# 10 ECONOMIC FREEDOM, INFLATION RATE AND THEIR IMPACT ON ECONOMIC GROWTH: A PANEL DATA ANALYSIS

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## Abstract

*The relationship between economic freedom and economic growth has always been discussed and investigated in the economic literature. This study investigates both the relationship among economic freedom, inflation rate, economic growth and, separately, economic freedom indices, inflation rate and economic growth in 23 upper-middle income countries during 1995-2010. Pooled Least Squares and Two-way Panel Least Squares methods are used to estimate two different models. According to the results of these tests, economic freedom has a significantly positive effect, while inflation rate has a significantly negative effect on economic growth. When the components of economic freedom are examined separately, it was found that the coefficient of some components of economic freedom, such as government size index and business freedom index, were not significant variables. All other components of economic freedom are significantly related to economic growth.*

**Keywords:** panel data analysis, inflation, economic freedom, economic growth

**JEL Classification**: C33, E31, O10, O40

## I. Introduction

The concept of economic freedom is not new in the economic theory. The concept has been examined and discussed in detail by economists since the period of Adam Smith (Ismail, 2010; Corbi, 2007). The concept of economic freedom reflects a subjective value judgment and does not have a single and functional definition. Therefore, the concept of economic freedom has been defined in various ways in the literature, by different scholars.

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According to Gwartney *et al*., 1996), economic freedom in its general meaning is about protecting private property rights and carrying out actions without violating the rights of the others.

On the other hand, Chafuen and Guzmán (2000) define economic freedom as non-existence of restrictive or forceful intervention of the state over the production, consumption and transportation of goods and services. In other words, economic freedom is about having the right for an individual to do whatever he wants, as defined into the law, by their self income and assets.

Beach and Kane (2007) consider economic freedom as the financial autonomy in an individual's relationship with the state and other organized bodies. Economic freedom is an important component that fulfills other freedoms in general. One who has the control power over his/her labor and belongings of which he/she has ownership can be assumed as independent from the economic point of view.

According to Chauffour (2011), economic freedom is component of the basic rights that give the power to value something. In other words, it is a part of the way according to which people live and interact with each other in society (unless these rights are not prohibited by regulations or other policies).

Although there is no consensus on the definition of economic freedom, there is a widely acknowledged agreement on the components of the concept. Based on this reconciliation, the components of economic freedom are as follows (Gwartney *et al*., 2005):

- Individual preferences rather than collective preference,
- A voluntary change coordinated by the markets rather than political decision-making mechanism,
- Freedom to enter markets and competition,
- Protecting individuals and their properties from the pressure of others.

If a common definition over the components of economic freedom is to be made, then economic freedom can be expressed as an environment where individuals make their decisions based on their freewill, the property rights of individuals are protected, the market decisions are coordinated by the market mechanism and where it is freedom of market entrance and competition.

Various indexes are used in the assessment and evaluation of economic freedom. Some of the most well known indexes include the "World Economic Freedom Index" prepared by the Fraser Institute in Canada and the "Economic Freedom Index" prepared by the US-originated Heritage Foundation together with the Wall Street Journal. Although these two organizations' indexes of economic freedom are based on different methods of measurement, they provide the same or very similar results (Acar, 2010).

The index proposed by the Fraser Institute is measured by five main fields. These are: (1) scale of public sector, (2) securing legal structure and property rights, (3) accessing strong finance, (4) international trade freedom and (5) regulations about loans, labor markets and businesses. The World Economic Freedom Index prepared by the Fraser Institute is measured on the basis these 5 fields, which include 23 categories and 42 sub-components. Each component and its sub-components have

scores between 0 and 10 (Gwartney *et al.*, 2011). While increase in scores refers to the recovery of the status of economic freedom (10 refers to the highest level of economic freedom or full economic freedom), decrease in scores refers to diminishing of economic freedom (0 refers to the lowest level of economic freedom or non-existence of economic freedom) (Berggren, 2003).

The first economic freedom index prepared by the Heritage Foundation together with the Wall Street Journal was published in 1995. The index is measured on the basis of 10 main fields. These are: (1) freedom of doing business, (2) freedom of trade, (3) financial freedom, (4) scale of public sector, (5) monetary freedom, (6) freedom of investment, (7) financial freedom, (8) property rights, (9) corruption, (10) freedom of labor (Kane *et al.*, 2007). A score between 0 and 100 is given for each basic field and then the averages of all fields are taken into consideration and, finally, the index of economic freedom is measured. This index gives a score from 0 to 100, since it includes the average of every field. The increase in score refers to the higher rates of economic freedom of the country.

