



RESEARCH PAPER

**Estimating and Forecasting the Growth Model by Autometrics
Technique: A Cross Country Analysis**

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ABSTRACT

The selection of a potential variable is issues of great concern. In this study six growth models have been used for analyzing the main determinants of economic growth in case of 43 cross countries analysis. Therefore, by using these six models we have tested all the potential variables through modern shrinkage procedure autometrics. Data from 1980 to 2020 were used to analyze the cross country growth factors. Current study looked at about 43 countries with modeling these different comparative studies based on growth modeling By evaluating the data and using the modern econometrics technique autometrics, different sets of economic variables has been used to evaluate which sets of the economic variables are important to boost up the growth level of the country. And found variable exports of goods and services (LNREXP) gross fixed capital formation (LNGCF) .Domestic investment (DI),Total labor force (LNTLF) current and lag values found highly.

KEYWORDS Autometrics, Cross Country, Economic Growth, Forecast

Introduction

The growth modeling is one of the crucial issues of any economy. There are many schools of thought that estimate growth models through their own way and explain conflict regression results. In conventional econometrics model, the selection criteria is based on the different economic theories. If we consider the growth model, we have seen the list of economic theories. All these theories have explained the different growth models because theory-based model is an important part of the conventional econometrics. In economics most often there exist more than one distinct model for underlying phenomenon and there is least clarity that which of these one should be used for policy purposes. The growth models start with simple endogenous growth model and then there are so many variants which have been used in the literature. One of the problem is having a specific model we need to select which of the variables are affecting the dependent variable and which are not. The other problem is that we have a variety of models having different set of variables and we have to choose among these models. There are set of challenges for selection of the models. The problem we are considering to relate a variety of different set of models and the choice between them.

Literature Review

Mortaza (2005) discovered that inflation has a negative impact on economic growth. Awan (2018), on the other hand, discovered that inflation is positively related to economic growth in the case of Pakistan. Mallick (2008) used cointegration procedure in his study for india from 1960 to 2005. the paper concluded that inflation effects negatively to economic growth. Most of the previous studies also suggest that inflation as adverse effect on economic growth, so the current study also validates the results.

Calero (2008) discovered that remittances improve school enrollment and reduce the extent of child labour in terms of education Bal et al. (2016) attempted to determine the relationship between capital formation and economic growth in India. The paper examined whether or not there is a long-term relationship between economic growth and capital formation. Fayissa and Nsiah (2008) argue that developing countries, particularly those with weak financial sectors, may be able to benefit from foreign capital remittances in order to meet their investment needs.

Gupta et al., 2009; Jong wanich, 2007; Stark and Lucas, 1988) have looked into the relationship between foreign remittances and economic growth in developing countries. According to the findings of the study, remittances have a positive impact on economic growth in developing countries. They argue that developing countries, particularly those with weak financial sectors, may be able to benefit from foreign remittances in order to meet their investment needs. Giuliano (2009) Calero (2008) discovered that remittances improve school enrollment and reduce the extent of child labor in terms of education. Borda (2015) find out the exported orientation variables are strongest factor of attraction of GDP. Their variables included Human capital, Population growth, trade openness, got burden, fiscal deficit, external debts, natural disaster, good governance, macroeconomic stabilization Policy crime rate, remittances their results suggest that there is a increasing trend toward the increasing complementarity between GDP and trade. Their findings also support to tariff jumping hypothesis.

Material and Methods

Autometrics

On the basis of the work of Hoover and Perez (1999) as well as Hendry and Krolzig (2007), Hendry and Doornik (2007), and Doornik (2009), developed an automated algorithm for model selection (2005). In place of multiple searches, it uses an enhanced search method called tree search, which takes all sets of variables and then systematically discards irrelevant sets, along with diagnostic testing F statistics. The final model is made up of various sub-models. It is a 3rd generation algorithm called Autometrics and is part of the Pc-Give software. The Autometrics algorithm is divided into three stages

Estimation and evaluation of General Unrestricted Model (GUM)

The formulation, estimation, and evaluation of the general unrestricted model (GUM), as well as the detection of outliers through dummy saturation and the pre-search for lag-length, are all covered in the first section. Initially, The first part of this stage is male GUM which is formulated as follows:

$$Y_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \dots + \beta_n X_{nt} + \mu_t \dots \dots (1)$$

Where μ_t is auto-correlated heteroscedastic and homoscedastic?

