mortality and illiteracy or education as indicator of poverty. The study compared the impact of the two measures of foreign aid that is the official bilateral and projects aid, which is distributed through international non-governmental organizations (NGOs) to developing countries. For analysis purpose the study used two approaches which were the two-stage least-squares (2SLS) regression and the System Generalized-Method of Moments (SGMM) approach. The results of the study concluded that foreign aid through NGO significantly reduces infant mortality compared to bilateral aid although the impact of both types of aid on illiteracy is less significant.

Kaya et al., (2013) researched on the foreign aid and the quest for poverty reduction. The aim of the study was to investigate the effectiveness of foreign aid directed to the agricultural sector in relation to poverty reduction and therefore the study only focused on the agricultural oriented foreign aids. The study used four year averaged cross-country panel data from 46 developing countries receiving foreign aid from 1980 to 2003. The fixed effects panel estimator was used to evaluate the outcomes and the results showed that 1 percent increase in agricultural aid reduces the headcount poverty ratio by 0.2% in the aid recipient countries. Therefore the researchers conclude that the agricultural aid is effective in poverty reduction directly and indirectly through growth.

Arndt et al., (2015) conducted a research on foreign aid long-run contribution to growth and development. The main objective of the study was to assess the impact of foreign aid on economic growth, social welfare indicators focusing on poverty and infant mortality and other variables such as education, health, investment, consumption, and agriculture. The study collected data from 1970 to 2007 and for analysis purposes the study estimated the long-run cumulative effects of foreign aid by using limited information maximum likelihood (LIML) and inverse probability weighted squares (IPWLS) estimators. The researchers concluded that foreign aid stimulates growth, improves social welfare indicators and reduces poverty. Although the results showed that foreign aid effects were insignificant on inequality, it was evident that aids can improve school enrolment, and reduce infant mortality, promote investment and boost life expectancy.

Mosley et al., (2010) conducted a study on foreign aid's long-run contribution to growth and development. The objective of the study was to examine the direct effects of foreign aid on poverty. The study used the generalized method of moments (GMM) and three stages least squares (3SLS) regression to come up with the results and evaluate the variables. The researchers concluded that foreign aid allocations which consider well income distribution, both macro and micro policies,

and GDP per capita, are more effective in reducing poverty. Either, the study concluded that corruption, inequality, and the composition of public expenditure are strongly associated and impact the aid effectiveness.

Table 1: Comparative Literature Review

Authors	Year	Main Objectives	Methodologies	Conclusions
Ugwuanyi et. al	20017	Assessing the impact of official foreign aid on poverty reduction in Nigeria.	Autoregressive distributed lag (ARDL) and bound test.	Official foreign aid has insignificant positive influence on poverty reduction
(Okoronkwo et al., 2016)Oronkwo et al.	2016	Investigating how foreign aid contributes to poverty eradication programs in Nigeria.	Qualitative methodology	The foreign aid essentially don't achieve the intended goal of eradicating poverty
Shitile & Sule	2019	Assessing the efficacy of foreign aid and grants toward poverty reduction in Nigeria.	Autoregressive distributed lag (ARDL) bounds testing approach	Official development assistance and technical cooperation grants have positive but insignificant impact on eradicating poverty at national level in short-term, but in the long-term has negative impacts
Calderón et al.	2006	Examining the effects of foreign aid on income inequality and poverty reduction	Dynamic panel data techniques	Foreign aid has weak contribution to the income distribution and poverty reduction.
Tsaurai	2021	Investigating the effects of foreign aid and examine the influence of the human capital development through foreign aid toward poverty reduction	Fixed effects and dynamic generalized methods of moments (GMM)	Foreign aid and the human capital development through foreign aid has positive influence and contributes to the reduction of poverty in the Middle East and North African (MENA) Region.
Khan et al.	2022	Examining the relationship between economic growth, poverty, inequality, remittances, and foreign aid in the Middle East and North Africa (MENA)	Ordinary least square (OLS) regression, panel random-effect model, and system-GMM	The foreign aid, remittances, and economic growth play a substantial role in poverty reduction in Middle East and North African (MENA) Region.
Farahmand	2021	Determining the relationship between economic growth and foreign aid in Afghanistan	Vector error correction model	There is a positive relationship between the foreign aid and economic development and therefore foreign aid contributes positively in eradicating the poverty
Mahembe & Odhiambo	2021	Examining the effects of foreign aid on extreme poverty in Sub-Saharan Africa (SSA)	Dynamic panel estimation techniques	Foreign aid have a significant poverty reduction effects in sub-Saharan African countries
Nur	2015	Assessing the impacts of foreign aid on poverty reduction in urban areas of Mogadishu.	Statistical techniques	There is minimum or small changes on the poverty level as an impact of the foreign aid.
Akobeng	2020	Exploring the direct effects of the foreign aid on poverty and quantifies the role of democracy in relation to foreign aid toward the	The two-stage least squares instrumental variable estimator	Foreign aid reduces poverty level. Either different types of foreign aid have different effects toward poverty level.

		reduction of poverty in Sub-Saharan Africa (SSA).		
Farah et al.	2018	Identifying the impact of foreign aid to socio-economic development in Ethiopia	Regression analysis	The foreign aids don't have a major impact on GDP growth, but it has a substantial influence on unemployment rate and foreign direct investment.
Seedee	2018	Explaining ways in which foreign aid contributes to poverty rather than alleviating it in Liberia	Interdisciplinary research methodology	The poverty level in Liberia is not reduced as expected and hence foreign aid don't really achieve the intended goal of eradicating the extreme poverty
Boye	2019	Examining the trends of foreign aid and whether foreign aid funds given to Ghana had any impact on poverty eradication	Co-integration analysis	Foreign aid got no significant effects on poverty eradication in Ghana.
Ugwuanyi et al.	2017	Assessing the impacts of foreign aid on eradication of poverty in Nigeria	Error Correction Model (ECM)	Foreign aid has significant positive impact on poverty reduction within the duration under the study
Feeny	2007	Examining the effectiveness of the foreign aid in Melanesian countries (Papua New Guinea, Fiji, Vanuatu, the Solomon Islands, and New Caledonia)	The econometric analysis	Foreign aid has been effective at driving economic growth and hence poverty reduction in Melanesian countries
Wrangberg	2018	Exploring the relationship between foreign aid and poverty level	Fuzzy regression discontinuity design and robustness tests	There is no any significant relationship between foreign aid and poverty, therefore foreign aid significantly doesn't have any impact on poverty level of the 31 countries under study
Charles & Attamah	2009	Determining the impact of foreign aid and the causal relationship between foreign aid and poverty reduction in Nigeria	Autoregressive distributed lag (ARDL) model	Foreign aid had significant impact on poverty reduction in Nigeria
Bahmani-Oskooee & Oyolola	2009	Examining the impact of foreign aid on poverty across country as the area of interest after the adoption of the Millennium Development Goals introduced by the United Nations to the international community	2SLS panel estimation techniques	The foreign aid is effective in reducing poverty
Kabir	2020	Investigating the effectiveness of foreign aid in reducing income inequality of the developing world and sub-samples of countries from Africa, South Asia, and South America	Fixed and random effect estimation	Foreign aid is statistically significant but marginally effective in reducing the income inequality in most developing countries
Alvi & Senbeta	2014	Examining the relationship between the aid, growth, and poverty	Quatile regression	Growth in average income and other growth enhancing policies has heterogeneous impact on poverty.

