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IRRELEVANCE OF INFLATION: THE 20 FAMA-FRENCH STOCKS

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ABSTRACT

Purpose - The relation between inflation and stock returns has been widely scrutinized. Its importance transcends finding just a simple relation, and has repercussions on the conduct of monetary policy. Theoretically, the relation should be positive and one-to-one. However, early on, the empirical relation was found to be statistically significantly negative. This paper contributes to the theoretical and empirical debate. The null hypothesis is that inflation is irrelevant to stock returns. Therefore, neither a positive theoretical, nor a negative empirical relation, should robustly hold. This position is in accordance to the basic principles of modern corporate finance, which state that the real and nominal equity values are equal.

Methodology - The paper starts with simple correlations and presents the probability distributions and histograms of all variables. All distributions are characterized by significant outliers. A theoretical model that excludes inflation is introduced, and the statistical significance of including inflation is tested. The quest covers the 20 Fama-French stock portfolios, classified by their percentiles of equity values. Hence, both bilateral and multilateral regressions are carried out.

Findings – Initially bilateral correlations were found to be negative consistent with the early empirical evidence. However, by using robust standard errors, robust least squares, and quantile regressions, the evidence is totally reversed. There is strong support for the irrelevance of inflation. This is true if the investor is sophisticated, i.e. she does not give too much attention to simple bilateral correlations, if she utilizes advanced economic procedures like robust least squares and quantile regressions, if she adjusts for residual autocorrelation and heteroscedasticity, and if she incorporates fundamental variables in the estimation process.

Conclusion - Hence the prima facie evidence of non-neutrality is challenged by this paper's analysis. In opposition to the conviction of many economists, and despite their inherent resistance, the paper argues for inflation irrelevance.

Keywords: inflation irrelevance, Fama-French stocks, model of stock returns, fallacious evidence, robust least squares, quantile regressions, bilateral and multilateral relations.
JEL Codes: G12, E31, C21, C22

1. INTRODUCTION

The hypothesis of a significant impact of inflation on stock returns has been abundantly tested. Such a relation is particularly crucial for the conduct of monetary policy. If there is a relation, then the financial markets would respond instantaneously to inflation shocks, and hence, they may indicate early on the appropriate forecast of equity prices, their link to economic activity, and determine the ensuing stance of monetary policy. This is true because central banks monitor scrupulously the behavior of financial and capital assets, and base their monetary reaction on the upheavals in these markets. Theoretically the sign of the relation is ambiguous. Both a negative supply shock and a positive demand shock predict higher consumer prices. However, a supply shock is accompanied by a fall in output, whereas a demand shock occurs concurrently with an improvement in business. It is not clear which one dominates the other. Maybe, on average, both shocks counterbalance and eliminate each other. Hence economists have favored either a negative or a positive sign, while teachers of corporate finance would opt, in general, to privilege the independence of both variables. Chronologically the negative sign has been empirically found by researchers before a positive

sign[1], and was justified by more than one channel of transmission. However, historically, the positive relation prevailed theoretically before the empirics (Fisher, 1930). The Fisher hypothesis states that the nominal interest rate is the summation of a real expected interest rate with an expected inflation rate. The real rate is approximately constant, and represents the secular marginal product of capital. This implies that the nominal interest rate varies one-to-one with inflation. Moreover, the Generalized Fisher Hypothesis specifies that stock returns should also vary one-to-one with inflation. More than that, stocks, being claims on real assets, should be a perfect hedge against inflation[2]. One particular and additional justification of a positive relation is to refer to a version of the Phillips curve, if stock prices predict positively future activity, and negatively unemployment. The seminal contribution of Engle & Granger (1987) on cointegration facilitated the search of a long run cointegration relation between stock market indexes and the price level. Early research using cointegration has been carried out by Boudoukh and Richardson (1993), Ely and Robinson (1997), Anari and Kolari (2001), and Crosby (2001). Boudoukh and Richardson (1993) find a positive relation but the impact is less than 1, around 0.43. Crosby finds an even smaller impact of 0.2. Later research on cointegration can be found in Hasan (2008), Boamah (2017) and especially in Al-Nassar and Bhatti (2019). Surprisingly Hasan (2008) documents a bidirectional causality between stocks and inflation, while Harper and Jin (2012) find a negative relation that has a magnitude of -6 for Indonesia. Very recently, Eldomiaty et al. (2020) also find a negative and significant impact for the US market. The presence of cointegration implies an Error Correction Model that contradicts weak form market efficiency, because stock returns become predictable by the lagged error-correction variable. Therefore, the lack of evidence on cointegration may simply be due to financial market efficiency, and should be expected to happen on average. To reconcile the evidence one might posit that there is a negative relation in the short run, and a positive relation in the long run, or vice versa. For example, a negative supply shock may be gradually dissipated as employment and output return to their natural levels. And a positive demand shock may be gradually eradicated as real money balances adjust. It is difficult to know theoretically the direction of the change. Why should the impact be different in sign? This is where a third generation of empirical studies, and which is among the most recent, comes about. One starts from the elementary principles of corporate finance (Brealey et al., 2017). Nominal cash flows are discounted by nominal rates, and real cash flows are discounted by real rates, both producing the same present value. Since stocks are Net Present Values (NPV), they should be insensitive to inflation. How, then, can one explain the empirical findings, of the difference in signs between short run and long run? Azar (2010) has argued that the empirical evidence is flawed and biased, either because of omitted fundamental variables, or from the specification of the model. He finds that the bias applies to inflation, expected inflation, unexpected inflation, and even for inflation uncertainty (Azar, 2013, 2020a). Azar (2014a) adds to the list of relevant variables the US dollar, the choice of the econometric procedure, and the S&P 500 stock market index. Azar (2014b) adds further by weighing the time series properties of the variables. Azar (2014b) concludes that the evidence is still strong in support to the irrelevance proposition that inflation has no impact on stock returns. Azar (2015) finds that the relation between the equity premium and inflation is similar to the relation between real stock returns and inflation, i.e. spurious. An econometric critique of the extant specification of such a relation and a statistical proof that it is spurious is available in Azar (2020b).

Moreover, a study on the stocks included in the Dow Jones Industrial Index (DJIA), or Dow stocks, came to the conclusion that inflation is irrelevant and neutral (Azar, 2020c). This is remarkable because most empirical research was undertaken on stock indexes, or their returns, like in Azar (2020d). The use of an index may show inflation neutrality by simple averaging, while the constituent stocks can have distinct sensitivities to inflation. The referenced paper has dismissed these concerns. Inflation is irrelevant to individual stocks and in addition to stock market indexes, and so whatever the econometric procedure adopted, whatever the price index from which the inflation rate is measured, whatever the industry, and whatever the specification of the model. This paper confronts the issue by studying a combination of the 20 Fama-French portfolios, which are classified according to the size of their individual equity values, and reports more evidence in support of inflation irrelevance. The plan of the paper is as follows. In section 2 the mathematical model is introduced. In section 3 the sources of the data are spelled out. Section 4 has 7 subsections. Subsection 4.1 presents the distribution histograms of all the variables, and presents strong evidence for the presence of outliers in all of them, outliers that must be taken into consideration by the econometric technique that is applied. Subsection 4.2 calculates bilateral Pearson correlation coefficients. Subsection 4.3 runs constrained models in case of nominal stock market returns and inflation, estimated with HAC robust standard errors. Subsections 4.4 and 4.5 tackle the same model except that it is estimated respectively by robust least squares and by quantile regressions on the medians. Subsection 4.6

[1] See Bodie (1976), Nelson (1976), and Jaffe and Mandelker (1976), followed closely by Fama and Schwert (1977). This initiated an abundance of research, and a huge attempt to explain this negative relation theoretically. Other early empirical studies are Gultekin (1983) and Solnik (1983).

[2] On the theoretical front some invoked taxes (Feldstein, 1980), some posited money or inflation illusion (Modigliani and Cohn, 1979; Campbell and Vuolteenaho, 2004), some reverted to money demand theory and its link to the stock market (Fama, 1981), and some reversed the direction of the relation and explained it by the monetary/fiscal nexus (Geske, and Roll, 1983).

generalizes the model to include additional variables, and this model is called unconstrained, and is estimated by robust least squares, which corrects for outliers in dependent and independent variables. Subsection 4.7 applies quantile regressions to the unconstrained model, while subsection 4.8 discusses the issue of choosing core inflation instead of CPI inflation. Section 5 summarizes and concludes.

2. THE MATHEMATICAL MODEL

In the literature there are two mathematical models that compete but that start from the same equilibrium equity value, that with a constant growth in dividends (Williams, 1938; Gordon and Shapiro, 1956; Gordon, 1959; Gordon, 1962).

$$S = \kappa E(1+g)/(k-g) \tag{1}$$

Where S is the stock market price, κ=payout ratio, E=earnings, g=growth rate, and k=cost of equity, with:

$$k = r + \pi + h \tag{2}$$

The real interest rate is r, expected inflation is π, and h is the equity risk premium.

The first application is due initially to Leibowitz et al. (1989) and was used by Jareño and Navarro (2010) and Eldomiaty et al. (2020). The basic equation is for the growth rate of profits (g) that is explained by the real interest rate r, with coefficient γ, and by the expected inflation π, with coefficient λ :

$$g = g_0 + \gamma r + \lambda\pi \tag{3}$$

Replacing this equation in the constant growth formula for a stock, one gets:

$$dS/S = -DUR(1-\gamma+\partial h/\partial r)dr - DUR(1-\lambda+\partial h/\partial\pi)d\pi \tag{4}$$

Where S is the stock price, DUR is the duration, and h is the equity risk premium. This equation collapses to the following if the risk premium h is independent of the real interest rate and of expected inflation:

$$dS/S = -DUR(1-\gamma)dr - DUR(1-\lambda)d\pi. \tag{5}$$

A λ close to 1 means that the firm is able to redirect totally to consumers the change in prices because of its market power, and hence the impact of inflation on stock returns is negligible. Problems with equation (3) is that one usually takes growth in net income as g and it is known that this proxy for growth is very noisy and possibly biased because of accounting standards. Finally a value of λ close to 1 may not come only from a firm's market power, but by the absence of money illusion of consumers in competitive markets. What is required is that the price elasticity of demand relative to consumer prices be the same as the price elasticity of demand for the firm's product.

The second mathematical model assumes the following process for S (Fama and French, 2002; Azar, 2013, 2014a, and 2014b):

$$G = LOG(S) = LOG[\kappa E(1+g)/(k-g)] \tag{6}$$

$$dG = dLOG(S) = dS/S = (\mu - 0.5*\sigma^2)dt + \sigma dz + (\partial G/\partial S)[(\partial S/\partial k)dk + (\partial S/\partial E)dE] \tag{7}$$

Or:

$$dG = dLOG(S) = dS/S = (\mu - 0.5*\sigma^2)dt + \sigma dz + (1/S)[(\partial S/\partial k)dk + (\partial S/\partial E)dE] \tag{8}$$

With:

$(1/S)\partial S/\partial k = -(1/(k-g))$ and $(1/S)\partial S/\partial E = (1/E)$

The variable dz is a Brownian motion, and μ is the percent average. Total earnings E are equal to domestic earnings E_d plus foreign earnings E_f. Foreign earnings E_f are related to the foreign exchange rate (X) by the equation $E_f = AX^\theta$, with A and θ being constants, implying that $dE_f/E_f = \theta dX/X$. Further assume that $E_f = (1-\tau)E$ and that $E_d = \tau E$, with τ being a constant between 0 and 1. Replacing all these definitions into equations (6), (7), and (8), one obtains:

$$dLOG(S) = dS/S = (\mu - 0.5*\sigma^2)dt + \sigma dz - (1/(k-g))dk + \tau\, dE_d/E_d + (1-\tau)\theta\, dX/X$$

If σ^2 varies with time and $dt = 1$, then we should have:

$$dLOG(S) = dS/S = \mu - 0.5 * \sigma_t^2 + \sigma_t dz - (1/(k-g))dk + \tau\, dE_d/E_d + (1-\tau)\theta\, dX/X \quad (9)$$

Equation (9) can be rewritten as a regression equation in discrete time:

$$\Delta LOG(S) = \mu + (\alpha * 0.5 * \sigma_t^2) + (\beta * \Delta k) + \tau * \left(\Delta LOG(E_d)\right) + \delta * \left(\Delta LOG(X)\right) + \epsilon \quad (10)$$

Where μ, α, β, τ, and δ are parameters to be estimated, and ϵ is the residual. The parameter μ is the monthly drift, α is expected to be equal to -1, $\beta = -[1/(D(1+g)/S)]$, with D being the current dividend, and $D(1+g)/S$ being the dividend yield, and τ being between zero and +1. The variance σ_t^2 is measured by the square of VIX, the volatility index, k is measured by the Baa corporate bond yield, E_d is measured by industrial production, and X is measured by the trade-weighted dollar index. An increase in X is an appreciation of the US dollar, which implies that θ and δ are negative (Azar, 2014a, and 2014b).

In the theoretical equation (10) inflation does not appear explicitly. Therefore, and if the above analysis is true, and at least theoretically, inflation has no place as an explanatory variable, and ought to be irrelevant. Any reduced form equation that does not include the variables that are present in equation (10) suffers from omitting relevant variables and cannot be validated.

3. DATA AND METHODOLOGY

This section is organized as follows. First, the sources of the data are acknowledged. Then, histograms of all variables are presented, that find significant outliers. Pearson correlation coefficients are calculated in subsection 3. In the following three subsections, robust standard errors are applied, and robust least squares and quantile regressions are conducted. So far, the models are simply bilateral. In subsections 7 and 8 multilateral unconstrained regressions are carried out in conformity to the generalized theoretical model introduced in the previous section. Both robust least squares and quantile regressions are statistically run. Subsection 9 repeats the analysis by replacing CPI inflation with core inflation, in a successful attempt to provide robustness to the irrelevance proposition that was supported in subsections 3 to 8.

3.1. Data sources

Monthly prices of 20 stock market portfolios are selected and retrieved from the data web site of French in which the Fama & French stocks are located. They span the period from December 1925 to June 2020, i.e. 1,135 observations. These indices are transformed to log returns, by taking the first-difference of the natural log of their prices. From the investing.com source is retrieved the volatility index, VIX, from 1990M02 till 2020M06. The US trade-weighted foreign exchange rate of the US dollar (DOLLAR, from 1985M12 till 2020M06) is also retrieved from the same source. Monthly values of the core CPI (1956M12 till 2020M06), from which the core inflation is derived, CPI (1946M12 till 2020M06), from which CPI inflation is calculated, US industrial production (IP, 1925M12 till 2020M06), and US Moody's Baa corporate bond yield (BAA, 1925M12 till 2020M06) are retrieved from the web site of the Federal Reserve Bank of Saint Louis. The core and the CPI inflation rates are calculated by taking the first-difference of their natural logs. The DOLLAR series is converted to log returns. So is the IP variable, and the VIX. The BAA yield is differenced and is divided by 1200, in order to get monthly decimal figures.

3.2. Histograms

In Figures 1, 2, and 3 are portrayed the frequency distributions in the form of histograms for all the selected series. Figure 1 is about D(LOG(PC5)) till D(LOG(PC45)), where D is the first-difference operator, LOG is the natural logarithm, and PC is the Fama-French percentile. Figure 2 is about D(LOG(PC50)) till D(LOG(PC90)). Figure 3 is about D(LOG(PC95)), D(LOG(PC100)), D(LOG(CPI)), D(BAA/1200), D(LOG(IP)), D(LOG(DOLLAR)), and D(LOG(VIX)). It is evident from the figures that there are pronounced outliers for all the 25 series. This will prompt us to choose as an econometric model Robust Least Squares with adjustment for outliers in the dependent variables and in the independent variables. Robust Least Squares is especially recommended in the presence of outliers. Since outliers affect the mean of a distribution, which renders Ordinary Least Squares biased, another econometric procedure is chosen, quantile regressions, computed around the median, granted that the median is not sensitive to outliers. As will be shown below these two econometric procedures will make a difference in significance.

Figure 1: Histograms of the Variables Mentioned on Top of Each Graph

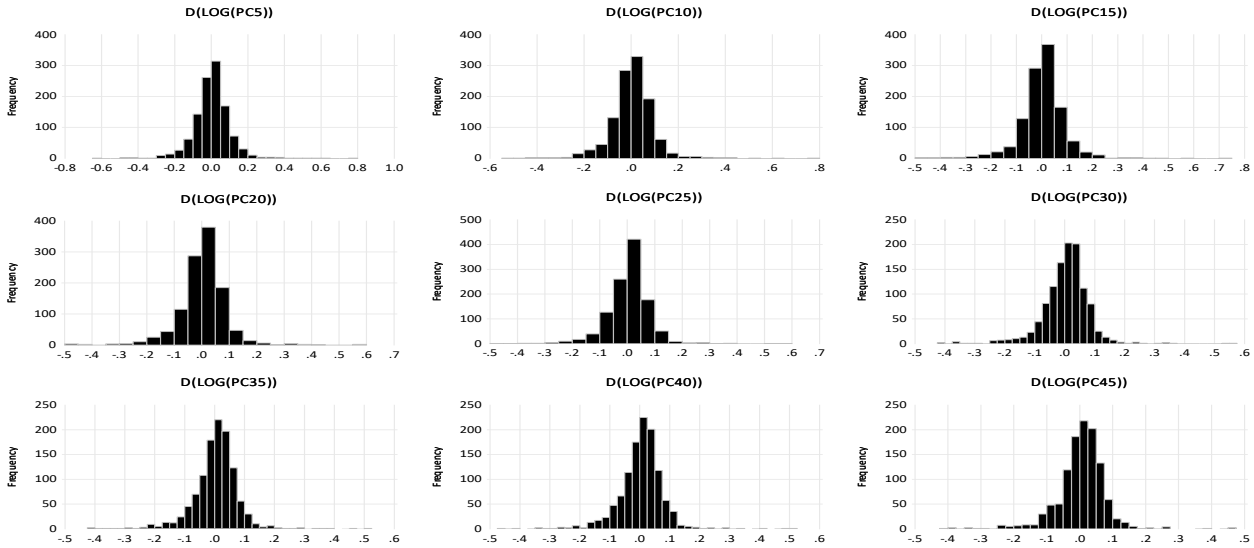


Figure 2: Histograms of the Variables Mentioned on Top of Each Graph

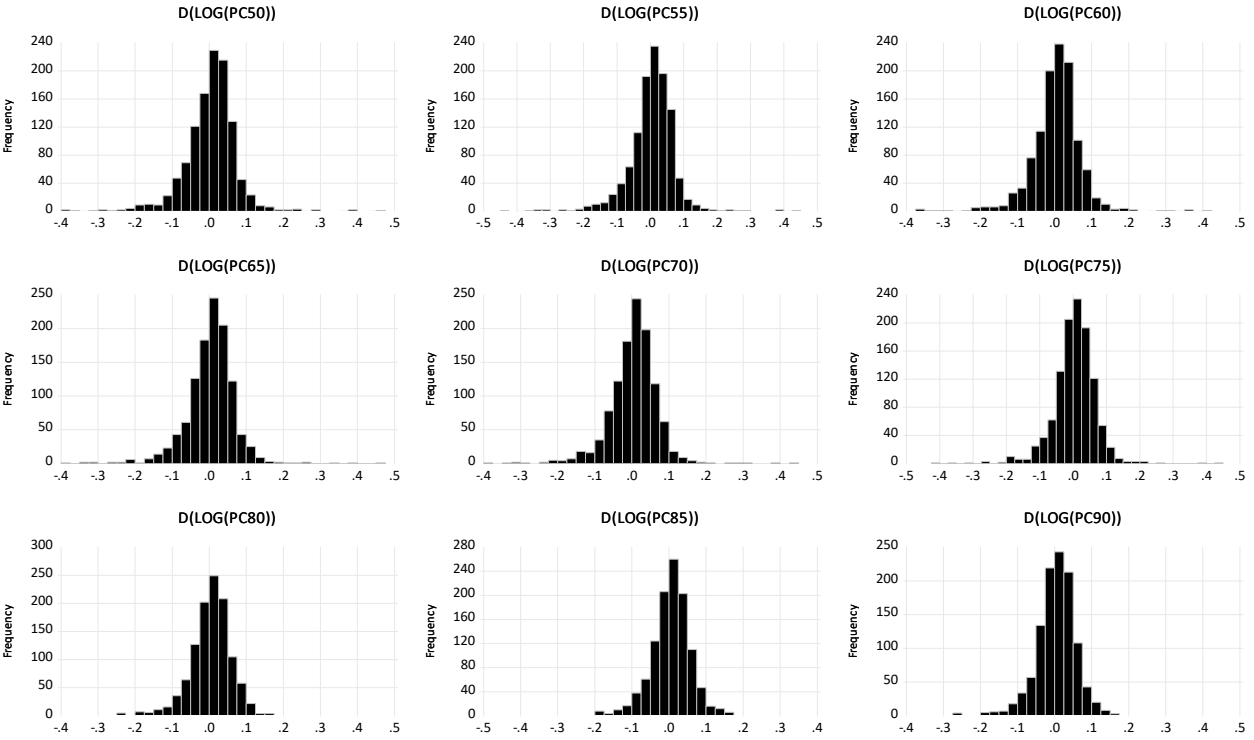
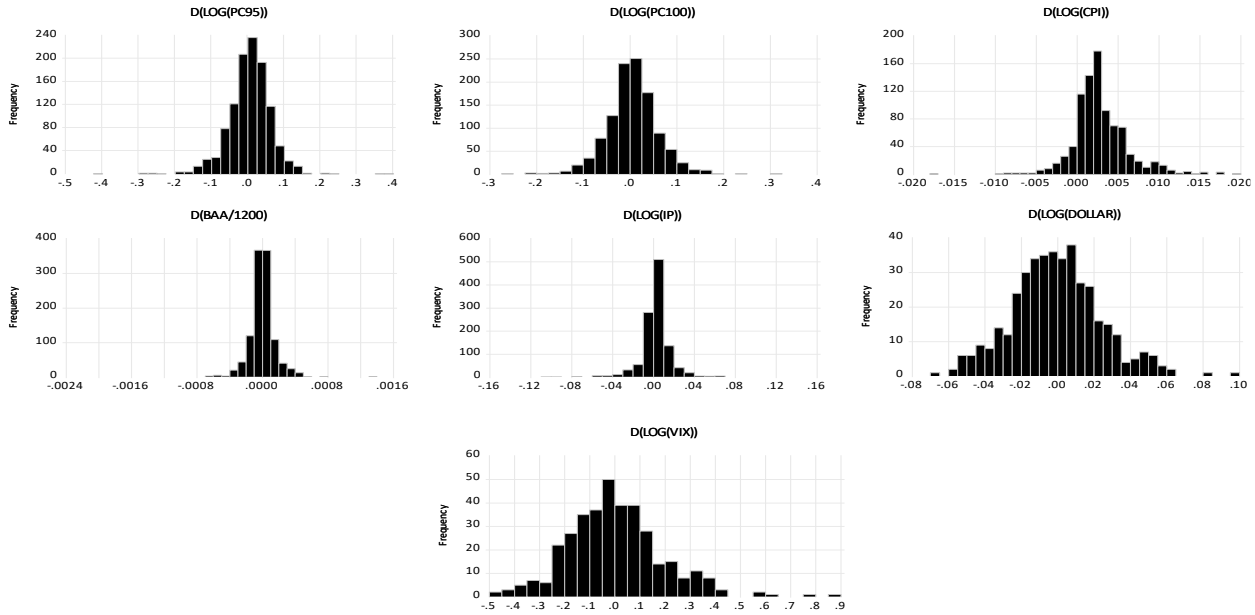


Figure 3: Histograms of the Variables Mentioned on Top of Each Graph



3.3. Pearson Correlation Coefficients

An unsophisticated investor who is studying the association between stock returns and inflation is likely to use Pearson correlation coefficients, or Ordinary Least Squares (OLS), to detect the presence of a linear bilateral relation. Since the OLS R-square is simply the square of the Pearson correlation coefficient, one may implement both procedures interchangeably. Starting from a two-tailed Type I Error of 5%, 18 out of the 20 Fama-French stocks have statistically significant correlation coefficients, the maximum actual p-value of these 18 comparisons is 0.0389. Moreover, 19 out of 20 estimates are positive. Therefore, simple pairwise statistics would reject the null hypothesis of irrelevance of inflation quite strongly in 90% of the cases. Since OLS is the procedure that is adopted in many empirical papers an erroneous and spurious evidence is reported in support to a significant positive or sometimes negative relation of inflation.

