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THE ECONOMICAL DETERMINANTS OF FOREIGN DIRECT INVESTMENT (FDI) IN DEVELOPING COUNTRIES AND TRANSITION ECONOMIES

ABSTRACT

The main purpose of this study is to develop an empirical framework to estimate the economical determinants of FDI inflows by employing a panel data set of 17 developing countries and transition economies for the period of 1989:01-2006:04. In our model there are seven explanatory economical variables. They are, respectively, the previous period FDI, GDP growth, Wage, Trade Rate, The Real Interest rates, Inflation Rate, Domestic Investment. By the way, throughout the paper, only the economical determinants (being separated and apart from the other studies in the literature) of FDI inflows to developing countries and transition economies are studied. It is found out that the previous period FDI which is directly related with the host countries' economic resources is important as an economical determinant. Besides, it is also understood that the main determinants of FDI inflows are the inflation rate, the interest rate, the growth rate and the trade (openness) rate and FDI inflows give power to the economies of host countries.

Keywords: Foreign Direct Investment, The Determinants Of FDI, The Developing Countries, Transition Economies, Panel Data Analysis

GEÇİŞ EKONOMİLERİNDE VE GELİŞMEKTE OLAN ÜLKELERDE DOĞRUDAN YABANCI YATIRIMLARIN İKTİSADİ BELİRLEYİCİLERİ

ÖZET

Bu çalışmanın ana amacı, panel data analizi kullanarak ve 1989:01-2006:04 dönemi verileri ile 17 gelişmekte olan ülke ve geçiş ekonomilerinde doğrudan yabancı yatırımlarının ekonomik belirleyicilerini tahmin etmektir. Modelimizde 7 açıklayıcı ekonomik değişken yer almaktadır. Bunlar sırasıyla; bir önceki dönemin yabancı sermaye yatırımı, GSYİH büyüklüğü, ücret, Ticaret Haddi, Reel Faiz Oranı, Yurtiçi Yatırım Harcamaları şeklindedir. Bu çalışmada yatırım yapılan ülkelerin ekonomik kaynaklarıyla doğrudan ilişkili olan bir önceki dönem doğrudan yabancı atırımının bir ekonomik belirleyici olarak önemli olduğu ortaya çıkarılmıştır. Bunun yanında, doğrudan yabancı yatırımların ana belirleyicilerinin Enflasyon Oranı, Faiz Oranı, Büyüme Oranı ve Dışa Açıklık Oranı olduğu ve de doğrudan yabancı yatırımların yatırım yapılan ülke ekonomilerine güç kattığı anlaşılmıştır.

Anahtar Kelimeler: Doğrudan Yabancı Yatırım, Doğrudan Yabancı Yatırımların belirleyicileri, Gelişmekte Olan Ülkeler, Geçiş Ekonomileri, Panel Data Analiz

1. INTRODUCTION (GİRİŞ)

Foreign direct investment (FDI) is increasingly important for developing countries and transition economies. The share of developing countries, in FDI inflows, rose from 17.8 percent in 1990 to 36.61 percent in 2004 and 35.0 percent in 2005. The share of transition economies in FDI inflows also rose from 0.04 percent in 1990 to 5.57 percent in 2004 and 4.33 percent in 2005. The share of in FDI inflows declined from 82.12 percent in 1990 to 57.82 percent in 2004 and 60.67 percent in 2005. In 2000, $168 billion was received in FDI inflows and the largest item in $197 billion of net long-term resource flows to developed countries. On account of a strong increase in FDI flows to developing countries, in 2004 a slight rebound was seen in global FDI after three years of declining flows. At $648 billion, world FDI inflows in 2004 were 2% higher than in 2003. Inflows to developing countries surged by 40% ($233 billion) but developed countries as a group experienced this surge as a 14% drop in their inward FDI. As a result, the share of developing countries in world FDI inflows was 36% that has been the highest level since 1997. Inflows of foreign direct investment (FDI) were substantial in 2005. These inflows rose by 29% – to reach $916 billion – having already increased by 27% in 2004. Inward FDI grew in all of the main sub-regions, in some to unprecedented levels, and in 126 out of the 200 economies covered by UNCTAD. Nevertheless, world inflows remained far below for the 2000 peak of $1.4 trillion. Similar to trends in the late 1990s, the recent up surge in FDI reflects a greater level of cross-border mergersand acquisitions (M&As), especially among developed countries. It also reflects higher growth rates in some developed countries as well as strong economic performance in many developing and transition economies.

