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RESEARCH PAPER

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

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ABSTRACT

There are lot of theories and plethora of model which can be applied for theories, but selection of most appropriate model is great job. Where the theory and empirical model support each other. The selection of a potential variable is issues of great concern and has very long history but still it is main issue. The reason is that the model is a simplification of reality, and the reality is very complex, due to simultaneously dynamic, non-synchronous, and high-dimensional. Six growth models have been used for analyzing the main determinants of economic growth in case of cross countries analysis, therefore by using these six models we have tested all the potential variables through modern shrinkage procedure automatrics Data from 1980 to 2020 were used to analyzed the cross country growth factors so therefore, the current study looked at about 43 countries with modelling these different comparative studies based on growth modelling. So, we can make these six individual models and we can estimate the General Unrestricted. By evaluating the data and using the modern econometrics technique automatrics, 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.

Keywords: Automatrics, 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

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:

$$\boldsymbol{Y_t = \beta_o + \beta_o X_1 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots \ldots \ldots \ldots \ldots \ldots . \beta_n X_n + \mu_t} \ldots \ldots \ldots (\mathbf{1})$$

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

Theory Based Models Of Economic Growth

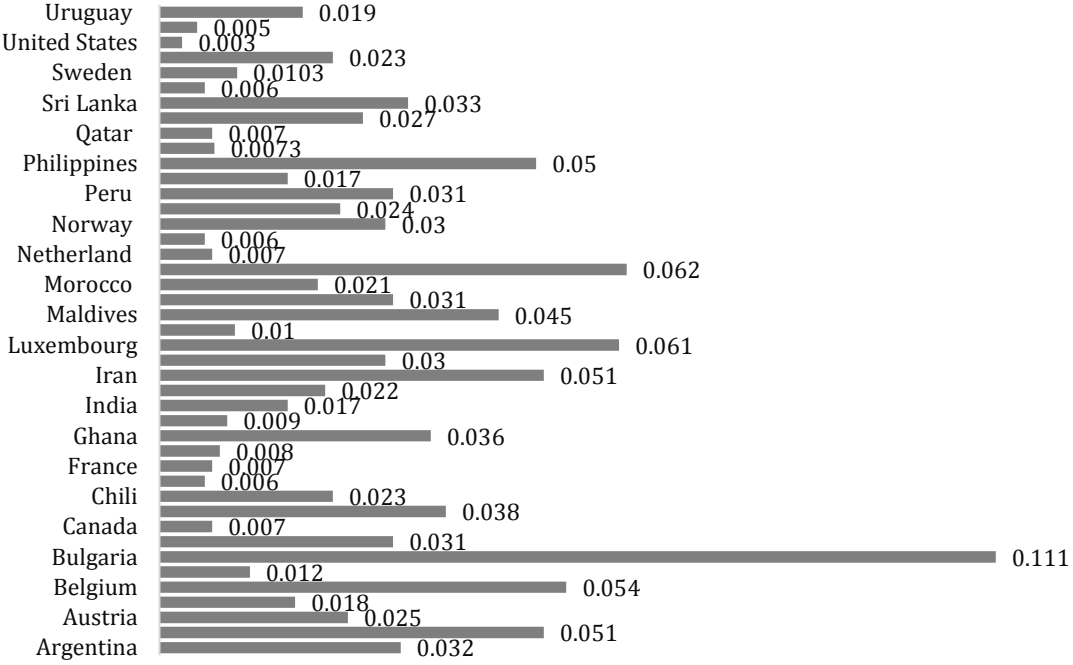
Country Name	Models Of Economic Growth
Model 1	LnGDP =f (FDI(inf) , T Debts, DI , Inf)
Model 2	LnGDP =f (Inf, LnTLF, TOTP, FDI (inf), GExp)
Model 3	LnGDP =f (Edu, RExp, P(remi), FDI)
Model 4	LnGDP =f (Inf, LnGCF , Rexp, P(remi)
Model 5	LnGDP = f (FDI ,TOP, LG, DI , LnGCF ,)
Model 6	LnGDP =f (DI, FDI,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

General Un Restricted Model (Economic Growth)