3.4. Regressions with HAC Robust Standard Errors and Covariance

For such regressions, with 882 observations, the lowest actual p-value is 0.1426 which corresponds to the highest Wald F-statistic of 2.1538. The highest actual p-value is a lofty 0.5919. Therefore, the null hypothesis of inflation irrelevance is very strongly supported in 100% of the cases. One would expect the signs of the inflation betas to be half-half positive and half-half negative. However, it turns out that 19 estimates out of 20 are positive and only one estimate is negative. Moreover, and to be fair, all these 19 estimates are statistically insignificantly different from +1. It is not clear what the impact of these two anomalies has on inflation irrelevance, especially if one notices that these 19 estimates are also statistically insignificantly different from +2!

3.5. Regressions with Robust Least Squares

For such robust regressions in the dependent and independent variables, with 882 observations, the lowest actual p-value is 0.1005. The highest actual p-value is a grand 0.9174. Therefore, the null hypothesis of inflation irrelevance is very strongly supported in 100% of the cases. Again, one would expect the signs of the inflation betas to be half-half positive and half-half negative. However, it turns out that 17 estimates out of the 20 are positive and only three estimates are negative. Moreover, all these 17 estimates are statistically insignificantly different from +1. These two anomalies are not compatible with inflation irrelevance, although it is not obvious what their relative impact is.

3.6. Quantile Regressions on the Median

For such regressions, with 882 observations, the lowest actual p-value is 0.2909. The highest actual p-value is a sizeable 0.9923. Therefore, the null hypothesis of inflation irrelevance is very strongly supported in 100% of the cases. Here again, one would expect the signs of the inflation betas to be half-half positive and half-half negative. However, it turns out, like with the previous econometric formulation, that 17 estimates out of the 20 are positive and only three estimates are negative. Moreover, like before, all these 17 estimates are statistically insignificantly different from +1. These two anomalies are not well-suited with inflation irrelevance, although it is not apparent what their relative influence is.

3.7. Unconstrained Regressions with Robust Least Squares

The unconstrained regressions consist of regressing each stock log return upon the CPI inflation rate, D(LOG(CPI)), the change in the Baa corporate bond yield, D(BAA/1200), the log change of industrial production, D(LOG(IP)), the log change of the US dollar index, D(LOG(DOLLAR)), and the log change of the VIX volatility index (D(LOG(VIX)). The sample is from March 1990 till June 2020, i.e. 364 observations per variable. For such regressions the lowest actual p-values, that reject the null with a Type I error of 5%, are five out of 20: 0.0087, 0.0150, 0.0218, 0.0266, and 0.0315. The highest actual p-value is a considerable 0.9567. Therefore, the null hypothesis of inflation irrelevance is supported in 75% of the cases. Again, one would expect the signs of the inflation betas to be half-half positive and half-half negative. However, it turns out that 15 estimates out of the 20 are positive and only five estimates are negative. Moreover, all these 15 estimates are statistically insignificantly different from +1. These are two anomalies that undermine inflation irrelevance, although their relative statistical significance is not evident at all. It is noteworthy to mention that 14 out of these 15 estimates are statistically insignificantly different from +2! Details are in Table 1.

The monthly drift, μ, is statistically significant, with an actual p-value less than 5%, in 5 out of 20 cases. These are all positive and vary, in annualized terms, between 6.964% and 10.048%, which are reasonable figures. There are 3 negative average returns on equity, which is unusual. Details are in Table 1. Surprisingly these unconstrained regressions yield no statistical evidence for an interest rate risk through duration. In all 20 regressions the coefficient on the change in the BAA bond yield is statistically insignificant. In addition, the estimates are flawed with the highest coefficient estimate being positive at 9.908317 instead of the predicted negative sign! Indeed, six "durations" out of 20 are positive! The lowest negative and statistically insignificant duration is -20.51180, which stands for a dividend yield of 4.875%, a rather high estimate. There is a chance that the BAA corporate bond yield is a bad proxy of the return on equity. Details are in Table 1. There are 18 coefficients out of 20 on the industrial production variable that are statistically significant, i.e. with an actual p-values less than 5%. These vary between 0.470638 and 3.694792. All coefficient estimates on the dollar variable are negative, as expected. However, there are 16 coefficients out of 20 that are statistically significant. These 16 vary between -0.327137 and -0.246755. All coefficients on the VIX variable are negative and statistically highly significant with estimates ranging between -0.334502 and -0.105810. The minimum R-square is 14.1111%, and the maximum is 31.1298%. Details are in Table 1.

Table 1: Unconstrained MM-Estimation by Robust Least Squares. Sample: 1990M03 2020M06, i.e. 364 observations

Stock return	constant	D(LOG(CPI))	D(BAA/1200)	D(LOG(IP))	D(LOG(DOLLAR))	D(LOG(VIX))	R-Square
PC5	-0.006450	1.546559	-20.51180	3.694792	-0.334502	-0.171708	0.141111
	(0.1920)	(0.3396)	(0.4059)	(0.0000)	(0.0550)	(0.0000)	
PC10	0.002337	-0.455161	2.525994	2.697323	-0.327137	-0.171882	0.179650
	(0.5844)	(0.7451)	(0.9057)	(0.0000)	(0.0300)	(0.0000)	
PC15	0.006948	-1.197666	-5.417005	1.012711	-0.215301	-0.156300	0.167226
	(0.0749)	(0.3487)	(0.8709)	(0.0007)	(0.1176)	(0.0000)	
PC20	0.007572	-0.703229	5.804462	0.699041	-0.290098	-0.167309	0.184760
	(0.0445)	(0.5689)	(0.7576)	(0.0156)	(0.0290)	(0.0000)	
PC25	0.008373	-0.312158	0.657741	0.491677	-0.301939	-0.171616	0.237313
	(0.0122)	(0.7755)	(0.9685)	(0.0552)	(0.0104)	(0.000)	
PC30	0.008207	-0.152021	-7.536197	0.629397	-0.315504	-0.165538	0.250015
	(0.0102)	(0.8845)	(0.6365)	(0.0103)	(0.0051)	(0.0000)	
PC35	0.007236	0.048337	-1.724535	0.618257	-0.306194	-0.151195	0.226685
	(0.0185)	(0.9617)	(0.9104)	(0.0087)	(0.0047)	(0.0000)	

PC40	0.001859	1.155237	9.908317	1.333559	-0.291741	-0.172426	0.301029
	(0.5353)	(0.2396)	(0.5081)	(0.0000)	(0.0058)	(0.0000)	
PC45	0.003099	0.894254	8.600778	1.357367	-0.286138	-0.155212	0.257617
	(0.2789)	(0.3402)	(0.5472)	(0.0000)	(0.0046)	(0.0000)	
PC50	0.000716	1.588518	4.910074	1.451486	-0.317317	-0.150837	0.248981
	(0.8013)	(0.0885)	(0.7297)	(0.0000)	(0.0016)	(0.0000)	
PC55	0.005803	0.046213	-9.900180	0.470638	-0.184275	-0.154718	0.271350
	(0.0281)	(0.9574)	(0.4528)	(0.0203)	(0.0479)	(0.0000)	
PC60	0.000521	1.752188	-13.56537	0.616711	-0.251033	-0.144063	0.311298
	(0.83410	(0.0315)	(0.2744)	(0.0012)	(0.0042)	(0.0000)	
PC65	-0.000798	2.230476	-12.08774	1.127151	-0.236796	-0.141780	0.302943
	(0.7584)	(0.0087)	(0.3505)	(0.0000)	(0.0096)	(0.0000)	
PC70	-0.000478	1.936173	-12.52330	1.049661	-0.278673	-0.142618	0.297859
	(0.8528)	(0.0218)	(0.3303)	(0.0000)	(0.0022)	(0.0000)	
PC75	0.003850	0.522742	-4.456719	0.812882	-0.300870	-0.139849	0.281198
	(0.1274)	(0.5275)	(0.7237)	(0.0000)	(0.0007)	(0.0000)	
PC80	0.002342	0.784892	-5.118416	0.818493	-0.219468	-0.140851	0.307442
	(0.3447)	(0.3338)	(0.6792)	(0.0000)	(0.0121)	(0.0000)	
PC85	0.001550	1.442175	-17.43471	0.684802	-0.157501	-0.130703	0.292901
	(0.5248)	(0.0709)	(0.1518)	(0.0003)	(0.0669)	(0.0000)	
PC90	0.001716	1.679975	-17.82398	0.885316	-0.220566	-0.122892	0.305942
	(0.4581)	(0.0266)	(0.1226)	(0.0000)	(0.0068)	(0.0000)	
PC95	0.000699	2.261932	-13.57426	0.418114	-0.188664	-0.139591	0.266319
	(0.8055)	(0.0150)	(0.3382)	(0.0550)	(0.0595)	(0.0000)	
PC100	0.003807	0.325219	-8.571705	0.535514	-0.206784	-0.105810	0.167512
	(0.2322)	(0.7554)	(0.5899)	(0.0285)	(0.0657)	(0.0000)	

Actual p-values in parentheses.

3.8. Unconstrained Quantile Regressions

For such regressions the lowest actual p-value out of 20 is 0.055, failing to reject the null of inflation irrelevance. The highest actual p-value is a substantial 0.9267. Therefore, the null hypothesis of inflation irrelevance is very strongly supported in 100% of the cases. Again, one would expect the signs of the inflation betas to be half-half positive and half-half negative. However, it turns out that 18 estimates out of the 20 are positive and only two estimates are negative. Moreover, all these 18 estimates are statistically insignificantly different from +1. Therefore, there are two anomalies that falsify inflation irrelevance, but their relative statistical significance is not straightforward. It is noteworthy to mention that all these 18 estimates are also statistically insignificantly different from +2! Details are in Table 2. The monthly drift, μ, is consistently statistically insignificant, with actual p-values more than 5%. In 4 out of 20 cases the estimates are negative. Surprisingly these unconstrained regressions yield no statistical evidence for an interest rate risk through duration. In all 20 regressions the coefficient on the change in the BAA bond yield is statistically insignificant. In addition, the estimates are flawed with the highest coefficient estimate being positive at 20.73893 instead of the predicted negative sign! Indeed, four "durations" out of 20 are positive! The lowest negative and statistically insignificant duration is -25.21191, which stands for a dividend yield of 3.966%, a reasonable estimate. But all other estimates are higher than this figure. As already mentioned, there is a chance that the BAA corporate bond yield is a bad proxy of the return on equity. Details are in Table 2. There are 4 coefficients out of 20 on the industrial production variable that are statistically significant, i.e. with actual p-values less than 5%. These vary between 0.392693 and 3.152701. All coefficient estimates on the dollar variable are negative, as expected. However, there are 9 coefficients out of 20 that are statistically significant. These nine vary between -0.408748 and -0.157501. All coefficients on the VIX variable are negative and statistically highly significant with estimates ranging between -0.182768 and -0.097939. The minimum R-square is 10.8884%%, and the maximum is 22.2173%. Details are in Table 2.

Table 2: Unconstrained Estimation by Quantile Regressions at the Median

Sample: 1990M03 2020M06, i.e. 364 observations.

Stock return	constant	D(LOG(CPI))	D(BAA/1200)	D(LOG(IP))	D(LOG(DOLLAR))	D(LOG(VIX))	R-Square
PC5	-0.009823	3.231722	-16.26011	3.152701	-0.270373	-0.163506	0.108941
	(0.2529)	(0.1674)	(0.5242)	(0.1154)	(0.2372)	(0.0000)	
PC10	0.006168	-0.278373	-16.73553	2.129381	-0.377330	-0.149564	0.128842
	(0.4250)	(0.8933)	(0.4812)	(0.1428)	(0.0877)	(0.0000)	
PC15	0.000655	1.578924	-9.657859	1.670957	-0.189504	-0.141702	0.122007
	(0.9190)	(0.3499)	(0.6613)	(0.1121)	(0.3622)	(0.0000)	
PC20	0.003092	-0.152193	10.77973	1.377506	-0.401364	-0.183662	0.150312
	(0.6104)	(0.9267)	(0.6822)	(0.2190)	(0.0319)	(0.0000)	
PC25	0.002658	1.269385	-2.171092	1.145217	-0.340864	-0.182768	0.181358
	(0.6424)	(0.3772)	(0.9293)	(0.2276)	(0.0275)	(0.0000)	
PC30	0.001424	1.793500	-10.91455	1.469874	-0.315507	-0.164675	0.185259
	(0.8382)	(0.2655)	(0.6474)	(0.2759)	(0.0341)	(0.0000)	
PC35	0.001436	0.808621	-10.74763	1.327423	-0.408748	-0.150023	0.173112
	(0.8084)	(0.5818)	(0.5522)	(0.1645)	(0.0187)	(0.0000)	
PC40	-0.000076	1.355647	-3.677903	0.912652	-0.200113	-0.169129	0.209386
	(0.9893)	(0.3692)	(0.8276)	(0.2429)	(0.1989)	(0.0000)	
PC45	0.003627	1.072488	3.393143	1.410749	-0.244064	-0.173512	0.204904
	(0.4301)	(0.3552)	(0.8303)	(0.0559)	(0.0683)	(0.0000)	
PC50	0.001841	1.855817	-6.168831	1.382883	-0.246755	-0.147580	0.205359
	(0.6834)	(0.1052)	(0.7432)	(0.0547)	(0.0314)	(0.0000)	
PC55	-0.001671	2.138977	-6.017838	1.297370	-0.183641	-0.159314	0.199517
	(0.7209)	(0.1201)	(0.6886)	(0.1110)	(0.1140)	(0.0000)	
PC60	-0.000617	2.142224	-3.700172	1.011446	-0.119835	-0.150956	0.222173
	(0.8869)	(0.0753)	(0.8440)	(0.1640)	(0.3108)	(0.0000)	
PC65	0.000671	1.790720	-12.72991	1.341462	-0.212979	-0.140537	0.201112
	(0.8703)	(0.1807)	(0.4840)	(0.0000)	(0.0617)	(0.0000)	
PC70	0.001520	1.343726	-13.34049	1.172475	-0.267218	-0.138009	0.216010
	(0.7473)	(0.3534)	(0.5694)	(0.1409)	(0.0485)	(0.0000)	
PC75	0.003326	0.467943	0.893124	0.985007	-0.317069	-0.134564	0.205218
	(0.3571)	(0.7032)	(0.9654)	(0.0000)	(0.0023)	(0.0000)	
PC80	0.003029	0.688042	-4.068640	0.815546	-0.251771	-0.133745	0.211496
	(0.5037)	(0.5869)	(0.8352)	(0.1403)	(0.0219)	(0.0000)	
PC85	0.000925	1.637923	-25.21191	0.392693	-0.116433	-0.131214	0.207858
	(0.7942)	(0.1186)	(0.0849)	(0.3718)	(0.3641)	(0.0000)	
PC90	0.003829	2.303456	-18.78467	0.784305	-0.186342	-0.130903	0.227129
	(0.2137)	(0.0550)	(0.1535)	(0.1511)	(0.0856)	(.0000)	
PC95	0.002088	1.878145	-7.860511	0.548738	-0.171014	-0.133254	0.167678
	(0.6229)	(0.1678)	(0.7645)	(0.0024)	(0.2156)	(0.0000)	
PC100	0.002902	0.399909	20.73893	0.573614	-0.244686	-0.097939	0.108884
	(0.4031)	(0.6858)	(0.1840)	(0.0021)	(0.0413)	(0.0000)	

Actual p-values in parentheses.

This part of the paper will dwell also on constrained and unconstrained models. Constrained models include only inflation as an independent variable, whereas unconstrained models include the 5 identified independent variables. First, bilateral constrained correlation coefficients are computed. There are two coefficients that are statistically insignificant out of the 20. The maximum actual p-value for these 18 coefficients is 0.0389. All 20 coefficients are negative, which is a bad signal. This feature contrasts with the results of CPI inflation which are almost all positive. It is as if there is a balance or trade-off between estimates. An

unsophisticated investor would conclude that inflation is non-neutral. However, this is contradicted by further analysis. The lowest actual Wald p-value for HAC regressions is 0.1007, failing to reject inflation irrelevance in 100% of the cases. Quantile regressions produce 4 actual p-values that are statistically significant: 0.0019, 0.0143, 0.0278, and 0.0364. This is additional evidence on inflation irrelevance in 80% of the cases. Robust Least squares depict a different picture for constrained models as 15 regressions have statistically significant p-values. Unconstrained regressions are much more and much more strongly supportive of inflation irrelevance. The lowest actual p-value on including inflation for unconstrained MM Robust Least Squares is 0.2590. And the lowest actual p-value on including inflation for unrestricted quantile regressions is 0.2742. Hence inflation irrelevance is supported by 100% in both cases.

4. CONCLUSION

The association between stock returns and inflation is challenging, debatable, and controversial. The generalized Fisher's theory predicts a positive one-to-one relation, as nominal rates of return change proportionately with expected inflation. Moreover, stocks are considered to be hedges against fluctuations in the prices of real assets. Early empirical evidence found a statistically significant but negative relation. Lately, the evidence has swayed towards inflation irrelevance. Although most Pearson correlation coefficients of stock returns with CPI and core inflation rates are statistically significant, the coefficient estimates with CPI inflation are mostly positive while those with core inflation are all negative, casting doubt on the stability of the underlying relation. Applying HAC standard errors with least squares, using robust least squares, and running quantile regressions reverse the evidence, and support inflation irrelevance in 100% of the cases. One adds to these constrained models the results with unconstrained regressions which favor inflation irrelevance in 75% of the cases, using robust Least Squares, and in 100% of the cases using quantile regressions. Therefore, there is very strong evidence on inflation irrelevance. This means that no money illusion or other inefficiencies, no tax effects, and no derived money demand explanation, exist and that there is no need to appeal to the fiscal/monetary nexus. Stock prices are NPVs, where real cash flows are discounted by real rates and nominal cash flows discounted by nominal rates, thereby giving the same value for both.

REFERENCES

Al-Nassar, N. S., & Bhatti, R. H. (2019). Are common stocks a hedge against inflation in emerging markets? *Journal of Economics and Finance*, 1-35.

Anari, A., & Kolari, J. (2001). Stock prices and inflation. *Journal of Financial Research*, *24*(4), 587-602. https://doi.org/10.1111/j.1475-6803.2001.tb00832.x

Azar, S. A. (2010). Inflation and stock returns. *International Journal of Accounting and Finance*, *2*(3-4), 254-274. https://doi.org/10.1504/IJAF.2010.034399

Azar, S. A. (2013). The spurious relation between inflation uncertainty and stock returns: evidence from the US. *Review of Economics & Finance*, *3*, 99-109.

Azar, S. A. (2014a). The determinants of US stock market returns. *Open Economics and Management Journal*, *1*(1), 1-13. https://doi.org/10.2174/2352630001401010001

Azar, S. A. (2014b). Inflation and stock returns II. *International Journal of Economics and Finance*, *6*(1), 208-216. https://doi.org/10.5539/ijef.v6n1p208

Azar, S. A. (2015). The equity premium and inflation: Evidence from the US. *Applied Finance and Accounting*, 1, 1, 30-36.

Azar, S. A. (2020a). *Irrelevance of Inflation and Inflation Uncertainty to Stock Returns*, Book Publisher International (India and UK).

Azar, S. A. (2020b). Hypothesis testing when the same variable appears on both sides of the regression, *The Empirical Economics Letters*, *19*(3), 221-225.

Azar, S. A. (2020c). Irrelevance of inflation: The Dow stocks. *Accounting and Finance Research*. 9, 1, 45-66. https://doi.org/10.5430/afr.v9n1p45

Azar, S. A. (2020d). *Irrelevance of Inflation: Six Stock Market Indices*, Book Publisher International (India and UK).

Boamah, M. I. (2017). Common stocks and inflation: an empirical analysis of G7 and BRICS. *Atlantic Economic Journal*, *45*(2), 213-224. https://doi.org/10.1007/s11293-017-9543-9

Bodie, Z. (1976). Common stocks as a hedge against inflation. *The Journal of Finance*, *31*(2), 459-470. https://doi.org/10.1111/j.1540-6261.1976.tb01899.x

Boudoukh, J., & Richardson, M. (1993). Stock returns and inflation: A long-horizon perspective. *The American economic review*, *83*(5), 1346-1355.

Brealey, R. A., Myers, S. C., & Allen, F. (2017) *Principles of Corporate Finance,* McGraw-Hill, 12th edition.

Campbell, J. Y., & Vuolteenaho, T. (2004). Inflation illusion and stock prices. *American Economic Review*, *94*(2), 19-23. https://doi.org/10.1257/0002828041301533

Crosby, M. (2001). Stock returns and inflation. *Australian Economic Papers*, *40*(2), 156-165.

Eldomiaty, T., Saeed, Y., Hammam, R., & AboulSoud, S. (2020). The associations between stock prices, inflation rates, interest rates are still persistent. Empirical evidence from stock duration model. *Journal of Economics, Finance and Administrative Science*, *25*(49), 149-162.

Ely, D. P., & Robinson, K. J. (1997). Are stocks a hedge against inflation? International evidence using a long-run approach. *Journal of International Money and Finance*, *16*(1), 141-167. https://doi.org/10.1016/S0261-5606(96)00039-3

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: Journal of the Econometric Society*, 251-276. https://doi.org/10.2307/1913236

Fama, E. F. (1981). Stock returns, real activity, inflation, and money. *The American Economic Review*, *71*(4), 545-565.