Table 1. The share of regions in global FDI inflows (%)(UNCTAD, 2006)
(Tablo 1. Global DYY girişlerinde bölgelerin % payları)(UNCTAD, 2006)

ECONOMY	1970	1980	1990	2000	2001	2002	2003	2004	2005
World	100	100.00	100	100	100	100	100	100	100
Developed economies	71.28	86.07	82.16	81.3	73.32	71.68	64.68	57.82	60.67
America	23.52	42.82	28.18	27.88	23.79	15.89	11.3	19.52	16.03
Asia	1.07	0.52	0.94	0.95	1.19	1.78	1.84	1.35	0.91
Europe	38.95	39.04	48.14	51.19	47.24	50.86	49.13	30.63	47.33
Northern Europe	13.56	19.58	17.85	15.46	11.04	13.28	9.98	11.04	19.13
Southern Europe	7.13	5.45	11.64	4.43	6.32	9.38	9.76	6.8	5.36
Eastern Europe	…	0.02	0.44	1.35	2.03	3.19	1.72	3.34	2.98
Western Europe	18.26	13.99	18.21	29.95	27.85	25.01	27.68	9.45	19.86
Oceania	7.74	3.70	4.89	1.27	1.1	3.15	2.41	6.33	-3.6
Developing economies	28.27	13.88	17.8	18.06	25.3	26.23	30.98	36.61	35
Africa	9.44	0.72	1.4	0.68	2.39	2.1	3.32	2.42	3.35
Eastern Africa	0.6	0.36	0.2	0.1	0.18	0.24	0.37	0.27	0.18
Middle Africa	0.23	0.64	-0.17	0.09	0.44	0.52	1.14	0.64	0.5
Northern Africa	3.25	0.28	0.55	0.25	0.65	0.64	0.96	0.83	1.39
Southern Africa	2.49	0.24	0.05	0.09	0.87	0.24	0.23	0.22	0.78
Western Africa	2.87	-0.79	0.77	0.15	0.25	0.47	0.62	0.46	0.5
America	11.91	11.75	4.83	6.86	9.43	8.55	7.86	12.06	9.83
Caribbean	3.05	0.71	0.41	1.37	1.28	0.7	0.65	3.76	2.69
Central America	4.25	4.53	1.52	1.39	3.51	3.24	2.91	3.03	2.26
South America	4.61	6.51	2.9	4.1	4.64	4.61	4.3	5.26	4.88
Asia	6.36	1.20	11.23	10.5	13.46	15.56	19.74	22.04	21.78
Eastern Asia	1.33	1.72	4.36	8.25	9.47	10.9	12.94	14.78	12.9
Southern Asia	0.72	0.51	0.11	0.33	0.78	1.22	1.11	1.04	1.07
South-Eastern Asia	3.43	4.99	6.36	1.67	2.35	2.55	3.57	3.61	4.05
Western Asia	0.89	-6.02	0.41	0.25	0.86	0.89	2.12	2.6	3.76
Oceania	1.01	0.21	0.35	0.02	0.01	0.02	0.06	0.1	0.04
Economies in transition	…	0.04	0.04	0.64	1.39	2.09	4.34	5.57	4.33
Asia	…	…	…	0.13	0.43	0.73	1.09	1.24	0.47
Europe	…	0.04	0.04	0.51	0.96	1.36	3.24	4.33	3.86

Many factors help to explain why the growth of FDI was particularly pronounced in developing countries in 2004. Intense competitive pressures in many industries are leading firms to explore new ways of improving their competitiveness. Some of these ways are by expanding operations in the fast-growing markets of emerging economies to boost sales, and by rationalizing production activities with a view to reaping economies of scale and lowering production costs. Higher prices for many commodities have further stimulated FDI to countries that are rich in natural resources such as oil and minerals. In some developed as well as developing countries, increased inflows in 2004 were linked to an up turn in cross-border merger and acquisition (M&A) activity. Provided economic growth is maintained, the prospects for a further increase in global FDI flows in 2005 are promising (UNCTAD, 2001, 2005, 2006).

