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# ECONOMIC GROWTH, GLOBALIZATION AND TRADE

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## Abstract

The purpose of this article is to investigate the relationship between economic growth, globalization and trade. The manuscript uses the assumptions of the economic growth exogenous and endogenous models. It introduces new proxies for explain the economic growth as in intra-industry trade, foreign direct investment and globalization index. The results indicate that economic growth is a dynamic process. The intra-industry has a positive impact on economic growth. This paper confirms relevant theoretical hypothesis as foreign direct investment and globalization promotes the economic growth. The good results obtained with GMM system estimator suggest that the building of dynamic theoretical models will be of interest to academic researchers.

**Keywords:** Exogenous and Endogenous models, Panel Data, and United States

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## 1. INTRODUCTION

The issue of convergence versus economic divergence has been a great debate in the literature over the past decades. In 1990s the endogenous growth models emerged. In fact, technological progress, innovation could not be analyzed outside the economic system, as demonstrated by exogenous growth models. The models of monopolistic competition (endogenous) showed that international trade, foreign direct investment and technological factors promoted the economic growth. Thus, it appears that it is more important to assess the growth perspective endogenous that exogenous. That is, more than studying the convergence versus the economic divergence between a group of economies, it is important evaluate the economic growth in a dynamic perspective. With the economic globalization the theoretical and empirical models were revisited.

The theory emphasizes endogenous (Romer 1986; Lucas 1988; Grossman and Helpman 1991; Rebelo 1991 and Aghion and Howitt 1992) introduced the assumptions of monopolistic competition to explain economic growth. These models are based on the theoretical construction of Schumpeter (1942). Technological progress, innovation is part of the economic system. Innovation is explained by endogenous factors.

In the 1980s and 1990s emerged some studies introduced other concerns the theory of growth. These studies (Rodrik 1998, Alesina et al., 1994, Dollar 1992, and Frankel and Romer 1996) introduced new

determinants of economic growth as foreign direct investment (FDI), the degree of openness of economies, technology, globalization and immigration.

This paper presents two contributions. We demonstrate that economic growth is a dynamic process, it is preferable to use dynamic estimators. Second, the changes in trade and globalization are key to explaining economic growth.

## 2. MEASURING OF INTRA-INDUSTRY TRADE

The empirical literature use the index proposed by Grubel and Lloyd (1975). The Grubel and Lloyd (1975) is given by:

$$IIT = 1 - \frac{|X_i - M_i|}{(X_i + M_i)} \quad (1)$$

Where  $X_i$  and  $M_i$  are the exports and imports of a particular in industry  $i$ . The index is equal 1 if all trade is intra-industry trade (IIT). If IIT is equal 0 all trade is inter-industry trade.

## 3. PANEL DATA APPROACH

This research uses static and dynamic panels. In the static panel, we estimated by means of pooled OLS, fixed effects (FE) and random effects (RE), the F statistic tests and the null hypothesis of the same specific effects for all individuals. If we accept the null hypothesis, we could use the OLS estimator. The Hausman test can decide which model is better: random effects (RE) or fixed effects (FE). The static panel data have some problems in serial correlation, heteroskedasticity and endogeneity of some explanatory variables. The estimator GMM-system (GMM-SYS) permits the researchers to solve the problems of serial correlation, heteroskedasticity and endogeneity for some explanatory variables. These econometric problems were resolved by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998, 2000), who developed the first differenced GMM (GMM-DIF) estimator and the GMM system (GMM-SYS) estimator. The GMM-SYS estimator is a system containing both first differenced and levels equations. The GMM-SYS estimator is an alternative to the standard first differenced GMM estimator. To estimate the dynamic model, we applied the methodology of Blundell and Bond (1998, 2000), and Windmeijer (2005) to small sample correction to correct the standard errors of Blundell and Bond (1998, 2000). The GMM system estimator that we report was computed using STATA. The GMM-system estimator is consistent if there is no second order serial correlation in the residuals (m2 statistics). The dynamic panel data model is valid if the estimator is consistent and the instruments are valid.