Fama, E. F., & French, K. R. (2002). The equity premium. *The Journal of Finance*, *57*(2), 637-659. https://doi.org/10.1111/1540-6261.00437

Fama, E. F., & Schwert, G. W. (1977). Asset returns and inflation. *Journal of Financial Economics*, *5*(2), 115-146. https://doi.org/10.1016/0304-405X(77)90014-9

Feldstein, M. (1980). Inflation, tax rules and the stock market. *Journal of Monetary Economics*, *6*(3), 309-331. https://doi.org/10.1016/0304-3932(80)90045-8

Fisher, I. (1930). *The Theory of Interest, as Determined by Impatience to Spend Income and Opportunity to Invest it*. New York: Macmillan.

Geske, R., & Roll, R. (1983). The fiscal and monetary linkage between stock returns and inflation. *The Journal of Finance*, *38*(1), 1-33. https://doi.org/10.1111/j.1540-6261.1983.tb03623.x

Gordon, M. J. (1959). Dividends, earnings and stock prices. *Review of Economics and Statistics*, 41, (2), 99-105.

Gordon, M. J. (1962). *The investment, financing, and valuation of the corporation*. Homewood, IL: RD Irwin.

Gordon, M. J., and Shapiro, E. (1956). Capital equipment analysis: The required rate of profit. *Management Science*, 3, (1), 102-110

Gultekin, N. B. (1983). Stock market returns and inflation: evidence from other countries. *The Journal of Finance*, *38*(1), 49-65. https://doi.org/10.1111/j.1540-6261.1983.tb03625.x

Harper, A. and Jin, Z. (2012). Stock returns and macroeconomic factors: An examination of the Indonesian domestic economy. *International Research Journal of Applied Finance*, 3, 4, 426-434.

Hasan, M. S. (2008). Stock returns, inflation and interest rates in the United Kingdom. *The European Journal of Finance*, *14*(8), 687-699.

Jaffe, J. F., & Mandelker, G. (1976). The" Fisher effect" for risky assets: An empirical investigation. *The Journal of Finance*, *31*(2), 447-458. https://doi.org/10.1111/j.1540-6261.1976.tb01898.x https://doi.org/10.2307/2326616

Jareño, F., & Navarro, E. (2010). Stock interest rate risk and inflation shocks. *European Journal of Operational Research*, *201*(2), 337-348.

Leibowitz, M. L., Sorensen, E. H., Arnott, R. D., and Hanson, N. (1989). A total differential approachto equity duration. *Financial Analysts Journal*, 45, (5), 30-37.

Modigliani, F., & Cohn, R. A. (1979). Inflation, rational valuation and the market. *Financial Analysts Journal*, *35*(2), 24-44. https://doi.org/10.2469/faj.v35.n2.24

Nelson, C. R. (1976). Inflation and rates of return on common stocks. *The Journal of Finance*, *31*(2), 471-483. https://doi.org/10.1111/j.1540-6261.1976.tb01900.x

Solnik, B. (1983). The relation between stock prices and inflationary expectations: the international evidence. *The Journal of Finance*, *38*(1), 35-48. https://doi.org/10.1111/j.1540-6261.1983.tb03624.x

Williams, J. B. (1938). *The Theory of Investment Value,* **F**raser Publishing, Cambridge: Harvard University Press.

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EX-POST ASSESSMENT OF HETEROGENOUS EFFECTS OF TRADE AGREEMENTS: THE CASE OF TURKEY

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ABSTRACT

Purpose -Free trade agreements (FTA) are prominent features of international trade. The proliferation of FTAs over the past 20 years is one of the most prominent aspects of the global economy. Turkey has also signed many FTAs in this period on the basis of obligations stemming from customs union with European Union. FTAs aim to increase trade flows and welfare through liberalizing trade and achieving a deeper integration between partners. In this respect, FTAs are getting more and more important as international trade is a crucial tool to boost the economic development. Indeed, getting the utmost benefit from FTAs is very important for Turkey and other developing countries. Regarding the increasing importance of FTAs, the ex-post effects of FTAs on Turkey's trade are examined in this paper.

Methodology -In the light of recent techniques, structural gravity model is used in this study. Trade data used consists of aggregate trade flows among pairs of 90 countries from 1988-2016, 29 years in total. As the estimation technique, Ppml_panel_sg command is used. This is an estimation command for Poisson pseudo-maximum-likelihood (PPML) regression for panel gravity models with time varying importer and exporter fixed effects and time invariant pair fixed effects.

Findings-The results indicate the econometric evidence of the impact of FTAs on Turkey's trade. When all FTAs are considered at macro level, the results suggest that, FTAs had a statistically significant positive effect on exports and imports of Turkey. However, at micro level, there is substantial variation and heterogeneity in the agreement specific effects and trade direction specific effects within the agreement.

Conclusion-This paper provides the first evidence that the impact of FTAs are heterogenous and not all the FTAs affected the trade of Turkey in the same positive way. Even within the same agreement, the effects vary considerably depending on the direction of trade.

Keywords: International Trade, Free Trade Agreements, Gravity Model, Heterogeneity
JEL Codes: F10, F13, F15

1. INTRODUCTION

The proliferation of economic integration agreements (EIA), notably free trade agreements over the past 20 years is one of the most prominent aspects of the global economy (Bergstrand, Larch and Yotov 2015). Given the multitude of FTAs in existence, there is a vast literature on the impacts of FTAs on trade. Broadly speaking, all FTAs aim to increase the trade and welfare. It is expected that FTAs increase the trade because the liberalization of the trade makes imports cheaper and these imported products replace domestic production or imports from the rest of the world. This basic theory dates back to Viner (1950) and Meade (1955). But "Do FTAs really increase the trade and if increase, to what extent?" This question is asked more and more and in search of an answer, measuring and assessing the impacts of FTAs became a popular topic among both academics and policymakers. Getting the utmost benefit from the FTAs is very important for developing countries as the increasing importance of international trade in economic development is considered. In this respect, this study is examining Turkey's FTAs in order to fully understand the ex-post effects of FTAs on her trade.

Turkey's policy on FTAs is determined on the basis of obligations stemming from customs union (CU) with European Union (EU). According to Article 16 of the Decision 1/95, establishing the customs union, Turkey has committed to harmonize her commercial policy with that of EU's. In this context, Turkey has been required to align itself progressively with the preferential customs regime of the Community and adopt all Free/Preferential Trade Agreements and Generalized System of Preferences (GSP) of EU. Based on this requirement, Turkey has signed FTAs with many countries. First FTA of Turkey is signed in 1991 and entered into force in 1992 with EFTA States (Iceland, Liechtenstein, Norway and Switzerland). This is the only FTA Turkey has signed before the CU. Following the EFTA agreement, FTAs with Israel (1997), Romania (1998), Lithuania (1998), Hungary (1998), Estonia (1998), Czech Republic (1998), Slovak Republic (1998), Bulgaria (1999), Poland (1999), Slovenia (2000), Latvia (2000), Macedonia (2000), Croatia (2003), Bosnia and Herzegovina (2003), Palestine (2005), Tunisia (2005), Morocco (2006), Syria (2007), Egypt (2007), Albania (2008), Georgia (2008), Montenegro (2010), Serbia (2010), Chile (2011), Jordan (2011), South Korea (2013), Mauritius (2013), Malaysia (2015), Moldova (2016), Singapore (2017), Faroe Islands (2017), Kosovo (2019), Venezuela (2020) and United Kingdom (2021) were signed and entered into force gradually at the dates mentioned. Among these agreements, the ones signed with Romania, Lithuania, Hungary, Estonia, Czech Republic, Slovak Republic, Bulgaria, Poland, Slovenia, Latvia, Croatia are terminated when these countries joined the EU. Agreement signed with Syria is suspended in 2011 and agreement signed with Jordan is suspended in 2018.Turkey has also signed FTAs with Lebanon, Sudan and Qatar but these FTAs are not in force yet. So currently Turkey has 22 FTA's in force.

Many of the countries that Turkey has signed FTAs are relatively small trade partners of Turkey. In the last three years, among Turkey's top 20 export markets, only Switzerland, Israel and Egypt had an FTA with Turkey. Similarly, among the top 20 sources of imports of Turkey only Switzerland and South Korea had an FTA with Turkey. As a consequence, though Turkey concluded various FTAs, still relatively small amount of trade takes place pursuant to FTAs. The percentage of exports to FTA countries in total exports is 8,75 and the percentage of the imports from FTA countries in total imports is 6,68 on average between 1996-2017 according to authors' own calculations based on data from Turkish Statistical Institute. Here there are two important questions: "What Turkey expects from FTAs?" and "Did she get what she expected?" Turkey's main expectations from FTAs are to increase her trade through better market access opportunity and to provide better competition for Turkish exporters especially when the EU exporters are considered. To answer the second question, which is the aim of this study, the effect of FTAs on Turkey's trade is estimated by using structural gravity model. The results of the estimations suggest that FTAs increased the trade at the macro level. However, effects of individual agreements differ widely across the agreements and within the agreement depending on the direction of trade. Therefore, gains from FTAs can't be taken for granted all the time. This finding is quite in line with the research of Carrere (2006), Kohl (2014) and Baier, Yotov and Zylkin (2016) on the heterogeneous effects of individual FTAs. The remainder of this paper is organized as follows: Section 2 covers the literature review, section 3 describes the econometric methodology and the data, section 4 presents the results and section 5 is the conclusion.

2. LITERATURE REVIEW

In this section, the literature will be reviewed with a focus on two subjects. First, the gravity model and advances in the application over time, second, application of the gravity model for estimating the effects of FTAs.

The gravity model is an econometric model that relates bilateral trade flows between country pairs to an economically influential variable of countries/country pairs. It is first introduced by Tinbergen in 1962. The gravity model of Tinbergen which is derived from Newton's law of "universal gravitation" proposes that bilateral trade flows between two countries are positively related to the national incomes of the partners and negatively related to the bilateral distance between them in the simplest form (Tinbergen 1962). The model's success in correctly estimating bilateral trade flows made it one of the most stable empirical relationships in economics (Benedictis and Taglioni 2011). Since introduced by Tinbergen, the model has been used extensively in international trade literature and it is often referred to as the workhorse of international trade. Though being used extensively, initial applications of gravity model were a-theoretical (Yotov, Piermartini, Monteiro and Larch 2016). Therefore, until recently the gravity model was "an intellectual orphan, unconnected to the rich family of economic theory" due to the absence of an accepted connection to economic theory (Anderson 2011). In time, new research and advances on theoretical foundations of the gravity model showed that, gravity equation can be derived from many different trade theories (De Benedictis and Taglioni 2011).

Among important studies about theoretical foundations of the model, first and one of the most important contributions is by James Anderson (1979). Anderson proposed an explanation of the gravity equation based on a demand function where the goods are differentiated on the basis of the country of origin. Later work includes contribution by Krugman (1980), Bergstrand (1985 and 1989) and Helpman and Krugman (1985) about the theoretical explanation based on monopolistic competition frameworks, contribution by Deardorff (1998) about derivation of the gravity model from Heckscher-Ohlin, contribution by Eaton and Kortum

(2002) about deriving gravity model on the supply side as a Ricardian structure and contribution by Bernard, Eaton, Jensen and Kortum (2003) and Melitz (2003) about the firm heterogeneity. Another contribution is the work of Anderson and Wincoop (2003) that is considered as a milestone about the theoretical foundation of the gravity model. Anderson and Wincoop popularized the work of Anderson (1979) and contributed to the gravity literature by emphasizing the effects of trade costs and introducing the multilateral resistance term in the gravity equation. The gravity model of Anderson and Wincoop is called theoretical gravity model.

Gravity model is commonly used to investigate the effects of different trade policies especially effect of FTAs on trade flows. The effects of FTAs on trade flows have been on the research agenda since the seminal work of Tinbergen where he studied the effects of BENELUX and Commonwealth membership. In the last 55 years, a lot of research is made on measuring the ex-post effects of FTAs. Kepaptsoglou, Karlaftis and Tsamboulas (2010) and Kohl (2014) provide a review of previous empirical studies about FTAs. However, till recent times, the gravity estimates were highly variable and economically implausible most of the time. Only recently economists have been able to provide unbiased and more precise ex-post effects of agreements on international trade flows (Bergstrand, Larch and Yotov 2015). Examples from recent studies concerning the ex-post effects of FTAs are as follows: Carrere (2006), assessed the effects of EU, ANDEAN, NAFTA, CACM, MERCOSUR, ASEAN and LAIA with gravity model using panel data. The findings of the study showed that, most of these agreements increased intra-regional trade but sometimes reduced the exports to the rest of the world. Baier and Bergstrand (2007), used panel data and estimated the gravity model both with fixed effects and with first differencing method. Their study showed that trade agreements increase trade considerably and have statistically significant lagged effects. Baier, Bergstrand, Egger and McLaughlin (2008), estimated the effects of various economic integration agreements including the EU. They applied gravity models with and without multilateral resistance terms and used estimation techniques such as first differencing and fixed effects. Their conclusion suggests that the effect of EU membership is economically significant even larger than the amount estimated in the previous studies. Mölders and Volz (2011), studied the impact of FTAs on the trade flows of East Asian economies. Their findings suggest that particularly bilateral trade agreements result in significant positive trade effects while the effect of multilateral trade agreements is insignificant in most of the cases. Magee (2008), estimated the effects of regional trade agreements on trade flows by controlling importer-year, exporter-year and country pair fixed effects. The results of the study reveal that there is an anticipatory effect of the agreements which increase the trade and this increase continues over the first 11 years after entry into force. Egger and Larch (2011), studied the trade, GDP and welfare effects of EU's trade agreements with 10 Central and Eastern European Country (CEEC). The results suggest that the agreements increased the trade between EU and CEEC but at the same time they induced trade diversion. Eicher and Henn (2011), investigated the effects of WTO membership and preferential trade agreements such as EU, APEC, CACM, CARICOM, MERCOSUR and LAIA and GSP regime. They concluded that, WTO membership does not have statistically significant effects on trade while trade agreements have a statistically significant trade creating effect which is uneven across different agreements. Baier, Bergstrand and Feng (2014), studied the impact of economic integration agreements on intensive versus extensive margins of trade. Their results suggest that; economic integration agreements affect both the intensive and extensive margins of trade and deeper integration agreements have larger impacts than shallower agreements. Kohl (2014), performed individual estimates for the trade effects and phase-in effects of 166 different economic integration agreement. The results suggest that only about one quarter of the agreements investigated promoted trade and more than half of the agreements had no impact on trade flows. Dai, Yotov and Zylkin (2014), estimated the trade creation and trade diversion effects of FTAs. Their results show that FTAs have trade diverting effects and this effect is stronger for imports than it is for exports. Baier, Bergstrand and Clance (2015), studied the heterogeneity in the effects of economic integration agreements and they concluded that there is heterogeneity in the effects of different trade agreements. Kohl, Brakman and Garretsen (2016), studied the effects of heterogeneous design of trade agreements. Their results indicate that trade promoting effects of agreements change depending on the legal enforceability of the provisions of the agreements. Zylkin (2016), examined the heterogeneity in the effects of trade agreements using NAFTA as an example. The results show that the effects of the agreement are not always symmetrical between the partners. Baier, Yotov and Zylkin (2016), used a two-stage methodology to search for the determinants of the effects of past free trade agreements and obtain ex-ante predictions for the effects of future agreements such as TPP and TTIP. They concluded that the effects of individual agreements differ considerably both qualitatively and quantitatively.

Another part of the literature is the literature for the case of Turkey. Unfortunately, there are just a few studies about the effects of Turkey's FTAs on her trade. Arısoy, Bayar and Çalışkan (2003), used a dummy variable to measure the effects of FTAs on Turkey's trade by using gravity model. Their results suggest that the FTA dummy is not statistically significant suggesting that FTAs had no impact on Turkey's foreign trade. Özkaya (2011), studied the effects of bilateral and multilateral agreements on Turkey's trade using gravity model. In that study as well, the dummy for FTA is found to be statistically insignificant. Türkcan and Pişkin (2016), studied the effects of Turkey's FTAs on the extensive and intensive margins. Their results suggest that FTAs increased intensive

trade while decreasing extensive trade and the effect on intensive trade is more than the effect on extensive trade. Kütük and Akbostancı (2016), studied the effects of customs union and free trade agreements on Turkey's trade with gravity model. Their results suggest that free trade agreements do not have a statistically significant effect on Turkey's export and import. Frede and Yetkiner (2017) analysed the Turkish export and import flows. The results of their model suggest that the coefficient of FTA is insignificant when aggregate data is used. When measured for selected time periods, some mixed results are obtained depending on the time interval. When sectorally disaggregated data is used, FTA coefficients found to be negative for all sectors with the exception of the export of textiles and footwear.

In addition to these studies, the effects of some of the Turkey's FTAs are included in a few studies in the international literature that estimate agreement specific effects for individual agreements. As an example, Baier Yotov and Zylkin (2016), studied the impact of individual agreements around the world including some agreements of Turkey. Their results suggest that some of the FTAs of Turkey had positive effect on her trade flows while some others had no impact. In this study, aggregated manufacturing trade flows are taken into consideration. The FTA's included in the study are the ones with Bulgaria, Romania, Israel, Poland, Hungary, Tunisia, Egypt and EFTA. According to the results except Egypt and EFTA, the others had a positive impact on trade. Another example is the study of Kohl (2014) where the effects of 166 FTAs including some FTAs from Turkey are estimated. The results suggest that, the effects of Turkey's FTAs on her trade are mixed. Some FTAs had positive effect, some had no statistically significant effect and some had negative effect on her trade. The FTAs included in the study are the ones with Bulgaria, Czech Republic, Estonia, EFTA, Hungary, Israel, Latvia, Lithuania, Macedonia, Poland, Romania, Slovak Republic and Slovenia. According to results, FTAs with Bulgaria, Romania and Slovenia had a positive effect on trade while EFTA had a negative effect and the rest of the agreements had no statistically significant effect on trade.

3. DATA AND METHODOLOGY

3.1. Econometric Methodology and Model

In this study, it is aimed to examine the ex-post effects of Turkey's FTAs on imports and exports of Turkey. Estimating the ex-post effect of a trade agreement is not easy as the increase in bilateral trade between the partners does not necessarily show the success of FTA. There could be many factors other than the FTA which could affect the bilateral trade volume. Therefore, statistical methods and analysis are required to isolate the effect of FTA among the other factors (Bergstrand, Baier, Sunesen and Thelle 2011). For this purpose, the structural gravity model is used in this study. Trade data used consists of aggregate trade flows among pairs of 90 countries from 1988-2016, 29 years in total. The basic gravity equation has the following multiplicative formulation in general:

$$X_{ij} = G\, S_i\, M_j\, \Phi_{ij} \qquad (1)$$

Here Xij represents the value of exports from country i to j, M_j represents importer-specific factors which determine the total demand of importer, S_i represents exporter-specific factors which determine the total supply of the exporter, G is a variable independent from i or j such as the level of world liberalization and Φ_{ij} represents the ease of access to the market of importer j by the exporter i (Bacchetta, Beverelli, Cadot, Fugazza, Grether, Helble, Nicita and Piermartini 2012). In the context of research concerning the theoretical foundation of the gravity equation Anderson and van Wincoop showed that; controlling for relative trade costs rather than the absolute trade costs between exporter and importer is crucial for a well-specified gravity model. In other words, exports from country i to j and imports of country j from country i depend on trade costs not only between i and j but also across all possible export markets and all suppliers. Anderson and van Wincoop (2003) called this relative trade costs "multilateral trade-resistance" (MTR). Omitting these MTR in the gravity model estimation is called "gold medal error" by Baldwin and Taglioni (2006). After the inclusion of MTR, a theoretically founded structural gravity equation takes the following form:

$$X_{ij} = \frac{Y_i Y_j}{Y}\left(\frac{t_{ij}}{\Pi_i P_j}\right)^{1-\sigma} \qquad (2)$$

Here X_{ij} represents the trade flows from country i to country j, Y represents the world GDP, Y_i and Y_j represent the GDP of countries i and j respectively, t_{ij} represents the cost of importing a good from i, σ represents the elasticity of substitution and $\prod_i$ and P_j represent exporter's outward and importer's inward multilateral resistance terms respectively. If this equation is re-written in exponential form by adding time subscript and an error term, the equation turns into following:

$$X_{ij,t} = \exp\left(\ln Y_t + \ln Y_{i,t} \prod_{i,t}^{\sigma-1} + \ln Y_{j,t} P_{j,t}^{\sigma-1} + \ln t_{ij,t}^{1-\sigma} \right) + \varepsilon_{ij,t} \qquad (3)$$

A number of proxy variables are used to measure the trade costs as they are not directly observable. Trade costs are generally assumed to take the following form in the gravity literature:

$$t_{ij} = d_{ij}^{\delta_1}.\exp(\delta_2 cont_{ij} + \delta_3 lang_{ij} + \delta_4 ccol_{ij} + \delta_5 col_{ij} + \delta_6 landlock_{ij} + \delta_7 RTA_{ij}) \quad (4)$$

Here d_{ij} represents distance between the countries, while $cont_{ij}$, $lang_{ij}$, $ccol_{ij}$, col_{ij}, $landlock_{ij}$ and RTA_{ij} are dummy variables representing whether two countries sharing a common border, common language and common colonizer, whether one of the countries was a colony of the other country, whether one of the two or both countries are landlocked country and whether there is a regional trade agreement between the countries (Bacchetta, Beverelli, Cadot, Fugazza, Grether, Helble, Nicita and Piermartini 2012).

The econometric specification of the gravity model is completed when equation 4 is inserted in equation 3. However, there are challenges to overcome to estimate the model and obtain unbiased results. The problem with estimating equation (2) is mainly about MTRs which are not directly observable. In the gravity literature there are different ways of proxying for MTR terms. A widely used method is using importer and exporter country fixed effects to control for country specific characteristics (Rose and van Wincoop 2001; Baldwin and Taglioni 2006; Baier and Bergstrand 2007; Anderson and Yotov 2010). In this study this approach is applied. Therefore, time varying importer and exporter country dummies control for MTRs together with Yi and Yj in equation (2).