According to Addison and Heshmati (2003), the scale and character of foreign direct investment (FDI) flows to developing countries and transition economies have long been affected by successive waves in the invention and adoption of new technologies. The latest wave—the revolution in information and communication technology (ICT)—is facilitating a global shift in the service industries (which are now relocating to select developing countries) following the earlier shift in manufacturing. Global political change also affects FDI flows. Since the early 1980s, a 'third wave' of democratization has pushed aside many authoritarian regimes, and the opening up of political systems is often a catalyst for economic reforms that favour investors. These two waves, technologically and politically, are interacting to reshape trade and capital flows, including FDI.

2. RESEARCH SIGNIFICANCE (ÇALIŞMANIN ÖNEMI)

The main purpose of this study is to develop an empirical framework to estimate the economical determinants of FDI inflows by employing a panel data set of 17 developing countries and transition economies for the period of 1989:01-2006:04. In our model there are seven explanatory economical variables. They are, respectively, The previous period FDI (the pull factor for new FDI), GDP growth (measures market size), Wage (unit labor costs), Trade Rate (measures the opennes of countries), The Real Interest rates (measures macroeconomic policy), Inflation Rate (as country risk and macroeconomic policy), Domestic Investment (Business Climate). Hence, throughout this paper, we especially focus on only the economical determinants (being separated and apart from the other studies in the literature) of FDI inflows to developing countries and transition economies. The paper is structured as follows. Section 2 presents a theoretical framework of the determimants of FDI. Empirical models and their results are presented in Sections 3 and 4. Finally, Section 5 concludes.

3. THE THEORETICAL FRAMEWORK OF THE DETERMINANTS OF FDI (DYY BELİRLEYİCİLERİNİN TEORİK ÇERÇEVESİ)

The literature examines a large number of variables that have been put forward to explain FDI. Some of these variables are encompassed in formal hypotheses or theories of FDI, whereas others are suggested because they make sense intuitively. In this section, we examine these variables and rationalise our focus on the limited set of explanatory variables used in this paper.

Moosa (2002), Moosa and Çardak (2006) survey the theories[1] of FDI, identifying the implied explanatory variables in the process, as well as variables that cannot be readily related to any of these theories which may be classified under "theories based on other factors"as shown in Appendix 1. These are market size (GDP or per capita GDP) as a market size hypothesis, wages as a location hypothesis, trade barriers as a other factor, growth rate as a differential rates of return, trade deficit as a other factor, exchange rate, currency areas hypothesis, tax as a other factor, cost of capital as a location hypothesis etc… Morever, UNCTAD (2002) classificates the determinants variables of inward FDI, as shown in Table 2.

Table 2. The UNCTAD's Classification of FDI Determinants
(Tablo 2. The UNCTAD's classification of FDI determinants (FDI belirleyicilerinin UNCTAD sınıflandırması)

Determiner variables	Examples
Policy variables	Tax policy, trade policy, privatisation policy, macroeconomic policy
Business variables	Investment incentives
Market-related economic determinants	Market size, market growth, market structure
Resource-related economic determinants	Raw materials, labour cost, technology
Efficiency-related economic determinants	Transport and communication costs, labour productivity

Source: UNCTAD, 2002

According to IMF (2003), investors underscore that the motivators for investing in EMCs and the determinants of investment locations differ among countries and across the economic sectors. They concur, however, that certain general factors consistently determine which countries attract the most FDI. IMF (2003) reports that motivation for and determinants of FDI and investors cite in particular as the following:

- *Market size and growth prospects of the host country play an important role in affecting investment location since FDI in EMCs is increasingly being undertaken to service domestic demand rather than to tap cheap labor.*
- *Wage-adjusted productivity of labor, rather than the local labor cost, will increasingly drive efficiency-seeking investments of "footloose" firms that use EMCs as export platforms.*
- *The availability of infrastructure is critical. EMCs that are best prepared to address infrastructure bottlenecks will secure greater amounts of FDI.*
- *Except in some sectors, tax incentives (holidays) do not play an important role in determining investment location, although reasonable levels of taxation and the overall stability of the tax regime do.*
- *A broad consensus in the host country in favor of foreign investment is an important consideration for investors. In this context, a reasonably stable political environment, as well as conditions that support physical and personal security, is an important benchmark that is used in judging the likelihood of*

[1] For details, see Moosa (2002).

adverse changes in the investment climate for foreign-owned firms.