#### 4. ECONOMETRIC MODEL

The dependent variable is the real GDP per capita of US1 (Growth) for the period 1995 and 2008. The data are taken from World Development Indicators, the World Bank.

Based on the link economic growth and globalization, we formulate the following hypotheses:

Hypothesis 1: There is a negative correlation between initial level of GDP per capita and economic growth.

According to the assumptions of growth models, the hypothesis 1 reflects economic convergence. Barro (1991), and Dreher (2006), showed that economic growth has been negatively correlated by initial level of GDP per capita.

Hypothesis 2: Intra-industry trade promotes the economic growth.

According to the literature the expected sign for IIT is positive (Grossman and Helpman 1991, Rebelo 1991).

Hypothesis 3: There is a positive (dominant paradigm) correlation between FDI and growth.

FDI - is the stocks inward foreign direct investment each country. The data are collected from UNCTAD, FDI database. The studies of Kai and Hamori (2009), Damijan and Rojec (2007), Campos and Kinoshita (2002), Badinger and Tondl (2002), Mileva (2008), and Onaran, (2007) show that foreign direct investment influences the economic growth.

However De Mello (1999) and Ayanwale (2007) defend a negative impact of FDI on growth.

Hypothesis 4: Globalization encourages the economic growth.

The index of globalization (KOF) proposed by Dreher (2006) represents three dimension of globalization: economic; social and political (see Dreher, 2006; Dreher, Gaston (2008). <http://globalization.kof.ethz.ch/>. There is a positive relationship between KOF and economic growth.

ECOKOF- this is economic globalization. The index is composed by two categories: Actual flows and Restrictions. The actual flows involve the following components: trade in percentage of GDP; foreign direct investment in percentage of GDP; portfolio investments in percentage of GDP, and income payments to foreign nationals in percentage of GDP. In restriction, the components consider are hidden import barriers, mean tariff rate, taxes on international trade and capital account restrictions.

CULTKOF- Cultural globalization is interpreted as the domination of American products (Dreher 2006: 1093). The data on cultural proximity are the number of McDonald's restaurants per capita.

<sup>1</sup> We select the following trade partners: Australia, Belgium, Brazil, Canada, China, Denmark, France, Germany, Netherlands, Spain, Portugal, Japan, Korea, Thailand, Italy, United Kingdom, and Russia.

POLTKOF- Political globalization is measured by embassies country and membership in international organizations.

## 5. MODEL SPECIFICATION

$$Growth_{it} = \beta_0 + \beta_1 X_{it} + \delta t + \eta_i + \varepsilon_{it} \quad (2)$$

Where  $Growth_{it}$  is the real GDP per capita,  $X$  is a set of explanatory variables. All variables are in the logarithm form;  $\eta_i$  is the unobserved time-invariant specific effects;  $\delta t$  captures a common deterministic trend;  $\varepsilon_{it}$  is a random disturbance assumed to be normal, and identical distributed (IID) with  $E(\varepsilon_{it})=0$ ;  $Var(\varepsilon_{it}) = \sigma^2 > 0$ .

## 6. EMPIRICAL RESULTS

In table 1 we can observe the determinants of growth using fixed effects estimator. All explanatory variables are statistically significant. The hypothesis for convergence, the initial level of GDP per capita (LogGDP) is according to the hypothesis formulate, i.e, economic growth has been negatively correlated by initial level of GDP per capita. Our result is according to previous studies (Barro ,1991, and Dreher ,2006). For the coefficient of intra-industry trade (LogIIT), the literature predicts a positive sign. The result confirms that intra-industry trade promotes the inovation and economic growth. The variable foreign direct investment (LogFDI) is significant with the expected positive sign. As in Badinger and Tondl (2002), Mileva (2008), and Onaran, (2007) our result confirms the hypothesis formulated. Our model of economic growth also shows that the coefficients of KOF (index of globalization) are statistically significant (Dreher, 2006; Dreher and Gaston 2008).