There are 3 other challenges to estimate the model especially for the effects of FTAs. First one is the presence of zero trade flows. The information contained in zero trade flows can't be taken into account if Ordinary Least Square (OLS) method, the most widely used technique to estimate the gravity models, is used. The second one is the heteroscedasticity of trade data which is known to plague data and cause biased and inconsistent estimates if OLS method is applied. The third one is the endogeneity of free trade agreements and in more general terms all trade policies. If the unobservable linkage between the trade policy and the error term is not taken into consideration, the results of the estimation could be biased. The literature proposes to apply Poisson pseudo-maximum-likelihood (PPML) estimator advocated by Santos Silva and Teneyro (2006) as a solution to challenge one and two. Santos Silva and Teneyro show that PPML generates robust results even when there are many zero trade values in the data set and at the same time it is consistent in the presence of heteroskedasticity. The study of Santos Silva and Teneyro (2006) suggest that, according to Monte Carlo simulations, estimates obtained using OLS models in the presence of heteroscedasticity are severely biased while PPML method is robust to different patterns of heteroskedasticity. Regarding the endogeneity of the FTAs which is the third challenge, the literature proposes to use country-pair fixed effects (Baier and Bergstrand 2007; Dai et al. 2014; Anderson and Yotov 2016). According to Baier and Bergstrand (2007), the set of pair fixed effects which absorb all the bilateral covariates that do not change in time, eliminates the unobservable linkage between endogenous trade policy variable and the error term. When the pair fixed effects are used, because of perfect collinearity, all the time-invariant bilateral effects included in equation 4 will be dropped. If the time-invariant bilateral effects are dropped and equation 4 is inserted in equation 3 and then time varying importer and exporter country dummies are inserted to control for MTRs, the following equation is obtained:

$$X_{ij,t} = \exp(\eta_{i,t} + \psi_{j,t} + \gamma_{ij} + \alpha\, STAW_{ij,t} + \beta\, STAT_{ij,t}) + \varepsilon_{ij,t} \quad (5)$$

This model which is used in this study is in line with the recent advances in the literature. Here $X_{ij,t}$ represents the trade flows from country i towards country j at time t, η_{it} and ψ_{jt} represent the exporter and importer time varying fixed effects which account for MTRs in structural gravity equation, γij represents the pair fixed effects introduced to control the endogeneity.

EIAs are one of the most important determinant of international trade flows. Therefore, the presence of a bilateral or multilateral EIA between the countries included in the data set is taken into consideration in the model and represented with a dummy named STAW. STAW dummy changes according to the estimate. It is always all the EIAs between the partners excluding the FTA/FTAs that we want to measure the effect of. It takes the value of 1 if a country pair has an EIA in force in the related year and 0 if there is no EIA in that year. Finally, STAT is the dummy variable indicating the presence of FTA between Turkey and the related country. STAT dummy changes according to the estimation. The estimation approach is based on to recover the macro effects, individual FTA effects and trade direction specific effects. In this context, it is started by estimating the average overall effect of all FTAs and the FTAs in force concluded by Turkey. Then, it is continued with decomposing this average overall effect into agreement specific effects for each agreement. For this purpose, earlier analysis is modified to include a separate dummy for each agreement. Then, it is continued with decomposing the effects one step further into direction specific effects within the agreement. In addition to STAW and STAT, there are many other dummies generated for importer time/exporter time/pair fixed effects. For the panel data set with 90 countries trading with each other over 29 years, there are 5220 (90x2x29) time varying importer/exporter fixed effects

and 8010 (90x89) time invariant pair fixed effects. In this situation, a long computing time is required for estimation in STATA. For that reason, ppml_panel_sg command of Zylkin (2017) is used for computations in STATA which enables faster computation of many fixed effects. Ppml_panel_sg is an estimation command for PPML regression for panel gravity models with time varying importer and exporter fixed effects and time invariant pair fixed effects. It is strictly intended for settings where the dependent variable is spatial flows from one location to another such as international trade flows or migration flows.

3.2. Data

The dataset in this study is a panel arranged by country pair and year. It includes the aggregate bilateral trade flows of goods among pairs of 90 countries during the period 1988-2016. Normally there are 92 countries included in the dataset but due to discontinuity of the trade data Belgium - Luxembourg and Serbia - Montenegro are considered as a single country. In the dataset, each country pair is represented twice depending on the direction of the trade; once as ij and once as ji. When 1988-2016 period is considered, the total trade covered by the dataset represents 92,4 % of the total world trade and 96 % of Turkey's international trade.

Data on trade flows come from World Trade Flows (WTF) Bilateral Trade Database developed by Feenstra and Romalis and UN COMTRADE Database where needed. The data on EIAs around the world, which is needed for STAW dummy, is from "Database on Economic Integration Agreements" constructed by Jeffrey Bergstrand. This dataset is updated by the authors using data on some additional years (2013-2016) from the WTO Regional Trade Agreements Information System (RTA-IS). In the formation of this dummy variable; free trade agreements, customs unions, common markets and economic unions are considered as the presence of EIA. Data on Turkey's FTAs, which is needed for STAT dummy, come from the Ministry of Trade in Turkey.

4. FINDINGS AND DISCUSSIONS

In this section the results of the gravity estimations are explained. Estimations are generated using equation (5) in 6 different sets.

(1) First, the average ex-post effect of Turkey's all FTAs (except the ones entered into force in 2016 and later) on trade between Turkey and the partner of the agreement is estimated. This is a symmetric approach where the average effect on total bilateral trade is estimated. In other words, the impact on Turkey's total export to the partners and total imports to Turkey from partners are assumed to be symmetric. The results are listed in Table 1.

Table 1: Average ex-post effect of Turkey's all FTAs

Agreement	Coefficient (β)	s.e.	Change (%)
All FTAs	0.192**	0.056	21.17
Exportation from Turkey	0.164*	0.072	17.82
Importation to Turkey	0.217**	0.077	24.23

** and * show the significance level at 1% and 5% respectively

In Table 1, first column shows the agreement/direction of the trade within the agreement, second column shows the estimated β value which is the coefficient of STAT dummy variable, third column shows the standard errors and the fourth column shows the corresponding % change in trade. The results of this estimation indicate that FTAs concluded by Turkey had a trade promoting effect in general. On average, Turkey's FTAs increased trade flows between Turkey and the respective countries by 21.17% ($e^{0.192}$-1).

(2) Considering the possibility that the trade affects may vary regarding the direction of trade, direction specific effects (exportation from Turkey to FTA partners and importation to Turkey from FTA partners) are estimated. This is an asymmetric approach which allows measuring the impact on Turkey's import from partner countries and Turkey's export to the partner countries separately. The result listed in Table 1 suggest that, FTAs had a positive effect on both exports and imports of Turkey. The effect on imports is more than the effects on exports. Indeed, importation to Turkey from the FTA partners increased by 24.23% while the exportation of Turkey to these countries increased by 17.82% due to the FTAs.

(3) As some of the FTAs included in the previous estimations are no longer in force, the same estimations are repeated this time only for the FTAs that are in force (as of 2016). This is again a symmetrical approach. Results are listed in Table 2.

Table 2: Average ex-post effect of Turkey's FTAs that are in force

Agreement	Coefficient (β)	s.e.	Change (%)
FTAs in Force	0.243**	0.066	27.51
Exportation from Turkey	0.226*	0.104	25.36
Importation to Turkey	0.258**	0.080	29.43

** and * show the significance level at 1% and 5% respectively

The results show that, when only the FTAs in force are taken into consideration, they again had trade promoting effect and this time the trade promoting effect of FTAs is slightly higher. On average, Turkey's FTAs currently in force had a partial average effect equal to 27.51% increase on trade.

(4) Similar to second estimation, the effects of FTAs in force are examined with an asymmetric approach for two different directions of trade: Exports from Turkey and imports to Turkey. The results of direction specific estimate about the FTAs in force listed in Table 2 shows that, though the FTAs increased both exports and imports of Turkey, as in the previous case the increase in imports of Turkey is higher than the increase in exports of Turkey. When the results are evaluated as % increase, importation to Turkey from the FTA partners increased by 29.43% while the export of Turkey to these countries increased by 25.36% due to the FTAs.

(5) To analyse the potential heterogeneity in individual FTA effects, the previous specification is extended and FTA effects are allowed to vary at the level of agreement similar to the approach taken in the studies of Kohl (2014) and Baier, Yotov and Zylkin (2016). This is also a symmetric approach. In this estimation, only the effects of FTAs in force (as of 2016) are included as the others are no longer in force. Therefore 16 separate estimates are made for each agreement. In addition to these agreement specific estimates, the effect of EFTA agreement is estimated separately for EFTA members, i.e. Norway, Switzerland and Iceland. Therefore, in total 19 estimates are made. The results are summarized in Table 3.

Table 3: Agreement specific effects

Positive Effects

Agreement	**Coefficient (β)**	**s.e.**	**Change (%)**
Israel	0.837**	0.228	130.94
Bosnia and Herzegovina	0.666**	0.126	94.64
Morocco	0.600**	0.095	82.21
Malaysia	0.433**	0.076	54.19
Egypt	0.326**	0.077	38.54
South Korea	0.313**	0.057	36.75
Mauritius	0.295**	0.102	34.31
Serbia and Montenegro	0.177**	0.062	19.36
Negative Effects			
Albania	-0.280*	0.138	-32.31
Palestine	-0.189*	0.094	-20.80
Insignificant Effects			
EFTA	0.152	0.082	-
Norway	0.335	0.210	-
Switzerland	0.117	0.078	-
Iceland	0.732	0.440	-
Chile	-0.273	0.142	-
Macedonia	-0.135	0.152	-
Tunisia	0.040	0.109	-
Georgia	-0.241	0.304	-
Jordan	-0.018	0.111	-

** and * show the significance level at 1% and 5% respectively

The results show that, similar to the findings of Kohl (2014) and Baier Yotov and Zylkin (2016), the effects of Turkey's FTAs differ very much both quantitatively and qualitatively. Out of 16 agreements, 8 (50%) of them had a statistically significant effect on promoting trade while 2 (%12.5) of them had a statistically significant negative effect and 6 (37.5%) of them had statistically insignificant effect on trade between Turkey and her partners. The agreements with Israel, Bosnia and Herzegovina, Morocco and Malaysia had a strong positive effect on trade. Agreements with Egypt, South Korea, Mauritius and Serbia and Montenegro had also positive effect on trade. However, the effect is modest when compared to the others. The % change in the trade for each agreement is given in Table 3. Interestingly not all the FTAs had a positive and statistically significant effect on trade. It is found that there is no statistically significant FTA related effect on bilateral trade due to the FTAs between Turkey and EFTA, Chile, Macedonia, Tunisia, Georgia and Jordan. Even more interestingly, agreements with Albania and Palestine turned out to be negatively affecting the trade between Turkey and these countries. This finding is contrary to common expectation that FTAs increase the trade. The substantial difference in the results both in qualitative and quantitative means proves that; finding for one particular agreement cannot be generalized for other agreements and FTAs not necessarily promote trade between the partners.

(6) In order to analyse the within agreement heterogeneity, the individual FTA effects are allowed to vary asymmetrically at the level of direction of trade. In other words, exports from Turkey and imports to Turkey are examined separately similar to the approach taken in the study of Baier Yotov and Zylkin (2016). For 19 agreements, 38 directional estimates (one for Turkey's exports and one for Turkey's imports) are made in total. The results are shown in Table 4.

Table 4: Direction specific effects within the agreement

Direction of Trade	Coefficient (β)	s.e.	Change (%)
Turkey → Israel	1.094**	0.151	198.62
Israel → Turkey	0.500**	0.121	64.87
Turkey →Bosnia Herzegovina	0.673**	0.145	96.01
Bosnia Herzegovina → Turkey	0.631**	0.156	87.95
Turkey → Morocco	0.646**	0.106	90.79
Morocco → Turkey	0.515**	0.141	67.36
Turkey → Malaysia	0.163**	0.063	17.70
Malaysia → Turkey	0.484**	0.056	62.25
Turkey → Egypt	0.355**	0.098	42.62
Egypt → Turkey	0.267**	0.086	30.60
Turkey → South Korea	0.048	0.050	-
South Korea → Turkey	0.343**	0.048	40.92
Turkey → Mauritius	0.364**	0.067	43.91
Mauritius → Turkey	-0.048	0.178	-
Turkey → Serbia-Montenegro	0.146*	0.061	15.72
Serbia-Montenegro → Turkey	0.293**	0.077	34.04
Turkey → Albania	-0.358**	0.114	-43.05
Albania → Turkey	0.377*	0.152	45.79
Turkey → Palestine	-0.192*	0.095	-21.17
Palestine → Turkey	0.214*	0.085	23.86
Turkey → EFTA	0.211	0.165	-
EFTA → Turkey	0.121	0.094	-
Turkey → Switzerland	0.097	0.125	-
Switzerland → Turkey	0.127	0.096	-
Turkey → Norway	0.649**	0.099	91.36
Norway → Turkey	0.075	0.092	-
Turkey → Iceland	1.301**	0.119	267.29
Iceland → Turkey	0.044	0.242	-
Turkey → Chile	-0.501**	0.103	-64.04
Chile → Turkey	-0.120	0.070	-
Turkey → Tunisia	0.119	0.094	-
Tunisia → Turkey	-0.180*	0.080	-19.72
Turkey → Georgia	0.110	0.098	-

Georgia → Turkey	-1.131**	0.107	-209.87
Turkey → Macedonia	-0.067	0.159	-
Macedonia → Turkey	-0.364	0.209	-
Turkey → Jordan	-0.084	0.084	-
Jordan → Turkey	0.439**	0.146	55.12

** and * show the significance level at 1% and 5% respectively

One of the notable aspects of the results of this estimate is that; there is a considerable asymmetry in the effects of agreements depending on whether Turkey is the exporter or importer. Even for the agreements with statistically significant positive impacts, not all the parties are assured of benefits. On the basis of agreements, the results suggest that both exports from Turkey and imports to Turkey increased as a result of FTAs with Israel, Bosnia and Herzegovina, Morocco, Malaysia, Egypt, Serbia and Montenegro. Regarding the agreements with Israel, Bosnia and Herzegovina, Morocco and Egypt exports of Turkey increased more than the imports of Turkey. The situation is reverse for Malaysia and Serbia and Montenegro. That is, imports of Turkey from these countries increased more than the exports of Turkey to these countries. The FTAs with South Korea and Jordan had a statistically significant effect on Turkey's importation from these countries. However, there is no statistically significant FTA related impact on Turkey's exportation to these countries. In contrast, FTAs with Mauritius, Norway and Iceland had a statistically significant effect on exportation of Turkey to these countries but had no statistically significant FTA related impact on Turkey's importation from these countries. The FTAs with Albania and Palestine had a statistically significant positive effect on importation of Turkey from these countries but had a statistically significant negative effect on Turkey's exportation to these countries. Similarly, the FTA with Chile had a statistically significant negative effect on Turkey's exportation to Chile but had no statistically significant FTA related effect on importation from Chile. The FTA with Georgia had a statistically significant negative impact on Turkey's importation from Georgia but had no statistically significant FTA related effect on the exportation of Turkey to Georgia. For the rest of the pairs, FTAs had statistically insignificant effects. Detailed information is included in Table 4.

When these results are interpreted to see the impact on Turkey's exportation and importation, it is found that; FTAs with Israel, Bosnia and Herzegovina, Morocco, Malaysia, Egypt, Mauritius, Serbia and Montenegro, Norway (EFTA) and Iceland (EFTA) had a statistically significant positive effect on Turkey's exportation. However, the FTAs with Albania, Palestine and Chile had a statistically significant negative effect on Turkey's exportation to these countries. Regarding imports, FTAs with Israel, Bosnia and Herzegovina, Morocco, Malaysia, Egypt, South Korea, Serbia and Montenegro, Albania, Palestine and Jordan had a statistically significant positive effect on Turkey's importation from these countries while FTAs with Georgia and Tunisia had a statistically significant negative effect.

5. CONCLUSION

In this study, a very large data set consisting of bidirectional trade data covering 29 years was used for 90 countries. Of course, the findings obtained offer results from a single country, which, of course, causes us to make some limited comments and interpretations. However, the fact that Turkey is in the category of developing countries, and has many FTAs provides the feature of being a good example. Thus, the historical dimension of the FTA agreements for Turkey constitutes a valuable sample for this type of study.

There are also individual benefits for Turkey. As discussed in the literature review, there are just a few studies about the trade effects of Turkey's FTAs. To fill this gap, this paper examines the effects of Turkey's FTAs in the light of latest developments and recent econometric techniques in the empirical trade literature. It also shed light on the agreement specific and direction specific heterogeneous trade effects. To the best of our knowledge, this is the first work that examined the ex-post effects of Turkey's all FTAs that are in force in terms of individual agreement effects and within agreement effects depending on the direction of trade.

The results indicate the econometric evidence of the impact of FTAs on Turkey's trade. Estimates at the macro level show that, FTAs increased the trade between Turkey and her FTA partners in both directions. This result is in accordance with the FTA literature in general. However, the amount of increase on trade is lower when compared to the results of two different meta-analysis, one by Cipollina and Salvatici (2010) and the other by Head and Mayer (2014). The results of these meta-analysis suggest that the average effect of FTAs is 40% and 43.3% respectively. The average effect of Turkey's FTAs is lower than these values. The reason for this could be the relatively small share of FTAs in total trade of Turkey and the selection of FTA partners on the basis of alignment with EU's commercial policy due to customs union with EU. The results of directional estimates at the macro level show that FTAs of Turkey had a greater impact on her imports than exports. This finding generally seems in accordance with the ratio of export to import in Turkey. However, in order to get utmost benefit from the FTAs, the opportunities of lower/ zero tariffs achieved by the FTAs should be better accounted to increase and maximize the exports. When the macro effect is decomposed

towards the micro level, it can be precisely said that there is substantial variation and heterogeneity in the results of agreement specific estimates and direction specific estimates within the agreement. Results show that the effectiveness of the FTAs vary significantly. This finding is quite in accordance with the recent literature about the heterogeneous effects of agreements indicating the robustness of the results of this study.

When it comes to the sources of heterogeneity, the possible reasons for the differences in the ex-post effects could be the diversity in the design and implementation of FTAs and/or some other factors related to the Turkey and her partners. Regarding the design and implementation of the agreements, the differences in the initial tariffs and level/speed of trade liberalization could be a reason for the heterogeneity. Some other reasons especially about the statistically significant negative results could be the origin requirement/rules of origin which is prerequisite for enjoying the preferences and administrative burdens associated with the application of the agreements. In addition to factors relating to the design and implementation of agreement, some characteristics of the partners such as factor endowments, their openness to trade, trade complementarity between partners and some other factors could have affected the effectiveness and success of Turkey's FTAs.

FTAs, when efficient and successful, are very important tools to improve the access to international markets and increase the exports. This is very important for Turkey and other developing countries as the international trade is one of the most important impetus for economic development. Consequently, knowing that the impact of FTAs are heterogenous and not all the FTAs affected the trade of Turkey in the same positive way, it is very important to understand the reasons behind the heterogeneity and take the necessary precautions for the future negotiations in order to improve the exports and get more gains. Based on the results of this study, further research is needed to explore and fully understand the determinants of the success and efficiency of Turkey's FTAs for future policies.

REFERENCES

Anderson, J. E. (1979). "A Theoretical Foundation for the Gravity Equation." American Economic Review 69, 106-116.

Anderson, J. E., and van Wincoop, E.. (2003). "Gravity with Gravitas: A Solution to the Border Puzzle." American Economic Review, 93, 170–92.

Anderson J. E, and Yotov, Y.V. (2010). "The Changing Incidence of Geography." American Economic Review 100(5), 2157-2186.

Anderson, J. E. (2011). "The Gravity Model", Annual Review of Economics, Vol. 3, pp. 133-160.

Anderson, J. E., and Yotov, Y.V. (2016). "Terms of Trade and Global Efficiency Effects of Free Trade Agreements, 1990-2002." Journal of International Economics 99[C], 279-298.

Arısoy, B., Bayar, G. and Çalışkan, Ö. (2003). "Türkiye'nin Dış Ticaret Denklemleri: Yer Çekimi, Gümrük Birliği ve Serbest Ticaret Anlaşmaları - Ekonometrik Bir Yaklaşım." Middle East Technical University International Economy Congress VII.

Bacchetta, M., Beverelli, C. Cadot, O. Fugazza, M. Grether, J. M. Helble, M. Nicita, A. and Piermartini, R. (2012). A Practical Guide to Trade Policy Analysis United Nations and World Trade Organization.

Baier, S. L., and Bergstrand, J. H. (2007). "Do Free Trade Agreements Actually Increase Members' International Trade." Journal of International Economics 71[1], 72-95.

Baier, S. L., Bergstrand, J. H. and Feng. M. (2014). "Economic Integration Agreements and the Margins of International Trade." Journal of International Economics 93, 2, 339–50.

Baier, S., J. H. Bergstrand, P. Egger, and McLaughlin, P. (2008). "Do Economic Integration Agreements Actually Work? Issues in Understanding the Causes and Consequences of the Growth of Regionalism." The World Economy 31(5), 461-497.

Baier, S.L., Bergstrand, J. H. and Clance, M. (2015). "Heterogeneous Economic Integration Agreement Effects." CESIFO Working Paper No 5488.

Baier, S.L., Yotov, Y. V. and Zylkin, T. (2016). "On the Widely Differing Effects of Free Trade Agreements: Lessons from Twenty Years of Trade Integration." CESIFO Working Paper No 6174.

Baldwin, R., and Taglioni, D. (2006). "Gravity for Dummies and Dummies for Gravity Equations." National Bureau of Economic Research Working Paper 12516, NBER.

Bergstrand, J. H. (1985). "The Gravity Equation in International Trade, Some Microeconomic Foundations and Empirical Evidence." Review of Economics and Statistics 67: 474–81.

Bergstrand, J. H. (1989). "The Generalized Gravity Equation, Monopolistic Competition, and Empirical Evidence." Review of Economics and Statistics 71: 143–153.

Bergstrand, J. H., Baier, S. Sunesen, E. R. and Thelle, M. H. (2011). "Ex-Post Assessment of Six EU Free Trade Agreements, An Econometric Assessment of Their Impact on Trade." Informed Decisions, Copenhagen Economics.

Bergstrand, J. H., Larch, M. and Yotov, Y.V. (2015). "Economic Integration Agreements, Border Effects, and Distance Elasticities in Gravity Equations." European Economic Review 78, 307-327.

Andrew, B. Eaton, J. Jensen, J. B. and Kortum, S. S. (2003) "Plants and Productivity in International Trade." American Economic Review 93(4), 1268-1290.

Carrere, C. (2006). "Revisiting the Effects of Regional Trade Agreements on Trade Flows with Proper Specification of the Gravity Model." European Economic Review 50, 223–247.

Cipollina, M., and Salvatici, L. (2010). "Reciprocal Trade Agreements in Gravity Models: A Meta-Analysis." Review of International Economics 18(1), 63–80.

Dai, M., Yotov, Y. V. and Zylkin, T. (2014). "On the Trade-Diversion Effects of Free Trade Agreements." Economics Letters 122(2), 321-325.

De Benedicts, Taglioni, L. (2011). "The Gravity Model in International Trade" in De Benedicts, L., Salvatici, L. (Eds), The Trade Impact of European Union Preferential Policies: An Analysis Through Gravity Models. Springer, 55-90 (Chapter 4)

Deardorff, A. (1998). "Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World?." in The Regionalization of the World Economy, ed. by J.A. Frankel (Chicago: University of Chicago Press), 7-31.

Eaton, J. and Kortum, S. (2002). "Technology, Geography and Trade." Econometrica 70, 1741–1779.

Egger, P. and Larch, M. (2011). "An Assessment of the Europe Agreements' Effects on Bilateral Trade, GDP, and Welfare." European Economic Review 55[2], 263-279.