Countries are combined under five freedom categories on the basis of the scores that they get for the mentioned fields. According to this, countries that get a score between 80 to 100 are classified as "free", 70 to 79.9 are classified as "mostly free", 60 to 69.9 are classified as moderately free, 50 to 59.9 are classified as "mostly not free" and 0 to 49.9 are entitled as "repressed" (Ismail, 2010).

The economic freedom index of 179 countries of 184 countries has been measured in the Heritage Foundation's 2012 Economic Freedom Index Report. According to this report, 5 of 179 countries are economically free, 23 of them are mostly free, 62 of them are moderately free, 60 of them are mostly not free and 29 of them are repressed. A positive correlation is observed between the level of economic development and economic freedom. While the development levels of countries which are economically free are higher, the economic development levels are lower in countries where the economic freedom levels are below levels (Miller *et al.*, 2012).

Furthermore, one may see that inflation rates of countries with economic freedom are lower as compared to countries which are economically repressed. From this point of view, the countries which are economically free and have lower inflation rates experience faster economic growth, while the countries which have high inflation rates with centrally-planned economic systems recede in the long run and suffer from tensions in society. Therefore, economic freedom, inflation and economic development are some of the mostly discussed subjects in the academic and political areas.

This study discusses the empirical literature on economic freedom and effects of inflation on the economic development. Following the literature review, the data, model and econometric methodology are given. Finally, the empirical analysis was performed and the results of analysis were discussed.

## II. Literature Review

Bengoa and Sanchez-Robles (2003) investigate the relationship among economic freedom, FDI and growth for 18 Latin American countries over the period 1970-1999.

They used a panel data analysis in order to test the interplay among economic freedom, FDI and economic growth. According to their results, the indexes of economic freedom and FDI are positively and significantly correlated with growth.

Saribas (2009) examined the relation of economic growth to economic freedom for a sample of 49 countries for 1995-2004. His results suggest that economic growth is negatively associated with economic freedom. Saribas (2009) also found that monetary freedom, trade freedom, government size and financial freedom that are some of the economic freedom components are not correlated with growth.

Mahmood *et al.*, 2010) investigated the link between economic freedom and economic growth in 5 South Asian countries over the period 1995-2007. They found that size of government has negative correlation with growth, whereas financial freedom, trade freedom, investment freedom, business freedom, property rights freedom, and freedom from corruption have positive relation with growth.

Hanke and Walters (1997) reported that it was found a positive relationship between economic freedom and the GDP per capita. Similarly, Cebula (2011) examines the impact of the economic freedom on economic growth in the OECD countries for the period 2003-2007 and concludes that economic growth is positively correlated with monetary freedom, business freedom, investment freedom, labor freedom, fiscal freedom, property rights freedom, and freedom from corruption. Islam (1996) showed that economic freedom has a direct relation with per capita income and economic growth rate by using cross-section data analysis for 98 low, middle, and high income countries.

Gwartney, Lawson and Holcombe (1999) find that economic freedom has positive effect on economic growth in the long-run, while economic freedom does not significantly have an impact on economic growth.

Pourshahabi *et al.*, 2011) investigate the relationship among FDI, human capital, economic freedom and growth in the OECD countries over the period 1997-2007 by using panel data analysis. Their research concluded that more economic freedom can improve economic growth, both directly and indirectly. It can indirectly improve economic growth through promoting incentives, productive effort and effectiveness of resource used.

Ayal and Karras (1998) showed that aggregate economic freedom enhances economic growth by means of increasing total factor productivity and enhancing capital accumulation.

Cole (2003), Strum and Deltann (2001), Powell (2003) and Gwartney (2009) showed that countries with greater economic freedom, which means the protection of private property and private markets operating with minimal government intervention, have greater rates of economic growth (Garrett and Rhine, 2010).

Garrett and Rhine (2010) extended the models of economic growth by exploring the effect of economic freedom on employment growth for the U.S. They reported that economic freedom has a positive effect on employment growth.