A battery of diagnostic tests is then used to examine the General Unrestricted Model (GUM) for uncorrelated and homoscedastic errors, data misspecification, and parameter constancy. such as White (1980) heteroscedasticity test, Godfrey (1978) autocorrelation test, Engle (1982) autoregressive conditional heteroscedasticity test, and Ramsey test (1994).

If any of the tests fail, the researcher can either get a new General Unrestricted Model GUM or low level of the significance of the test so it can be change later. Secondly, In order to detect outliers, the impulse saturation method (Santos et al., 2008; Johansen and Nielson, 2009) is used. which can then be added to the GUM. Create

dummies for each observation and split them up for regression. They are then added to the estimated model. Autometrics also allows you to drop irrelevant variables with low significance levels. A top-down search eliminates insignificant variables while a bottom-up search retains significant variables by using a joint F-test. They used the F test until it failed in order to determine the lag length to use. In order to save time Pre-searches are not used by default in Autometrics. GUM 0 is created after the first stage. It could be similar to the initial GUM, contain any dummy discovered to be significant in dummy saturation detection, or remove variables or lags through pre-search.. The next stage starts at GUM 0.

Stage II: Reduction Process

Stage III: Iterative Search.

**Table 1
Theory Based Models Of Economic Growth**

Country Name	Models Of Economic Growth
Model 1	LnGDP =f (FDI(inf) , T Debts, DI , Inf)
Model 2	LnGDP =f (Inf, LnTLF, TOTP, FDI (inf) , GExp)
Model 3	LnGDP =f (Edu, RExp, P(remi), FDI)
Model 4	LnGDP =f (Inf, LnGCF , Rexp, P(remi)
Model 5	LnGDP = f (FDI ,TOP, LG, DI , LnGCF ,)
Model 6	LnGDP =f (DI, FDI, Edu, TOP)

LnGDP =f (FDI, TOP, LG, DI, LnGCF, TDebts, INF , LnTLF, LnTOTP EDU, LnREXP , LnGEXP , REMI)

General Un Restricted Model for Economic Growth

$$\begin{aligned}
 \text{LN}GDP_t = & \beta_0 + \beta_1 \text{LN}GDP_{-1t} + \beta_2 \text{FDI}(\text{inf})_t + \beta_3 \text{FDI}(\text{inf})_{-1t} + \beta_4 \text{TOP} \\
 & + \beta_5 \text{TOP}_{-1t} + \beta_6 \text{LG}_t + \beta_7 \text{LG}_{-1t} + \beta_8 \text{DI} \\
 & + \beta_9 \text{DI}_{-1t} + \beta_{10} \text{Ln}GCF_t + \beta_{11} \text{Ln}GCF_{-1t} + \beta_{12} \text{TDebt}_t + \beta_{13} \text{TDebt}_{-1t} + \beta_{14} \text{Inf}_t + \beta_{15} \text{Inf}_{-1t} + \\
 & \beta_{16} \text{Ln}TLF_t + \beta_{17} \text{Ln}TLF_{-1t} + \beta_{18} \text{Ln}TOTP_t + \beta_{19} \text{Ln}TOTP_{-1t} + \beta_{20} \text{Edu}_t + \beta_{21} \text{Edu}_{-1t} + \beta_{22} \text{Ln}R \\
 & \text{Exp}_t + \text{Ln}R\text{Exp}_{-1t} + \beta_{24} \text{Ln}GExp_t + \beta_{25} \text{Ln}GExp_{-1t} + \beta_{26} \text{REMI}_t + \beta_{27} \text{REMI}_{-1t} + \mu_t \dots \dots \dots 1)
 \end{aligned}$$

Results of Autometrics Procedure

The autometrics procedure in which we select the final model and account the total significance of each variable. Also, estimate the forecasted values and find out the RMSE (see, table 1.a, 1.b, 1.c, and 1.d). The table 1.a, 1.b, 1.c, and 1.d show the significant variable values for each country and also RMSE for each country. The missing value (..) means the variable is not significant for this country modeling. The last column of the table 28.a, 28.b, 28.c, and 28.d shows the total significance and last row shows the forecast model RMSE for each country. The figure 9 is based on the results of table 1.a, 1.b, 1.c, and 1.d given below. The figure 1 shows that the forecast RMSE of final model of autometrics modeling for growth of United state is lowest 0.06 while the forecast RMSE for Bulgaria Growth model is highest 1.11. So, according to the autometrics modeling on the basis of forecast RMSE the US model forecast performance is best and Bulgaria model has worst ability to forecast.