Abiola & Olofin	2008	Exploring the relationship between foreign aid and poverty level	Fuzzy regression discontinuity design and robustness tests	Multilateral aid, food supply, public sector spending on health care and education are the major determinants and have impact on of poverty reduction in Nigeria.
Edmore, & Odhiambo	2018	Examining the effects of foreign aid on poverty in Sub-Saharan Africa (SSA) region from	Dynamic panel estimation techniques	Foreign aid has statistically significant poverty reduction effects.
Yontcheva & Masud	2005	Assessing the effectiveness of foreign aid in reducing poverty	The two-stage least-squares (2SLS) regression and the System Generalized-Method of Moments (SGMM) approach	Foreign aid through NGO significantly reduces infant mortality compared to bilateral aid although the impact of both types of aid on illiteracy is less significant.
Kaya, et al.	2013	Investigating the effectiveness of foreign aid directed to agricultural sector in relation to poverty reduction	The fixed effects panel estimator	The agricultural aid is effective in poverty reduction directly and indirectly through growth
Arndt et al.	2015	Assessing the impact of foreign aid on economic growth, social welfare indicators focusing on poverty and infant mortality and outcomes (education, health, investment, consumption, and agriculture)	Limited information maximum likelihood (LIML) and inverse probability weighted squares (IPWLS) estimators	Foreign aid stimulates growth, improves social welfare indicators and reduces poverty
Mosley et al.	2010	Examining the direct effects of foreign aid on poverty	The generalized method of moments (<i>GMM</i>) and three-stage least squares (3SLS)	Foreign aid allocations which take consider well income distribution, both macro and micro policies, and GDP per capita, are more effective in reducing poverty.

3. METHODOLOGY

This study conducted literature survey on the macroeconomic level, assessing the effectiveness of foreign aid, by reviewing the conclusions drawn from different studies and reports based on the data collected in a particular targeted time periods. The study also used reports, journal and books related to foreign and poverty for deep entail of the issue. The study pays attention to studies of foreign aids inflows and economic growth by focusing on qualitative information rather than the quantitative information of the subject matter to draw conclusion.

4. FINDINGS

Based on this intensive literature review of the studies conducted by scholars in different regions especially in Sub-Saharan African countries, it is evident that, quantitatively it is nearly impossible to conclude weather the foreign aid significantly contributes to poverty reduction in recipient countries or not. This is because empirically some quantitative based studies concluded in favour of foreign aid and while some studies conclude against the foreign aid.

Considering the above fact, it is more logic to conclude that, the effectiveness of the foreign aids depends on many factors from both recipients and donor countries and not just the trend and the volume of the foreign aid funds. The efficient allocation of the foreign aid funds is the leading factor, which literary means that the funds should be distributed efficiently targeting the most strategic areas and sectors based on recipient countries long term strategies, goals and policies. Again, it should also be noted that some of the factors that determines the effectiveness of the foreign aid don't even relate directly to the foreign aid funds rather than political and administrative system of the recipient countries. These factors include countries level of accountability, transparency, financial monitoring system and public servant individual capability.

Conditions that sometimes attached to foreign aid fund which sometime basically serve the donors interests likewise play the significant role in determining the effectiveness of the foreign aid funds on the poverty reduction. A vivid example of such are conditions attached to foreign aids funds aiming at controlling the political influence and affiliations of a countries. The

Political influence based foreign aid funds normally tends not to achieve positive impact on poverty reduction rather than controlling particular decisions and political affiliations of the recipient countries. For efficient foreign aids and possible poverty reduction effects, countries should have free mandate and be able to dictate and decide on better ways to allocate the foreign aids given to them without any external influences.

Accountability plays a very significant role in making sure that the foreign aid funds achieve the intended goals effectively. Developing countries with strict rule of law with a proper accountability system in place is more likely to utilize the foreign aid in more efficient way. With strict financial accountability systems, leaders and staffs in projects funded by foreign aids funds that are associated themselves with corruption and mal utilization of funds can be held accountable in accordance to rules and regulations. It is unfortunate that most developing countries don't have a strict and proper accountable system in place yet. Those with systems in place sometimes they are no strict enough to encounter the corrupt acts.

Political weather of a nation also plays a great role in making sure that the foreign aid funds given by international organizations efficiently used and impacts positively the outcomes of the poverty reduction programs funded. Political instability not only causes the destruction of infrastructures but also it diverts the local and central governments focus from development toward security and stability. This apparently slows down growth even in medium economy countries and not just in least developing countries. Most countries in sub-Saharan countries such as south Sudan can show the vivid example of this factual narration.

Transparency also contributes to effectiveness of the foreign aid in beneficiary countries. Financial transparency literally has a direct relationship with the accountability. When a states have a transparency financial system it is easier to detect any signs of corruptions and mal practice related to development projects and programs. While the accountability makes corrupt personnel accountable for what they have embezzled the transparency makes it easier to track them down and sometime prevent the misuse of the offices. Therefore foreign aid and other public funds effectiveness also depends on how the transparent financial system is.

5. CONCLUSION AND RECOMMENDATION

Based on the above findings in referring to differences studies that have been reviewed, it can be concluded that the efficiency of the foreign aid toward poverty reduction depends on both recipients and donor countries commitment. Although the recipients countries which are the beneficiaries of the foreign aid should always be concerned and put efforts toward making sure prior to receiving funds they have fundamental management and monitoring system that will facilitate the efficient use of the funds. Countries should also make sure that, they have accounting and financial systems that are transparent enough to make responsible institutions accountable and prevent any possible attempts of corruption and embezzlement.