- *Corruption and governance concerns have a significant bearing on investment prospects. The investment regime and the environment for business—including the business licensing system, the tax regime, and the attitude and quality of the bureaucracy—are vital.*
- *Recent crises have magnified perceptions of regulatory risks and greater attention is now being focused on the legal framework and the rule of law. A predictable legal system, which among other things respects the sanctity of contracts and facilitates a level playing field, will further enable EMCs to secure large amounts of FDI on a sustained basis.*

Frenkel, Funke and Stadtmann (2004) examine the determinants of FDI flows to emerging economies by analyzing data set of bilateral FDI flows. They aim to investigate both home and host country factors that may play an important role in determining the level and the destination of FDI flows, using a panel approach. They found out that distance and both home and host country characteristics play a significant role in determining of FDI flows and that FDI flows are inversely related to the distance between the home and the host country. On the side of the host countries, their results suggest that important pull factors are economic developments as indicated by the GDP growth rate and the extent of risk and that market size and distance play an important role for FDI flows, risk and economic growth in host countries are crucial for attracting in ternational investment projects.

Bevan and Estrin (2004) find that FDI between developed Western and transition countries is determined by unit labor costs, host and source country size, and proximity. It is shown that country risk is not a significant factor. They also establish that an announcement about time tables for admission to the EU increases levels of FDI to the prospective members. Bevan and Estrin employ data on FDI flows from 18 market economies to 11 transition ones from 1994 to 2000. They include variables to capture proximity and concentration advantage in describing the characteristics of source and host countries, following the literature in using proxy variables, such as GDP, input costs, geographical distance and institutional and legal factors such as trade and political stability, country-risk.

Opening up of transition countries and the process of systematic reforms have been crucial to attracting FDI. In Central and Eastern Europe, the prospect of EU memberships has contributed to the creation of a particularly favorable investment climate. Bevan and Estrin (2000) explored the impact of the announcements about EU membership for the transition economies on FDI flows. Based on information on FDI flows from 18 market economies to 11 transition economies, over 1994-98 period, the econometric model estimation revealed that although announcements concerning EU membership were found not to influence a country's credit rating, they have affected FDI directly. Furthermore, they found that FDI inflows to these countries are motivated by several factors: low unit labour costs, large market size, and economic geography (geographical proximity is associated with increased FDI).

Nonnemberg and Mendonça (2004) investigate the determinants of foreign direct investiment (FDI) in developing countries. In order to achieve this purpose, they perform an econometric model based on panel data analysis for 38 developing countries (including transition

economies) for the 1975-2000 period. They found out that the determinants of FDI are level of schooling, economy's degree of openness, risk and variables related to macroeconomic performance like inflation, risk, growth rate and stock market performance.

Uygur (2005) investigates the determinants and importance of FDI for Türkiye for the period of 1992-2004 by employing the VAR model. In this study, he examines the inflation rate, real interest rate, investment atmosphere, export rate, growth rate and budget deficit rate and he finds out that the real interest rate of official treasury department and consolidated budget balance are the main determinants of FDI for Türkiye.

Mercereau (2005) investigates the impact of China's emergence on FDI flows to Asia and the determinants of FDI flows to this region using data from 14 Asian economies from 1984 to 2002. They found out that China did not have much impact on FDI to other countries and that some economic fundamentals (healthy government balances, an appreciating real exchange rate, low inflation, and low interest rates in the G3) aid explained the allocation of FDI flows among Asian economies.

Moosa and Çardak (2006) investigate the determination of FDI with eight determining variables of FDI inflows that are examined by applying extreme bounds analysis to a cross-sectional sample encompassing data on 138 countries. The results reveal three robust variables: exports as a percentage of GDP, telephone lines per 1000 of the population and country risk in their study. They find that developed countries with large economies, a high degree of openness and low country risk tend to be more successful than others in attracting FDI.

The results of the above mentioned empirical studies concerning the subject are listed in the table 3.