Contrary to studies that claimed the economic freedom index frequently found positive and significant coefficient on economic growth, Turker (2009), who tested the relation between economic liberalization measured by the economic freedom index and economic growth, focused on 128 countries over the period 1996-2008, has shown

that it was a negative relation between economic liberalization and economic growth. Carlsson and Lundstrom (2002) found that some of the categories in the economic freedom index are insignificant or fragile and some of the significant variables negatively related with increases in economic growth for 74 countries during a period of 25 years.

As well as empirical evidence subject to the relation of economic freedom-economic growth, theoretical studies confirm the existence of this relationship or association link. According to North (1990), institutions have the incentive role in the economy by encouraging the production to increase and supporting valuable national output (Giffin, 2005). According to Berggren (2003), the countries with an independent legal system, protective property rights, full capital mobility, have advantages such as productivity in goods and services through low taxation, the flow of trade and capital investment, and the highest returns.

The effects of inflation on economic growth, as well as the effects of economic freedom's components on economic growth, are investigated in this study. Economists, who search the relationship between inflation and economic growth, found three different directional relations: negative, positive, and none. Until 1970s, when inflation is not considered as a very serious problem, the empirical studies indicated the positive effect of inflation on economic growth. But, the empirical studies suggested that inflation caused negative effects on economic growth after 1980s. As it is understood, the direction of this relationship is sensitive to the period of time examined. Sarel (1996) found that there was a positive relationship between inflation and economic growth before 1970s, when inflation registered modest rates. After 1970s, when inflation rates started to be higher, Sarel (1996) found that there was a negative relationship between inflation and economic growth.

Berber and Artan (2004) examine the relation of inflation and economic growth over the period 1987:1-2003:2 in Turkey. They conclude that inflation affects economic growth negatively and the magnitude of this relation is 0.19. Kormendi and Merguire (1985) test the relation between inflation and economic growth by using cross-section data for the period 1950-1977. As a result of their studies, inflation affects economic growth negatively and the magnitude of this relation is 0.57. According to Alexander (1997), inflation and its first difference are significantly negatively related to economic growth for 20 OECD countries over the period 1974-1991. Similarly, the existence of this negative relation is supported by the empirical studies of Kim and Willett (2000); Frenkel and Mehrez (1998); Gillman, Harris and Mátyás (2002); Hodge (2006). Contrary, Lucas (1973) found that inflation affects economic growth positively. Fischer (1993) found that there was a positive association between inflation and economic growth at low rate of inflation. On the other hand, Bhatia (1960); Hineline (2004); Vaona (2006) found that there was no significant relationship between inflation and economic growth.

Moreover, some economists suggest that threshold effects are indicative of the relation of inflation and economic growth. If inflation rate is below the estimated threshold level, then inflation promotes the economic growth. Otherwise, if inflation rate is beyond this threshold value, then inflation is harmful for the economic growth. According to Thirlwall and Barton (1971), Levin and Zervos (1993), Mubarik (2005),

and Sergii (2009), these threshold values are 10 percent, 40 percent, 9 percent and 8 percent, respectively.

## III. Data, Model and Econometric Methodology

### III.1. Data

This study uses the panel data from 1995 to 2010 of 23 upper-middle income countries[1]. Member countries' economic freedom measurements are taken from the Heritage Foundation (2012). All the other statistics (inflation and real per capita GDP) are taken from the World Bank. The period has been chosen as 1995-2010 due to availability of data and the reason of selecting the 25 countries among the 34 countries is that the selected countries have non-missing values between 1995 and 2010 time period.

This study focuses on economic growth among theselected countries for the period 1995-2010. Per capita gross domestic product (constant 2000 US$) is used as a proxy variable for economic growth. Also, inflation measured by the consumer price index that reflects the annual percentage changes in the price level of consumer goods and services purchased by households is one of the variables added to analysis. In order to carry out the paper, E-views 6.0 was used. Adding inflation to the model and using the recent period have differentiated this study from other studies related to the relation of economic freedom and economic growth.

Table 1 presents the descriptive statistics and correlation matrix of the variables used in the study. According to correlation matrix, economic freedom, which is the core explanatory variable of our study, is positively correlated with the GDP per capita, and the intensity of this correlation is 39%.

