GOVERNMENT OF PUERTO RICO

Planning Board

ECONOMETRIC FORECASTING TO PORTRAY THE PR EVOLVING ECONOMY

Puerto Rico Planning Board

August 21, 22, 2017

JUNTA DE PLANIFICACIÓN

AGENDA

WHO WE ARE?

WHAT WE DO?

ECONOMETRIC FORECASTING TO PORTRAY THE PR EVOLVING ECONOMY

CHALLENGES

WHO WE ARE & WHAT WE DO?

The Planning Board (PRPB) - created by Law # 213 of May 12, 1942, as part of the Office of the Governor. Act 75 of 1975 as amended, states present responsibilities, which in summary are embodied in the following annual documents to the Governor and the Legislature:

- The Integral Development Plan;
- The Four Year Investment Program;
- The Economic Report to the Governor
- Regional Plans; Land Use Plans;
- Zoning Maps and Regulations.
- By law, the PRPB also has the responsibility of preparing the economic accounts for Puerto Rico on an annual basis.

WHO WE ARE & WHAT WE DO?

All these documents in the areas of physical, economic and social planning assist policy making in Puerto Rico and are aimed at achieving balanced economic, social and infrastructure growth.

- **The Physical Planning Area** is in charge of formulating and designing the plans, regulations and guidelines, to stimulate an integrated and efficient use of land in Puerto Rico.
- The **Economic and Social Planning Program** is the official center that produces, collects, analyzes, and disseminates economic and social data of Puerto Rico. Its main function is to advise the Governor and the Legislature on economic and social matters.


ECONOMETRIC
FORECASTING

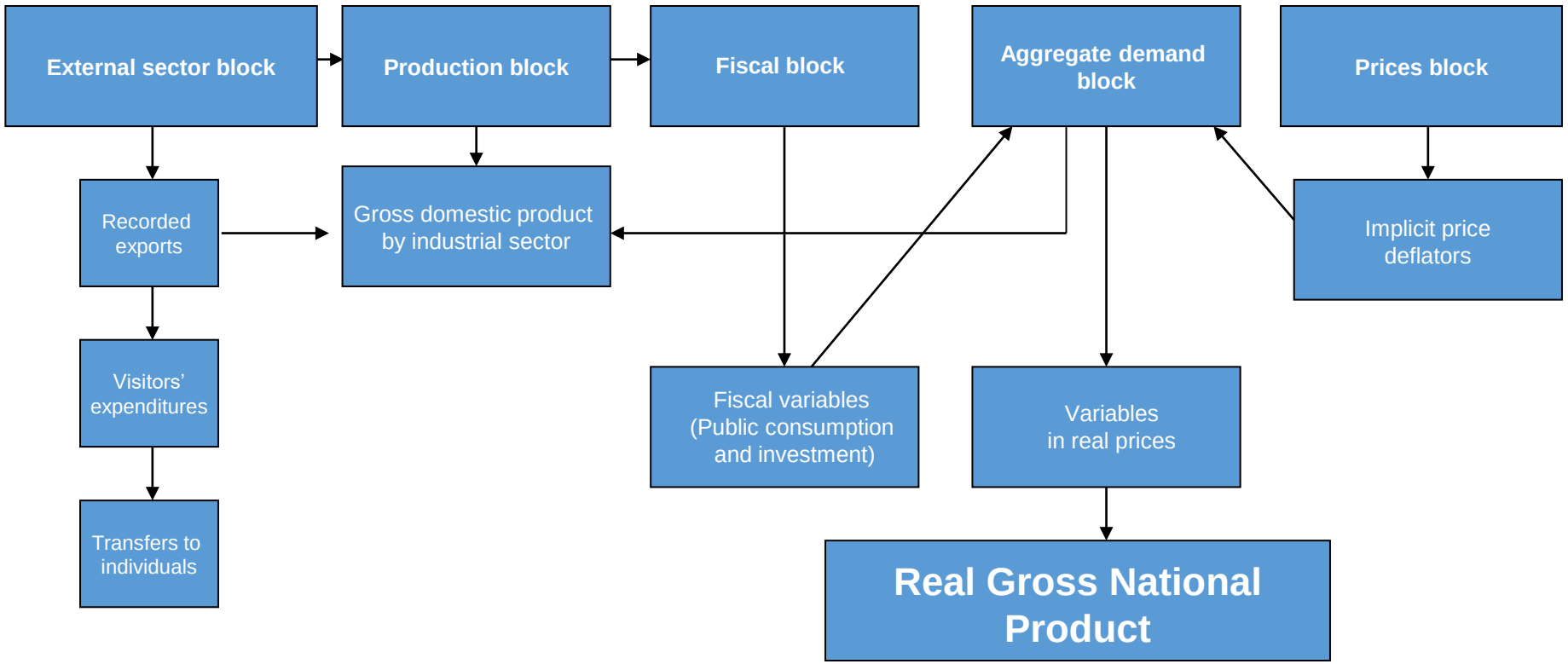
ECONOMETRIC MODELING SCENARIOS FOR PR

- THE ORIGINAL FORECASTING MODEL
- THE PRPB SHORT TERM NEW DYNAMIC FORECASTING MODEL
- FISCAL POLICY IMPLICATIONS
- APPLICATION OF OKUNS LAW FOR 10 YEAR FORECAST