Table 3: The results of the empirical studies about the determinants of FDI
(Tablo 3. DYY belirleyicilerine yönelik ampirik çalışmaların bulguları)

Empirical Studies	The Determinants of FDI
Moosa (2002)	market size (GDP or per capita GDP) as a market size hypothesis, wages as a location hypothesis, trade barriers as a other factor, growth rate as a differential rates of return, trade deficit as a other factor, exchange rate, currency areas hypothesis, tax as a other factor, cost of capital as a location hypothesis etc…
UNCTAD (2002)	Tax policy, trade policy, privatisation policy, macroeconomic policy, Investment incentives, market size, market growth, market structure, raw materials, labour cost, technology transport and communication costs, labour productivity
Frenkel, Funke and Stadtmann (2004)	the GDP growth rate and the extent of risk and that market size and distance, risk and economic growth
Bevan and Estrin (2000), Bevan and Estrin (2004)	unit labor costs, host and source country size, and proximity, country risk is not a significant factor, GDP, input costs, geographical distance and institutional and legal factors such as trade and political stability, country-risk.
Nonnemberg and	level of schooling, economy's degree of openness,

Mendonça (2004)	risk and variables related to macroeconomic performance like inflation, risk, growth rate and stock market performance.
Uygur (2005)	the real interest rate of official treasury department and consolidated budget balance are the main determinants of FDI for Türkiye.
Mercereau (2005)	They found out that China did not have much impact on FDI to other countries and that some economic fundamentals (healthy government balances, an appreciating real exchange rate, low inflation, and low interest rates in the G3) aid explained the allocation of FDI flows among Asian economies.
Moosa and Çardak (2006)	The results reveal three robust variables: exports as a percentage of GDP, telephone lines per 1000 of the population and country risk in their study. They find that developed countries with large economies, a high degree of openness and low country risk tend to be more successful than others in attracting FDI.

Cross sectional studies of the determinants of FDI in the literature are typically based on a regression form as follows as in Moosa and Cardak (2006).

$$FDI_i = \alpha_0 + \sum_{j=1}^{n} \alpha_j X_{ji} + \varepsilon_i \quad (1)$$

where FDI_i is foreign direct investment into the country *i* as the dependent variable, X_{ji} the jth variable of country *i*. Our model includes seven explanatory economical variables. They are namely; The previous period FDI, GDP growth, Wage, Trade Rate, The Real Interest rates, Inflation Rate, Domestic Investment

4. EMPIRICAL ANALYSIS (AMPİRİK ANALİZ)

In this section, we investigate the economical determinats of FDI in developing countries and transition economies between 1989:01-2006:04 by using panel data analysis. Before this statistical technique, it should be tested whether the series are stationary, or not.

4.1. Data (Veri)

In the empirical study, in order to analyze the determinants of FDI in developing countries and transition economies, we include eight variables, one of them is the dependent and the others are as explanatory variables. Our choice of the dependent variable fell on FDI as a percentage of GDP (fdi). Seven explanatory variables are considered as shown in Table 4.

The data was taken from the International Financial Statistics (IFS). All series have quarterly data between 1989:01-2006:04. We would like to note that, as (1) the data is available and (2) the said variables are already placed in the theoretical framework, in Section 2, in detail, are the main reasons why these variables are chosen. There are 17 countries observed by this study. Those are; Argentina, Chile, China (P.R.:Hong Kong), Croatia, Czech Republic, Hungary, Latvia, Lithuania, Malaysia, Mexico, Poland, Russia, Slovak Republic, Slovenia, South Africa, Thailand, Türkiye.

Table 4. The list of explanatory variables
(Tablo 4. Açıklayıcı değişkenlerin listesi)

Variable	Definition	The direction of expected effect	Reasons for inclusion
Wages	The percentage change of wages	negative	Indicates the rising labour costs. Provides a representation of location hypothesis (Resource-related economic determinants)
Inf	inflation rate	negative	Indicates rising country's macroeconomic risk. (Macroeconomic policy variables)
Intrate	Real interest rate	positive or negative	Indicates the rising country's macroeconomic risk and also pull factor of FDI. (Macroeconomic policy variables)
Growth	Growth rate of GDP over the previous years	positive	Captures the changes of demand for goods and services and indicates rising productivity and profitability. Provides a representation of the market size hypothesis. (Market-related economic determinants)
Trade	the rate of export plus import to GDP	positive	Indicates the rising country's openness. (Market-related economic determinants)
Inv	the rate of capital formation to GDP	positive	Indicates the rising country's domestic investment climate. (Business variable)
$FDI_{(t-1)}$	the rate of previous period FDI to GDP	positive	Indicates a pull factor for host countries.

3.2. Panel Unit Root Tests (Panel Birim Kök Testleri)

The first step in econometric analysis is to analyze the time series properties of the data by testing whether the variables are stationary or not. For this purpose, we apply Levin, Lin & Chu-t test, Im, Pesaran and Shin W-stat test, ADF - Fisher Chi-square test and PP - Fisher Chi-square test[2] to the series. The results of these tests are given in Table 5. In accordance with these results, the levels of all series do not include unit root at 1% significance level. This means that levels of these series are stationary.