**Table 1**

**Descriptive Statistics and Correlation Matrix of the Variables**

|  | CPI | EFI | GDPPER |
|---|---|---|---|
| Mean | 15.39049 | 61.82690 | 3999.971 |
| Median | 6.862684 | 62.95000 | 3835.808 |
| Maximum | 1058.374 | 78.60000 | 10749.32 |
| Minimum | -1.936604 | 37.10000 | 1373.268 |
| Std. Dev. | 58.14310 | 7.429477 | 1670.479 |
| Skewness | 15.92736 | -0.294633 | 0.969417 |
| Kurtosis | 283.3338 | 2.859078 | 4.301945 |
| **Correlation Matrix** | CPI | EFI | LOG(GDPPER) |
| CPI | 1.000000 | -0.212009 | -0.185513 |
| EFI | -0.212009 | 1.000000 | 0.394116 |
| LOG(GDPPER) | -0.185513 | 0.394116 | 1.000000 |

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[1] *The countries in the sample are Algeria Argentina, Botswana, Brazil, Bulgaria, Chile, Colombia, Costa Rica, Dominic Republic, Gabon, Jamaica, Lithuania, Malaysia, Mauritius, Mexico, Panama, Peru, Romania, Russian, South Africa, Turkey, Uruguay and Venezuela.*

### III.2. The Model

To examine both the links between the components of economic freedom-economic growth and economic freedom index (overall score)-economic growth, we pursue a panel data analysis. The model is as following:

$$\log(GDPPER)_{it-1} = \gamma_0 + \gamma_1 EFI_{it-1} + \gamma_2.CPI_{it-1} \tag{1}$$

The variables used in model 1 estimation are: log(GDPPER) is the natural log of the per capita gross domestic product in constant 2000 US$ that is the proxy variable of economic growth; EFI is degree of economic freedom that is calculated from nine freedom indexes (business freedom, trade freedom, fiscal freedom, government size, monetary freedom, investment freedom, financial freedom, property right and freedom from corruption); CPI is the annual inflation rate as measured by the consumer price index.

$$\log(GDPPER)_{it-1} = \beta_0 + \beta_1 \log(BF)_{it-1} + \beta_2 \log(FF)_{it-1} + \beta_3 \log(IF)_{it-1} + \beta_4 \log(TF)_{it-1}$$
$$+ \beta_5 \log(MF)_{it-1} + \beta_6 \log(FIS)_{it-1} + \beta_7 \log(PR)_{it-1} + \beta_8 \log(GS)_{it-1} + \beta_9.CPI_{it-1} \tag{2}$$

The second model is used to determine separately the effect of the components of economic freedom index on economic growth. Apart from model 1, BF refers to the value of business freedom index, FF refers to the value of financial freedom index, IF refers to the value of investment freedom index, TF refers to the value of trade freedom index, MF refers to the value of monetary freedom index, FIS refers to the value of fiscal freedom index PR refers to the value of property rights index and GS refers to the value of government size index in model 2.

According to Baltagi (2005), panel data technique or longitudinal data technique that is used in the empirical section of the study has some advantages. These advantages are summarized as follws: 1-) Panel data are able to control the heterogeneity that occurs among individuals, firms, states or countries, whereas time-series and cross-section studies do not control the heterogeneity for these units; 2-) Panel data give more informative data, more variability, less co-linearity among the variables, more degrees of freedom and so, more efficiency; 3-) Panel data are relatively more suitable regarding the dynamics of adjustment than other techniques; 4-) Panel data model is better able to study more complicated behavioral models that the pure time-series or pure cross-section models cannot study.

### III.3. Econometric Methodology

As a first step, this study applies Pesaran and Yamagata's (2008) homogeneity test, which modified Swamy's (1970) dispersion test for the panels with a large number of units.

An homogenous panel data model (or pooled model) is a model in which all coefficients are common, while an heterogeneous panel data model is defined as a model in which all parameters (constant and slope coefficient) vary across individuals (Hurlin, 2010). The estimation methods differentiate in accordance with the selection of a homogenous panel or heterogeneous panel data.