Eicher, T., and Henn, C. (2011). "In Search of WTO Trade Effects: Preferential Trade Agreements Promote Trade Strongly but Unevenly." Journal of International Economics 83, 137-153.

Frede, J., Yetkiner, H.: (2017). The Regional Trade Dynamics of Turkey: A panel data gravity model, The Journal of International Trade and Economic Development https://doi.org/10.1080/09638199.2017.1279205.

Head, K., and Mayer, T. (2014). "Gravity Equations: Workhorse, Toolkit, and Cookbook." in Gopinath, G., Helpman, E., and Rogoff, K. (eds), Handbook of International Economics Vol. 4, Oxford: Elsevier B. V.

Helpman E., and Krugman, P. (1985). Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition and the International Economy Cambridge, MIT Press.

Kepaptsoglou, K., Karlaftis, M. G. and Tsamboulas, D. (2010). "The Gravity Model specification for Modelling International Trade Flows and Free Trade Agreement Effects: A 10-Year Review of Empirical Studies." The Open Economics Journal 3, 1-13.

Kohl, T. (2014). "Do We Really Know that Trade Agreements Increase Trade?" Review of World Economics 150(3), 443-169.

Kohl, T., Brakman, S. and Garretsen, H. (2016). "Do Trade Agreements Stimulate Trade Differently? Evidence From 296 Trade Agreements." World Economy 39(1), 97-131.

Krugman, P., (1980). "Scale Economies, Product Differentiation, and the Patterns of Trade." American Economic Review 70(5): 950-59.

Kütük, M. Akbostancı; E. (2016) Do Regional Trade Agreements Actually Increase Turkey's Foreign Trade, METU Studies in Development, 43, 257-288

Magee, C. (2008). "New Measures of Trade Creation and Trade Diversion." Journal of International Economics 75(2), 349–362.

Meade, J. (1955). The Theory of Customs Unions Amsterdam: North-Holland.

Melitz M. J.(2003). "The Impact of Trade on Intra-industry Reallocations and Aggregate Industry Productivity." Econometrica 1695-1725.

Mölders, F., and Volz, U. (2011). "Trade Creation and the Status of FTAs: Empirical Evidence from East Asia." Review of World Economics/Weltwirtschaftliches Archiv 147(3), 429–456.

Özkaya, H. (2011). "İkili ve Çok Taraflı Anlaşmaların Türkiye'nin İhracatı Üzerine Etkisi." Doğuş Üniversitesi Dergisi 12(2), 279-288.

Rose, A., and van Wincoop, E. (2001). "National Money as a Barrier to International Trade: The Real Case for Currency Union." American Economic Review 91(2): 386–90.

Silva, S.J. M. C., and Tenreyro, S.. (2006). "The Log of Gravity." The Review of Economics and Statistics 88[4], 641-658.

Tinbergen J. 196). "An Analysis of World Trade Flows." Shaping the World Economy" The Twentieth Century Fund, New York: 1-117.

Türkcan, K., and Pişkin, E. (2014). "The Effects of The Trade Agreements on The Dynamics of Turkey's Export: Extensive and Intensive Margins." MPRA Paper No 59841.

Viner, J., 1950. The Customs Union Issue. New York: Carnegie Endowment for International Peace.

Yotov, Y.V., Piermartini, R. Monteiro, J. A. and Larch, M. (2016). An Advanced Guide to Trade Policy Analysis: The Structural Gravity Model United Nations and World Trade Organization.

Zylkin, T. (2016). "Beyond Tariffs: Quantifying Heterogenity in the Effects of Free Trade Agreements" National University of Singapore Global Production Networks Centre Faculty of Arts and Social Sciences Working Paper Series, GPN 2016-006.

Zylkin, T. (2017). "PPML_PANEL_SG: Stata Module to Estimate "Structural Gravity" Models via Poisson PML." https://ideas.repec.org/c/boc/bocode/s458249.htm

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ANALYZING THE SOCIAL FACTORS AFFECTING AVIATION DEVELOPMENT IN COUNTRIES BY CREATING A MIXED CURVILINEAR REGRESSION MODEL

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ABSTRACT

Purpose- The objective of this study is to determine the social factors of countries that are effective in the development of aviation and to measure their effects on aviation development by creating a mixed curvilinear regression model.
Methodology- The study is started with a literature review to determine the possible effective social factors on aviation development and then a mixed curvilinear regression model is developed to measure the weights of these factors.
Findings- 15 different social factors were examined to produce inputs for the regression model. Feature selection of regression model is examined and the reasons for eliminating the features were investigated. The weights of the social factors included in the regression model relative to each other was measured.
Conclusion- Aviation has been battling the devastating impact of the Covid-19 outbreak since the beginning of 2019. Now, the importance of every passenger, the value of the money spent on investments and impact of airport efficiencies have increased to a level which is never touched before. This study is carried out to enrich the research conducted before investments in the aviation industry.

Keywords: Curvilinear regression, mixed regression, social factors, aviation, air travel per capita
JEL Codes: L91, L83, O57

1. INTRODUCTION

After the spread of the Covid-19 pandemic, international tourism activities in the entire world have decreased significantly and the number of daily flights has dropped more than half because of travel restrictions and lockdowns (Gössling et al., 2005). Airports and airlines accelerated their investments in touchless passenger journeys (Serrano and Kazda, 2020; Tabares, 2021) however according to some researches (Gudmundsson et al., 2021; Curley et al., 2020) aviation will not recover to pre-crisis levels until 2023. Therefore, determining the effective social factors of aviation development and the weights of these factors could provide insight for stakeholders of the industry to direct their investments. A series of studies have been reviewed to determine possible effective social factors and details of findings are shared in Section 2.

The entire study is conducted across the country's 2018 statistics to prevent the covid-19 effect from distorting the results. In this study, social factor scores of countries are placed as inputs and air travel per capita scores of countries are placed as the output of regression models. Also, for each determined social factor, country scores are compared with air travel per capita scores to measure the linear correlations between factors and air travel performances. After the linear correlation measurement, it is seen that there is no linear correlation between some of the factors and air travel per capita scores. So, polynomial normalization is applied to these factors to increase the linear correlation score between these factors and air travel per capita scores. After the normalization phase, various linear regression models formed with a different combination of factors and adjusted R Squared

values for the models, and p values for the factors were measured with real air travel per capita scores. At the end of this process, it is seen that some factors do not have a significant effect on predicting air travel per capita scores, and these factors are removed from the final regression model. In the last stage of the study, separately for each factor, scores of the countries were increased by 10% and the regression model has generated new air travel per capita predictions. Regression model outputs of real inputs and increased inputs are compared so the weights of factors according to the generated regression model are determined.

2. LITERATURE REVIEW

According to the article (Schafer and Victor, 2000), years of changes in transportation trends pointing out that air travel as a transportation option will keep rising in the future because people, in general, tend to travel faster and more comfortably with the increase in their income. Also, another research (Ishutkina and Hansman, 2011) correlation above 0.9 measured between GDP and the number of passengers for the entire world between the years 1970 and 2005. Therefore, "GDP per Capita" was added to this study as a possible effective social factor on aviation development and input for regression models.

In another article (Tayco, 2013), World Tourism Organization Travel Reports are evaluated with countries Global Peace Index scores and as a result, it is seen that tourists, in general, are considering peace and safety level of the destinations before they travel. According to the Institute for Economics & Peace, Global Peace Index scores of countries are calculated with measuring objectives such as well-functioning government, equitable distribution of resources, free flow of information, good relations with neighbors, high level of human capital, acceptance of the rights of others, low levels of corruption, sound business environment (Index, 2018). Global Peace Index could affect aviation development but people are not traveling just for leisure but also for business activities. According to several articles (Hassan and Basit, 2018; Corcoran and Gillanders, 2015) Ease of Doing Business scores has a high level of correlation with foreign direct investments and business trip counts relatively. According to the World Bank, Ease of Doing Business scores of countries are calculated with measuring objectives such as starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts, resolving insolvency (World Bank, 2017). Therefore, "Global Peace Index Score" and "Ease of Doing Business Score" have been added to this study as possible effective social factors on aviation development and inputs for regression models.

Another important social factor is mentioned as travel distance because passengers are considering the time that they will spend on the flight and distance-related flight prices (Chen, 2018). Other factors such as the weakness of the transport network inside the country and customs regulations may also affect the air travel per capita scores of the countries. Therefore, in this study, the "Logistic Performance Index" score (LPI) of World Bank, which generates country LPI scores by evaluating custom performances, infrastructure sufficiency, international shipments, logistic quality and competence, tracking, tracing, and timeliness performances, is used as an input (Arvis et al., 2018). Also, for the same reasons, "Visa-Free Destination Count" and "Neighbor Count" of countries are included in the study as inputs because 60% – 65% of the daily flights are being operated between different countries (Oxley, 2018). Travelers tend to choose visa-free destinations (Bangwayo-Skeete and Skeete, 2017) and culturally and physically close countries (Debski and Nasierowski, 2017).

It is accepted as one of the social factors affecting the development of aviation in cultural development such as financial development. It has been determined that the higher the number of immigrants and the proportion of women immigrants in a country could be used as a performance indicator for measuring the financial prosperity and cultural diversity of that country (Taylor, 2006). Immigrants who have reached a sufficient income level are flying to their own countries and visit their relatives and friends at certain intervals. For example, more than 5 million Turkish Citizen living outside of Turkey and their relative visits are increasing the number of flights in cities that are not tourist cities during the summer months (Özpolat, 2012; İslamoğlu et al., 2014). However, for some cases, the proportion of women immigrants doesn't mean that country is developed in gender equality. Women are immigrating to some countries where women's rights are not given yet, but financial development is above average (Silvey, 2006). There are also some other parameters determined to measure cultural development in a country such as education and technology usage levels of citizens (Woolman, 2001; Calhoun et al., 2002). Because of all these findings, "Gender Inequality Index Score", "Percentage of International Migrants", "Emigration Ratio", "Education Index Score", "IDI Index Score" of countries has been added to this study as possible effective social factors on aviation development and inputs for regression models. Gender Inequality Index Score is being calculated by the United Nation Development Program and measures gender inequalities in three important aspects of human development; reproductive health, empowerment, and economic status (Gaye et al., 2010). Education Index Score is also being measured by United Nations Development Program and calculated by using mean years of schooling and expected years of schooling (Nguefack-Tsague et al., 2011). However, IDI Index Score is published by the United

Nations International Telecommunication Union based on internationally agreed information and communication technologies (ICT) indicators (Kwan, 2007; Ayanso and Lertwachara, 2011).

According to DATASET2050 Project Reports, there is a correlation between household size and air travel count of countries because it is seen that households without children are those with the highest disposable income (Cook et al., 2017). Also, in the same report, it is clear that the percentage of urban population ratio and population ages of 15-64 has a relation with air travel per capita ratios of countries. Therefore, "Household Size Ratio For 6+ (% of the total population)", "Urban population (% of the total population)", "Population Ages 15-64 (% of the total population)" of countries have been added to this study as possible effective social factors on aviation development and inputs for regression models. Also, "Global Weight of Cross Border Financial Services per Capita" has the potential to be an effective social factor because it's seen that air travel per capita rates of some island countries with high financial privacy appeared to be high (Zheng, 2020).

Throughout the literature review, 15 different possible social factors can affect people's flight tendencies detected. Whether or to what extent these social factors affect people's flight tendencies is evaluated in detail in the following sections.

3. DATA AND METHODOLOGY

3.1. Feature (Input) Preparation

First, the social factor scores that can affect the aviation development of the countries determined in the literature review section were collected from appropriate sources as indicated in Table 1. For some countries, there were no scores in one or more data sources, so these countries are not included in the regression model. Also, Ireland, Switzerland, UAE, Qatar, and Denmark are defined as outliers because no successful results were obtained with the values of these countries in any input configuration.

Since the population numbers of the countries are different, air travel per capita values are used despite total air travel counts when analyzing the effects. In other words, the output of the regression model is the air travel per capita ratios of countries. Air travel per capita ratios of 2018 are gathered from The World Bank databases.

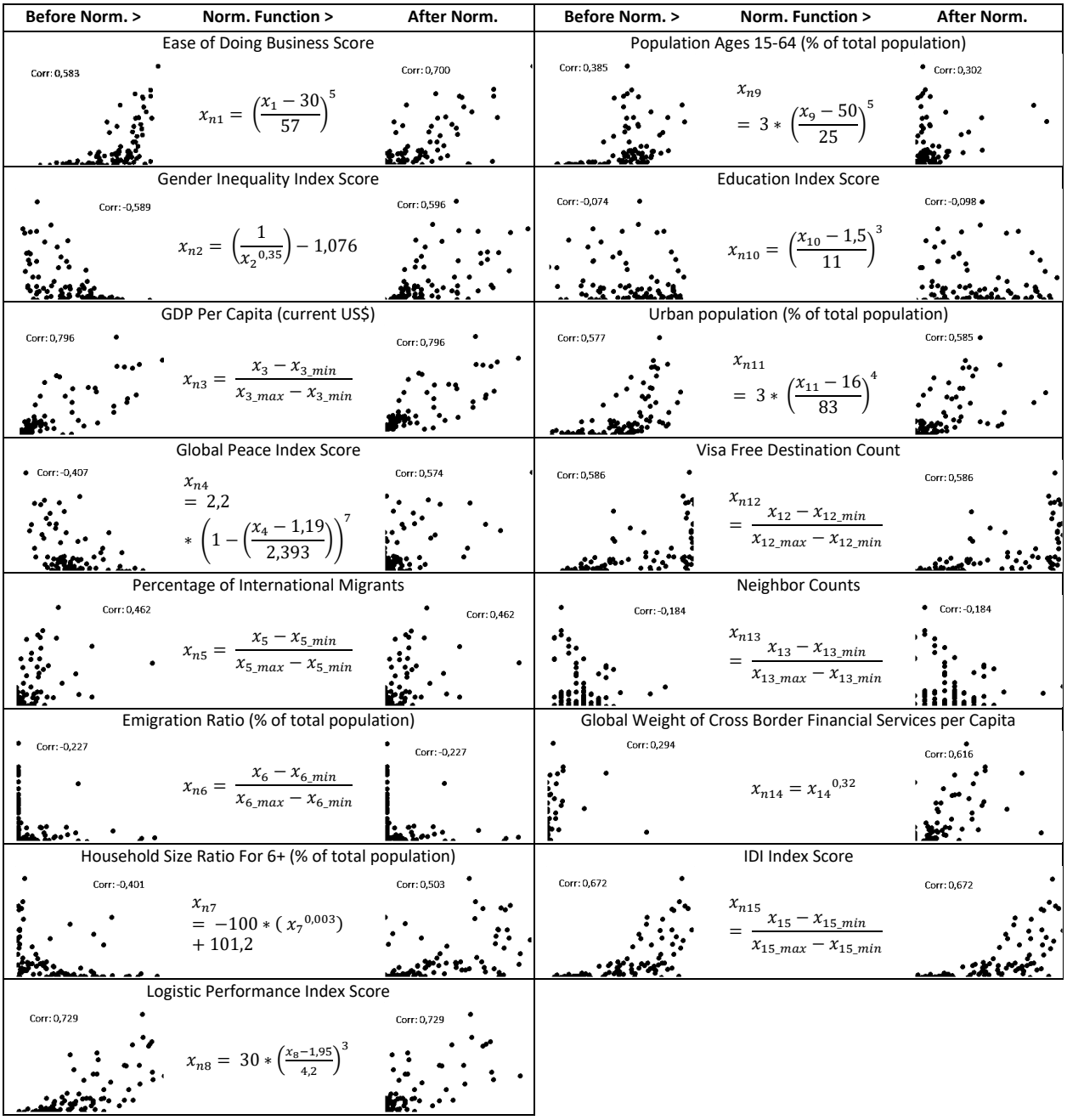
Table 1: Inputs (Social Factors) for Regression Model

No	Input Name	Input Variable	Variable after Normalization	Data Source
1	Ease of Doing Business Score	x_1	x_{n1}	The World Bank, 2018
2	Gender Inequality Index Score	x_2	x_{n2}	The United Nations, 2018
3	GDP Per Capita (current US$)	x_3	x_{n3}	The World Bank, 2018
4	Global Peace Index Score	x_4	x_{n4}	The Institute for Economics & Peace, 2018
5	Percentage of International Migrants	x_5	x_{n5}	Migration Data Portal, Total of last 40 years
6	Emigration Ratio (% of total population)	x_6	x_{n6}	Migration Data Portal, Total of last 40 years
7	Household Size Ratio For 6+ (% of total population)	x_7	x_{n7}	The United Nations, Newest Value
8	Logistic Performance Index Score	x_8	x_{n8}	The World Bank, 2018
9	Population Ages 15-64 (% of total population)	x_9	x_{n9}	The World Bank, 2018
10	Education Index Score	x_{10}	x_{n10}	The United Nations, 2018
11	Urban population (% of total population)	x_{11}	x_{n11}	The World Bank, 2018
12	Visa Free Destination Count	x_{12}	x_{n12}	The World Bank, 2018
13	Neighbor Counts	x_{13}	x_{n13}	The World Bank, 2018
14	Global Weight of Cross Border Financial Services per Capita	x_{14}	x_{n14}	Tax Justice Network, 2018
15	IDI Index Score	x_{15}	x_{n15}	International Telecommunication Union, 2018

3.2. Input Linearization and Normalization

After gathering all the input data, the linear correlation between the countries' air travel per capita rates and input values was measured. Polynomial normalization was applied to some of the inputs which has low linear correlation with air travel per capita ratios. Thus, the linear correlation between air travel per capita and inputs has been increased, as can be seen in Figure 1.

Figure 1: Correlations between Air Travel per Capita Ratios and Inputs Before and After Input Normalization



Ease of Doing Business Score, Global Peace Index, Household Size Ratio For 6+, Global Weight of Cross Border Financial Services per Capita had a strong polynomial correlation with air travel per capita ratios. Therefore, after polynomial normalization applied to these features, correlations are increased as is seen in Figure-1. GDP per Capita, Logistic Performance Index Score, IDI Index Score had a strong linear correlation with air travel per capita already so only stand normalization is applied on these features. Also, polynomial normalization has increased correlations of Urban Population, Gender Inequality Index Score, and Education Index Score slightly. However, there were also some features whose correlation could not be increased despite all the attempts such as Emigration Ratio, Neighbor Count, Percentage of International Migrants, Population Ages 15-64 (% of the total population), and Education Index Score.

3.3. Creating Regression Model with Modified Features

After all the features have been modified, the search for the regression model that gives the most successful result with various feature combinations has begun. In the first test, a regression model is generated with all features and without constants. Adjusted R Square for first regression model is measured 0,841 and standard error is calculated 0,377. Performance of first regression model is better than expectation but it is seen in Table 2 that P-Values of some features are higher than 0,2.

Table 2: Regression Model Feature Results of First Test

Modified Feature Variable	Coefficients	Standard Error	T Stat	P-Value	Lower 95%	Upper 95%
Ease of Doing Business Score	1,33	0,32	4,10	0,00	0,68	1,97
GDP Per Capita (current US$)	0,81	0,57	1,41	0,16	-0,33	1,94
Global Peace Index Score	0,28	0,15	1,93	0,06	-0,01	0,57
Emigration Ratio (% of total population)	-0,39	0,23	-1,71	0,09	-0,85	0,07
Household Size Ratio For 6+	-0,57	0,25	-2,23	0,03	-1,07	-0,06
Logistic Performance Index	0,16	0,10	1,61	0,11	-0,04	0,36
Population Ages 15-64 (% of total population)	0,19	0,09	2,19	0,03	0,02	0,37
Urban population (% of total population)	0,23	0,11	2,04	0,04	0,01	0,45
Gender Inequality Index Score (GII)	**-0,05**	**0,21**	**-0,25**	**0,80**	**-0,48**	**0,37**
Percentage of International Migrants	**-0,11**	**0,49**	**-0,22**	**0,82**	**-1,08**	**0,86**
Education Index Score	**0,00**	**0,00**	**-1,03**	**0,31**	**0,00**	**0,00**
Visa Free Destination Count	**0,18**	**0,25**	**0,71**	**0,48**	**-0,32**	**0,68**
Neighbor Counts	-0,31	0,22	-1,42	0,16	-0,75	0,13
Global Weight of Cross Border Financial	**-0,05**	**0,06**	**-0,82**	**0,42**	**-0,16**	**0,07**
IDI Index Score	**0,36**	**0,41**	**0,88**	**0,38**	**-0,45**	**1,17**

After evaluating the results of the first test, all features with a P-Value higher than 0.2 were removed from the model and the second test is executed. In the second test, although many features were removed, the adjusted R square value of the model became slightly higher (0,846) and the standard error is decreased to 0,371. Thus, it was determined that the features extracted from the model did not benefit the model in predicting the number of passengers in countries. When Table 3, which includes the feature results of the second test, is examined, it can be seen that the P-Values of all features except Neighbor Count are less than 0.15.

Table 3: Regression Model Feature Results of Second Test

Modified Feature Variable	Coefficients	Standard Error	T Stat	P-Value	Lower 95%	Upper 95%
Ease of Doing Business Score	1,50	0,28	5,30	0,00	0,94	2,07
GDP Per Capita (current US$)	0,69	0,44	1,56	0,12	-0,19	1,57
Global Peace Index Score	0,31	0,13	2,38	0,02	0,05	0,57
Emigration Ratio (% of total population)	-0,34	0,21	-1,59	0,11	-0,75	0,08
Household Size Ratio For 6+	-0,44	0,16	-2,77	0,01	-0,76	-0,12
Logistic Performance Index	0,15	0,09	1,67	0,10	-0,03	0,33
Population Ages 15-64 (% of total population)	0,22	0,07	3,04	0,00	0,08	0,36
Urban population (% of total population)	0,26	0,08	3,18	0,00	0,10	0,43
Neighbor Counts	**-0,25**	**0,19**	**-1,31**	**0,19**	**-0,62**	**0,13**

In the third and last test, the Neighbor Counts feature was removed from the model and a new regression model was created. Adjusted R Square is dropped 0,001 point and became 0,845 and standard error is increased 0,002 point became 0,373. Thus, it was determined that the Neighbor Count feature benefited the regression model in predicting the number of passengers of countries, but this benefit was not significant. When the table 4 containing the feature results of the model created with the test number 3 is examined, the coefficients of the modified features are seen.