[2] For details, see Baltagi (2003).

Table 5. The results of panel unit root tests
(Tablo 5. Panel birim kök testleri sonuçları)

Variables	Levin, Lin & Chu-t test value* and prob	Im, Pesaran and Shin W-stat test value** and prob	ADF - Fisher Chi-square test value** and prob	PP - Fisher Chi-square test value** and prob	Test for unit root in	Include in test equation
fdi	-8.91488 p = 0.0000	-7.94506 p = 0.0000	124.888 p = 0.0000	262.026 p = 0.0000	level	individiual trend and intercept
Wages	32.6171 p = 0.0000	-22.2374 p = 0.0000	591.309 p = 0.0000	2384.06 p = 0.0000	level	individiual trend and intercept
Inf	-6.66487 p = 0.0000	-7.37461 p = 0.0000	124.172 p = 0.0000	32.7703 p = 0.0000	level	individiual trend and intercept
Intrate	-7.33655 p = 0.0000	-6.77524 p = 0.0000	118.610 p = 0.0000	95.2947 p = 0.0000	level	individiual trend and intercept
Growth	6.36721 p = 0.0000	-2.13165 p = 0.0165	52.4095 p = 0.0127	48.8182 p = 0.0149	level	individiual trend and intercept
Trade	-6.06770 p = 0.0000	-6.47191 p = 0.0000	115.180 p = 0.0000	114.915 p = 0.0000	level	individiual trend and intercept
inv	-5.87076 p = 0.0000	-8.84431 p = 0.0000	154.429 p = 0.0000	504.783 p = 0.0000	level	individiual trend and intercept

* Null: Unit root (assumes common unit root process)
** Null: Unit root (assumes individual unit root process)

4.3. Panel Data Analysis (Panel Veri Analizi)

Panel data sets provide some advantages over cross-sectional or time series data alone. These advantages are: (1) better control for effects of individual heterogeneity, (2) possible reduction in collinearity among explanatory variables, and (3) increase in efficiency of econometric estimators.

In panel data models[3], the data set consists of *n* cross-sectional units, denoted *i = 1,……,N*, observed at each of *T* time periods, *i = 1,…..,T*. In data set, the total observation is *nT*. The basic framework for the panel data analysis starts with the following classical regression model:

$$y_{it} = \alpha + \beta' x_{it} + u_{it} \qquad (2)$$

where the subscript "*i*" indexes groups (firms, countries, individuals, etc), and "*t*" indexes period, y_{it} is independent variable, α represents the intercept coefficient , x_{it} is the *it*-th observation on K explanatory variables, β' represents the vector of slope coefficients, u_{it} is the vector of error term.

Most of panel data applications utulize a one-way error compoment for the disturbances, with $u_{it} = \mu_{it} + \nu_{it}$, where μ_{it} denotes the unobservable individual specific effect and ν_{it} denotes the remainder stochastic disturbance term. But, if it utilizes a two-way error compoment for the disturbances, this equation becomes the following form: $u_{it} = \mu_{it} + \lambda_{it} + \nu_{it}$, where λ_{it} denotes the unobservable time effect.

In order to apply GLS (generalized least squares) instead of OLS (ordinary least squares), we are in need of testing the model for groupwise heteroscedasticity. The Lagrange Multipler test can be used

[3] See Baltagi (2003), Gür (1998) and Erlat (1997)

for this purpose. If homoscedasticity exists in the model, the null hypothesis of equal variances is rejected. According to LM test, one of those effects (individual effect or time effect) should be existed at least when the null hypothesis of equal variances is rejected. On other hand, upon the rejection of the null hypothesis of equal variances, there exists an individual effect as per LM1 test. By the way, this time, upon the rejection of the null hypothesis of equal variances, as per LM2 test, a time effect exists. In accordance with these LM tests, if there is not a time effect, one-way error compoment model is to be used. Otherwise, two-way error compoment model is to be used.