Existing tests for slope homogeneity (Lin, 2011):

- T is large relatively to N
- Swamy (1970)
- LR test or LM test
- N is large relatively to T
- Pesaran, Smith, and Im (1996) Hausman type test
- Pesaran and Yamagata (2008), Lin (2009) Dispersion type
- N is much larger relatively to T
- Sakata (2009) Score type

In this study, we follow Pesaran and Yamagata (2008)'s delta_tilde test statistic in order to determine whether slope coefficients vary across individuals, because the cross section dimension is large relatively to the time dimension in study.

As the second step of the study, we investigate whether there is cross-section dependency among the series. For this purpose, we follow Pesaran's (2004) methodology. Pesaran (2004) investigates the normal approximation version of the LM test (denoted by NLM) where the mean and variance of the test indicator is approximated up to $T^{-1}$. The exact mean and variance of the Lagrange multiplier (LM) test statistic are provided for the purpose of the bias-adjustments and it is shown that the proposed tests have a standard normal distribution for the fixed time series dimension (T) as the cross section dimension (N) tends to infinity. The proposed bias-adjusted NLM tests are consistent even when the Pesaran's (2004) CD test is inconsistent. Furthermore, it is shown that the bias-adjusted NLM tests successfully control the size, maintaining satisfactory power in panel with exogenous regressors and normal errors, even when cross section mean of the factor loadings is close to zero, where the cross-section dependency (CD) test has little power (Pesaran *et al*. 2008). Thus, we follow Pesaran's NLM test statistic in the analysis of the cross-section dependency.

After analyzing cross-section dependency, we control whether there is unit root in the series in order to get unbiased estimations. Several different panel unit root tests are available. Panel unit root testing emerged from time series unit root testing. The major difference to time series testing of unit roots is that we have to consider asymptotic behavior of the time-series dimension T and the cross-sectional dimension N (Nell and Zimmermann, 2011).

In this study, we used the approaches of Im *et al*., 2003), Augmented Dickey Fuller Fisher, Phillips-Perron Fisher, Levin, Lin and Chu (2002) as the panel unit root tests. They are denoted by IPS, ADF-Fisher, PP-Fisher, and LLC, respectively.

Panel data may have group effects, time effects, or both. These effects are either fixed effects or random effects. A fixed effects model assumes differences in intercepts across groups or time periods. Fixed effects model explore the relationship between the predictor and outcome variables within an entity. This entity may be households, countries, firms. The model assumes all other time invariant variables across entities that can influence the predictor variables to be constant (Torres-Reyna, 2007).

$$u_{it} = \mu_i + \lambda_t + v_{it} \qquad i=1,\dots,N \quad t=1,\dots,T$$

where: $\mu_i$ denotes the unobservable individual effect, $\lambda_t$ denotes the unobservable time effect, and $v_{it}$ is the stochastic disturbance term. $\lambda_t$ is individual-invariant and it accounts for any time-specific effect that is not included in the regression (Baltagi, 2005).

If the $\mu_i$ and $\lambda_t$ are assumed to be fixed parameters to be estimated and $v_{it}$ ~IID $(0, \sigma_v^2)$, then the above regression represents a two-way fixed effects error component model (Baltagi, 2005).

The fixed effects model can be formulated as:

$$y_{it} = x'_{it}.\beta + \alpha_i + \varepsilon_{it} \tag{3}$$

where: $\alpha_i$ denotes all the observable effects and it is group-specific constant term in the regression model. $\alpha_i$ equals $z'_i.\alpha$ in the regression (3). If $z_i$ is unobserved, but correlated with $x_{it}$, then the coefficient of $\beta$ is biased and inconsistent under assumptions of $E(u_{it}) = 0$ ;

$$E(u^2_{it}) = \sigma^2 \text{ all i; } E(u_{it}.u_{jt-s}) = 0 \text{ for } s \neq 0 \text{ and } i \neq j$$

$$y_{it} = \alpha_0 + X_{it}.\beta + \alpha_i + \gamma_t + \varepsilon_{it} \tag{4}$$

Equation (4) can be formulated as a two-way fixed effects model controlling for unmeasured time-invariant differences between units and unit-invariant differences between time periods. $\alpha_i$ denotes individual-specific effects and $\gamma_t$ denotes period-specific effects (Worrall and Pratt, 2004).