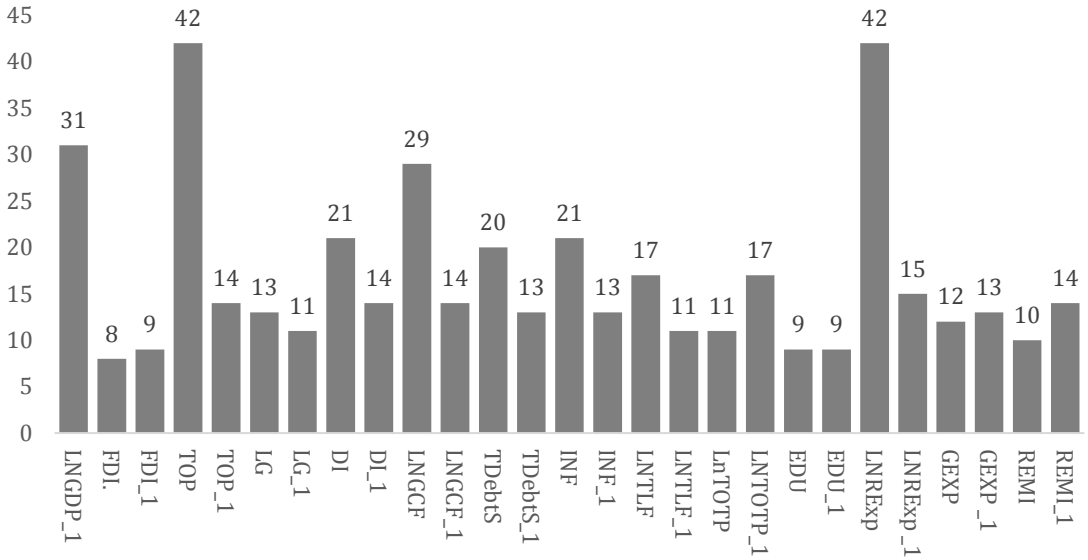
$$LNGDP_t = \beta_o + \beta_1 \text{LNGDP\_1}_t + \beta_2 \text{FDI(inf)}_t + \beta_3 \text{FDI(inf)\_1}_t + \beta_4 \text{TOP}_t + \beta_5 \text{TOP}_1 +_t \beta_6 \text{LG}_t + \beta_7 \text{LG\_1}_t + \beta_8 \text{DI}_t + \beta_9 \text{DI\_1}_t + \beta_{10} \text{LnGCF}_t + \beta_{11} \text{LnGCF\_1}_t + \beta_{12} \text{TDebtS}_t + \beta_{13} \text{TDebtS\_1}_t + \beta_{14} \text{Inf}_t + \beta_{15} \text{Inf\_1}_t + \beta_{16} \text{LnTLF}_t + \beta_{17} \text{LnTLF\_1}_t + \beta_{18} \text{LnTOTP}_t + \beta_{19} \text{LnTOTP\_1}_t + \beta_{20} \text{Edu}_t + \beta_{21} \text{Edu\_1}_t + \beta_{22} \text{LnRExp}_t + \text{LnRExp\_1}_t + \beta_{24} LnGExp_t + \beta_{25} LnGExp\_1_t + \beta_{26} P(remi)_t + \beta_{27} P(remi)\_1_t + \mu_t \ldots\ldots\ldots 1)$$

Results of Automatrics Procedure

The automatrics 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 automatrics 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 automatrics modeling on the basis of forecast RMSE the US model forecast performance is best and Bulgaria model has worst ability to forecast.



Graph 1 of RMSE of Automatrics for Growth Modeling



Graph 2 Total Significance of Variables in Automatrics for Growth Modeling

The figure 2 shows the total significance of variables in automatrics 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 1
The Results of Automatrics for Growth Modeling

Coutnr yName / Vari able	Argentina	Australia	Austria	Bangladesh	Belgium	Bhutan	Balgeria	Brazil	Canada	China	Chilli	Total
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 2
The Results of Automatrics for Growth Modeling

Country Name / Variables	Denmark	France	Germany	Ghana	Hungary	India	Indonesia	Iran	Japan	Louxembourg	Malaysia	Total significant
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	-10.7790.0000	-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 2
The Results of Automatrics for Growth Modeling

Country Name / Variables	Maldives	Mexico	Morocco	Nepal	Netherland	Newzeland	Norway	Pakistan	Peru	Paraguay	Philippines	Total significant
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 3
The Results of Automatrics 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 .0235224	0.003608	0.005496	0.01954 3	

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 automatrics. 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 automatrics 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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