A critical assumption in the error correction regression model is that $E(u_{it} / x_{it}) = 0$. This is important given that disturbances contain individual in variant effects (the μ_i) which are unobserved and may be correlated with the x_{it}. For this purpose, it is better to use Hausman test statistic[4]. Hausman (1978) suggested a specification test of the most commonly used in the model selection process. This test assumes that the individual specific effects are random. It tests for ortagonality of random effects and regressors. Under the null hypothesis of no correlation, both the LSDV model and the GLS model are consistent, but OLS is an inefficient estimator. A large value of the test argues in favor of the Fixed Effects Model (LSDV) and the low value of the test argues in favor of the Random Effects Model. In these cases where the test statistic is smaller than the table value, the argument that the individual effects are uncorrelated with the explanatory variables will not be rejected.

5. EMPIRICAL RESULTS (AMPİRİK SONUÇLAR)

5.1. The Choice Model (Model Seçimi)

According to the result of the LM test, the null hypothesis of equal variances ($H_0 : \sigma_\mu^2 = \sigma_\lambda^2 = 0$) is rejected as shown below, in Table 6.

Table 6. The results of LM test
(Tablo 6. LM test sonuçları)

Test Values	Probability	Result	(chi-sqr(1))
LM test	350.9814	0.000000*	individual effect or time effect
LM1 test	350.9770	0.000000*	individual effect
LM2 test	0.004439	0.946877	no time effect.

Note: The series has a statistically significance at 1% level (*)

Therefore, one of individual effect or time effect should be existed at least. In the model, there is groupwise heteroscedasticity. By LM1 test result, we are to reject the null hypothesis of equal variances ($H_0 : \sigma_\mu^2 = 0$). Thereby, in our model there is an individual effect. By LM2 test result, we do not reject the null hypothesis of equal variances ($H_0 : \sigma_\lambda^2 = 0$) in this model, there is not a time effect.

According to the Hausman test result, the test statistic is smaller than the table value, the null-hypothesis by which the individual effects are uncorrelated with the explanatory variables ($H_0 : E(u_{it} / x_{it}) = 0$) will not be rejected, as shown below in Table 7.

[4] Hausman test statistic is distributed as χ^2 (chi-square).

Table 7. The Results of Hausman Test
(Tablo 7. Hausman Test Sonuçları)

Test Values		Probability (chi-sqr(1))
LM test	1.199548	0.548936

4.2. The Results of Model (Model Sonuçları)

Primarily, for diagnostic purposes, autocorrelation and heteroskedasticity tests applied. According to the results of these tests (as shown appendix 2 and 3) there aren't any autocorrelation but there are heteroskedasticity problem in the model. In order to solve the heteroskedasticity problem, the estimations were done by "White cross-section standard errors & covariance (d.f. corrected)" in the Fixed Effect Model. The results of Fixed Effect Model are shown in Table 8. The results indicate that all variables, except for wages, have the theoretically expected signs which are given in Table 4. Inflation has negative signs and this means if inflation rates decrase, FDI inflows increase in developing countries and transition economies, as expected. On the other hand, as all other variables have positive effects, an increasing in interest rate, growth rate, openness level, the previous period FDI or domestic investment causes to an increasing in FDI inflow to those countries. While the coefficients of variables of inflation, the previous period FDI and interest rates are statistically significant at 1 percent significance level, the coefficient of variables of trade rate is (openness) statistically significant at 5 percent significance level and the coefficient of variables of growth rate is statistically significant at 10 percent significance level. The other, remaning variables of the model are not statistically significant at 10 percent significance level. According to these results, all variables which are included in the model, except for wages and inv variables, are all suggested determinants of FDI inflow to developing countries and transition economies.

Table 8. The results of fixed effect model
(Tablo 8. Sabit etki modeli sonuçları)

Variable	Coefficient	Std. Error	t-Statistic	Probability
FDI(-1)	0.106615*	0.032697	3.260689	0.0012
GROWTH	0.039379***	0.021479	1.833403	0.0673
INF	-0.000377*	0.000128	-2.942668	0.0034
INTRATE	0.045574*	0.012313	3.701249	0.0002
TRADE	0.021174**	0.014407	1.8969668	0.0532
INV	0.022839	0.050003	0.456749	0.6480
WAGES	0.000582	0.000645	0.901273	0.3678
C	0.013500	0.010664	1.265951	0.2060

R-squared	0.439496	F-statistic	19.46635
Adjusted R-squared	0.416919	Prob(F-statistic)	0.000000
Durbin-Watson stat	2.096055	Akaike info criterion	-3.294852