Table 4: Regression Model Feature Results of Third Test

Modified Feature Variable	Coefficients	Standard Error	T Stat	P-Value	Lower 95%	Upper 95%
Ease of Doing Business Score	1,51	0,29	5,29	0,000	0,94	2,08
GDP Per Capita (current US$)	0,82	0,43	1,92	0,059	-0,03	1,68
Global Peace Index Score	0,33	0,13	2,49	0,015	0,07	0,59
Emigration Ratio (% of total population)	-0,38	0,21	-1,80	0,076	-0,79	0,04
Household Size Ratio For 6+	-0,52	0,15	-3,48	0,001	-0,82	-0,22
Logistic Performance Index	0,13	0,09	1,47	0,146	-0,05	0,31
Population Ages 15-64 (% of total population)	0,20	0,07	2,85	0,005	0,06	0,34
Urban population (% of total population)	0,24	0,08	2,97	0,004	0,08	0,40

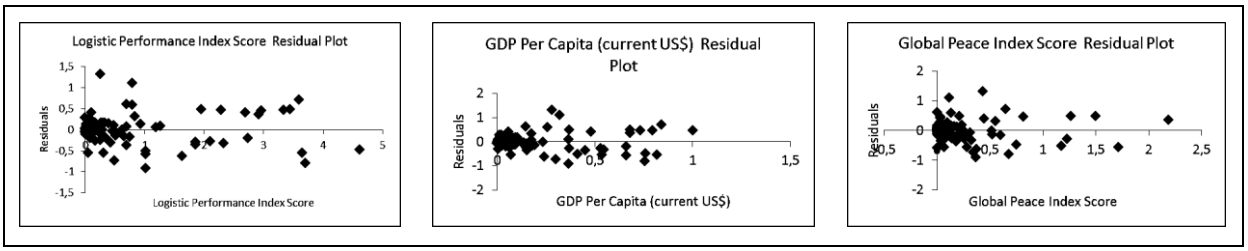
As seen in Table 4, P-Values of all modified features except Logistic Performance Index are well below 0.1. As a result of that, the final regression model is formed as indicated in the equation:

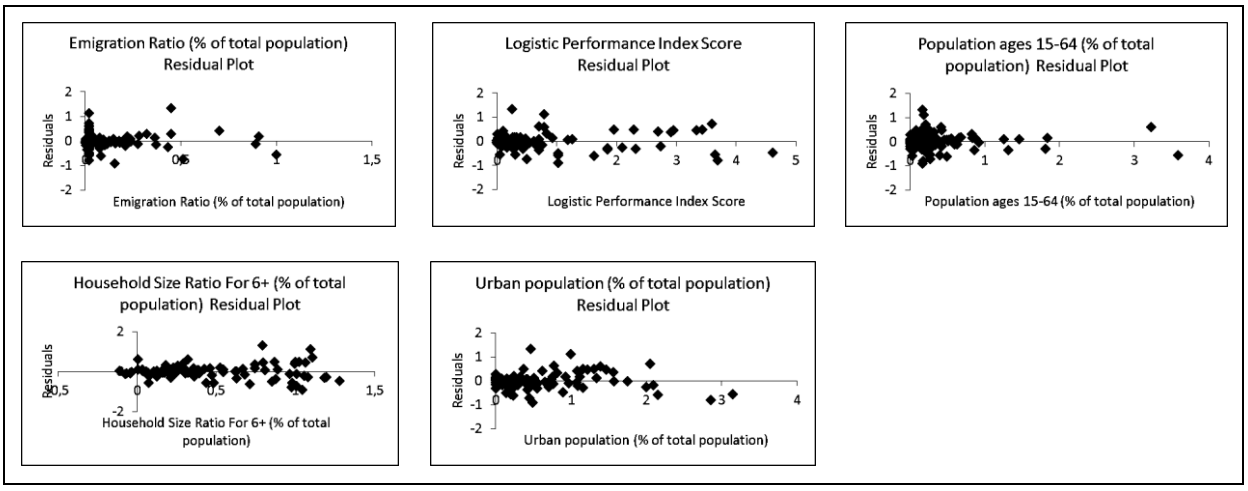
$$Y = 1{,}51 * \left(\frac{x_1 - 30}{57}\right)^5 + 0{,}82 * \left(\frac{x_3 - 381{,}2}{62615{,}2}\right) + 0{,}33 * 2{,}2 * \left(1 - \left(\frac{x_4 - 1{,}19}{2{,}393}\right)\right)^7 - 0{,}38 * \left(\frac{x_6 - 0{,}001}{0{,}468}\right) - 0{,}52 * \left((-100 * {x_7}^{0{,}003}) + 101{,}2\right) + 0{,}13 * 30 * \left(\frac{x_8 - 1{,}95}{4{,}2}\right)^3 + 0{,}2 * 3 * \left(\frac{x_9 - 50}{25}\right)^5 + 0{,}24 * 3 * \left(\frac{x_{11} - 16}{83}\right)^4$$

3.4. Performance of Final Regression Model

After the regression model was created, all feature performances and entire model results were measured. When the residual plots in Figure 2 are examined, it is seen that the normalizations applied for the features result successful and the linear correlation between the modified features and air travel per capita is clear. Also, it is seen that there is not any point at widely varying distances from the lines. When standard residuals of countries are calculated it is seen that predictions for some countries are failed (Magnitude of Standard Residual > 2) more than others such as Belgium, Estonia, Greece, Lithuania, Latvia, Netherlands.

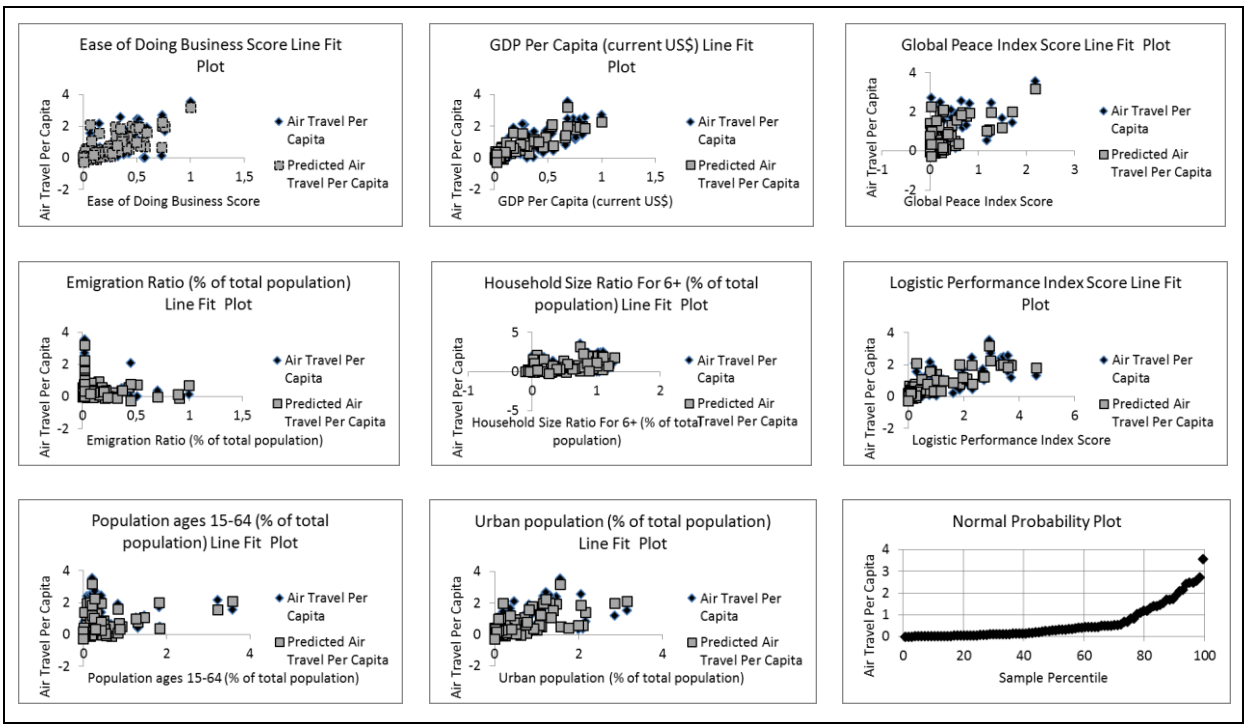
Figure 2: Residual Plots of Features





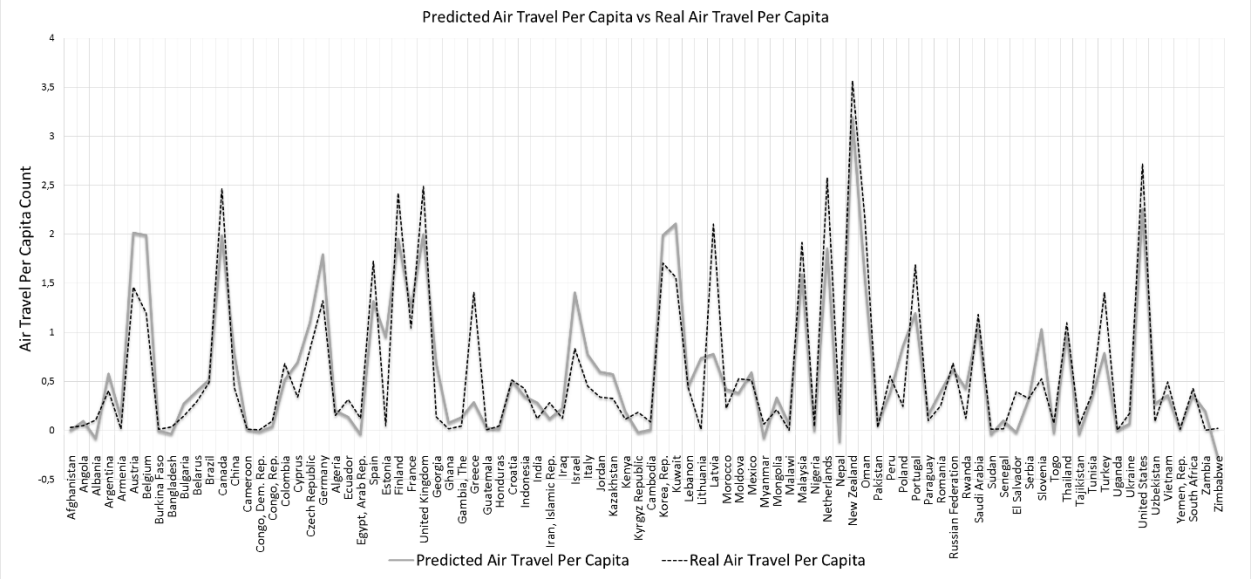
When the Line Fit Plots of Features in Figure 3 are examined, it is seen that the predictions and real values for all features are very close to each other.

Figure 3: Line Fit Plots of Features and Normal Probability Plot



As is mentioned above; Prediction scored of Belgium, Estonia, Greece, Lithuania, Latvia, Netherlands are worse than other countries and it can also be seen easily in Figure 4. When these countries are accepted as an outlier and removed from the model, the adjusted R Square value of the regression model reaches 0.899 and the standard error decreases to 0.27. However, the P-value of GDP per Capita increase to 0,163 and therefore these countries these countries were not excluded from the model.

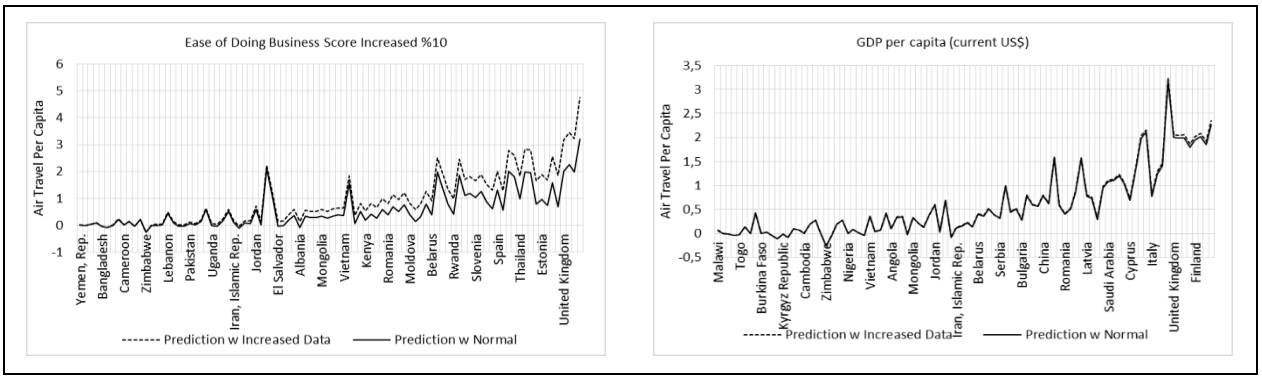
Figure 4: Predictions of Regression Model and Real Air Travel Per Capita Comparison

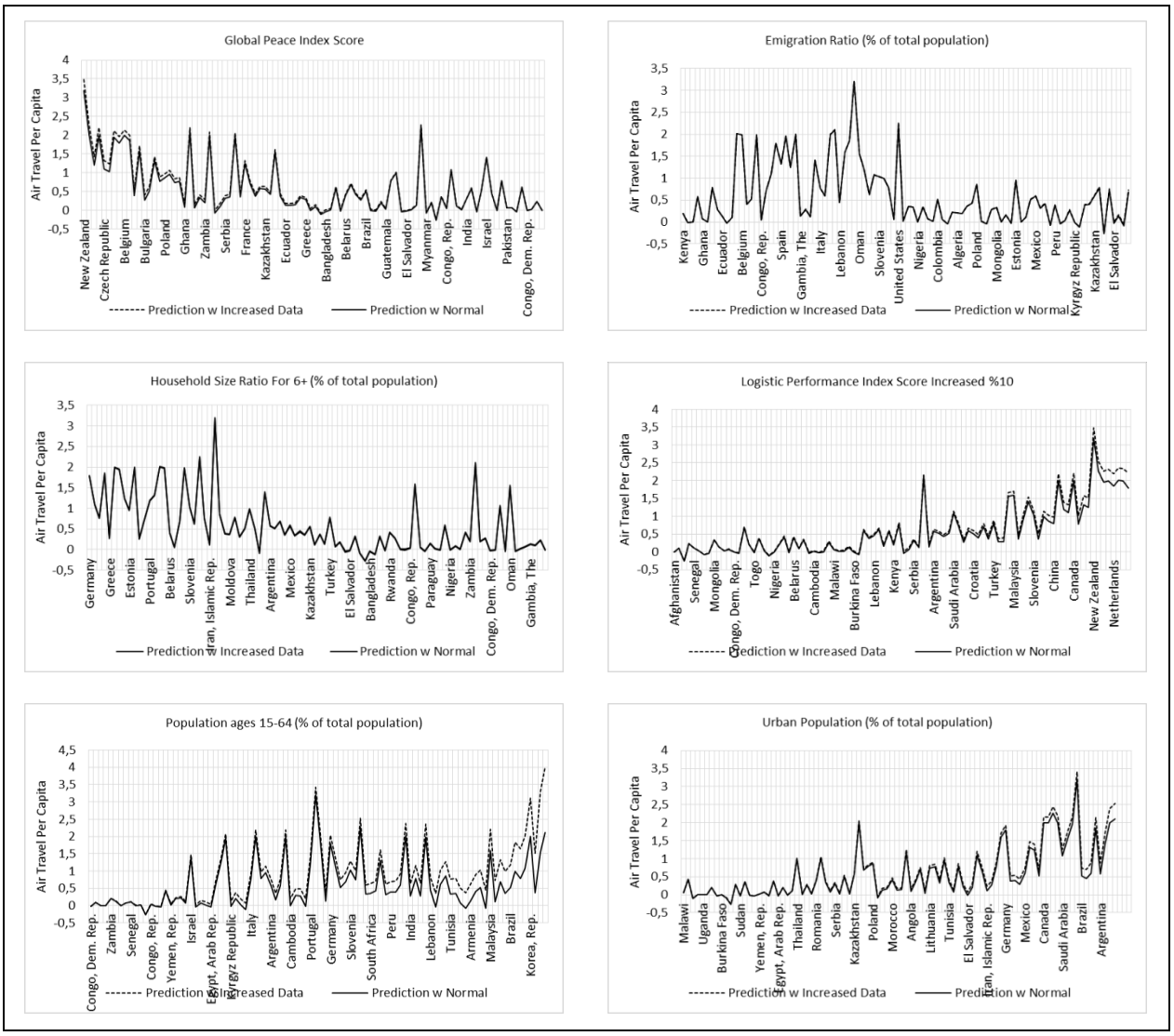


3.5. Measuring the Weights of Features

Since polynomial normalization is applied to the data of some features, the weights of the coefficients cannot be determined by proportioning the coefficients in the regression model. For this reason, for each feature, all input data was entered into the regression model again by increasing the feature values by 10%, and how much the results changed compared to the previous prediction was examined.

Figure 5: Regression Model Predictions after Feature Value Set Increased One by One





In Figure 5, the countries for each feature are ordered with their feature values from small to large. Also, it is seen that the increase of air travel per capita values for some features are exponential, such as Ease of Doing Business Score, Logistic Performance Index Score, Population Ages 15-64, Urban Population and GDP per Capita. Table 5 is generated by taking the averages of Figure 5 feature prediction differences and it is clearly seen that according to the regression model Ease of Doing Business and Population Ages 15-64 features are stronger than others. Detailed findings are shared in Section 4.

Table 5: Air Travel per Capita Change Rates with Feature Value Increase by 10%

Feature Name	Average Air Travel Per Capita Prediction Changes of Countries	Normalized Weight
Ease of Doing Business Score	34,92%	31,2%
GDP Per Capita (current US$)	1,55%	1,4%
Global Peace Index Score	8,5%	7,7%
Emigration Ratio (% of total population)	1,14%	1,0%
Household Size Ratio For 6+	**-3,26%**	2,9%

Logistic Performance Index	9,03%	8,1%
Population Ages 15-64 (% of total population)	43,78%	39,2%
Urban population (% of total population)	9,42%	8,5%

4. FINDINGS AND DISCUSSIONS

First, it was observed that some of the 15 features that were detected by searching different resources had a very weak correlation with Air Travel per Capita. For example, Education Index Score, Neighbor Count, Emigration Ratio. These features were not used by the model as expected, but Population Ages 15-64 with poor correlation was used with high weight. The proportion of the compatible age group compatible with travel in the population could have strong effect on the result however according to the model this feature is the key aspect of aviation development. Therefore, the model can be considered failing for this feature. Also, some features with a high linear correlation like Gender Inequality Index, Visa Free Destination Count, and Global Weight of Cross Border Financial Services per Capita, IDI Index Score are not used by the regression model. This does not mean these features are not affecting aviation development in countries because they are just overshadowed by other features. Moreover, there were also some features selected by the model, even if they did not have a very strong linear correlation, for example, Urban Population, Percentage of International Migrants, Household Size Structure 6+. Probably, the reason is the independence structure of them so other features couldn't neutralize these features.

Another important finding is the countries that the regression model sees as outliers, Ireland, Switzerland, UAE, Qatar, and Denmark, Belgium, Estonia, Greece, Lithuania, Latvia, Netherlands. As mentioned in the above sections, the adjusted R Square of the regression model is 0,845, so the regression model still needs some independent features. It may be useful to focus on the common characteristics of outlier countries to take the study to a further level.

In this study, 1 out of 15 features affects the model in the opposite direction of what was expected: Household Size Ratio For 6+ (% of the total population). Normally, if the proportion of families with more than 6 people increases in a country, it is expected poverty to increase and the number of flights to decrease. However, in the regression model, that feature is affecting results in other directions. Probably, the regression model considered this feature as the increasing number of young people who can travel.

As mentioned in the Literature Review section, in research, the correlation between GDP and Air Travel Count measured above 0.9 (Ishutkina and Hansman, 2011) for the entire world between the years 1970 and 2005. However, in this study, it is seen that there is not such a correlation between GDP and Air Travel. This shows us that GDP and Aviation developments are increasing over the years due to different features.

Power of Ease of Doing Business on the development of aviation can be seen in Table 5. The reason is; the fact that the sub-evaluation criteria that make up the Ease of Doing Business index indirectly measure the welfare level in that country, the state of domestic peace, technological development, and the relations of countries with their neighbors. Therefore, this feature constitutes an important part of the model on its own.

5. CONCLUSION

Aviation has been battling the devastating impact of the Covid-19 outbreak since the beginning of 2019. Now, the importance of every passenger, the value of the money spent on investments and impact of airport efficiencies have increased to a level which is never touched before.

This study was carried out to enrich the research conducted before investments in the aviation industry. Countries or institutions that want to build new airports or want to expand their airports can use this study to predict the number of passengers in the coming years. In addition, countries that want to increase the number of passengers can examine this study and make inferences about which issues they should focus on first. Although the regression model has been created with only 8 features, examined other features can also be evaluated by investment analysts.

There are many continuation studies that can be done to increase the depth of this study. Country data of other previous years can also be used in model training, so that this study, which is carried out using only 2018 data, can be based on more solid foundations. In addition, by examining outlier countries, the model can be strengthened with new features for the points where the model is missing. Finally, the index type used in the model can be divided into social factors components and inserted into the model. Thus, it can be determined at which points the features overshadow each other.

REFERENCES

Arvis, J. F., Ojala, L., Wiederer, C., Shepherd, B., Raj, A., Dairabayeva, K., & Kiiski, T. (2018). *Connecting to compete 2018: trade logistics in the global economy.* World Bank.

Ayanso, A., Cho, D. I., & Lertwachara, K. (2011). ICT development index and the digital divide. In *International conference on information resources management (CONF-IRM 2011) proceedings, Seoul, South Korea. Retrieved from http://aisel. aisnet. org/confirm2011/3.*

Bangwayo-Skeete, P. F., & Skeete, R. W. (2017). Who travels visa-free? Insights into tourist hassle-free travel. *Journal of Travel Research, 56(3)*, 407-418.

Calhoun, K. J., Teng, J. T., & Cheon, M. J. (2002). Impact of national culture on information technology usage behaviour: an exploratory study of decision making in Korea and the USA. *Behaviour & Information Technology*, 21(4), 293-302.

Chen, Z. (2018). A Comparison of Short-and Long-Haul Vacation Tourists on Evaluation of Attractiveness: The Case of Hong Kong. *World Academy of Science, Engineering and Technology, International Journal of Humanities and Social Sciences*, 5(2).

Cook, A. J., Kluge, U., Paul, A., & Cristóbal, S. (2017, February). Factors influencing European passenger demand for air transport. In *Air Transport Research Society World Conference. Air Transport Research Society*.

Corcoran, A., & Gillanders, R. (2015). Foreign direct investment and the ease of doing business. Review of World Economics, 151(1), 103-126.

Curley, A., Dichter, A., Krishnan, V., Riedel, R., & Saxon, S. (2020). *Coronavirus: Airlines brace for severe turbulence*.

Dębski, M., & Nasierowski, W. (2017). Criteria for the selection of tourism destinations by students from different countries. *Foundations of Management*, 9(1), 317-330.

Gaye, A., Klugman, J., Kovacevic, M., Twigg, S., & Zambrano, E. (2010). Measuring key disparities in human development: The gender inequality index. *Human development research paper*, 46, 1-37.

Gössling, S., Scott, D., & Hall, C. M. (2020). Pandemics, tourism and global change: a rapid assessment of COVID-19. *Journal of Sustainable Tourism*, 29(1), 1-20.