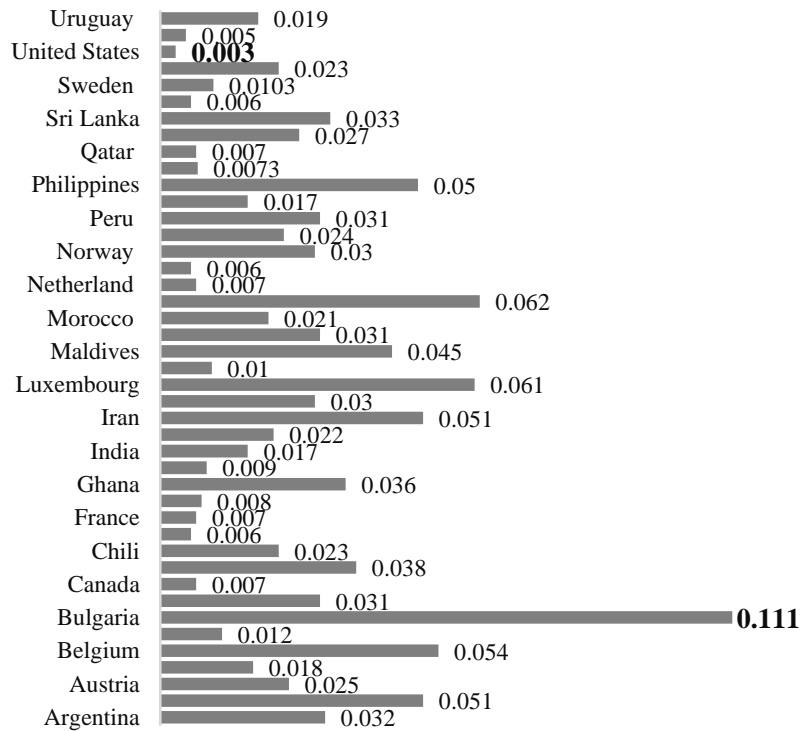


Figure 1: Graph of RMSE of Automatics for Growth Modeling

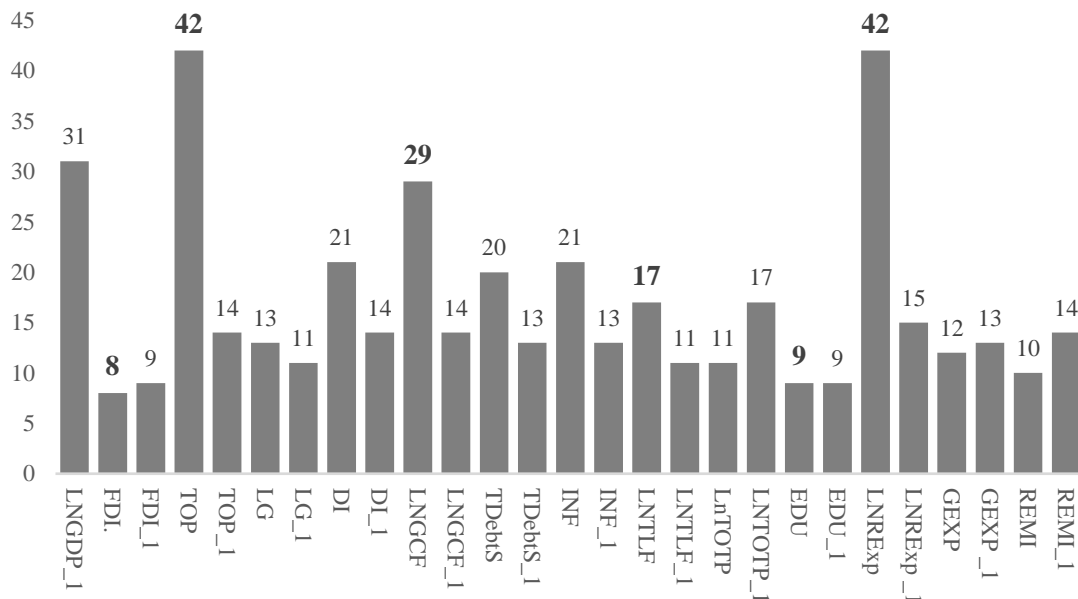


Figure 2: Graph of Total Significance of Variables in Automatics for Growth Modeling

The figure 2 shows the total significance of variables in automatics modeling for all countries. In focus variables the foreign direct investment (FDI) current and lag values are found significant 8 and 9 times out of 43 regressions respectively. The gross fixed capital formation (LNGCF) current and lag values got significant 29 and 14 times out of 43 regressions respectively. While the total labor force (LNTLF) current and lag values

found significant 20 and 13 times out of 43 regressions. It means in focus variables the LNGCF is highly significant in repeated modeling and FDI got low significance.