THE ORIGINAL FORECASTING MODEL

The Structural Macroeconomic Model, known as Modular Stochastic Model (ECOMODULAR), consists of five blocks or modules: external sector block, production block, fiscal block, prices block and aggregate demand block.

The first step is to run the external sector block:



Oliver Blanchard, quoted in his intermediate macroeconomic book that the economic forecast is the most hard task performed by economists. Thus, it is not superfluous to have several alternative models to predict the course of the economy.

The NEW ECONOMETRIC DYNAMIC MODEL OF PUERTO RICO

includes two models to estimate the gross national product (GNP):

- ✓ **Aggregated production model in real prices**
- ✓ **Aggregated expenditure model in nominal prices**

Short Term Econometric Forecasting Models

Puerto Rico Planning Board hired the company *Econometrics and Statistics Research Inc.* (*ESR*), owned by Wilfredo Toledo, PhD to calibrate the Modular Stochastic Model (ECOMODULAR, for its acronym in Spanish). Also, to examine the properties of the NEW ECONOMETRIC DYNAMIC MODEL OF PUERTO RICO in order to decide other changes needed.

Dynamic forecasting consists of two small models for aggregate production in Puerto Rico: four multi-equation systems and two single equation in nominal terms (one for the government expenditures and the other for public construction investment). One of the models is based upon a real aggregate production function, using Gross National Product (GNP) as the output indicator. The other model has two systems of the main components of aggregate expenditure, in nominal terms and a system that defines the behavior of the GNP principal deflators. This last system is used to transform the nominal values, generated by these last two systems and the single equations, into real terms.

Aggregated production model in real prices

Aggregated production model

This model represents the relationship between the factors of production and gross national product. It shows the aggregate production based on labor, capital and other inputs.

Variable descriptions		
Endogenous variables	**Local exogenous variables [1]**	**Non local exogenous variables [2]**
GNP	Salaries and wages	Prime rate at commercial banks
Employment	Transfer federal payment to individuals	Oil prices
Investment	Exports	
	Binary variables that reflect structural changes	

1) These variables are estimated using auxiliary models outside the systems.
2) The source of these projected variables is IHS Economics.

Aggregated production model specification

- DLOG(PNBREAL) = c(1)*DLOG(PNBREAL(-1)) +C(5)*DLOG(INVERSIONREAL (0)) + + C(4)*DLOG(INVERSIONREAL (-1)) + C(7)*DLOG(LESTBLETOT1 (-1)) + C(8)*DLOG(LESTBLETOT1 (-2)) + C(10) + C(15)*D00 + C(16)*DLOG(SUELDYJOR/DCON) + C(17)*DLOG(EXPORTVENTAS) +c(18)*d02 + C(19)*DLOG(POIL(0)) +c(20)*d0121 +c(22)*d07*@trend

- DLOG(INVERSIONREAL) = C(21)*dlog(PNBREAL(-1)) + C(30) + C(31)*DLOG(LESTBLETOT1 (0)) +C(32)*D012 +C(35)*D(TBILL10YR(-1))

- DLOG(LESTBLETOT1) = C(46)*DLOG(INVERSIONREAL (-2)) + C(47)*DLOG(LESTBLETOT1 (-1)) + C(48)*DLOG(LESTBLETOT1 (-2)) + C(50) + C(53)*D(TBILL10YR(-1)) + C(55)*D00 + C(56)*DLOG(SUELDYJOR/DCON)

E VIEWS Output

System: SYSTPRODREAL2
Estimation Method: Seemingly Unrelated Regression
Date: 04/29/16 Time: 10:17
Sample: 1981 2015
Included observations: 35
Total system (unbalanced) observations 101
Linear estimation after one-step weighting matrix