Gudmundsson, S. V., Cattaneo, M., & Redondi, R. (2021). Forecasting temporal world recovery in air transport markets in the presence of large economic shocks: *The case of COVID-19. Journal of Air Transport Management*, 91, 102007.

Hassan, Z., & Basit, A. (2018). Ease of doing business and its impact on inward FDI. Hossain, MT, Hassan, Z., Shafiq, S., & Basit, A.(2018). Ease of Doing Business and Its Impact on Inward FDI. *Indonesian Journal of Management and Business Economics*, 1(1), 52-65.

Index, G. P. (2018). Measuring peace in a complex world. *Institute for Economics & Peace*.

Ishutkina, M. A., & Hansman, R. J. (2011). *Analysis of the interaction between air transportation and economic activity: a worldwide perspective*.

İslamoğlu, E., YILDIRIMALP, S., & Benli, A. (2014). Türkiye'de tersine göç ve tersine göçü teşvik eden uygulamalar: İstanbul ili örneği. *Sakarya İktisat Dergisi*, 3(1), 68-93.

Kwan, M. P., Dijst, M. J., & Schwanen, T. (2007). The interaction between ICT and human activity-travel behavior. *Transportation research. Part A, policy and practice, 41*(2), 121-124.

Nguefack-Tsague, G., Klasen, S., & Zucchini, W. (2011). On weighting the components of the human development index: a statistical justification. *Journal of Human development and Capabilities*, 12(2), 183-202.

Oxley, D. IATA, 2018, pp. 1–4, *AIR PASSENGER MARKET ANALYSIS*.

Özpolat, V. (2012). Küreselleşme sürecinde yurt dışındaki Türklerin önemi. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*, (34), 211-219.

Schafer, A., & Victor, D. G. (2000). The future mobility of the world population. *Transportation Research Part A: Policy and Practice*, 34(3), 171-205.

Serrano, F., & Kazda, A. (2020). The future of airport post COVID-19. *Journal of Air Transport Management*, 89, 101900.

Silvey, R. (2006). Consuming the transnational family: Indonesian migrant domestic workers to Saudi Arabia. *Global networks*, 6(1), 23-40.

Tabares, D. A. (2021). An airport operations proposal for a pandemic-free air travel. *Journal of Air Transport Management*, 90, 101943.

Tayco, R. (2013). Tourist arrivals and peace indices: Ascertaining the impact of the irregularities and ruggedness of peace situation on tourism across the globe. NORSU. Prism, 18(1).

Taylor, J. E. (2006, June). International migration and economic development. In International symposium on international migration and development (pp. 28-30).

Woolman, D. C. (2001). Educational reconstruction and post-colonial curriculum development: A comparative study of four African countries. *International Education Journal*, 2(5), 27-46.

World Bank. (2017). *Doing business 2018: reforming to create jobs*. The World Bank.

Zheng, S., Duan, L., & Sun, W. (2020). Global air network and cross-border venture capital mobility. *Habitat International, 106*, 102105.

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FINANCIAL GLOBALIZATION, INSTITUTIONS AND ECONOMIC GROWTH IMPACT ON FINANCIAL SECTOR DEVELOPMENT IN FRAGILE COUNTRIES USING GMM ESTIMATOR

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ABSTRACT

Purpose- The aim of the research is to predict the impact of financial globalization, institutional quality and economic growth on financial development in fragile economies. In this paper the panel data consists of Turkey, Brazil, India, South Africa, Indonesia, Argentina, Egypt, Pakistan's annual data from 1995-2017.

Methodology –System GMM dynamic panel data approach has been applied to deal with simultaneity bias and endogeneity bias when the explanatory variable is correlated with the residual disturbance term. The System GMM estimator combines regression in differences with regression in levels to get rid of the individual specific effects and along with it any time invariant regressor. The models are estimated by using one step system GMM estimator in other words Arellano and Bover /Blundell and Bond System Generalized Moments Method.

Findings- The results show that economic growth and financial development are positively related. Thanks to financial development interest rates can be determined by market conditions and financial intermediaries can minimize transaction costs and information acquisition costs can be minimized. Empirical findings suggest policy guidelines for developing financial sector by using economic growth as an economic instrument.

Conclusion- The paper concludes that economic growth have significant impact on financial development so both financial institutions and financial markets development in fragile countries. For less developed countries, developments in institutions are likely to have far greater direct effects on growth than financial development itself. When the financial system is developed, Institutional improvements can also deliver more growth. Since global standards for institutions such as International Country Risk Guide, Global Government Indicators increase, it seems also developing ountries are aware of the importance of institutional quality on economic growth. The findings suggest that financial development is affected by economic growth, inflation and population in fragile countries.

Keywords: Financial development, economic growth, GMM dynamic panel data analysis, fragile countries
JEL Codes: F65, G10, G20

1. INTRODUCTİON

With the progress of globalization, the effects of financial sector development and institutional quality on economic growth in developing and developed countries have increased and has been highly researched in the recent years. Opening financial markets to foreign capital directly, increases access to capital and lowers investment costs. Many emerging economies with a high degree of financial integration have higher growth rates. Additionally, differences in the degree of globalization, financial sector depth and intitutional quality between developing and developing countries are significant (Dreher, 2006).

A financial system involved in financial globalization is expected to have a high level of financial development because financial globalization will defeat informal and advantageous information in financial markets. Because the financial system will disseminate all available information, as a result of conflicts and new demands of the external economic actors. It is practicable that with financial globalization the best practices and methods of financial supervision spread around the world and improve corporate governance.

Financial globalization also favors risk diversification because local economic institutions can share risks with foreign institutions in local and foreign exchange markets. Thus, a country can lend to a foreigner and borrow in a recession, which helps mitigate the up-and-down effects on income levels, consumption and investment. Free movement of capital around

the world will support global mobilization and accumulation of savings. Domestic savings will be able to seek foreign financial markets seeking better returns and the domestic financial market will have to develop methods to accumulate savings because of international competition. And financial globalization reduces international transaction costs and supports a global relationship between finance and the real sector. In other words, globalization facilitates exchanges in the real economy on a global scale (Demetrio and Garcia; 2012:158-159). Besides all this, the financial uncertainty is a feature of globalization. Increasing foreign capital inflows doesn't always mean faster economic growth (Prasad, Rajan and Subramanian, 2007). Uncertainty is high in developing countries as known and could potentially return more when they share risk. However, financial integration also causes a change in the value of steady state capital stocks, affecting the distribution of risk among countries. Risky countries will also see capital outflows and production decline as their prudential savings are reallocated to developed countries, unless they experience a shortage of capital. When riskier countries also experience significant capital shortages, the standard efficiency gains from faster convergence are greatly reduced by reallocating prudential savings.

Many empirical studies have provided convincing evidence to support the view that institutional quality differences can also have a significant impact on economic performance. A properly functioning financial market helps meet borrowers and lenders by channeling resources to the funding options. A high level of investment increases employment opportunities, improves public finances and helps to reduce poverty due to the growing economic activities. Institutions consist of 'set of rules, compliance procedures, moral and ethical norms' designed to limit behaviour in order to maximize the benefits of principals.

Liberalization, globalization and technological advances in a country have helped equity market integration through the creation of stock exchange networks. In some countries, the effectiveness of financial institutions leads to economic growth, while in others, economic growth increases the depth and impact of financial institutions, differences in the quality of financial institutions can have a big impact on economic performance.

Financial sector plays an important role in the efficient allocation of scant economic resources, and its rapid tempo leads to an increase in total factor productivity. Financial market effectiveness and competitiveness assist economic growth.

The purpose of this article is to explore the impact of financial globalization, institutional quality and economic growth on financial development using the panel data for fragile countries. "Fragile Five" is a term created in 2013 by Morgan Stanley to represent some emerging market economies that had become too rely on volatile foreign investment to fund their growth prospects. The original five members of the fragile five cover Turkey, Brazil, India, South Africa and Indonesia (https://www.morganstanley.com). After the 2008 financial crisis, investors began to transfer money from the emerging markets to the U.S. dollar and developed countries. These escapes mainly from Brazil, India, Indonesia, South Africa, and Turkey. Their currencies, the Brazilian real, the Indian rupee, the Indonesian rupiah, the South African rand, and the Turkish lira experienced significant weakness and made it harder to fund account deficits. These countries are similar to each other in terms of high inflation rates, high current account deficits, uncertainties in capital flows, some economic features, such as instability in growth performances. After 2013, in November 2017, credit rating agency S&P Global has also described the countries of Turkey, Argentina, Pakistan, Egypt and Qatar as the "Fragile Five" because they have been so negatively affected by rising interest rates. According to some analysts, India and Indonesia are now a safe haven for investors at the time of the trade war. Turkey is the only country in which both the old and the new fragile five status. In this paper our dataset consists of Turkey, Brazil, India, South Africa, Indonesia, Argentina, Egypt, Pakistan's annual data.

In this study, the system GMM dynamic panel data approach was applied to cope with the simultaneity and endogeneity bias caused by the possible correlation of financial development with economic growth and financial institutions.

2. LITERATUR REVIEW

The issue of the impact of the financial market on economic growth was first raised almost 150 years ago within the classical school. In the early 20th century, J. Schumpeter (1912) examined the issue applying it to the theory of entrepreneurship. Later, due to objective factors – two world wars and the Great Depression – the issue of relation between the financial market and economic growth was out of the scope of the economic science. Since the early 1960s, there has been a steady increase in interest in this issue: first large-scale research of mainly historical and economic nature, were carried out. In the 1970s-1980s, there were works which rejected a verbal description of the influence of the financial market on economic growth in a particular country or countries in favor of building theoretical models, including those based on economic and mathematical methods, taking into account the determinnig factor of financial development: openness, political power, political institutions, financial liberalization, legal traditions, economic institutions, macroeconomic determinants, as well as determinants that characterize culture and geography (Voghouei et al., 2011, La Porta, et al., 2002, Acemoglu, et al., 2001, Acemoglu, et al., 2005, Acemoglu and Robinson, 2006) The increasing significance of the financial markets for the global economy, processes of its liberalization, development of the finance theory and emergence of new models of economic growth encouraged the active growth of scientific knowledge in this area.

Lipset (1959) pointed out that economic growth resulted in higher quality institutions due to capital accumulation and public capital. In this sense, as people's welfare level increases, demands for higher institutional quality, better bureaucratic conditions, more legal and legal regulation will increase (Nasreen, Mahalik, Shahbaz and Abbas, 2020:2). And also Barro (1996) noted that by supporting the positive impact of economic growth on institutional quality in a country, citizens in that country gain more political freedom.

Despite the numerous studies in the literature that support the impact of financial development on economic growth in the past years (Schumpeter, 1912; Gurley and Shaw, 1967) . Rajan and Zingales (1998) concluded that the economic growth has a positive effect on financial system and development in their study. Their study suggest that economic growth leads to further development of the financial system and also provides incentives for deepening and expanding the system for financial mediation (Nasreen, Mahalik, Shahbaz and Abbas, 2020:2).

Mishkin (2009) and Demetrio and Garcia (2012) argued that globalization leads to increasing the growth of the financial sector and hence contribute positively to economic growth of a country and also the bureaucracy, property rights, governance and political stability contributed to positive economic growth. According to them, globalization is a crucial factor in promoting institutional reform that promotes financial development and economic growth in developing countries. By encouraging developing countries to increase their participation in global markets, developed countries can create exactly the right incentives for developing countries to implement reforms that will drive their high economic growth. Chong and Calderon (2000) argued that there is causality between financial institutions and economic growth, and vice versa. Mishkin (2009) reported that the institutions quality serve growth of the economy by improving financial sector.

Levin, Loayze and Beck (2000) examined the growth and finance relationship using panel data from 71 countries for the period 1960-1995 and found a positive relationship between them. Odhiambo (2011), in South Africa analysed the dynamic relationship between financial development and economic growth and determined a causal relationship between financial depth and economic growth. Moreover, Rajan and Zingales (2003) compared the characteristics of European financial system. They have concluded that financial system of European countries has moved from a bank-based system to a market-based system. The ongoing process may result in a further development of the market-based system over time.

Demetrio and Garcia (2012) researched the impact of financial globalization on financial development in transition countries using the dynamic panel data analysis. The main results suggest mostly that financial globalization has a positive and significant relationship with the process of growth of the financial system. The basic hypothesis is that financial development is positively dependent on the level of financial globalization, and furthermore, financial development is positively dependent on some control variables other than the rate of inflation (Demetrio and Garcia, 2012:162). Luo, Zhang and Zhu (2016) in China, using time series analysis, found that commercial and financial openness had valuable effects on financial performance but also negative effects on the size of financial development. Muye and Muye (2017), also found positive long-run relationship between globalization and financial development for the BRICS countries, using the time series data.

Additionally, Khan, Khan and Abdulahi et. al (2019) used the International Monetary Fund's (IMF) dataset for financial development which is considered the most comprehensive measure. According to the results, based on a strong co-integration method, definitively verify that institutional quality is required for financial development in the United States. It turned out that there was a negative relationship between natural resource rent and financial development when appropriate control variables to the model were also added. This study examines that institutional quality modulates the link between natural resource rent and finance. As a result, they have advised policymakers and researchers to produce realistic forecasts and policy inputs, taking into account the importance of institutions.

Nasreen, Mahalik, Shahbaz and Abbas (2020) examined the role of financial globalization, institutions and economic growth on the development of the financial sector using panel data of European countries for the period 1989-2016. The empirical results indicate like as Rodrik's (1997) and Law, Kutan and Naseem’s (2018); economic growth and institutional quality are positively associated with financial development, but apart from this, financial globalization blocks the development performance of the financial sector.

Le (2020) identified the link between energy consumption and economic growth with a comprehensive assessment of the impact of institution quality, government spending, financial development and commercial freedom bu using panel econometric estimate model with data from 1990 to 2014 for 46 emerging markets and emerging economies. The findings show that energy consumption, gross fixed capital formation, government spending, financial development and trade openness positively and significantly affect economic growth. According the test results, energy consumption and economic growth are interconnected and that provides a basis for policy makers to design effective energy and environmental policies. Taking into account the sustainable development goal, governments were advised to consider the importance of financial governance-trade relations for economic growth, as well as the performance of energy-effective programme.

Another study about financial development and economic growth examined by Yıldız and Atasaygın (2015) in Turkey. By analyzing the relationship between financial deepening and economic growth using the ECM co-integration approach, they

showed that there is a long-term relationship between financial development and economic growth and that the demand pull hypothes is acceptable for the Turkish economy.

Chen and Quang (2014) analysed the circumstances under which international financial integration increases growth. Based on non-linear dynamic panel techniques, they found that countries that can benefit from international financial integration meet certain threshold conditions for economic, institutional and financial development and the level of government spending. The results also differentiated portfolio equity liabilities compared to other types of capital flows and Financial Development Index are systematically less restrictive for the former and growth behavior the effects of the threshold conditions is significantly greater.

Şamiloğlu and Savaş's study (2010) conducted in Turkey, the effect of financial development on economic growth was investigated using the ARDL boundary test. This study also concluded that financial development is a long-term process promoted by economic wealth. Then again, according to the results domestic loans provided by the banking sector affect economic growth and Granger causality test results were obtained that support the supply-leading hypothesis in the long term and the hypotheses that both drive supply and demand following in the short term.

The underdeveloped countries that have experienced financial crisis; Mexico (1994-1995), Asia (1997), Russia (1998), Brazil (1998-1999), Argentina (2000-2001) and the United States (2007-2008) and also Europe (2011). It is clear that financial crises and their easy transmission are the basic warning signals against financial globalization (Demetrio and Garcia; 2012:157). Financial development helps distribute capital; accelerates growth and stages of economic development. In the early stages of economic development, people with savings in hand only entered financial markets to enjoy access to financial markets and to enjoy the benefits of financial services. At higher levels of economic development, the number of people accessing the financial market subsequently increased causing financial development (Kavya and Shijin;2020:81).

General moves in capital flows and asset prices in emerging market economies are mainly driven by two global factors; global risk averting and US monetary policy (Rey, 2013). In 2019, as a result of tighter financial conditions, lower domestic demand or currency depreciation, current account balances rose toward surplus in some emerging market and developing economies like as Argentina, South Africa and Turkey. The currencies of Brazil, South Africa and Turkey depreciated vis-à vis the US dollar by 8 percent to 14 percent, also with smaller real effective depreciations (https://www.imf.org).

In the literature, the results of the empiric tests usually indicate a positive effect of globalization on financial development, notably in developed countries. But the results for underdeveloped countries are complex but the positive effect has been seen in emerging economies. Furthermore, the test results after adding the financial institutional factors show that the impact of financial globalization on financial development will be positive only if financial institutions in a country are of quality.

3. DATA AND METHODOLOGY

The three models are estimated by using one step system GMM estimator. The dependent variables according to the three models established are financial development, financial institutions and financial markets. In this section, information about the variables used in the analysis and the method is given. The dependent and independent variables and description in three models set up to analyze are as follows:

Financial Globalization Index (KOFFGI)

The Konjunkturforschungsstelle (KOF) Globalization Index was used to evaluate these relationships; the KOF calculation method addresses globalization's economic, social and political aspects (https://ethz.ch). It is used to monitor changes in the levels of globalisation of different countries over a long period. KOF Globalization Index is calculated for 195 countries and based on the period from 1970 to 2017. In this study, new measures developed by the KOF financial Globalization Index were implemented, together with several economic factors, to more rigorously analyze how the financial globalization indicator affects economic growth.

Gygli, Haelg, Potrafke and Sturm (2019) reconsidered the KOF globalization index dividing it into de-facto and de-jure. The *KOF de-facto* measures consist of that variables (all variables are expressed as a percentage of GDP): the sum of foreign assets and liabilities, sum of international equity portfolio investment assets and liabilities, sum of international portfolio debt securities and international bank loans and deposits, international reserve excluding gold and sum of primary income and receipts (Nasreen, Mahalik, Shahbaz and Abbas, 2020:5). The *KOF de-jure* measures of financial globalization comprises investment restrictions that include measures of the prevalence of foreign ownership and regulations to international capital flows, capital account openness index and capital account openness index. In this paper, The KOF financial Globalization Index developed by Gygli et. al (2019) is considered as a whole and its values for the countries that make up our sample are taken between 1995-2017. The new measures developed by the KOF Financial Globalisation Index, along with various economic elements to more meticulously analyze how financial globalization indicator affects on eonomic growth. In the analysis this variable symbolized by *KOFFGI.*

Table 1: 2019 Financial Globalisation variables and weights in KOF Globalisation Index

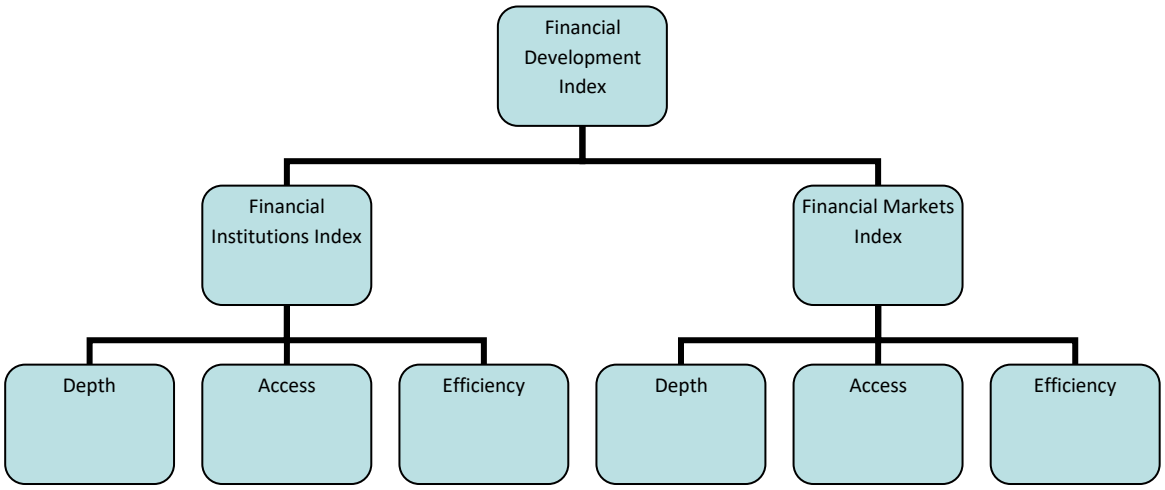
Variables	Weights	Variables	Weights
Financial Globalisation, de facto	50.0	*Financial Globalisation, de jure*	50
Foreign direct investment	27.3	Investment restrictions	33.3
Portfolio investment	16.9	Capital account openness	38.5
International debt	27.6	International Investment Agreements	28.2
International reserves	2.1		
International income payments	27.1		

Source: Gygli, S., Haelg, F., Potrafke, N. *et al.* (2019) The KOF Globalisation Index – revisited. *Rev Int Organ.* 14, 543–574. https://doi.org/10.1007/s11558-019-09344-2, p.545.

Financial Development Index (FDV

In studies so far, various proxies have been used to compute the status of financial development. Multiple indicators to measure financial development should used across countries because of the diversity of financial systems. Instead of using a one-dimensional indicator to measure financial development, an index consisting of the sum of the financial institutions index and the financial markets index was used, in which different dimensions were also included in the index. Description of financial development index subcategories presented in Figure 1. below.

Figure 1: Financial Development Index



Source: https://data.imf.org/?sk=F8032E80-B36C-43B1-AC26-493C5B1CD33B

Financial sector consists of two main pillars; financial institutions and financial markets. The variables of Financial Institutions Index and Financial Markets Index subcomponents and also sources are presented in Table 2.

Table 2: Variable Names, Definitions and Sources

Category	Indicators	Source
Financial Institutions Index		
Depth	Bank credit to the private sector, pension and mutual fund assets and insurance premiums, life and non life	IMF
Access	Bank branches and ATMs per 100.000 adults	IMF
Efficiency	Banking sector net interest margin, lending deposits spread, non-interest income to total income, overhead costs to total assets, return on assets and return on equity.	IMF
Financial Markets Index		
Depth	Stock market capitalization, stocks traded, international debt securities of government and total debt securities of financial and non financial corporations	IMF
Access	Percent of market capitalization outside of top 10 largest companies	IMF

	and total number of issuers of debt per 100.000 adults	
Efficiency	Stock market turnover ratio	IMF

Source:https://data.imf.org

Institutional quality (EFW)

The world's Economic Freedom Index derived from the Fraser Institute used to measure the institutions that regulate the market. In a society that is economically independent, the most basic task of the state is to protect individuals and their property from aggression. The World Economic Freedom Index shows us whether a nation's institutions and policies are consistent with its protective function and individuals' rights to economic freedom (Economic Freedom of the World: 2019 Annual Report, The Fraser Institute). EFW Index consists of size of government, legal system and property rights, sound money, freedom to trade internationally and regulation.

Economic growth (GDP)

Gross domestic product (GDP) series is used as an indicator of economic growth in sample countries by making a logarithmic form with fixed $ prices in 2010.