In case of auxiliary variables, the current and lag values of exports of goods and services (LNREXP) found highly significant 42 and 15 times out of 43 regressions respectively and EDU got less significance 9 and 9 times for current and lag values out of 43 regressions respectively.

Table 2
The Results of Automatics for Growth Modeling

Country Name	Argentina	Australia	Austria	Bangladesh	Belgium	Bhutan	Balgeria	Brazil	Canada	China	Chilli	Total significant
Variables												
Constant	7.60155 (0.0019)	..	14.879 (0.0000)	20.560 (0.0000)	44.623 (0.0000)	4.541 (0.7645)	..	..	-23.670 (0.0037)	..		
LNGDP_1	0.065 (0.0068)	0.451 (0.0000)	0.504 (0.0000)	0.299 (0.0000)	0.726 (0.0000)	0.753 (0.0007)	..	1.185 (0.0000)	0.740 (0.0000)	0.297 (0.0000)	0.199 (0.0000)	31
FDI(inf)	..	..	..	..	..	0.009 (0.8509)	..	..	..	..	..	08
FDI(inf)_1	0.013 (0.0022)	..	..	-0.040 (0.0154)	..	0.007 (0.8649)	0.003 (0.0001)	..	..	-0.021 (0.0005)	..	9
TOP	-12.712 (0.0000)	2.790 (0.0005)	-13.734 (0.0000)	-8.684 (0.0000)	-16.766 (0.0000)	-5.522 (0.0007)	-12.542 (0.0000)	-14.287 (0.0000)	-11.912 (0.0000)	-8.754 (0.0000)	-10.919 (0.0000)	42
TOP_1	..	2.398 (0.0009)	7.539 (0.0000)	2.849 (0.0001)	11.300 (0.0000)	4.218 (0.0118)	..	15.646 (0.0000)	7.584 (0.0000)	-1.324 (0.0000)	..	14
LG	..	..	..	0.540 (0.0108)	..	..	..	1.162 (0.0000)	..	-0.602 (0.0009)	..	13
LG_1	..	..	..	..	-573.302 0.0157	-201.459 (0.3486)	..	2.54521 (0.0000)	..	-0.702 (0.0003)	..	11
DI	0.001 (0.0016)	0.051 (0.0000)	..	..	..	0.001 (0.8435)	-0.002 (0.0000)	-4.302 (0.0002)	..	..	..	21
DI_1	..	..	..	..	..	0.002 (0.7276)	..	-9.3900 (0.0000)	..	..	-0.001 (0.0235)	14
LnGCF	0.833 (0.0000)	..	..	..	..	0.145 (0.0357)	0.075 0.0000	0.468 (0.0001)	0.348 (0.0000)	..	0.383 (0.0000)	29
LnGCF_1	..	..	..	..	-0.192 0.0131	-0.063 (0.4089)	..	-0.699 (0.0000)	-0.231 1 (0.0000)	0.173 (0.0003)	..	14
TDebtS	..	..	..	..	..	-0.001 (0.8981)	..	..	..	-0.039 (0.0108)	4.324 (0.0030)	20
TDebtS_1	..	0.011 (0.0002)	..	0.050 (0.0092)	0.011 (0.0000)	..	..	..	0.009 (0.0008)	-0.003 (0.0005)	-4.443 (0.0024)	13
Inf	..	-0.035 (0.0001)	0.018 (0.0000)	0.003 (0.0437)	0.026 (0.0000)	0.005 (0.7873)	-0.002 (0.0000)	..	..	0.008 (0.0000)	..	21
Inf_1	..	-0.021 (0.0006)	..	..	..	-0.002 (0.3366)	-0.002 (0.0000)	0.003 (0.0000)	..	0.006 (0.0000)	0.004 (0.0000)	13
LnTLF	-0.749 (0.0000)	..	..	..	37.755 0.0156	16.079 (0.3562)	..	..	..	..	..	17
LnTLF_1	-0.454 (0.0017)	-0.253 (0.0024)	..	-0.078 (0.0000)	-37.750 (0.0156)	-16.237 (0.3510)	..	..	..	..	..	11
LnTOTP	..	..	-3.185 (0.0036)	-22.554 (0.0005)	..	0.132 (0.9681)	..	..	1.836 (0.0006)	-42.016 (0.0000)	16.603 (0.0000)	11