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.025037	0.129308	0.193620	0.8470
C(5)	0.023582	0.014644	1.610328	0.1115
C(4)	-0.021465	0.017838	-1.203370	0.2326
C(7)	0.316749	0.104408	3.033757	0.0033
C(8)	-0.104286	0.090607	-1.150976	0.2534
C(10)	-0.002189	0.003481	-0.628735	0.5314
C(15)	0.021013	0.006894	3.047947	0.0032
C(16)	0.344232	0.062949	5.468441	0.0000
C(17)	0.132776	0.031618	4.199337	0.0001
C(18)	-0.019009	0.005763	-3.298427	0.0015
C(19)	-0.006842	0.006328	-1.081221	0.2830
C(20)	0.018912	0.007072	2.674112	0.0092
C(22)	-0.000110	9.88E-05	-1.108798	0.2710
C(21)	-1.858476	0.798675	-2.326951	0.0226
C(30)	0.012360	0.019718	0.626816	0.5327
C(31)	3.447994	0.765701	4.503053	0.0000
C(32)	-0.039979	0.050968	-0.784392	0.4352
C(35)	-0.044871	0.015637	-2.869592	0.0053
C(46)	-0.018142	0.023756	-0.763673	0.4474
C(47)	0.536727	0.128791	4.167422	0.0001
C(48)	-0.238949	0.108441	-2.203500	0.0306
C(50)	0.003361	0.004645	0.723555	0.4716
C(53)	-0.002889	0.002340	-1.234373	0.2209
C(55)	-0.006024	0.006003	-1.003401	0.3189
C(56)	0.355207	0.088591	4.009523	0.0001

Determinant residual covariance 3.85E-11

Equation: DLOG(PNBREAL) = C(1)*DLOG(PNBREAL(-1)) +C(5) *DLOG(INVERSIONREAL (0)) + + C(4)*DLOG(INVERSIONREAL (-1)) + C(7)*DLOG(LESTBLETOT1 (-1)) + C(8)*DLOG(LESTBLETOT1 (-2)) + C(10) + C(15)*D00 + C(16)*DLOG(SUELDYJOR/DCON) + C(17) *DLOG(EXPORTVENTAS) +C(18)*D02 + C(19)*DLOG(POIL(0)) +C(20)*D0121 +C(22)*D07*@TREND

Observations: 33

R-squared	0.934282	Mean dependent var	0.014267
Adjusted R-squared	0.894851	S.D. dependent var	0.025633
S.E. of regression	0.008312	Sum squared resid	0.001382
Durbin-Watson stat	1.962158		

Equation: DLOG(INVERSIONREAL) = C(21)*DLOG(PNBREAL(-1)) + C(30) + C(31)*DLOG(LESTBLETOT1 (0)) +C(32)*D012 +C(35) *D(TBILL10YR(-1))

Observations: 35

R-squared	0.604401	Mean dependent var	0.017859
Adjusted R-squared	0.551655	S.D. dependent var	0.147995
S.E. of regression	0.099095	Sum squared resid	0.294596
Durbin-Watson stat	2.135550		

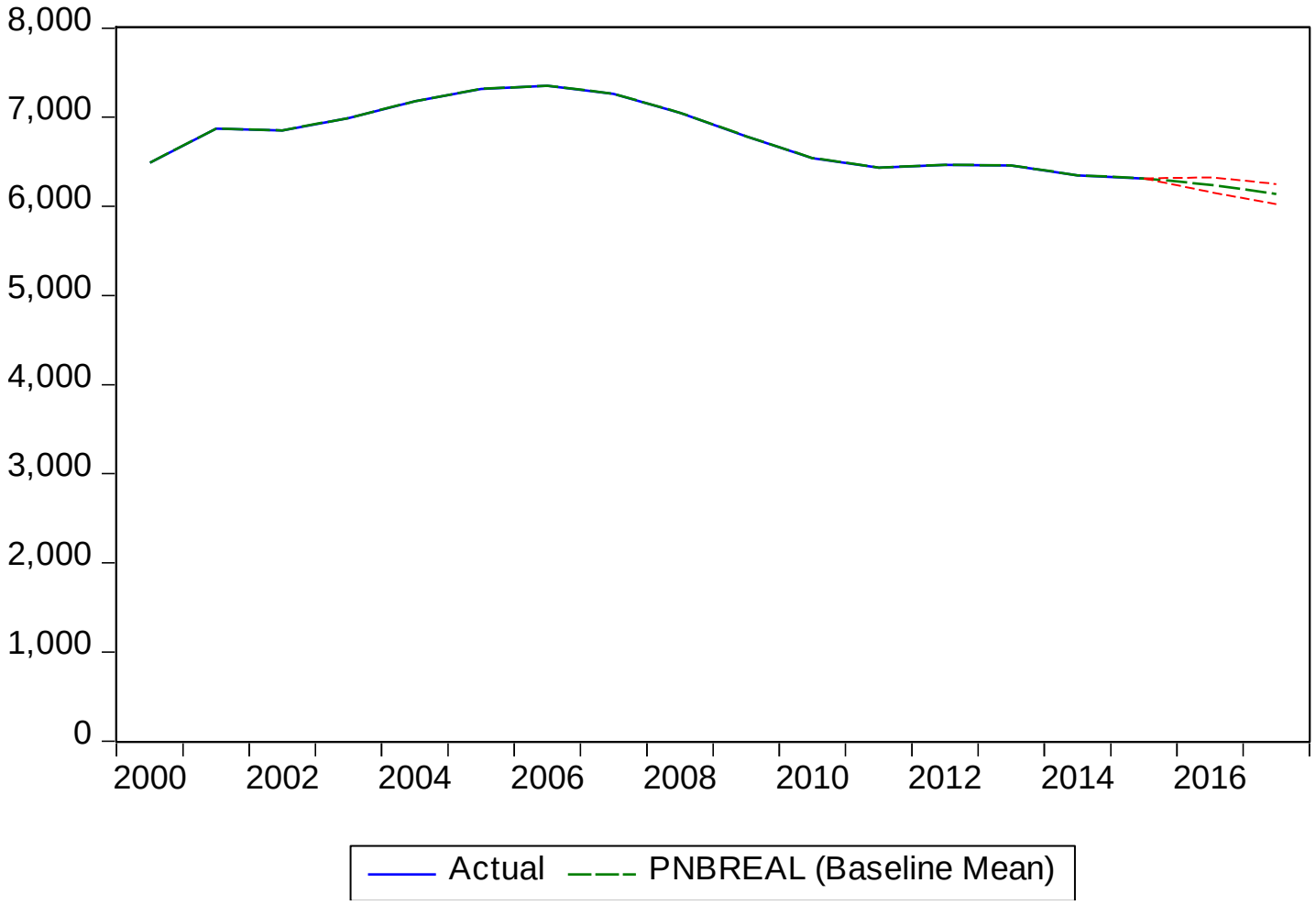
Equation: DLOG(LESTBLETOT1) = C(46)*DLOG(INVERSIONREAL (-2)) + C(47)*DLOG(LESTBLETOT1 (-1)) + C(48)*DLOG(LESTBLETOT1 (-2)) + C(50) + C(53)*D(TBILL10YR(-1)) + C(55)*D00 + C(56) *DLOG(SUELDYJOR/DCON)