For analysis, control variables used with independent variables; sum of export and imports to GDP ratio which gives trade opennes, inflation (consumer price index) and population.

Exports and imports to GDP ratio (Trade openness)

It is the ratio of the sum of exports and imports to GDP. This variable explains the degree of economic integration between countries. Trade liberalization, which promotes a more competitive environment, will lower the revenue of entrenched firms so that they will need greater access to external sources of capital. Thus, they will be more likely to support reforms that promote a deeper and more efficient financial system (Mishkin, 2009:166).

Inflation (INf)

Inflation is a condition that refers to a constant and palpable increase in the overall level of goods and services prices. Another definition is that nominal national income increases compared to the amount of goods purchased with this income.

Population (PP)

A real development is the increase of trained and specialized workforce, it can happen if the entire population is under the umbrella of social security, and meanwhile the unemployment rate is 1 or 2 percent.

In this study, first dynamic model created to determine the relationship between $FDV_{it,}$ which represents financial development, FDV_{it-1} is the lagged value of financial development, z_{it} is the set of explanatory variables including financial globalization (*KOFFGI*), institutional quality index (*EWF*), economic growth (ln*GDP*) and also inflation, population and trade to gdp ratio (trade openness).

$$FDV_t = ßFDV_{it-1} + \gamma'[z]_{it} + \psi_i + \mu_{it} \quad (1)$$

The term ψ_i is a time-invariant country specific effect, μ_{it} represents independently and identically distributed error term. The appearance of lagged value of financial development in empirical model indicates the presence of correlation between regressor and error term since lagged value of financial development depends on μ_{it-1} which is a function of ψ_i the country specific effect. Because of this correlation, dynamic model presented in 1. equation can have specification bias. The Arellano-Bond (1991) and Arellano-Bover (1995)/Blundell-Bond (1998) dynamic panel estimators method is able to correct time invariant country specific effect, omitted variable bias, measurement error and endogeneity problem. Arellano- Bond estimation starts by transforming all regressors by differrencing and uses the Generalized Method of Moments (Hansen 1982), and because of this called Difference GMM. The Arellano-Bover/Blundell-Bond estimator augments Arellano-Bond by making an additional assumption, that first differences of instrument variables are uncorrelated with the fixed effects. This allows the introduction of more instruments and can dramatically improve efficiency alleviating the weak instrument problem. It builds a system of two equations- the original equation as well as the transformed one-and is known as System GMM (Roodman,2006:1).

The efficiency of difference GMM estimation, however, is criticized in terms of bias and imprecision. A well-known property of difference GMM is that standard errors may be severely biased downwards in small samples. A more fundamental weakness of difference GMM is that lagged values of variables may be weak instruments for first difference, especially when the series are highly persistent. Thus situated, additional assumptions on the initial conditions of the process are required to improve the identification of the model. The System GMM estimator combines regression in differences with regression in levels to get rid of the individual specific effects and along with it any time invariant regressor. This also gets rid of any endogeneity that may be due to the correlation of these individual effects and the right hand side regressors.

First difference control unobserved country heterogeneity, omitted variable bias and endogeneity problem. To achieve identification, level equation uses the lagged first differences of explanatory variables as instruments. The lagged dependent variable is specified as a "GMM-style" instrument, where all available lags will be used as separate instruments (Baum, 2014:23). The moment conditions utilize the orthogonality conditions between the differenced errors and lagged values of the dependent variable. The additional moments conditions are as shown below;

$$E\,[\Delta FDV_{it-r}\,(\psi_i+\mu_{it})] = 0 \quad for\ r=1 \tag{2}$$

$$E\,[\Delta Z_{it-r}\,(\psi_i+\mu_{it})] = 0 \quad for\ r=1 \tag{3}$$

This assumes that the original disturbances are serially uncorrelated. Specification tests suggested by Arellano and Bond (1991) and Blundell and Bond (1998) are used. The first test is a Sargen test of over identifying restriction which test the overall validity of instruments by analyzing the sample analog of moment conditions used in the estimation process neverthless too many moment conditions introduce bias while increasing efficiency. With respect to autocorrelation test, one should reject the null of the absence of first order serial correlation and not reject the absence of second order serial correlation. The second is difference in- Hansen test of too many instruments and the third is an autocorrelation test in disturbances (Baltagi, 2011:324).

There are two versions of system GMM estimators- the one step and two step estimators. Theoretically, two-step system GMM estimator uses optimal weighting matrix. The two-step estimator would just combine the (T − 1) first-differenced equations and the average level equation. In this paper, one-step System GMM estimator is applied. *Xtabond2* comand is applied to examine the effect of economic growth, financial globalization, institutional quality on financial development. In one-step GMM, xtabond2's robust is equivalent to cluster (id) in most other estimation commands, where id is the panel identifer variable, requesting standard errors that are robust to heteroskedasticity and arbitrary patterns of autocorrelation within individuals (Roodman, 2006:37).

4. EMPIRICAL RESULTS

Our goal in this paper is to examine the effect of economic growth, financial globalization, institutional quality along with other variables on combined index of financial development. The three models are estimated by using one step system GMM estimator, in other words Arellano and Bover /Blundell and Bond System Generalized Moments Method.

Table 3: System GMM Regression Analysis Using Financial Development as Dependent Variable

Dependent variable: FDVit		
Variables		
	Coefficient	**Standart Error**
FDVit L1.(lagged)	0.858*	0.056
$lngdp_{it}$	0.002*	0.001
$KOFFGI_{it}$	0.000	0.000
EFW_{it}	-0.000	0.000
$Trade_{it}$	0.007	0.021
INf_{it}	-0.000	0.000
PP_{it}	-1.11e-11	8.69e-12
Wald Test	24242.63 [0.000]	
Sargan Test (P-value)	8.47 [0.206]	
AR(1) (P value)	-4.44 [0.000]	
AR(2) (P value)	-0.05 [0.957]	

Note: Estimated by using dynamic system-GMM estimator developed by Blundell and Bond (1998). *AR*(1) first order and *AR*(2) second order serial correlation test. [p values] *, ** and *** are significant at %1, %5 and %10 levels respectively.

The results reported in Table 3 above shows that lagged dependent variable is positive and significant which shows us the use of dynamic panel estimator is suitable. The economic growth's coefficient (lngdp) has been seen to be positive and significant in regression, suggesting that economic growth increases investors' confidence and thus increases both demand and the supply of credit from the private sector. According to Patrick (1966), in the early stages of development services

provided by the financial system accelerate technological development and economic growth is increasing. As the development process progresses, economic growth increases the demand for financial instruments and causes the financial system to develop. Our results support 'growth lead finance' as reported by Patrick (1966), Filippidis and Katrakilidis (2014), Nasreen et al. (2020).

The coefficients of financial globalization (KOFFGI), Institution quality (EFW) and trade, inflation and population coefficients are insignificant. The results of diagnostic tests indicate that model is right specified. The null hypothesis of first order serial correlation is rejected at %1 while the null hypothesis of second order serial correlation is failed to reject. The Sargen test fail to reject the null hypothesis of over identification restriction and confirms that the instruments are valid.

Table 4: System GMM Regression Analysis using Financial Institutions as Dependent Variable

Dependent variable: $FDInst_{it}$		
Variables		
	Coefficient	**Standart Error**
$FDInst_{it}$ *L1.* (lagged)	0.938*	0.034
$lngdp_{it}$	0.001**	0.000
$KOFFGI_{it}$	0.000	0.000
EFW_{it}	-0.000	0.000
$TRade_{it}$	0.011	0.017
INf_{it}	-0.000*	0.000
PP_{it}	-1.26e-11***	7.96e-12
Wald Test	42151.89 [0.000]	
Sargan Test (P-value)	9.63 [0.141]	
AR(1)(P-value)	-6.32 [0.000]	
AR(2)(P-value)	0.41 [0.685]	

Note: Estimated by using dynamic system-GMM estimator developed by Blundell and Bond (1998). *AR*(1) first order and *AR*(2) second order serial correlation test. [p values] *, ** and *** are significant at %1, %5 and %10 levels respectively.

Table 4 presents the results for the model which Financial Institutions Development Index (FDInst) is taken as dependent variable and FDInst (lagged), economic growth (lngdp), Financial Globalization (KOGGFI), Institutional quality (EFW) as explanatory variables and trade opennes, inflation and population size as control variables. The results show the positive and significant coefficient of economic growth (gdp) validates that financial institutions development can be driven by economic growth (Rodrik, 1997; Levin et al., 2000; Demetriades and Law,2004).

The negative and significant coefficient of inflation infers that in the case of high inflation, banks are reluctant to provide finance on long-term basis and it adversely impact banks' ability to increase allocation of resources and through a bad monetary policy that systematically hinders the granting of credits (Khalfaoui, 2015:7). The negative sign suggests that high level of inflation creates uncertainty which is detrimental to long term investment decisions. This points to the fact that more developed financial sectors, ensure effective monetary policy through more influence of policy decisions on money demand and supply in the economies. A high-quality institutional environment vital in explaining financial development (Cherif and Gazdar, 2010) and economic growth, at the contrary, weak institutions blocking such development (Bhattacharyya and Hodler, 2014). The population of one country could suddenly become more pessimistic regarding both the government and the economy, depressing the financial stability in a systematic manner. And also the size of population may hinder the process of banking sector development in these countries.

In table 4, the results of diagnostic tests imply that model is correctly specified. The p-value of Sargen test suggest that instruments are valid and there is no problem of serial correlation at second order as expected.

Table 5: System GMM Regression Analysis using Financial Markets as Dependent Variable

Dependent variable: $FDMar_{it}$		
Variables		
	Coefficient	**Standart Error**
$FDMar_{it}$ (lagged)	0.902*	0.093
$lngdp_{it}$	0.002***	0.001
$KOFFGI_{it}$	0.002	0.000
EFW_{it}	-0.006	0.000
$TRade_{it}$	-0.014	0.040
INfit	0.000	0.000
PPit	-7.38e-13	1.69e-11
Wald Test (p-value)	6202.09 (0.000)	
Sargan Test (P-value)	4.82 (0.567)	
AR(1) (P-value)	-3.47 (0.001)	
AR(2) (P-value)	-1.38 (0.168)	

Note: Note: Estimated by using dynamic system-GMM estimator developed by Blundell and Bond (1998). *AR*(1) first order and *AR*(2) second order serial correlation test. [p values] *, ** and *** are significant at %1, %5 and %10 levels respectively.

In Table 5, the results are estimated by the model of using Financial markets development $FDMar_{it}$ as dependent variable. The positive value of coefficient for lngdp explains that economic growth (lngdp) leads to the development of financial markets only if a country is equipped with certain level of legal and institutional development. Developed countries have more developed institutional structure, so that they can benefit from financial globalization in the development of equity markets. With respect to control variables, the results show that the coefficient of trade openness, population size and inflation are insignificant for our sample. The results of diagnostic tests indicate that both models have valid instruments.

5. CONCLUSION

This paper investigates relationship between financial development, financial globalization, institutions and economic growth using the data of eight fragile countries over the period of 1995−2017. The years of 2018 and 2019 data of the financial development index as an indicator of financial development couldn't be reached from IMF data. Because the impression of financial development is comprehensive, financial markets and financial institutions dimensions been used. Institutional quality is measured by using Economic Freedom of the World Index (calculated by Fraser Institute) aggregate of local legal system and property rights, sound money, freedom to trade internationally and regulation values. The results show that economic growth and financial development are positively related. Thanks to financial development interest rates can be determined by market conditions and financial intermediaries can minimize transaction costs and information acquisition costs can be minimized.

For less developed countries, developments in institutions are likely to have far greater direct effects on growth than financial development itself. They are also likely to have positive indirect effects through the financial system, especially when the financial system provides large amounts of credit to the private sector. When the financial system is developed, Institutional improvements can also deliver more growth.

The study also finds that high inflation slows financial development. The Fragile economies, should strengthen their macroeconomic Fundamentals in mitigating the disruptive effects of the upcoming tightening cycle. Macroeconomic policies such as monetary, fiscal and exchange rate management play a crucial role in managing the risks that financial globalization can lead to. Institutions quality help to attract financial inflows, thus, increase the scope of financial development and economic growth at the contrary, weak institutions impede such development (Bhattacharyya and Hodler, 2014). In addition, the improvement of corporate infrastructure, especially the rule of law, the effectiveness of government and property rights, will promote the development of domestic markets. As the quality of institutions and the development of the financial sector increases, it will enable economies to achieve higher growth rates in the long term. Using a composite index for financial development as dependent variable, our analysis result shows that financial development and economic growth have a complementary relationship that supports their positive effects over time. Additionally, enhancing institutional infrastructure particularly rule of law, government effectiveness and property rights

may encourage the development of domestic markets. Especially in this period, it is the reduction of global integration that must be undertaken carefully in order to ensure the possible optimal growth and development of the economy in the countries with appropriate quality institutions. We recommend that policymakers and researchers consider the importance of financial institutions to come up with realistic estimations and policy inputs.

REFERENCES

Acemoglu, D., Johnson, S. and Robinson, J.A. (2001). The Colonial Origins of Comparative Development: An Empirical Investigation. *American Economic Review*, 91(5): 1369 – 1401

Acemoglu, D., Johnson, S. and Robinson, J.A. (2005). Institutions as the Fundamental Cause of Long-Run Growth, in: Philippe Aghion and Steven Durlauf (ed.), Handbook of Economic Growth, Edition 1, Volume 1, Chapter 6: 385-472. Elsevier, North Holland.

Acemoglu, D. and Robinson, J. (2006). De Facto Political Power and Institutional Persistence. *American Economic Review*, 96(2): 325-330.

Baltagi, Badi H. (2011). Econometrics. (5th Edition)Springer Heidelberg Dordrecht, London, New York. DOI 10.1007/978-3-642-20059-5.

Barro, R.J. (1996). Democracy and growth. *Journal of Economic Growth*,1,1-27. https://doi.org/10.1007/BF00163340

Baum, Christopher F. (2014). Dynamic Panel Data Estimators, EC 823: Applied Econometrics. *Boston College.* https://www.bc.edu/ECC/S2014/823/EC823.S2014.nn05.slides.pdf

Bekaert, G., Campbell R. Harvey, Christian Lundblad (2005). Does financial liberalization spur growth? *Journal of Financial Economics*,77(1), Pages 3-55, ISSN 0304-405X. https://doi.org/10.1016/j.jfineco.2004.05.007.

Bhattacharyya, S. y Hodler, R. (2014). Do Natural Resource Revenues Hinder Financial Development? The Role of Political Institutions, World Development, 57 (C), 101-113DOI: 10.1016/j.worlddev.2013.12.003

Chen J. and Quang, T. (2014). The impact of international financial integration on economic growth: new evidence on threshold effects. *Economic Modelling*, 42, pp. 475-489, 10.1016/j.econmod.2014.06.011

Cherif, M., Gazdar, K. (2010). Macroeconomic and Institutional Determinants of Stock Market Development in MENA Region New Results from a Panel Data Analysis. *International Journal of Banking and Finance*, Vol. 7, No. 1, pp. 139-159.

Chong, A. and Calderón, C. (2000). Institutional Quality and Income Distribution. *Economic Development and Cultural Change*, 48 (4), 761-786. https://doi.org/10.1086/452476

Coeurdacier, N. and Rey, H., Winant, P. (2020). Financial integration and growth in a risky World. *Journal of Monetary Economics*,112,1–21. https://doi.org/10.1016/j.jmoneco.2019.01.022

Dreher, A. (2006). Does globalization affect growth? Evidence from a new index of globalization. *Applied Economics,* 38(10), 1091–1110.

Dreher, A., Gaston, N. and Martens, P. (2008). Measuring globalisation - gauging its consequences. New York: Springer

Dumitrescu, E.-I. and Hurlin, C. (2012). Testing for Granger non-causality in heterogeneous panels. *Economic Modelling*, 29(4),1450-1460. https://doi.org/10.1016/j.econmod.2012.02.014

Demetrio, E. and García, T. (2012). Financial globalization and financial development in transition countries. *Economía teoría y práctica*, (36), 155-178. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0188-33802012000100007&lng=es&tlng=en.

Demetriades, P. and Law, S.H.(2004). Finance, Institutions and Economic Growth. University of Leicester, Working paper No.04/5

Filippidis, I. and Katrakilidis, C. (2014). Institutions, policy and banking sector development: A reassessment. *Czech Journal of Economics and Finance*, 82(2), 93-208.

Gurley, J. and Shaw, E. (1967). Financial Structure and Economic Development. *Economic Development and Culture Change*, 15, 257-268.

https://doi.org/10.1086/450226

Gygli, S., Haelg, F., Potrafke, N. and Sturm, J.E. (2019). The KOF Globalisation Index – Revisited. The Review of International Organizations, 14(3), 543-574. https://doi.org/10.1007/s11558-019-09344-2.

Kavya, T. B. and Shijin, S. (2020). Economic development, financial development, and income inequality nexus. *Borsa Istanbul Review*, *20*(1), 80–93. https://doi.org/10.1016/j.bir.2019.12.002

Khalfaoui, H.(2015). The Determinants of Financial Development: Empirical Evidence from Developed and Developing Countries. *Applied Economics and Finance*, 2(4),1-9.URL: http://aef.redfame.com

Khan, M.A., Khan, M.A, Abdulahi, M.E. , Liaqat, I. , Shah, S.S.H. (2019). Institutional quality and financial development: the United States perspective. *Journal of Multinational Financial Management*, Volume 49, pp. 67-80.

Kosolapov, N.A.(2001). The international political organization of the globalized world: models for a medium-term prospect. *Social Sciences and Modernity*, 6, 141-143.

La Porta, R., Lopez-De-Silanes, F., Shleifer, A. and Vishny, R. (2002). Investor Protection and Corporate Valuation. *The Journal of Finance*, 57:1147-1170. https://doi.org/10.1111/1540-6261.00457

Law, S. H., Kutan, Ali M., Naseem N.A.M. (2018). The role of institutions in finance curse: Evidence from international data. *Journal of Comparative Economics*, 46 (1), 174-191, ISSN 0147-5967. https://doi.org/10.1016/j.jce.2017.04.001.

Le, Hoang P. (2020). The energy-growth nexus revisited: the role of financial development, institutions, government expenditure and trade openness. *Heliyon,* 6(7),1-11. https://doi.org/10.1016/J.HELIYON.2020.E04369

Levin, R., Loayze, N., Beck, T., (2000). Financial intermediation and growth: causality and causes. *Journal of Monetary Economics,* 46 (1), 31–77. https://doi.org/10.1016/S0304-3932(00)00017-9.

Lipset, S., M. (1959). Requisites of democracy: Economic Development and political legitimacy. *The American Political Science Review*, 53 (1), 69-105.

Luo, Y., Zhang, C., Zhu, Y. (2016). Openness and financial development in China: the political economy of financial resources distribution. Emerging Markets Finance and Trade, 52(9),2115–2127. https://doi.org/10.1080/1540496X.2016.1186451

Mishkin, Frederic S. (2009). Globalization and financial development. J*ournal of DevelopmentEconomics*,89(2),164-169,ISSN0304-3878, https://doi.org/10.1016/j.jdeveco.2007.11.004.

Muye, I.M. and Muye, I.Y. (2017).Testing for causality among globalization, institution and financial development: further evidence from three economic blocs. *Borsa Istanbul Rev*. 17 (2), pp. 117-132.

Nasreen, S., Mahalik, M. K, Shahbaz, M. and Abbas, Q. (2020). How do financial globalization, institutions and economic growth impact financial sector development in European countries? *Research in International Business and Finance*, Volume 54, 101247, ISSN 0275-5319, https://doi.org/10.1016/j.ribaf.2020.101247.

Neto, D. G., & Veiga, F. J. (2013). Financial globalization, convergence and growth: The role of foreign direct investment. *Journal of International Money and Finance*, *37*, 161-186. http://refhub.elsevier.com/S0275-5319(19)30059-5/sbref0275

Odhiambo, N.M. (2011). Financial intermediaries versus financial markets: A South African experience. International Business and Economics Research Journal, 10 (2), 7784. https://doi.org/10.19030/iber.v10i2.1795.

Patrick, H. (1966). Financial development and economic growth in underdeveloped countries. *Economic Development and Cultural Change*, 14(6): 174-189.

Pesaran, M. H. (2004). General diagnostic tests for cross section dependence in panels. Cambridge Working Papers in Economics 0435, 3, 1–39. doi:https://doi.org/https://ideas.repec.org/p/cam/camdae/0435.html

Prasad, E., Rajan, R. and Subramanian, A.(2007). The Paradox of Capital. *Finance and Development*, A quarterly magazine of the IMF, 44(1). https://www.imf.org/external/pubs/ft/fandd/2007/03/prasad.htm

Rajan, R. and Zingales, L. (2003). Banks and Markets: The Changing Character of European Finance. National Bureau of Economic Research Working Paper, No. 9595. http://www.nber.org/papers/w9595.

Rey, H. (2013). Dilemma not Trilemma: The Global Cycle and Monetary Policy Independence. *Economic Policy Symposium Background Paper*. Federal Reserve Bank of Kansas City, Jackson Hole, WY.

Rodrik, D.(1997). ìTFPG Controversies, Institutions and Economic Performance in East Asia. î National Bureau of Economic Research Working Paper: 5914.

Roodman, D. (2006) *revised* (2008). How to Do xtabond2: An Introduction to Difference and System GMM in Stata. Center for Global Development, Working Paper Number 103,pp.1-50. http://dx.doi.org/10.2139/ssrn.982943.

Ruiz, J. L.(2018). Financial development, institutional investors, and economic growth. *International Review of Economics and Finance, 54*,218-224. doi:10.1016/j.iref.2017.08.009.

Schumpeter, J.A. (1912). The Theory of Economic Development (2004 version), Transaction Publishers, New Brunswick, New Jersey.

Şamiloğlu, F., and Savaş, B. (2010). Financial Development and Economic Growth in Turkey: An ARDL Bounds Testing Approach. *Çankırı Karatekin Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 1, 25-34.

Voghouei, H., Azali, M. and Jamali, M.A. (2011). A survey of the determinants of financial development. *Asian-Pacific Economic Literature*, 25:1-20. https://doi.org/10.1111/j.1467-8411.2011.01304.x

Westerlund, J. (2007). Testing for error correction in panel data. *Oxford Bulletin of Economics and Statistics,* 69,709–748. doi:10.1111/j.1468-0084.2007.00477.x

Yıldız, H. and Atasaygın, S. (2015). Financial Deepening and Economic Growth: The Turkish Experience. *American Journal of Economics,* 5(5), 477-483.

https://www.morganstanley.com/public/Tales_from_the_Emerging_World_Fragile_Five.pdf

https://www.imf.org/en/Publications/ESR/Issues/2020/07/28/2020-externalsectorreport

https://www.fraserinstitute.org/studies/economic-freedom-of-the-world-2019-annual-report

https://ethz.ch/content/dam/ethz/specialinterest/dual/kofdam/documents/Globalization/2019/KOFGI_2019_variables.pdf