LnTOTP_1	1.366 (0.0000)	..	3.467 (0.0019)	22.253 (0.0005)	-1.812 (0.0001)	-0.012 (0.9963)	1.388 (0.0000)	..	..	43.021 (0.0000)	-15.736 (0.0000)	17
Edu	-0.021 (0.0092)	-0.122 (0.0012)	..	..	..	..	0.012 (0.0000)	..	..	-0.040 (0.0010)	..	09
Edu_1	..	..	..	-0.096 (0.0014)	..	-0.007 (0.5525)	..	..	-0.014 (0.0177)	..	..	09
LnRExp	0.538 (0.0000)	0.371 (0.0000)	0.655 (0.0000)	0.670 (0.0000)	0.834 (0.0000)	0.504 (0.0006)	1.056 (0.0000)	1.041 (0.0000)	0.681 (0.0000)	0.539 (0.0000)	0.710 (0.0000)	42
LnRExp_1	0.118 (0.0064)	..	-0.431 (0.0000)	..	-0.569 (0.0000)	-0.408 (0.0090)	..	-1.102 (0.0000)	-0.503 (0.0000)	..	..	15
GEXP	..	-0.022 (0.0060)	..	..	..	2.251 (0.9976)	-0.002 (0.0003)	0.002 (0.0254)	..	0.616 (0.0000)	-0.003 (0.0314)	12
GEXP_1	..	..	-0.008 (0.0084)	..	..	0.004 (0.5135)	-0.002 (0.0000)	0.002 (0.0333)	..	-0.608 (0.0000)	..	13
P(remi)	..	..	..	-0.018 (0.0022)	..	..	..	..	..	..	..	10
P(remi)_1	..	..	0.006 (0.0050)	..	..	0.019 (0.7051)	0.013 (0.0000)	0.032 (0.0000)	..	-0.100 (0.0152)	1.814 (0.0000)	14
RMSE	0.032399	0.051469	0.025471	0.018832	0.054141	0.012291	0.111132	0.031513	0.007649	0.038686	0.023489	

Table 3
The Results of Autometrics for Growth Modeling

Country Name	Denmark	France	Germany	Ghana	Hungary	India	Indonesia	Iran	Japan	Luxembourg	Malaysia	Total significant
Variables												
Constant	..	..	..	24.840 (0.0000)	..	18.090 (0.0000)	..	42.593 (0.0000)	12.594 (0.0000)	..	54.808 (0.0000)	
LNGDP_1	-0.060 (0.0000)	0.064 (0.0046)	0.052 (0.0018)	..	..	0.135 (0.0007)	0.133 (0.0001)	..	0.298 (0.0000)	0.855 (0.0000)	0.139 (0.0011)	31
FDI(inf)	..	-0.005 (0.0000)	0.005 (0.0000)	..	..	..	0.025 (0.0001)	..	..	..	0.010 (0.0003)	08
FDI(inf)_1	..	..	0.004 (0.0005)	..	..	..	..	..	..	..	..	9
TOP	-10.779 (0.0000)	-14.510 (0.0000)	-13.284 (0.0000)	..	-13.312 (0.0000)	-11.030 (0.0000)	-10.763 (0.0000)	-13.108 (0.0000)	-9.002 (0.0000)	-9.852 (0.0000)	-10.507 (0.0000)	42
TOP_1	..	..	..	-9.494 (0.0000)	..	..	..	-1.4789 (0.0001)	..	..	..	14
LG	..	..	..	..	..	-0.250 (0.0048)	-1.289 (0.0011)	-1.408 (0.0000)	-1.195 (0.0443)	..	0.256 (0.0389)	13
LG_1	..	..	3.606 (0.0000)	..	..	-0.423 (0.0001)	..	1.740 (0.0000)	..	..	..	11
DI	..	0.014 (0.0001)	0.875 (0.0097)	..	..	-1.031 (0.0000)	-0.0059 (0.0008)	..	-0.040 (0.0000)	..	-0.009 (0.0047)	21
DI_1	..	..	-0.835 (0.0130)	-0.006 (0.0004)	..	0.685 (0.0009)	..	..	0.015 (0.0313)	0.079 (0.0473)	..	14
LnGCF	0.089 (0.0000)	..	-0.096 (0.0146)	-0.037 (0.0023)	0.121 (0.0002)	0.153 (0.0201)	..	..	..	0.079 (0.0609)	0.137 (0.0000)	29
LnGCF_1	..	..	..	-0.040 (0.0018)	-0.061 (0.0283)	..	0.081 (0.0000)	..	..	0.064 (0.1953)	..	14
TDebtS	..	-0.031 (0.0000)	..	-0.013 (0.0081)	..	..	..	-0.025 (0.0000)	..	..	-1.703 (0.0000)	20
TDebtS_1	..	..	..	0.010 (0.0420)	0.297 (0.0000)	..	..	..	..	..	..	13