Observations: 33

R-squared	0.800012	Mean dependent var	0.009612
Adjusted R-squared	0.753861	S.D. dependent var	0.027192
S.E. of regression	0.013490	Sum squared resid	0.004732
Durbin-Watson stat	2.425081		

E VIEWS Output

Real Gross National Product – Short Term



Aggregated expenditure model in nominal prices

Aggregated expenditure model in nominal prices

The model is part of the identity: aggregate expenditure = **consumption + investment + government expenditure + exports – imports.** Also, the model: predicts the disposable personal income, contains a system that describes the pattern of the principal GNP deflators, and is used to convert the nominal values generated by the model into real prices.

Variables descriptions		
Endogenous variables	**Local exogenous variables [1]**	**Non local exogenous variables [2]**
Consumption of durable goods	Federal tranfers payment to person	Oil prices
Consumption of non durable goods	Dichotomous variables to model structural changes	Fed funf rate
Consumption of services	Employment	
Salaries and wages	Investment	
Exports	GNP deflators	
Imports	Tendency variables	
Disposable personal income	Population	

1) These variables are estimated using auxiliary models outside the systems.
2) The source of these projected variables is IHS Economics.

Aggregated expenditure model specification

- DLOG(CONSNODUR) =C(6)* DLOG(CONSNODUR(-1)) + C(8)*DLOG(SUELDYJOR(-1)) + C(9) + C(10)*DLOG(IMPORTCOMPRAS(0))+C(11)*D04+ C(12)* DLOG(CONSNODUR(-2)) + C(13)*D(FEDFUND)+ C(14)*DLOG(SUELDYJOR(-2)) + C(16)*D012 +c(17)*d0961 +c(18)*d0121

- DLOG(CONSUMOSERV) = C(25)*DLOG(CONSUMOSERV(-1)) + C(26)*DLOG(TOTAL_TRANSF__FED__RECIB(-1)) + C(29)*DLOG(SUELDYJOR(-2)) + C(31) + C(33)*D07

- DLOG(CONSUDUR)= C(45)*DLOG(CONSUDUR(-1)) + C(47)*DLOG(TOTAL_TRANSF__FED__RECIB(-1)) + C(51) + + C(55)*D(FEDFUND(-1)) + C(56)*D00 +C(58)*D012*@TREND

- DLOG(SUELDYJOR) = C(87)*DLOG(TOTAL_TRANSF__FED__RECIB(-1)) + C(91) + C(94)*DLOG(LESTBLETOT1(-1)) + C(95)*D(FEDFUND) + C(99)*DLOG(POIL(-1)) + C(101)*DLOG(POBLA)