REFERENCES

- Abiola, A. G., & Olofin, O. P. (2008). Foreign Aid, Food Supply and Poverty Reduction in Nigeria - Examination of Possible Nexus. MPRA Munich Personal RePEc Archive, 2116.
- Akobeng, E. (2020). Harnessing foreign aid for the poor: role of institutional democracy. *Journal of Economic Studies*, 47(7), 1689–1710. <https://doi.org/10.1108/JES-05-2019-0225>
- Alkire, S., Oldiges, C., & Kanagaratnam, U. (2021). Examining multidimensional poverty reduction in India 2005/6–2015/16: Insights and oversights of the headcount ratio. *World Development*, 142, 105454. <https://doi.org/10.1016/j.worlddev.2021.105454>
- Alvi, E., & Senbeta, A. (2014). Foreign Aid, Growth, and Poverty Relation: A Quantile Regression Approach. *The Journal of Developing Areas*, 48(3), 381–403. <https://doi.org/10.1353/jda.2014.0046>
- Arndt, C., Jones, S., & Tarp, F. (2015). Assessing foreign aid's long-run contribution to growth and development. *World Development*, 69, 6–18. <https://doi.org/10.1016/j.worlddev.2013.12.016>
- Bahmani-Oskooee, M., & Oyolola, M. (2009). Poverty reduction and aid: Cross-country evidence. *International Journal of Sociology and Social Policy*, 29, 264–273. <https://doi.org/10.1108/01443330910965796>
- Boye, R. A. (2019). Impact of foreign Aid on Poverty Reduction in Ghana. 10702179, 79. <http://ugspace.ug.edu.gh>
- Calderón, M. C., Chong, A., & Gradstein, M. (2006). Foreign Aid , Income Inequality , and Poverty by October. <http://www.iadb.org/res/publications/pubfiles/pubWP-547.pdf>
- Charles, O. J., & Nicholas, A. (2009). Analysis of the Impact of Foreign Aid on Poverty Reduction in Nigeria, 1981-2017. *Journal of Social Sciences*, 11(1), 8923.
- Drèze, J., & Sen, A. (1989). *Hunger and Public Action* Oxford University Press. New Delhi, 224-7.
- Duffy, K. (1995). *Social Exclusion and Human Dignity in Europe: Background Report for the Proposed Initiative by the Council of Europe*. Council of Europe.
- Edgell, S. (2008). *Class: Key Concept in Sociology*. In Routledge.
- Edmore, M., & Odhiambo, N. M. (2018). Does Foreign Aid Reduce Poverty In Sub-Saharan Africa? A Dynamic Panel Data Analysis. In Unisa

Economic Research Working paper Series.

- Farah, A. M., Önder, M., & Ayhan, E. (2018). How Foreign Aid Affect Developing Countries: The Case of Ethiopia. *Avrasya Etüdüleri*, 1(53), 7–39.
- Farahmand, M. (2021). The Relationship Between Economic Growth and Foreign Aid: The Case of Afghanistan. *Journal of Economic Policy Researches / İktisat Politikası Araştırmaları Dergisi*, 8(2), 141–154. <https://doi.org/10.26650/jepr885246>
- Fayissa, B., & El-Kaissy, M. I. (1999). Foreign aid and the economic growth of developing countries (LDCs): Further evidence. *Studies in Comparative International Development*, 34(3), 37–50. <https://doi.org/10.1007/BF02687626>
- Feeny, S. (2007). Impacts of foreign aid to Melanesia. *Journal of the Asia Pacific Economy*, 12(1), 34–60. <https://doi.org/10.1080/13547860601083603>
- Fried, A., & Elman, R. M. (1969). Charles Booth 's London. In Hutchinso and CO (Publishers).
- George, V. (1988). *Wealth, Poverty and Starvation. An International Perspective*. Wheatsheaf Books.
- Haughton, J., & Khandker, S. R. (2009). *Handbook on Poverty and Inequality*. The World Bank. Washington DC.
- Kabir, M. A. (2020). Foreign Aid Effectiveness: Evidence from Panel Data Analysis. *Global Journal of Emerging Market Economies*, 12(3), 283–302. <https://doi.org/10.1177/0974910120961570>
- Kaya, O., Kaya, I., & Gunter, L. (2013). Foreign aid and the quest for poverty reduction: Is aid to agriculture effective? *Journal of Agricultural Economics*, 64(3), 583–596. <https://doi.org/10.1111/1477-9552.12023>
- Khan, R., Zeeshan, Haque, M. I., Gupta, N., Tausif, M. R., & Kaushik, I. (2022). How foreign aid and remittances affect poverty in MENA countries? *PLoS ONE*, 17(1 January), 1–20. <https://doi.org/10.1371/journal.pone.0261510>
- Mahembe, E., & Odhiambo, N. M. (2019). Foreign aid and poverty reduction: A review of international literature. *Cogent Social Sciences*, 5(1). <https://doi.org/10.1080/23311886.2019.1625741>
- Mahembe, E., & Odhiambo, N. M. (2021). Does foreign aid reduce poverty? A dynamic panel data analysis for sub-Saharan African countries. *Journal of Economic Inequality*, 19(4), 875–893. <https://doi.org/10.1007/s10888-021-09496-5>
- MAHEMBE, E., & Odhiambo, N. M. (2017). On the Link Between Foreign Aid and Poverty Reduction in Developing Countries. *Revista Galega de Economía*, 26(2), 113–128. <https://doi.org/10.15304/rge.26.2.4456>
- Mosley, P., Hudson, J., & Verschoor, A. (2010). *Aid , Poverty Reduction and the ' New Conditionality ' Author (s) : Paul Mosley , John Hudson , Arjan Verschoor Published by : Blackwell Publishing for the Royal Economic Society Stable URL : <http://www.jstor.org/stable/3590061> Your use of the JSTOR arch. Society, 114(496).*
- Nur, A. (2015). *Impact of Foreign Aid on Poverty and Economic Development In Selected Urban Areas of Mogdishu, Somalia*. In (Doctoral dissertation, Kampala International University, College of Higher Degrees and Research) (Issue April). <http://www.oppapers.com/essays/Impact-Of-Foreign-Aid-On-Poverty/300468>
- O'Higgins, M., & Jenkins, S. (1990). *Poverty in the EC: 1975, 1980, 1985. Analysing Poverty in the European Community*. Eurostat News Special Edition, 1–1990.
- Okoronkwo, P. N., Victor, O. O., & Eytayo, A. (2016). The Impact of Foreign Aid on Poverty Reduction / Alleviation Programmes in Lagos State , Nigeria. *Academic Journal of Research in Economics and Management*, 2(12), 40–49. <https://doi.org/10.12816/0028320>
- Osberg, L., & Kuan, X. (2000). International comparisons of poverty intensity: Index decomposition and bootstrap inference. *Journal of Human Resources*, 35(1), 51–81. <https://doi.org/10.2307/146356>
- Pankaj, A. K. (2005). Revisiting Foreign Aid Theories. *International Studies*, 42(2), 103–121. <https://doi.org/10.1177/002088170404200201>
- Papers, I. E. E. W., & Bender, D. (2005). *Working Papers Two – Gap Models : Post-Keynesian Death and Neoclassical Rebirth (Issue 180)*.
- Pascall, G. (2020). *Poverty and social security*. In *Social Policy*. <https://doi.org/10.4324/9780203424056-12>
- Piachaud, D. (1981). Peter Townsend and the holy grail 421. *New Society*, 10.
- Riddell, R. C. (2014). Does foreign aid really work? Presentation at the International Development Workshop. International Development Workshop, Canberra February 2014, February, 1–18.
- Rodgers, G. (1995). *The Poverty Agenda and the ILO (Geneva: International Institute for Labor Studies)*.
- Routley, N. (2020). Mapping the Global Flow of Foreign Aid. *Visual Capitalist*, January, 1. <https://www.visualcapitalist.com/mapping-the-global-flow-of-foreign-aid/>
- Seedee, R. (2018). *The Impact of Foreign Aid on Extreme Poverty : A Case Study of Liberia ' s Development A thesis presented to the faculty of the School of Continuing Studies and Academic Outreach East Tennessee State University In partial fulfillment of the requirements, December issue*.
- Shitile, T. S., & Sule, A. (2019). Reassessing the efficacy of foreign aid and grants in poverty reduction in Nigeria. *Asian Economic and Financial Review*, 9(4), 450–460. <https://doi.org/10.18488/journal.aefr.2019.94.450.460>