Inf	..	..	..	-0.001 (0.0098)	-0.001 (0.0028)	..	..	..	..	..	..	21
Inf_1	..	..	..	-0.001 (0.0002)	-0.002 (0.0076)	..	..	..	..	..	..	13
LnTLF	0.060 (0.0000)	..	0.411 (0.0000)	..	..	..	-0.142 (0.0000)	-0.279 (0.0000)	..	..	0.028 (0.0071)	17
LnTLF_1	..	..	..	..	-0.081 (0.0001)	-0.030 (0.0000)	..	..	..	..	..	11
LnTOTP	1.095 (0.0000)	1.515 (0.0000)	..	-29.732 (0.0100)	1.665 (0.0000)	..	45.947 (0.0000)	16.449 (0.0000)	..	..	-2.616 (0.0000)	11
LnTOTP_1	..	..	1.110 (0.0000)	30.003 (0.0093)	..	..	-44.783 (0.0000)	-16.640 (0.0000)	..	..	..	17
Edu	..	-0.056 (0.0000)	..	..	..	..	..	..	..	..	0.015 (0.0001)	09
Edu_1	..	..	..	0.039 (0.0000)	..	0.011 (0.0104)	..	..	..	..	..	09
LnRExp	1.099 (0.0000)	1.035 (0.0000)	1.016 (0.0000)	0.665 (0.0000)	0.934 (0.0000)	0.902 (0.0000)	0.825 (0.0000)	0.617 (0.0000)	0.905 (0.0000)	0.883 (0.0000)	0.974 (0.0000)	42
LnRExp_1	..	..	..	..	..	..	..	0.133 (0.0001)	..	-0.787 (0.0000)	..	15
GEXP	..	-0.004 (0.0457)	..	..	..	0.002 (0.0012)	..	..	0.014 (0.0025)	-0.004 (0.0229)	..	12
GEXP_1	..	..	..	-0.001 (0.0180)	-0.003 (0.0000)	0.003 (0.0002)	..	..	..	..	..	13
P(remi)	..	..	..	..	-0.021 (0.0000)	..	..	..	..	..	..	10
P(remi)_1	..	..	0.330 (0.0000)	..	..	..	0.082 (0.0000)	..	-0.269 (0.0010)	..	..	14
RMSE	0.006819	0.00797	0.008034	0.036219	0.009899	0.017761	0.022639	0.051588	0.030671	0.061419	0.010623	

Table 4
The Results of Automatrix for Growth Modeling

CountryName	Maldives	Mexico	Morocco	Nepal	Netherland	Newzealand	Norway	Pakistan	Peru	Paraguay	Philippines	Total significant
Variables												
Constant	..	-5.846 (0.0102)	16.508 (0.0000)	..	28.496 (0.0000)	24.497 (0.0000)	..	16.264 (0.0000)	11.741 (0.0000)	23.789 (0.0000)	41.198 0.0000	
LNGDP_1	0.901 (0.0000)	1.065 (0.0000)	0.324 (0.0000)	0.453 (0.0003)	..	..	0.894 (0.0000)	0.370 (0.0000)	0.101 (0.0140)	0.158 (0.0000)	..	31
FDI(inf)	..	..	..	..	..	-0.0001 (0.0011)	..	..	..	..	..	08
FDI(inf)_1	-0.011 (0.0009)	..	..	..	..	..	..	..	..	..	..	9
TOP	-8.8177 (0.0000)	-11.203 (0.0000)	-13.024 (0.0000)	-5.992 (0.0017)	-13.686 (0.0000)	-12.339 (0.0000)	-16.215 (0.0000)	-9.603 (0.0000)	-9.570 (0.0000)	-10.802 (0.0000)	-14.242 (0.0000)	42
TOP_1	8.1907 (0.0000)	15.414 (0.0000)	..	..	..	..	15.512 (0.0000)	..	..	..	..	14