- DLOG(YDPADJ)= C(105)*DLOG(LESTBLETOT1(-1))+ C(107)*DLOG(POIL(0)) + + C(111) + C(114)*DLOG(FEDFUND(0)) +C(116)*D012*@TREND +C(117)*D011*@TREND

- DLOG(EXPORTVENTAS)= C(120) +C(121)*DLOG(IMPORTCOMPRAS(0)) + C(124)*D00*@trend + + C(126)*DLOG(DLEFLAINVTOT1* INVERSIONREAL(-2)) + c(127)*dlog(poil(0))

- DLOG(IMPORTCOMPRAS)= C(130) + C(131)*D07 + C(132)*DLOG(LESTBLETOT1(-1)) +C(137)*DLOG(DPNB(-1))+C(138)*D(FEDFUND(-1)) +C(139)*DLOG(IMPORTCOMPRAS(-1))

Aggregated expenditure model specification (Cont.)

- DLOG(CONSTRUEMPPU) = C(1)*DLOG(CONSTRUEMPPU(-1)) + C(2)*DLOG(CONSTRUEMPPU(-2)) + C(11)*DLOG(INVMAQUITOT(-2)) + C(13) + C(15)*DLOG(LESTBLETOT1(-1)) + C(25)*DELECIO

- DLOG(CONSTRUPIRV) = C(57) + C(50)*DLOG(CONSTRUPIRV(-1)) + C(59)*DLOG(LESTBLETOT1(0)) + C(60)*D92 + C(63)*D(TBILL10YR (-1)) + c(64)*dlog(poil(-1))

- DLOG(INVMAQUITOT) = + C(76)*DLOG(INVMAQUITOT(-1)) + C(77) + C(78)*D95*@TREND + C(79)*DLOG(LESTBLETOT1(0)) +C(80)*D012 + c(81)*d011 +c(82)*d991 +c(83)*d(fedfund(-1)) +c(84)*d07

- CAMINV= C(90) +C(94)*CAMINV(-1) + C(95)*CAMINV(-2)

Aggregated expenditure model specification (Cont.)

- DLOG(DCON) = C(1)*DLOG(DCON(-1)) + C(6) + + C(9)*D95 + C(11)*DLOG(POIL(-1)) + C(12)*PNBREALGAP(-1) + C(13)*D(FEDFUND(-1))

- DLOG(DEFLAEXPORT) = + C(15)*DLOG(DEFLAEXPORT(-1)) + C(18)*DLOG(DPNB(-1)) + C(19) + C(20)*D00 +C(22)*D95 + C(23)*D07 + C(24)*DLOG(POIL(-2)) + C(25)*PNBREALGAP(-1) + C(26)*D(FEDFUND(0))

- DLOG(DFLAGOBTOT) = C(27)*DLOG(DCON(-1)) + C(29)*DLOG(DFLAGOBTOT(-1)) + C(32) + C(34)*D85 + C(37)*DLOG(POIL(-1)) + C(38)*PNBREALGAP(-1) + C(39)*D(FEDFUND(-1))+C(40)*DLOG(DFLAGOBTOT(-2))

- DLOG(DLEFLAINVTOT1) = + C(43)*DLOG(DLEFLAINVTOT1(-1)) + C(45) + C(46)*D00 + C(47)*D85 + C(49)*D07 + C(50)*DLOG(POIL(-1)) + C(51)*DLOG(POIL(0))

- DLOG(DPNB) = + C(57)*DLOG(DPNB(-1)) +C(59) + C(61)*D00 + C(65)*DLOG(POIL(-1)) + C(66)*PNBREALGAP(-2) + C(67)*D(FEDFUND(0)) +c(68)*d02 +c(69)*d07*@trend

E VIEWS Output

System: SYSGASTONOMINAL1
Estimation Method: Seemingly Unrelated Regression
Date: 04/29/16 Time: 10:19
Sample: 1978 2015
Included observations: 38
Total system (unbalanced) observations 254
Linear estimation after one-step weighting matrix