# IV. Main Results

Results for the homogeneity test of Pesaran and Yamagata (2008) are illustrated in Table 2. According to Pesaran and Yamagata (2008), the problem of the small sample can be overcome under the normally distributed errors by considering mean and variance bias adjusted version, delta_tilde_adjusted. Thus, we rely on the result regarding delta_tilde_adjusted statistic. Because the p-value of delta_tilde_adjusted is higher than 0.05 significance level we cannot reject that the slope coefficients do not vary across individuals for models 1 and 2. That is, it is clear that the null of hypothesis of Pesaran and Yamagata (2008)'s homogeneous test is not rejected at 95% for models 1 and 2.

**Table 2**

**Pesaran and Yamagata (2008) Homogeneity Tests**

|  | Model 1 | | Model 2 | |
|---|---|---|---|---|
|  | Test statistic | P-value | Test statistic | P-value |
| delta_tilde | 1.088 | 0.138 | -1.149 | 0.875 |
| delta_tilde_adjusted | 1.244 | 0.107 | -2.055 | 0.980 |

Table 3 shows the bias-adjusted CDLM test, control the size, maintaining satisfactory power in panel with exogenous regressors and normal errors, even when cross section mean of the factor loadings is close to zero, where the CD test has little power (Pesaran *et al.*, 2006). According to the results of the NLM test, the test statistic is higher than 0.05 significance level for models 1 and 2. Thus, we follow the first generation panel unit root tests, which assume independence units.

**Table 3**

**A Bias-Adjusted CDLM Test**

|  | Model 1 | | Model 2 | |
|---|---|---|---|---|
|  | **Test Statistic** | **P-value** | **Test Statistic** | **P-value** |
| **The NLM** | -0.176 | 0.570 | -0.278 | 0.610 |

The results of first generation panel unit root tests for models 1 and 2 are given in Table 4.a and 4.b.

**Table 4.a**

**Panel Unit Root Tests for Model 1 (1995-2010)**

| Series | LLC | IPS | ADF | PP |
|---|---|---|---|---|
| **dlogGDPPER** | -9.956 (0.00)* | -7.008 (0.00)* | 128.415 (0.00)* | 131.515 (0.00)* |
| **dCPI** | -13.606 (0.00)* | -13.844 (0.00)* | 234.875 (0.00)* | 333.453 (0.00)* |
| **dEFI** | -17.700 (0.00)* | -12.899 (0.00)* | 219.464 (0.00)* | 252.385 (0.00)* |

*Note:* Probability values of the variables are reported in parenthesis. d is the first difference operator. log denotes the logarithm of the variable. * denotes the rejection of the null at the 5% level.

**Table 4.b**

**Panel Unit Root Tests for Model 2 (1995-2010)**

| Series | LLC | IPS | ADF | PP |
|---|---|---|---|---|
| dLog BF | -15.42 (0.00)* | -12.05 (0.00)* | 208.86 (0.00)* | 221.79 (0.00)* |
| dLog FF | -14.74 (0.00)* | -12.24 (0.00)* | 186.70 (0.00)* | 195.94 (0.00)* |
| dLog IF | -11.03 (0.00)* | -8.64 (0.00)* | 125.46 (0.00)* | 128.12 (0.00)* |
| dLog TF | -23.02 (0.00)* | -17.48 (0.00)* | 289.80 (0.00)* | 383.96 (0.00)* |
| dLog MF | -14.96 (0.00)* | -10.68 (0.00)* | 186.85 (0.00)* | 241.83 (0.00)* |
| dLog FIS | -15.20 (0.00)* | -12.94 (0.00)* | 224.59 (0.00)* | 262.72 (0.00)* |
| dLog PR | -7.63 (0.00)* | -6.18 (0.00)* | 63.97 (0.00)* | 65.80 (0.00)* |
| dLog GS | -16.34 (0.00)* | -13.76 (0.00)* | 239.24 (0.00)* | 317.17 (0.00)* |
| dCPI | -13.60 (0.00)* | -13.84 (0.00)* | 234.87 (0.00)* | 333.45 (0.00)* |

*Note*: Probability values of the variables are reported in parenthesis. d denotes the first-difference operator. * denotes the rejection of the null at the 5% significance level.

As one may see from Tables 4.a and 4.b, all first generation panel unit root tests results show that null hypothesis of a unit root for the variables of all models can be rejected at the 5 % significance level. But, this result is obtained by taking log- first-difference of some variables, than by taking first-difference of some variables.