*statistically significant at 1 percent significance level,
** statistically significant at 5 percent significance level
*** statistically significant at 10 percent significance level

6. CONCLUSION (SONUÇ)

The main purpose of this study is to develop an empirical framework to estimate the economical determinants of FDI inflows by employing a panel data set of 17 developing countries and transition economies for the period of 1989:01-2006:04. In our model there are

seven explanatory economical variables. They are, respectively, The previous period FDI (the pull factor for new FDI), GDP growth (measures market size), Wage (unit labor costs), Trade Rate (measures the opennes of countries), The Real Interest rates (measures macroeconomic policy), Inflation Rate (as country risk and macroeconomic policy), Domestic Investment (Business Climate). Hence, throughout this paper, we especially focused on only the economical determinants (being separated and apart from the other studies in the literature) of FDI inflows to developing countries and transition economies.

The results of our analysis show that FDI is related positively with interest and growth rates, trade (openness) rates and the previous period FDI but inversely related with inflation rates. Finally, it is concluded that the inflation and the interest rates (by means of macroeconomic policy determinants), the rates of trade (openness) and growth (by means of market-related economical determinants) are all the main economical determinants for FDI inflows. Besides, it is also understood that the previous period FDI which is directly related with the host countries economic resources is one of the important economical determinants. Hence, the FDI inflows give an high power to the host countries' economies.

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Appendix 1: The Variables Effecting Inward FDI
(Ek 1: DYY Girişini Etkileyen Değişkenler)

Variable	Theory/hypothesis	Direction of effect	Empirical findings	Examples
Market size (GDP or per capita GDP)	Market size hypothesis	+	+	Tsai (1994), Shamsuddin (1994), Billington (1999), Pistoresi (2000), Cheng and Kwan (2000), Tuman and Emmert (1999), Wang and Swain (1995), Love and Lage-Hidalgo (2000)
Wages	Location hypothesis	+/−	+/−/0	Wheeler and Mody (1992), Pistoresi (2000), Tsai (1994), Cleeve (2000), Lunn (1980), Culem (1988), Blonigen and Feenstra (1996), Cheng and Kwan (2000), Moore (1993)
Trade barriers	Other	−	+/−/0	Lunn (1980), Culem (1988), Blonigen and Feenstra (1996)
Growth rate	Differential rates of return, diversification, internal financing	+	+/0	Billington (1999), Tsai (1994), Martin and Ottaviano (1999), Sin and Leung (2001)
Openness	Other	+	+/0	Kravis and Lipsey (1982), Pistoresi (2000), Wheeler and Mody (1992), Gyapong and Karikari (1999), Sin and Leung (2001)
Trade deficit	Other	?	+/−	Tsai (1994), Shamsuddin (1994), Pistoresi (2000)
Exchange rate	Currency areas hypothesis	+/−	+/−/0	Edwards (1990), Blonigen and Feenstra (1996), Tuman and Emmert (1999)
Tax	Other	−	+/−/0	Swenson (1994), Billington (1999), Porcano and Price (1996), Wei (2000), Schoeman et al. (2000), Hines (1996)
Country risk	Other	−	−	Lehmann (1999), Ramcharran (1999), Tuman and Emmert (1999)
Incentives	Other	+	+	Ihrig (2000)
Corruption	Other	−	−	Wei (2000)
Labour disputes and unionisation	Location hypothesis	−	+/−	Moore (1993), Tcha (1998), Yang et al. (2000), Leahy and Montagna (2000), Zhao (1995, 1998)
Cost of capital	Location hypothesis	−	+	Love and Lage-Hidalgo (2000)
Inflation	Other	−	−	Schnieder and Frey (1985), Bajo-Rubio and Sosvillo-Rivero (1994), Yang et al. (2000)

Source: Moosa and Çardak (2006)

Appendix 2: The Result of Autocorrelation Test
(Ek 2:Otokorelasyon Testi Sonucu)

lmrho_chi-sqr(1) =	0.398308
p-value =	0.527964
Durbin-Watson=	2.039691

Appendix 3: The Result of Heteroskedasticity Test
(Ek 3: Değişen Varyans Testi Sonucu)

LMh test for heteroscedasticty

LMh_ols	
chi-sqr(16) =	766.2900
p-value =	0.000000
LMh_fixed	
chi-sqr(16) =	1026.207
p-value =	0.000000