- Spicker, P. (1998). Housing and Social Exclusion. Shelter Scottish Campaign for Homeless People, 67–79.
<https://doi.org/10.2307/j.ctt18fs41f.10>
- Statista. (2019). Largest Recipients of Humanitarian Aid Worldwide, by Country/plan (in million U.S. dollars). 1965/13, 118–39.
- Temple, J. R. (2010). Aid and conditionality. In *Handbook of Development Economics*. Elsevier.
- Thapa, I. (2020). Foreign Aid : Positive and Negative Impact in Developing Countries. Public Administration Campus, Tribhuvan University, Nepal, July. <https://doi.org/10.13140/RG.2.2.19155.81448>
- Tiemann, S. (1993). Opinion on Social Exclusion. *Official Journal of the European Communities*, 93, 268-279.
- Tsaurai, K. (2021). Impact of Foreign Aid on Poverty in the Middle East and North African (MENA) Region . A Panel Data Analysis Approach. *Acta Universitatis Danubius. (Economica)*, 17(3), 89–106.
- Ugwuanyi, U. B., Ezeaku, H. C., & Ibe, I. G. (2017). The Impact of Official Aid on Poverty Reduction: Empirical Evidence From Nigeria (1981-2014) Using the Ardl and Bound Test Approach. *European Journal of Sustainable Development*, 6(2), 111–120.
<https://doi.org/10.14207/ejsd.2017.v6n2p111>
- Umoru, D. (2018). National Policy and Big-Push Theory of Development In Nigeria : Moving Away from Low-Level Economic. 116(1995).
- Wrangberg, P. (2018). The Effect of Foreign Aid on Poverty Evidence from a Quasi-Experimental Setting. Erasmus University Rotterdam, 1–36.
- Xu, K. (2020). The Sen-Shorrocks-Thon Index of Poverty Intensity. *Encyclopedia of Quality of Life and Well-Being Research*, 1–3.
https://doi.org/10.1007/978-3-319-69909-7_2697-2
- Yontcheva, B., & Masud, N. (2005). Does Foreign Aid Reduce Poverty? Empirical Evidence From Nongovernmental and Bilateral Aid. IMF Working Papers, 05(100), 1. <https://doi.org/10.5089/9781451861198.001>



THE IMPACT OF TERRORISM ON TURKISH FINANCIAL MARKETS: THE SECTORAL APPROACH

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ABSTRACT

Purpose- This study investigated the financial effects of the environment of uncertainty and fear resulting from terrorist attacks on sub-sectors such as industry, tourism, and service.

Methodology- In order to examine the interaction between the variables, EGARCH models, which are frequently used in the econometric literature and take into account the asymmetric effect of shocks, were used. Unlike studies in the literature, terrorist attacks not only within the country but also outside the country were taken into consideration in this study.

Findings- According to the findings obtained, the terrorist attacks and uncertainty environment in both Turkey in the developing country status and the US in the developed country status have an adverse affect the sub-sectors in financial markets at different levels. This adverse impact has been found that is not equal for each sub-sectors, and the tourism sector is more affected by terrorist attacks compared to the industrial and service sectors. Also, it has been found that news about terrorist attacks affected volatility more than good news in the same period.

Conclusion- Considering the borderless structure and the size of the trade volume of financial markets in the globalizing world, it cannot be thought that terrorist attacks will not affect another country while they occur in one country. In view of the share of the tourism sector in the GDP of Turkey and the rational behavior of human factors in an environment of uncertainty and fear, the fact that the environment of uncertainty most affects this sector gives a result that is in line with expectations. In addition, it has been determined that financial market shocks resulting from the activities classified as terrorism experienced by countries with a large economic volume and market share in the world, especially the USA, have a short-term spill over effect on the global market. In this context, although ensuring government security creates an environment of trust, measures to be taken with the joint work of global security organizations to minimize these effects will help to protect the stable structure of the markets more effectively.

Keywords: Financial markets, terrorism, exponential GARCH, sectoral analysis, volatility.