	Coefficient	Std. Error	t-Statistic	Prob.
C(6)	0.185586	0.113497	1.635162	0.1035
C(8)	0.322186	0.120954	2.663707	0.0083
C(9)	-0.012184	0.013782	-0.884056	0.3777
C(10)	0.342275	0.104940	3.261641	0.0013
C(11)	0.040749	0.010962	3.717411	0.0003
C(12)	-0.161314	0.084652	-1.905613	0.0581
C(13)	-0.002269	0.002364	-0.959816	0.3383
C(14)	0.215047	0.126664	1.697771	0.0910
C(16)	-0.026264	0.011773	-2.230926	0.0267
C(17)	0.055460	0.016849	3.291609	0.0012
C(18)	0.047633	0.018224	2.613821	0.0096
C(25)	0.098332	0.108811	0.903690	0.3672
C(26)	0.255514	0.058269	4.385074	0.0000
C(29)	-0.106328	0.109205	-0.973661	0.3313
C(31)	0.059247	0.010385	5.705212	0.0000
C(33)	-0.053690	0.009835	-5.459040	0.0000
C(45)	0.301003	0.137086	2.195728	0.0292
C(47)	-0.375334	0.192747	-1.947286	0.0528
C(51)	0.068398	0.019624	3.485465	0.0006
C(55)	-0.013232	0.005185	-2.551832	0.0114
C(56)	-0.041203	0.019546	-2.107948	0.0362
C(58)	-0.000143	0.000484	-0.296052	0.7675
C(87)	-0.091876	0.081592	-1.126035	0.2614
C(91)	0.037147	0.005777	6.429962	0.0000

	Coefficient	Std. Error	t-Statistic	Prob.
C(91)	0.037147	0.005777	6.429962	0.0000
C(94)	0.515969	0.127046	4.061269	0.0001
C(95)	0.000835	0.002531	0.329869	0.7418
C(99)	-0.029356	0.015928	-1.843098	0.0667
C(105)	0.699334	0.304624	2.295729	0.0227
C(107)	0.089987	0.036835	2.442962	0.0154
C(111)	0.062993	0.009963	6.322803	0.0000
C(114)	-0.004768	0.018622	-0.256034	0.7982
C(116)	-0.000739	0.000386	-1.915436	0.0568
C(117)	0.001165	0.000856	1.360422	0.1752
C(120)	-0.012776	0.009407	-1.358083	0.1759
C(121)	1.185688	0.097540	12.15586	0.0000
C(124)	0.000278	0.000167	1.661893	0.0980
C(126)	0.053215	0.025045	2.124779	0.0348
C(127)	0.008349	0.017225	0.484719	0.6284
C(130)	0.072017	0.024468	2.943342	0.0036
C(131)	-0.064066	0.020099	-3.187577	0.0017
C(132)	0.251643	0.364273	0.690809	0.4904
C(137)	0.093306	0.477168	0.195541	0.8452
C(138)	0.001452	0.005022	0.289030	0.7728
C(139)	-0.186843	0.207978	-0.898380	0.3700

Determinant residual covariance	6.34E-23

E VIEWS Output

Equation: DLOG(CONSNODUR) =C(6)* DLOG(CONSNODUR(-1)) + C(8) *DLOG(SUELDYJOR(-1)) + C(9) + C(10)*DLOG(IMPORTCOMPRAS(0))+C(11)*D04+ C(12)* DLOG(CONSNODUR(-2)) + C(13)*D(FEDFUND) + C(14)*DLOG(SUELDYJOR(-2)) + C(16)*D012 +C(17)*D0961 +C(18) *D0121

Observations: 38

R-squared	0.629885	Mean dependent var	0.046131
Adjusted R-squared	0.492805	S.D. dependent var	0.029737
S.E. of regression	0.021178	Sum squared resid	0.012110
Durbin-Watson stat	2.334047		

Equation: DLOG(CONSUMOSERV) = C(25)*DLOG(CONSUMOSERV(-1)) + C(26)*DLOG(TOTAL TRANSF FED RECIB(-1)) + C(29) *DLOG(SUELDYJOR(-2)) + C(31) + C(33)*D07

Observations: 38

R-squared	0.694899	Mean dependent var	0.064276
Adjusted R-squared	0.657917	S.D. dependent var	0.030814
S.E. of regression	0.018022	Sum squared resid	0.010718
Durbin-Watson stat	2.392925		

Equation: DLOG(CONSUDUR)= C(45)*DLOG(CONSUDUR(-1)) + C(47) *DLOG(TOTAL TRANSF FED RECIB(-1)) + C(51) + + C(55) *D(FEDFUND(-1)) + C(56)*D00 +C(58)*D012*@TREND

Observations: 38

R-squared	0.376245	Mean dependent var	0.041509
Adjusted R-squared	0.278783	S.D. dependent var	0.068263
S.E. of regression	0.057972	Sum squared resid	0.107544
Durbin-Watson stat	2.077052		

Equation: DLOG(SUELDYJOR) = +C(87)*DLOG(TOTAL_TRANSF__FED__ RECIB(-1)) + C(91) + C(94)*DLOG(LESTBLETOT1(-1)) + C(95) *D(FEDFUND) + C(99)*DLOG(POIL(-1)) + 1.43*DLOG(POBLA)

Observations: 34

R-squared	0.634836	Mean dependent var	0.038053
Adjusted R-squared	0.584469	S.D. dependent var	0.034646
S.E. of regression	0.022333	Sum squared resid	0.014465
Durbin-Watson stat	1.999830		