LG	..	-1.651 (0.0000)	..	..	..	..	..	..	..	..	1.189 (0.0015)	13
LG_1	..	..	..	..	..	..	..	..	..	..	..	11
DI	..	0.003 (0.0025)	..	-0.112 (0.0202)	..	-0.003 (0.0007)	..	..	0.001 (0.0222)	-0.007 (0.0000)	-0.006 (0.0032)	21
DI_1	..	..	0.015 (0.0150)	..	..	..	..	..	..	..	..	14
LnGCF	..	0.482 (0.0000)	0.286 (0.0000)	0.053 (0.0061)	0.068 (0.0001)	0.080 (0.0000)	0.518 (0.0000)	0.419 (0.0005)	0.4309 (0.0000)	0.258 0.0000	0.149 0.0000	29
LnGCF_1	..	-0.450 (0.0000)	..	..	..	..	-0.407 (0.0000)	-0.281 (0.0206)	..	..	..	14
TDebtS	..	-0.007 (0.0184)	..	-0.157 (0.0004)	..	..	..	-0.018 (0.0063)	..	-0.003 (0.2582)	..	20
TDebtS_1	..	..	..	..	..	..	..	..	..	..	0.019 (0.0043)	13
Inf	..	-0.004 (0.0000)	0.008 (0.0041)	..	..	0.003 (0.0042)	..	0.007 90.0033	-0.003 (0.0187)	0.002 (0.0210)	..	21
Inf_1	..	0.004 (0.0000)	0.007 (0.0054)	..	..	..	..	..	..	..	..	13
LnTLF	..	..	..	..	..	..	..	..	-0.076 (0.0000)	..	0.129 (0.0000)	17
LnTLF_1	..	..	..	..	..	..	..	..	..	..	..	11
LnTOTP	..	..	..	1.009 (0.0002)	4.902 (0.0001)	..	..	..	0.358 (0.0034)	-0.566 (0.0000)	-50.480 (0.0000)	11
LnTOTP_1	..	..	..	..	-5.086 (0.0001)	..	..	..	..	..	49.510 (0.0000)	17
Edu	-0.014 (0.0437)	..	..	..	..	..	..	..	..	..	..	09
Edu_1	0.022 (0.0025)	..	0.082 (0.0000)	..	..	..	..	..	..	..	0.038 (0.0164)	09
LnRExp	0.636 (0.0000)	0.669 (0.0000)	0.750 (0.0000)	0.259 (0.0085)	1.002 (0.0000)	..	0.925 (0.0000)	0.606 (0.0000)	0.578 (0.0000)	0.872 (0.0000)	1.00 (0.0000)	42
LnRExp_1	-0.460 (0.0000)	-0.851 (0.0000)	..	..	..	..	-0.712 (0.0000)	..	..	..	..	15
GEXP	..	..	..	..	..	..	..	..	..	..	..	12
GEXP_1	..	-0.003 (0.2089)	..	..	..	..	..	..	..	..	..	13
P(remi)	..	..	0.012 (0.0380)	..	..	-0.102 (0.0066)	..	..	..	0.060 (0.0015)	..	10
P(remi)_1	..	..	..	..	..	..	-1.239 (0.0023)	0.022 (0.0000)	..	..	-0.023 (0.0007)	14
RMSE	0.04509	0.031548	0.020691	0.062292	0.007949	0.006325	0.030931	0.024013	0.031268	0.017327	0.050829	

Table 5
The Results of Automatics for Growth Modeling

Country Name Variables	Portugal	Qatar	South Africa	Sri Lanka	Switzerland	Sweden	Turkey	United States	United Kingdom	Uruguay	Total significant
Constant	-36.317 (0.0000)	10.501 (0.9838)	24.441 (0.0000)	13.712 (0.0000)	19.311 (0.0000)	20.180 (0.0000)	26.095 (0.0000)	-16.903 (0.0007)	..	73.907 (0.0000)	
LNGDP_1	0.208 (0.0000)	-0.505 (0.0831)	..	0.345 (0.0001)	..	..	..	0.577 (0.0000)	..	0.291 (0.0010)	31
FDI(inf)	..	0.007 (0.4259)	..	..	..	..	-0.002 (0.0057)	..	..	..	08