JEL Codes: C22, C58, E44

1. INTRODUCTION

Terrorist attacks have been a source of great fear and anxiety for societies for many years. The climate of fear and the environment of uncertainty formed as a result of these attacks affect daily life significantly and have remarkable effects on financial markets and economic indicators. Especially in the twenty-first century, increasing terrorist attacks and the resulting material and moral losses have an important place in the agenda of many countries. The effect of this destruction on markets varies according to many variables, such as the economic structures of countries and their fragility. Although the terrorist acts of September 11, the Charlie Hebdo attack, and the 2003 bombing attacks in Istanbul are openly referred to as terrorist events in the press, there is no clear consensus on the definition of terrorism in the legal literature. However, this situation did not constitute an obstacle to adopting many international conventions (Dumitriu, 2019). Especially the terrorist attacks that took place on September 11, 2001, created great uneasiness for the American people and marked the beginning of a new era in the perspective of international markets on terrorism. The September 11 attacks also brought the immediate or delayed effects of terrorist attacks on national economies and financial markets to the agenda of academic studies (Charles and Darné, 2006; Rider, 2003; Shannon, 2012; Palkar, Larson, and Larson, 2012).

Understanding the extent of the damage caused by terrorist attacks is one of the prerequisites for reducing the costs caused by the attacks and making the national economies resilient against these attacks (Karolyi and Martell, 2010). Like many social,

economic, or psychological variables, financial markets can react to terrorist attacks outside of their normal flow. When the studies based on stock markets are reviewed, it is observed that social (Czudaj, 2018; Piñeiro-Chousa, Vizcaíno-González, and Pérez-Pico, 2017), political (Lehkonen and Heimonen, 2015; Füss and Bechtel, 2008; Döpke and Pierdzioch, 2006; Chau, Deesomsak, and Wang, 2014), and economic (Wasserfallen, 1989; Gunasekarage, Pisedtasalasai, and Power, 2004; Bhuiyan and Chowdhury 2020; Camilleri, Scicluna, and Bai, 2019) events have significant effects on stock markets.

The aim of this article is to examine the effects of terrorist attacks in both Turkey and the USA on stock exchange returns and volatility by examining daily time series for Turkey. In this context, exponential generalized autoregressive conditional heteroscedasticity (EGARCH) models, which are frequently used for volatility modeling in the economic literature, were used, and economic and political fluctuations were excluded with the help of dummy variables to interpret the effect of terrorism on markets more accurately.

In the following sections of the paper, studies investigating the effects of terrorist incidents, financial crises and natural disasters on the globalizing world economy are included and the findings obtained as a result of the empirical analysis are interpreted.

2. HISTORICAL PERSPECTIVE AND LITERATURE REVIEW

Although the rising globalization trend in the century we live in provides great convenience, especially for the business world, it has made countries interdependent on many issues. Accordingly, the international effects of national-scale terrorist attacks, financial crises, and natural disasters have become the subject of many studies (Beine, Cosma, and Vermeulen, 2010; Christiansen and Ranaldo, 2009; Bilson et al., 2012).

Niederhoffer (1971), who is considered one of the pioneers of studies examining the effects of non-economic shocks on financial markets, analyzed the shocks created by the Korean War, the Suez Crisis, the Kennedy assassination, and similar global events in financial markets and revealed that these events had a noticeable effect on financial markets. However, the recent terrorist attacks of September 11 are one of the most prominent examples of the contagious effects of globalization due to the damage they caused to international markets (Richman, Santos, and Barkoulas, 2005; Mun, 2005). Unlike these studies, Reilly and Drzycimski (1975) focused on hourly changes during the first opening day after the events that had a global impact. According to the findings obtained in the study, the effect of these events on the markets takes place between the closing moment before the announcement of the event to the market and the opening moment of the next day. Examining similar events on a sectoral basis, Barrett et al. (1987) focused on completely unexpected events such as commercial airline accidents and showed that the negative reaction of financial markets to these accidents was only significant for the next trading day.

In addition to political crises and unexpected events, financial markets also seem to give clear reactions to events related to security factors such as terrorism, military coups, and internal disturbance. Considering the effects of terrorist attacks on investments and the frequency of their occurrence, it can be stated that they have a very strong impact on the markets. Studies examining the effects of terrorist attacks on foreign direct investments (Enders, Sachsida, and Sandler, 2006; Powers and Choi, 2012; Bandyopadhyay, Sandler, and Younas, 2014; Lee, 2017) and stock markets (Khan et al., 2020; Markoulis and Katsikides, 2020; Chaudhry et al., 2018; Memdani and Shenoy, 2019; Aslam and Kang, 2015) in the literature generally confirm the power of this impact.

3. DATA AND METHODOLOGY

When the terrorist attacks in the two countries (Turkey and the USA) included in the econometric analysis are classified according to their target types, it is observed that there are differences arising from variables such as the geopolitical position, sociological structure, and management system of the countries. Upon reviewing the data obtained from the GTD (Table 1), it is observed that law enforcement officers are mainly targeted in terrorist attacks that take place in Turkey, while civilian citizens are targeted in attacks in the USA. Furthermore, it is seen that the number of terrorist attacks targeting citizens in the USA, where the rate of individual armament is high, is lower than in Turkey.

Table 1: Classification of Terrorist Attacks according to Target Types Source: Global Terrorism Database (GTD)

Turkey		United States	
Target Type	Terrorist Attack	Target Type	Terrorist Attack
Military	501	Private Citizens and Property	142
Private Citizens and Property	308	Business	121
Police	288	Religious Figures/Institutions	113
Business	130	Government (General)	54
Government (General)	111	Abortion Related	32
Unknown	83	Educational Institution	30
Educational Institution	75	Police	26

This study examined the effects of terrorist attacks in Turkey and the USA between January 2, 2001, and December 31, 2019, on the sub-sector indices in Borsa Istanbul (BIST) with the help of EGARCH models. Data on terrorist acts were obtained from the Global Terrorism Database (GTD) and were included in the analysis by being calculated as in equation 1 (University of Maryland, 2021).

$$Terrorism_t = (Fatalities_t + Injured_t) \tag{1}$$

$Fatalities_t$ represents the number of people killed as a result of terrorist attacks at time t, and $Injured_t$ represents the number of people injured. The return rates of the stock exchange indices are calculated using the formula in equation 2.