TABLE 1 - ECONOMIC GROWTH, GLOBALIZATION AND TRADE: FIXED EFFECTS ESTIMATOR

Dependent variable : LogGrowth( real GDP per capita)		
Independent Variables	Coefficient	Expect Signs
LogGDP	-0.98 (-6.57)***	(-)
LogIIT	0.28 (2.14)**	(+)
LogFDI	3.68 (2.60)***	(+)
LogECOKOF	4.34 (16.66)***	(+)
LogCULTKOF	30.49(29.15)***	(+)
LogPOLTKOF	27.54 (5.40)***	(+)
C	-58.02 (-29.54)***	
N	220	
$R^2$	0.85	

T- Statistics (heteroskedasticity corrected) are in brackets; \*\*\*/\*\*-indicates statistical significance, respectively at 1%, and 5%level.

In Table 2 we can observe the determinants of growth using GMM-system estimator. The model presents consistent estimates, with no serial correlation (the Arellano and Bond test for Ar(2)). The specification Sargan test shows that there are no problems with the validity of instruments used. The Windmeijer (2005) finite sample correction is used.

The model presents all significant variables (LogGDP, LogIIT, LogFDI, LogECOKOF, LogCULTKOF, and LogPOLKOF).

The initial per capita GDP (LogGDP) is statistically significance with a negative sign.. Our results confirm the empirical studies of as in Barro (1991), Kai and Homori (2009), Dreher (2006), and Dreher and Gaston (2008).

A positive effect of intra-industry trade (LogIIT) on economic growth was expected and the results confirm this, showing that changes of trade encourage growth. This result is according to Grossman and Helpman (1991) and Rebelo (1991).

The coefficient of foreign direct investment flows (LogFDI) is positive with significant. So we can conclude that FDI promotes the economic growth.

Our results show that the economic growth is positively correlated with all components of the index of globalization (LogKOF). This result is according to previous studies (Dreher 2006, Dreher and Gaston, 2008, Kai and Hamori, 2009).

TABLE 2.ECONOMIC GROWTH, GLOBALIZATION AND TRADE: GMM-SYSTEM

Dependent variable : LogGrowth( real GDP per capita)		
Independent Variables	Coefficient	Expect Signs
LogGDP	-0.75 (-7.00)***	(-)
LogIIT	0.70 (4.71)***	(+)
LogFDI	3.20 (2.40)**	(+)
LogECOKOF	3.84 (21.0)***	(+)
LogCULTKOF	21.70 (5.22)***	(+)
LogPOLTKOF	27.79 (33.32)***	(+)
C	-52.68 (-29.55)***	
N	220	
Arellano-Bond test for Ar(2) (P-value)	0.372	
Sargan test (P-value)	1.00	

The null hypothesis that each coefficient is equal to zero is tested using one-step robust standard error. T-statistics (heteroskedasticity corrected) are in round brackets. P-values are in square brackets; \*\*\* - statistically significant at the 1 per cent level. Ar(2) is tests for second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null hypothesis of no serial correlation (based on the efficient two-step GMM estimator). The Sargan test addresses the over-identifying restrictions, asymptotically distributed X2 under the null of the instruments' validity (with the two-step estimator).

## 7. CONCLUSIONS

In this article, we analyze the link between economic growth, and globalization. To understand this, we introduced the exogenous and endogenous explanatory variables. We applied a static panel data (Fixed effects) and the GMM-System approach with orthogonal transformation of data. The globalization was consider three dimensions: economic, social and political. Regarding the initial GDP per capita, the results confirms the assumptions of Solow model. The study confirms that intra-industry trade promotes the growth. The results also show that foreign direct investment influences the economic development.

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