Equation: DLOG(YDPADJ)= C(105)*DLOG(LESTBLETOT1(-1))+ C(107) *DLOG(POIL(0)) + + C(111) + C(114)*DLOG(FEDFUND(0)) +C(116) *D012*@TREND +C(117)*D011*@TREND

Observations: 34

R-squared	0.353330	Mean dependent var	0.068194
Adjusted R-squared	0.237854	S.D. dependent var	0.057456
S.E. of regression	0.050159	Sum squared resid	0.070447
Durbin-Watson stat	2.644843		

Equation: DLOG(EXPORTVENTAS)= C(120) +C(121)*DLOG(IMPORTCOM PRAS(0)) + C(124)*D00*@TREND + + C(126)*DLOG(DLEFLAINVTOT1 * INVERSIONREAL(-2)) + C(127)*DLOG(POIL(0))

Observations: 38

R-squared	0.852129	Mean dependent var	0.065779
Adjusted R-squared	0.834206	S.D. dependent var	0.060931
S.E. of regression	0.024810	Sum squared resid	0.020312
Durbin-Watson stat	2.363184		

Equation: DLOG(IMPORTCOMPRAS)= C(130) + C(131)*D07 + C(132) *DLOG(LESTBLETOT1(-1)) +C(137)*DLOG(DPNB(-1))+C(138) *D(FEDFUND(-1)) +C(139)*DLOG(IMPORTCOMPRAS(-1))

Observations: 34

R-squared	0.401644	Mean dependent var	0.050074
Adjusted R-squared	0.294795	S.D. dependent var	0.045450
S.E. of regression	0.038167	Sum squared resid	0.040789
Durbin-Watson stat	1.864423		

E VIEWS Output

System: SYSGASTONOMINAL2
Estimation Method: Seemingly Unrelated Regression
Date: 04/29/16 Time: 10:28
Sample: 1980 2015
Included observations: 36
Total system (unbalanced) observations 140
Linear estimation after one-step weighting matrix

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.179758	0.188649	-0.952868	0.3426
C(2)	-0.424812	0.163039	-2.605586	0.0104
C(11)	0.365888	0.328840	1.112663	0.2682
C(13)	-0.038086	0.035161	-1.083214	0.2810
C(15)	2.562254	1.409533	1.817803	0.0717
C(25)	0.104545	0.061938	1.687907	0.0941
C(57)	0.009958	0.031464	0.316488	0.7522
C(50)	0.300419	0.155054	1.937506	0.0551
C(59)	1.583312	0.857933	1.845497	0.0675
C(60)	0.013149	0.037857	0.347348	0.7290
C(63)	-0.010983	0.018538	-0.592469	0.5547
C(64)	-0.150949	0.083794	-1.801439	0.0742
C(76)	-0.229815	0.114913	-1.999898	0.0478
C(77)	0.054445	0.014936	3.645238	0.0004
C(78)	-0.000902	0.000347	-2.603735	0.0104
C(79)	3.213015	0.408567	7.864099	0.0000
C(80)	-0.064456	0.028299	-2.277669	0.0246
C(81)	-0.037305	0.043606	-0.855511	0.3940
C(82)	0.181229	0.043901	4.128089	0.0001
C(83)	-0.013847	0.005030	-2.752901	0.0069
C(84)	0.073011	0.026749	2.729528	0.0073
C(90)	249.4401	65.63788	3.800246	0.0002
C(94)	0.184257	0.161310	1.142254	0.2557
C(95)	-0.068008	0.159722	-0.425792	0.6710
Determinant residual covariance		0.009129		

Equation: DLOG(CONSTRUEMPPU) = C(1)*DLOG(CONSTRUEMPPU(-1)) + C(2)*DLOG(CONSTRUEMPPU(-2)) + C(11)*DLOG(INVMAQUITOT(-2)) + C(13) + C(15)*DLOG(LESTBLETOT1(-1)) + C(25)*DELECIO
Observations: 34

R-squared	0.355645	Mean dependent var	0.012914
Adjusted R-squared	0.240582	S.D. dependent var	0.174091
S.E. of regression	0.151711	Sum squared resid	0.644452
Durbin-Watson stat	2.090853		

Equation: DLOG(CONSTRUPIRV) = C(57) + C(50)*DLOG(CONSTRUPIRV(-1)) + C(59)*DLOG(LESTBLETOT1(0)) + C(60)*D92 + C(63)*D(TBILL10YR (-1)) + C(64)*DLOG(POIL(-1))
Observations: 35

R-squared	0.469733	Mean dependent var	0.037683
Adjusted R-squared	0.378308	S.D. dependent var	0.137578
S.E. of regression	0.108477	Sum squared resid	0.341248
Durbin-Watson stat	2.032283		