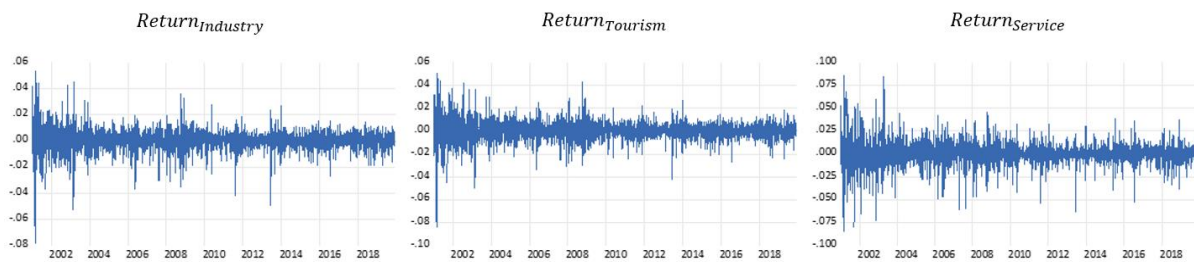
$$Returns_t = Ln\left(\frac{Stock_t}{Stock_{t-1}}\right) \tag{2}$$

In equation 2, Ln represents the natural logarithm, $Stock_t$ represents the current period index price, and $Stock_{t-1}$ represents the past period index price.

$$Returns_t = \beta_0 + \beta_1 TerrorisMTUR_t + \beta_2 TerrorisMUSA_t + \beta_3 D_t + \omega_t \tag{3}$$

$TerrorisMTUR_t$ indicates the terrorist attacks in Turkey, $TerrorisMUSA_t$ indicates the terrorist attacks in the USA, β_0 indicates the constant parameter, D_t indicates the dummy variable corresponding to economic or political shocks, and ω_t indicates the error term of the model¹. The time series graphs of the return series used in the analysis are shown in Figure 1. In the graphs of all three sectors, it is observed that the periods of high volatility are similar, but the severity of the markets' reactions is different.

Figure 1: Stock Market Returns



Time series generally have an increasing or decreasing trend, and accordingly, they have a non-stationary structure. This led researchers to find different methods for modeling time series apart from conventional time series analyses. Engle (1982) became an important reference point for modeling volatility by proposing the Autoregressive Conditional Heteroscedasticity (ARCH) model in his study examining inflation data in the United Kingdom. Engle (1982) suggested that the similarity method should be used, arguing that effective results could not be obtained if the least-squares method was used in predicting ARCH models.

$$X_t = \beta_0 + \sum_{i=1}^k \beta_i X_{t-i} + \omega_t \tag{4}$$

In the ARMA model defined in equation 4, ω_t represents the conditional variance of the prediction error series in period t. Thus, the ARCH(p) model can be written as follows:

$$\sigma_t^2 = \beta_0 + \sum_{i=1}^p \beta_i \varepsilon_{t-i}^2 + \varepsilon_t \tag{5}$$

Parameters ε_{t-i}^2 in model p in equation 5 show the prediction errors of the past period.

In addition to the model proposed by Engle, Bollerslev (1986) developed generalized ARCH (GARCH) models, in which the variance of error terms is affected both by their past values and the past values of the conditional variance.

¹ A dummy variable was used to control the overvaluations that took place on April 27, 2001, November 7, 2002, and September 19, 2008.

$$c > 0 \text{ and } \theta_i, \varphi_i \geq 0 \quad (6)$$

$$\sum_{i=1}^q \theta_i + \sum_{k=1}^p \beta_k < 1 \quad (7)$$

When the assumptions in equations 6 and 7 are satisfied, the GARCH(p,q) model can be represented as in equation 8:

$$X_t = c + \sum_{k=1}^q \beta_k X_{t-k} + \sum_{i=1}^p \theta_i v_{t-i} \quad (8)$$

The most criticized aspect of both the ARCH model and the GARCH model is the assumption that positive and negative shocks in the markets have the same effect on volatility. However, data on financial markets show that these shocks have different effects on volatility. In line with this, Nelson (1991) developed the Exponential GARCH model for better modeling of asymmetric movements (Brooks 2008, p. 406).

$$\ln(\sigma_t^2) = \omega + \beta \ln(\sigma_{t-1}^2) + \gamma \frac{|u_{t-1}|}{\sqrt{\sigma_{t-1}^2}} + \alpha \left[\frac{|u_{t-1}|}{\sqrt{\sigma_{t-1}^2}} - \sqrt{\frac{2}{\pi}} \right] \quad (9)$$

4. FINDINGS AND DISCUSSIONS

In this section, the effect of terrorist attacks on the returns of sectoral indices in the stock exchange was examined, and the results were compared. In this context, this study focused on two different issues, including (a) the effects of attacks on financial markets and (b) examining these effects on a sectoral basis. To examine the sectoral effects, three different sub-sector indices were selected, including industry, tourism, and service sectors. According to Table 2, which shows the descriptive statistics regarding the variables used in the analysis, it is observed that the volume of the industry and service sectors is much larger than the tourism sector.

Table 2: Descriptive Statistics

	Industry	Tourism	Service
Mean	500.40	60.63	354.92
Median	405.32	59.25	341.59
Maximum	1,362.64	135.25	866.87
Minimum	52.89	11.67	40.66
Standard Deviation	354.49	23.90	223.82
Skewness	0.70	0.12	0.32
Kurtosis	2.45	2.54	1.94
Observations	4998	4998	4998

The basis of conventional time series analysis is the assumption that the variables used are stationary. In particular, there is a significant correlation between the stationarity of the series and their predictability. For this reason, unit root tests were applied to the variables defined as shown in equations 1 and 2, and according to the results obtained, it was revealed that the variables were stationary with their level states (Table 3).