FDI(inf)_1	..	0.002 (0.7656)	..	..	..	..	..	-0.006 (0.0012)	..	..	9
TOP	-13.426 (0.0000)	-10.410 (0.0000)	-11.161 (0.0000)	-7.787 (0.0000)	-13.030 (0.0000)	-12.842 (0.0000)	-14.001 (0.0000)	3.439 (0.0003)	-16.661 (0.0000)	-11.188 (0.0000)	42
TOP_1	..	-4.952 (0.0705)	..	..	..	..	..	..	..	..	14
LG	0.590 (0.0001)	0.043 (0.8453)	0.635 (0.0363)	..	..	..	..	..	..	..	13
LG_1	..	-402.844 (0.0052)	..	..	..	..	..	-14.601 (0.0000)	0.437 (0.0004)	-0.352 (0.0499)	11
DI	9.298 (0.0000)	..	..	..	..	..	-0.002 (0.0001)	0.068 (0.0053)	..	-0.003 (0.0003)	21
DI_1	-7.564 (0.0000)	0.011 (0.3308)	..	..	..	..	0.001 (0.0042)	..	0.006 (0.0003)	-0.003 (0.0000)	14
LnGCF	0.211 (0.0000)	..	0.316 (0.0000)	0.309 (0.0000)	0.293 (0.0000)	..	..	0.133 (0.0000)	..	0.231 (0.0043)	29
LnGCF_1	..	..	..	..	..	-0.088 (0.0020)	..	..	..	-0.281 (0.0005)	14
TDebtS	12.357 (0.0000)	13.419 (0.9839)	..	-0.010 (0.0104)	-0.012 (0.0000)	..	-0.025 (0.0000)	1.437 (0.0012)	38.208 (0.0006)	-0.564 (0.0000)	20
TDebtS_1	3.672 (0.0000)	-34.200 (0.9839)	..	..	..	..	..	-1.319 (0.0010)	-38.203 (0.0006)	..	13
Inf	0.007 (0.0000)	-0.002 (0.5720)	-0.007 (0.0001)	0.002 (0.0193)	-0.003 (0.0070)	..	..	..	..	0.005 (0.0003)	21
Inf_1	..	-0.002 (0.9475)	..	..	..	..	..	0.0041 (0.0002)	-0.007 (0.0000)	..	13
LnTLF	0.037 (0.0000)	32.166 (0.0052)	0.095 (0.0000)	-0.072 (0.0243)	..	0.807 (0.0000)	(0.108) (0.0005)	78.187 (0.0000)	..	..	17
LnTLF_1	..	-32.149 (0.0051)	..	..	..	..	..	-78.225 (0.0000)	0.044 (0.0000)	-0.036 (0.0024)	11
LnTOTP	..	-1.040 (0.3557)	-0.575 (0.0000)	..	..	5.086 (0.0002)	..	1.248 (0.0001)	7.057 (0.0014)	..	11
LnTOTP_1	..	0.953 (0.3529)	..	..	..	-5.552 (0.0001)	..	..	-7.589 (0.0004)	..	17
Edu	..	..	0.013 (0.0379)	..	..	-0.012 (0.0002)	..	..	..	..	09
Edu_1	..	-0.056 (0.0492)	..	..	..	..	..	..	..	..	09
LnRExp	0.928 (0.0000)	0.457 (0.0000)	0.953 (0.0000)	0.477 (0.0000)	0.979 (0.0000)	1.003 (0.0000)	1.015 (0.0000)	0.276 (0.0000)	1.057 (0.0000)	0.869 (0.0000)	42
LnRExp_1	..	0.079 (0.4825)	..	..	..	0.108 (0.0001)	..	-0.109 (0.0000)	0.049 (0.0443)	..	15
GEXP	..	0.500 (0.6656)	..	..	..	..	..	..	..	-0.203 (0.0000)	12
GEXP_1	0.001 (0.3147)	0.104 (0.9531)	..	..	..	0.008 (0.0006)	..	..	-0.004 (0.0069)	..	13
P(remi)	..	-0.404 (0.1043)	-0.292 (0.0182)	..	..	-0.100 (0.0020)	..	0.699 (0.0198)	0.095 (0.0173)	..	10
P(remi)_1	..	-0.215 (0.3770)	..	..	..	..	..	..	0.131 (0.0010)	..	14
RMSE	0.007317	0.007928	0.02785	0.033424	0.006986	0.01038	0	0.003608	0.005496	0.019543	
							.0235224				

Conclusion

In this study six growth models have been used for analyzing the main determinants of economic growth in case of 43 cross countries analysis. Therefore, by using these six models we have tested all the potential variables through modern shrinkage procedure automatics. And found that current variables foreign direct investment (FDI) current and lag values are found significant 8 and 9 times out of 43 regressions respectively in automatics modeling for all countries. The gross fixed capital formation (LNGCF) current and lag values got significant 29 and 14 times out of 43 regressions respectively. While the total labor force (LNTLF) current and lag values found significant 20 and 13 times out of 43 regressions.

On the other hand, the current and lag values of exports of goods and services (LNREXP) found highly significant 42 and 15 times out of 43 regressions respectively and EDU got less significance 9 and 9 times for current and lag values out of 43 regressions respectively.

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