Table 5 indicates the results of the test of cross section and period fixed effects. We estimate the relationship among economic freedom index, consumer price index, and economic growth using two-way fixed effects estimator. Employing the two-way fixed effects model will give reliable results, since the estimated probability values of both cross section F and period F statistic at 0.00 are smaller than the significance level at 0.05 significance level.

**Table 5**

**Test of Cross-Section and Period Fixed Effects for Model 1**

| Effects Test | Statistic | d.f. | Prob. |
|---|---|---|---|
| **Cross-section F** | **305.418145** | **(22,306)** | **0.0000*** |
| Cross-section Chi-square | 1081.117443 | 22 | 0.0000* |
| **Period F** | **49.892237** | **(14,306)** | **0.0000*** |
| Period Chi-square | 410.084744 | 14 | 0.0000* |
| **Cross-Section/Period F** | **205.091821** | **(36,306)** | **0.0000*** |
| Cross-Section/Period Chi-square | 1112.280226 | 36 | 0.0000* |

The results obtained from the two-way fixed effects are shown in Table 6. Firstly, the coefficient of economic freedom index is significant and positive as expected. That is, a 1% increase in the economic freedom index would raise economic growth by 0.7%. Similarly, the relation between inflation rate and economic growth gives a result appropriate to our expectations.

**Table 6**

**The Results for Two-way Fixed Effects Model**

**Dependent Variable: dlogGDPPER**

| | $\beta$ | t-Ratio | Std.Error | Prob. |
|---|---|---|---|---|
| **DEFI** | 0,0072 | 6.42 | 0.001 | 0.00 |
| **DCPI** | -0,0002 | -2.62 | 7.94E-05 | 0.00 |
| **C** | 7.7529 | 111.26 | 0.06 | 0.00 |

**Table 7**

**Correlation Matrix**

| | DLBF | DLFF | DLFIS | DLGS | DLIF | DLMF | DLPR | DLTF |
|---|---|---|---|---|---|---|---|---|
| **DLBF1** | **1.000** | | | | | | | |
| **DLFF** | 0.3821 | **1.0000** | | | | | | |
| **DLFIS** | 0.1378 | 0.0604 | **1.0000** | | | | | |
| **DLGS** | 0.0166 | 0.0147 | 0.3023 | **1.0000** | | | | |
| **DLIF** | 0.3900 | 0.4604 | -0.015 | -0.006 | **1.0000** | | | |
| **DLMF** | 0.2822 | 0.1567 | 0.4061 | 0.2952 | 0.0713 | **1.0000** | | |
| **DLPR** | 0.4654 | 0.3385 | 0.0119 | -0.030 | 0.4531 | 0.0559 | **1.0000** | |
| **DLTF** | 0.1502 | 0.0190 | 0.2935 | -0.041 | 0.1249 | -0.006 | 0.0870 | **1.0000** |

The coefficient is significant and negative. That is, a 1% increase in inflation rate would reduce economic growth by 0.02%. Most of the previous studies, as emphasized in the section of literature review, have found a positive and robust relationship between economic freedom and economic growth, which supports the empirical results of this study.

A summary of the results for the economic freedom variables is presented in Table 8. The size of government (GS) is not significant and the coefficient is negative, which confirms Ayal and Karras (1998); Nelson and Singh (1998), who find no significant effect of government size on growth. The coefficient of business freedom index (BF) reflecting the individual right and ability to conduct entrepreneurial activities freely is not significant.

All the other economic freedom indices, except for GS and BF, are statistically significant variables. A one-unit increase in the trade freedom index (TF) raises the economic growth rate by 0.34 percentage points. This result supports Sala-i Martin (1997), who finds a positive and robust relation between decreased trade restrictions and growth. Increasing the property rights freedom index (PR) by one unit raises economic growth by 0.37 percentage points. Security of property rights, protected by a country's legal system, is essential to economic freedom (Kaur, 2006). A one-unit increase in the monetary freedom index raises the economic growth rate by 0.20 percentage points. Increasing the investment freedom index (IF) by one unit decreases economic growth by 0.12 percentage points. Increasing the fiscal freedom index (FIS) by one unit raises economic growth by 0.26 percentage points. A one-unit increase in the financial freedom index (FF) reduces the economic growth rate by 0.14 percentage points. In addition to the economic freedom indices, the impact of inflation rate on economic growth is investigated in the study, as well. The coefficient of inflation rate (CPI) on economic growth is economically and statistically significant, and negative as expected.