Table 3: Unit Root Tests

Variables	Augmented Dickey-Fuller Test		Phillips-Perron Test	
	t-Statistics	Prob.	t-Statistics	Prob.
<i>Return</i> _{Industry}	-68,04*** (i)	<.01	-68,04*** (i)	<.01
<i>Return</i> _{Tourism}	-62,35*** (n)	<.01	-62,66*** (n)	<.01
<i>Return</i> _{Services}	-62,63*** (i)	<.01	-62,64*** (i)	<.01
<i>Terrorism</i> _{Turkey}	-20,09*** (i)	<.01	-78,24*** (i)	<.01
<i>Terrorism</i> _{USA}	-68,93*** (n)	<.01	-68,93*** (n)	<.01

Notes: *** indicates significance at 1 percent respectively, i(intercept), n(without trend or intercept)

To use ARCH type equations instead of the least-squares method, the ARCH effect in the predicted model should be tested. Therefore, equation 3 was predicted using the least-squares method using all sub-sector variables, and the ARCH test results

of the predicted models were examined. In addition, in order to select the optimum models, models with minimum variables were selected in accordance with the Box-Jenkins methodology. According to the results obtained, the presence of the ARCH effect was determined in all three models belonging to the sub-sectors (Table 4).

Table 4: ARCH Heteroskedasticity Test

	Industry Sector	Tourism Sector	Services Sector
	ARMA(5,2)	ARMA(3,3)	ARMA(2,2)
F Statistics	394.18	721.79	254.35
Probability	<.01	<.01	<.01
$N * R^2$	364.13	626.84	241.53
Probability	<.01	<.01	<.01

The determined ARCH effect shows that there is a problem of heteroscedasticity in these models and the least-squares method is not sufficient for predicting these models. Therefore, to see the impact of terrorist attacks on financial markets, equation 3 was predicted for all sub-sectors using the EGARCH method.

Table 5: Results of EGARCH Models²

Variable	Industry		Tourism		Service	
	ARMA(5,2)-EGARCH(1,1)		ARMA(3,3)-EGARCH(3,1)		ARMA(2,2)-EGARCH(1,2)	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
$Terrorism_{Turkey}$	-0.000018	<.01	-0.000032	<.01	-0.000009	<.10
$Terrorism_{USA}$	-0.000006	<.01	-0.000022	<.01	-0.000009	<.01
Constant	0.000375	<.01	0.000130	.33	0.000232	<.01
AR(1)	-0.847594	<.01	-0.607312	<.01	-0.182945	<.10
AR(2)	-0.572870	<.01	0.384419	<.01	-0.751708	<.01
AR(3)	0.076638	<.01	0.903457	<.01	-	<.01
AR(4)	0.045068	<.05	-	-	-	<.01
AR(5)	0.044868	<.01	-	-	-	<.01
MA(1)	0.892214	<.01	0.629620	<.01	0.209659	<.10
MA(2)	0.643273	<.01	-0.355332	<.01	0.752050	<.01
MA(3)	-	-	-0.887548	<.01	-	<.01
Dummy	0.044589	<.01	0.055613	<.01	0.044809	<.01
Variance Equation						
Constant	-0.615230	<.01	-0.237025	<.10	-0.417589	<.01
β	-0.097682	<.01	-0.016760	<.01	-0.058835	<.01
θ_1	0.239665	<.01	0.403986	<.01	0.233037	<.01
θ_2	-	-	-0.147881	<.01	-	<.01
θ_3	-	-	-0.106822	<.01	-	-
λ_1	0.957571	<.01	0.986087	<.01	0.519168	<.01
λ_2	-	-	-	-	0.456888	<.01
R^2	0.022865		0.015012		0.022831	
Durbin Watson	2.066607		1.871039		2.046580	
ARCH LM						
F Statistics	0.546406	.46	0.315598	.57	1.637511	.20
$N * R^2$	0.546573	.46	0.315710	.57	1.637636	.20

Upon examining the results in Table 5, it was revealed that terrorist attacks in both Turkey and the USA had a negative effect on financial markets and these negative effects were felt more clearly in the tourism sector than in other sectors. The fact that the structure of the tourism sector is foreign-dependent and its market volume is smaller compared to the other two sub-sectors caused it to be affected by terrorist attacks at a higher level. When changes in the service sector are reviewed, it is observed that the response to internal and external terrorist attacks is very close to each other, unlike other sectors.

² $\theta = \text{ABS}(\text{RESID}(-1))/\text{SQRT}(\text{GARCH}(-1))$, $\beta = \text{RESID}(-1)/\text{SQRT}(\text{GARCH}(-1))$, $\lambda = \text{LOG}(\text{GARCH}(-1))$

Furthermore, the asymmetry (β) coefficient was found to be negative and statistically significant in all predicted models. In other words, terrorist news affects volatility more than the good news of the same significance.

The findings obtained as a result of the empirical analysis cover the direct effects of terrorist attacks on the financial markets. However, in addition to these findings, it will be useful to examine the indirect effects of terrorist attacks on financial markets in order to determine future policies. Based on other studies in the literature, it can be easily said that economic variables such as capital movements and foreign direct investments are sensitive to terrorist attacks. It is quite normal to expect the indirect effect of the deterioration in these two variables to be stronger than the direct effects of terrorist incidents on the financial markets. Especially in developing countries, this negative cycle is more destructive.

5. CONCLUSION

The environments of fear and uncertainty created by terrorist attacks are two of the most important factors that have an adverse impact on financial markets. In a market dominated by fear and uncertainty, it is difficult for investors and monetary policy-makers to make rational decisions. Thus, the fragile financial structures of developing countries cause them to be affected by a possible terrorist attack at a higher level.

According to the results obtained in this study, in which the effects of terrorist attacks in Turkey and the USA on the financial markets in Turkey were examined, it was observed that the attacks had a negative effect on the financial markets as expected. However, the severity of the sub-sectors being affected by these attacks differs from each other. In particular, the tourism sector is more sensitive to terrorist attacks due to its structure. Considering the share of the tourism sector in the GNP of Turkey, it is highly possible that the environment of uncertainty created by such terrorist attacks will have adverse effects on the Turkish economy. For this reason, increasing the security measures in tourism regions and making these regions more reliable against terrorist attacks are among the important conditions of a sustainable economy.

Nowadays, the fact that the financial markets of countries become significantly interconnected causes the instant shocks in any market to have a significant effect on the markets of other countries. Shocks that occur in high-volume markets, especially in the USA, create contagious effects in the short term. To minimize these effects, both non-governmental organizations and military and security organs of countries should cooperate intensively on the measures to be taken against terrorist attacks.

REFERENCES

- Aslam, F., and Kang, H.-G. (2015). How Different Terrorist Attacks Affect Stock Markets. *Defence and Peace Economics*, 26(6), 634-648.
- Bandyopadhyay, S., Sandler, T., and Younas, J. (2014). Foreign direct investment, aid, and terrorism. *Oxford Economic Papers*, 66(1), 25-50.
- Barrett, W., Heuson, A., Kolb, R., and Schropp, G. (1987). The adjustment of stock prices to completely unanticipated events. *Financial Review*, 22(4), 345-354.
- Beine, M., Cosma, A., and Vermeulen, R. (2010). The dark side of global integration: Increasing tail dependence. *Journal of Banking and Finance*, 34(1), 184-192.
- Bhuiyan, E., and Chowdhury, M. (2020). Macroeconomic variables and stock market indices: Asymmetric dynamics in the US and Canada. *The Quarterly Review of Economics and Finance*, 77, 62-74.
- Bilson, C., Brailsford, T., Hallett, A., and Shi, J. (2012). The impact of terrorism on global equity market integration. *Australian Journal of Management*, 37(1), 47-60.
- Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of Econometrics*, 31(3), 307-327.
- Brooks, C. (2008). *Introductory Econometrics for Finance*. New York: Cambridge University Press.
- Camilleri, S., Scicluna, N., and Bai, Y. (2019). Do stock markets lead or lag macroeconomic variables? Evidence from select European countries. *The North American Journal of Economics and Finance*, 48, 170-186.
- Charles, A., and Darné, O. (2006). Large shocks and the September 11th terrorist attacks on international stock markets. *Economic Modelling*, 23(4), 683-698.
- Chau, F., Deesomsak, R., and Wang, J. (2014). Political uncertainty and stock market volatility in the Middle East and North African (MENA) countries. *Journal of International Financial Markets, Institutions and Money*, 28, 1-19.
- Chaudhry, N., Roubaud, D., Akhter, W., and Shahbaz, M. (2018). Impact of terrorism on stock markets: Empirical evidence from the SAARC region. *Finance Research Letters*, 26, 230-234.
- Christiansen, C., and Rinaldo, A. (2009). Extreme coexceedances in new EU member states' stock markets. *Journal of Banking and Finance*, 33(6), 1048-1057.
- Czudaj, R. (2018). Is equity market volatility driven by migration fear? *Finance Research Letters*, 27, 34-37.
- Döpke, J., and Pierdzioch, C. (2006). Politics and the stock market: Evidence from Germany. *European Journal of Political Economy*, 22(4), 925-943.

- Dumitriu, E. (2019). The E.U.'s Definition of Terrorism: The Council Framework Decision on Combating Terrorism. *German Law Journal*, 5(5), 585-602.
- Enders, W., Sachida, A., and Sandler, T. (2006). The Impact of Transnational Terrorism on U.S. Foreign Direct Investment. *Political Research Quarterly*, 59(4), 517-531.
- Engle, R. (1982). Autoregressive Conditional Heteroscedasticity with Estimates of the Variance of United Kingdom Inflation. *Econometrica*, 50(4), 987-1007.
- Füss, R., and Bechtel, M. (2008). Partisan politics and stock market performance: The effect of expected government partisanship on stock returns in the 2002 German federal election. *Public Choice*, 135, 131–150.
- Gunasekarage, A., Pisedtasalasai, A., and Power, D. (2004). Macroeconomic Influence on the Stock Market: Evidence from an Emerging Market in South Asia. *Journal of Emerging Market Finance*, 3(3), 285-304.
- Karolyi, G., and Martell, R. (2010). Terrorism and the Stock Market. *International Review of Applied Financial Issues and Economics*, 2(2), 285-314.
- Khan, D., Ullah, A., Alim, W., and Haq, I. (2020). Does terrorism affect the stock market returns and volatility? Evidence from Pakistan's stock exchange. *Journal of Public Affairs*, e2304, 1-10.
- Lee, C.-y. (2017). Terrorism, Counterterrorism Aid, and Foreign Direct Investment. *Foreign Policy Analysis*, 13(1), 168–187.
- Lehkonen, H., and Heimonen, K. (2015). Democracy, political risks and stock market performance. *Journal of International Money and Finance*, 59, 77-99.
- Markoulis, S., and Katsikides, S. (2020). The Effect of Terrorism on Stock Markets: Evidence from the 21st Century. *Terrorism and Political Violence*, 32(5), 988-1010.
- Memdani, L., and Shenoy, G. (2019). Impact of terrorism on stock markets across the world and stock returns: An event study of Taj attack in India. *Journal of Financial Crime*, 26(3), 793-807.
- Mun, K.-C. (2005). Contagion and impulse response of international stock markets around the 9–11 terrorist attacks. *Global Finance Journal*, 16(1), 48-68.
- Nelson, D. (1991). Conditional Heteroskedasticity in Asset Returns: A New Approach. *Econometrica*, 59(2), 347-370.
- Niederhoffer, V. (1971). The Analysis of World Events and Stock Prices. *The Journal of Business*, 44(2), 193-219.
- Palkar, D., Larson, S., and Larson, R. (2012). The valuation effects of military contract awards surrounding 11th September. *Applied Financial Economics*, 22(2), 147-164.
- Piñeiro-Chousa, J., Vizcaíno-González, M., and Pérez-Pico, A. M. (2017). Influence of Social Media over the Stock Market. *Psychology and Marketing*, 34(1), 101-108.
- Powers, M., and Choi, S.-W. (2012). Does transnational terrorism reduce foreign direct investment? Business-related versus non-business-related terrorism. *Journal of Peace Research*, 49(3), 407-422.
- Reilly, F., and Drzycimski, E. (1975). The Stock Exchange Specialist and the Market Impact of Major World Events. *Financial Analysts Journal*, 31(4), 27-32.
- Richman, V., Santos, M. R., and Barkoulas, J. T. (2005). Short-and long-term effects of the 9/11 event: the international evidence. *International Journal of Theoretical and Applied Finance*, 8(7), 947-958.
- Rider, B. (2003). Financial regulation and supervision after 11th September, 2001. *Journal of Financial Crime*, 10(4), 336-369.
- Shannon, M. (2012). Did the September 11th attacks affect the Canadian labour market? *Economics Letters*, 115(1), 91-93.
- University of Maryland. (2021). National Consortium for the Study of Terrorism and Responses to Terrorism An Emeritus Center of Excellence of the U.S. Department of Homeland Security. Retrieved from <https://www.start.umd.edu/gtd/>
- Wasserfallen, W. (1989). Macroeconomics news and the stock market: Evidence from Europe. *Journal of Banking and Finance*, 13(4-5), 613-626.