Consequently, four of the significant economic freedom variables are positively related to economic growth, but two are negatively related to growth. The negative sign relation in some of the significant variables can be explained by multicollinearity. As indicated by Carlsson and Lundstrom (2002), when decomposing an index such as the economic freedom index, multicollinearity becomes a potential problem. Table 7 shows the correlation matrix for the economic freedom indices. As shown in Table 7, almost all of the economic freedom variables are affected by each other to different sizes and with different signs.

F statistic is statistically significant at far beyond the 1 percent level, attesting to the overall strength of the model.

**Table 8**

### Results of Panel Least Squares for Model 2
### White Cross-Section Standard Errors and Covariance (d.f.corrected)

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|-------|
| **LTF(-1)** | 0.296803 | 0.081498 | 3.641860 | 0.0003* |
| **LPR(-1)** | 0.346159 | 0.074596 | 4.640451 | 0.0000* |
| **LMF(-1)** | 0.176940 | 0.049861 | 3.548700 | 0.0004* |

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| LIF(-1) | -0.217021 | 0.055695 | -3.896564 | 0.0001* |
| LFIS(-1) | 0.253340 | 0.094453 | 2.682178 | 0.0077* |
| LFF(-1) | -0.116704 | 0.062875 | -1.856134 | 0.0643** |
| CPI(-1) | -0.000519 | 0.000134 | -3.872277 | 0.0001* |
| LGS(-1) | 0.409560 | 0.060927 | 6.722196 | 0.0000* |
| LBF(-1) | 0.410674 | 0.135247 | 3.036465 | 0.0026* |
| C | 1.653122 | 0.368355 | 4.487851 | 0.0000* |
| R-Squared : 0.27 | | F-statistic : 13.56 | | Prob (F-stat) : 0.00* |

## V. Concluding Remarks

As globalization has increased the strength of development process in many countries, economically free institutions have an important place for taking advantage of this opportunity to improve the life standards of citizens in the developing countries. The relationship between economic freedom and economic growth has been discussed in economic literature and both theoretical and empirical studies related to this relationship have become widespread with globalization. In order to test this relationship, most researchers used various measures of economic and social performance. We can say that the general comment obtained from the numerous articles is that economic freedom is vitally important to a society, while the methods used to estimate this relationship are different. Most of them found that economic freedom leads to more investment, higher per capita incomes, and growth rates. Moreover, economic freedom induces less poverty and improvements in the life standards of citizens of a nation.

In this study, the relationship among economic freedom, inflation and economic growth nexus in the selected 23 upper-middle income countries over the period 1995-2010 was surveyed. In order to estimate the relation, panel data estimation techniques were applied. In this study, we tried to answer these questions: 1) Is the economic freedom an effective indicator on economic growth? 2) Does inflation affect the economic growth? 3) Which are the magnitude and sign of components of economic freedom on economic growth?

Based on the empirical results, all other economic freedom indices are statistically significant variables. A one-unit increase in the trade freedom index raises the economic growth rate by 0.29 percentage points. Increasing the property rights freedom index by one-unit raises economic growth by 0.34 percentage points. A one-unit increase in the monetary freedom index raises the economic growth rate by 0.17 percentage points. Increasing the investment freedom index by one-unit decreases economic growth by 0.21 percentage points. Increasing the fiscal freedom index by one-unit raises economic growth by 0.26 percentage points. A one-unit increase in the financial freedom index reduces the economic growth rate by 0.11 percentage points. A one-unit increase in the business freedom index raises the economic growth rate by 0.41 percentage points. A one-unit increase in the government size index raises the economic growth rate by 0.40 percentage points.

In addition to the economic freedom indices, the impact of inflation rate on economic growth is investigated in study, as well. The coefficient of inflation rate on economic

growth is economically and statistically significant and negative. Hence, decrease in the inflation rate can reduce the harmful effect on growth in selected countries.

When investigating the aggregate effect of the economic freedom index, we found that an increase in economic freedom, as measured by the economic freedom index, increases growth. Most of the previous studies, as emphasized in the literature review, have found a positive and robust relationship between economic freedom and economic growth, which supports the results of this study.

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