Equation: DLOG(INVMAQUITOT) = + C(76)*DLOG(INVMAQUITOT(-1)) + C(77) + C(78)*D95*@TREND + C(79)*DLOG(LESTBLETOT1(0)) +C(80)*D012 + C(81)*D011 +C(82)*D991 +C(83)*D(FEDFUND(-1)) +C(84)*D07
Observations: 35

R-squared	0.802547	Mean dependent var	0.056272
Adjusted R-squared	0.741792	S.D. dependent var	0.100538
S.E. of regression	0.051087	Sum squared resid	0.067858
Durbin-Watson stat	2.000688		

Equation: CAMINV= C(90) +C(94)*CAMINV(-1) + C(95)*CAMINV(-2)
Observations: 36

R-squared	0.036150	Mean dependent var	281.4658
Adjusted R-squared	-0.022265	S.D. dependent var	200.8283
S.E. of regression	203.0517	Sum squared resid	1360590.
Durbin-Watson stat	1.979760		

E VIEWS Output

System: SYDEFLACTORES
Estimation Method: Seemingly Unrelated Regression
Date: 04/29/16 Time: 10:29
Sample: 1980 2015
Included observations: 36
Total system (unbalanced) observations 175
Linear estimation after one-step weighting matrix

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.314488	0.113148	2.779429	0.0062
C(6)	0.018939	0.005473	3.460379	0.0007
C(9)	-0.005729	0.004887	-1.172357	0.2431
C(11)	0.012383	0.011741	1.054748	0.2934
C(12)	3.49E-05	1.71E-05	2.040735	0.0432
C(13)	0.001057	0.001500	0.704877	0.4821
C(15)	0.189080	0.107775	1.754397	0.0816
C(18)	0.633190	0.227848	2.778996	0.0062
C(19)	0.004984	0.009227	0.540143	0.5900
C(20)	-0.040079	0.010905	-3.675390	0.0003
C(22)	0.022470	0.009129	2.461353	0.0151
C(23)	0.023185	0.008592	2.698327	0.0078
C(24)	0.027656	0.014565	1.898807	0.0597
C(25)	4.32E-05	2.44E-05	1.769784	0.0790
C(26)	0.010817	0.001836	5.889988	0.0000
C(27)	-0.343026	0.238613	-1.437586	0.1528
C(29)	0.992200	0.171152	5.797187	0.0000
C(32)	0.024409	0.018884	1.292578	0.1983
C(34)	-0.017272	0.015218	-1.134991	0.2584
C(37)	-0.001063	0.017825	-0.059639	0.9525
C(38)	4.08E-05	2.73E-05	1.495589	0.1371
C(39)	-0.002402	0.002165	-1.109211	0.2693
C(40)	-0.162931	0.129702	-1.256196	0.2112
C(43)	-0.633866	0.138605	-4.573195	0.0000
C(45)	0.091475	0.011698	7.819993	0.0000
C(46)	-0.053589	0.010286	-5.210093	0.0000
C(47)	-0.045117	0.010027	-4.499295	0.0000
C(49)	0.014077	0.008974	1.568635	0.1190
C(50)	0.048443	0.014076	3.441613	0.0008
C(51)	0.055437	0.014276	3.883268	0.0002
C(57)	0.578027	0.092346	6.259365	0.0000
C(59)	0.017833	0.004031	4.423817	0.0000
C(61)	0.004152	0.004777	0.869081	0.3863
C(65)	-0.003321	0.005978	-0.555535	0.5794
C(66)	4.09E-05	9.11E-06	4.491657	0.0000
C(67)	0.002856	0.000836	3.414898	0.0008
C(68)	-0.010355	0.005592	-1.851842	0.0662
C(69)	4.68E-05	6.05E-05	0.772361	0.4412
Determinant residual covariance		1.07E-19		

Equation: DLOG(DCON) = C(1)*DLOG(DCON(-1)) + C(6) + + C(9)*D95 + C(11)*DLOG(POIL(-1)) + C(12)*PNBREALGAP(-1) + C(13) *D(FEDFUND(-1))
Observations: 35

R-squared	0.564142	Mean dependent var	0.024016
Adjusted R-squared	0.488994	S.D. dependent var	0.019324
S.E. of regression	0.013814	Sum squared resid	0.005534
Durbin-Watson stat	2.482537		

Equation: DLOG(DEFLAEXPORT) = + C(15)*DLOG(DEFLAEXPORT(-1)) + C(18)*DLOG(DPNB(-1)) + C(19) + C(20)*D00 +C(22)*D95 + C(23)*D07 + C(24)*DLOG(POIL(-2)) + C(25)*PNBREALGAP(-1) + C(26) *D(FEDFUND(0))
Observations: 35

R-squared	0.719833	Mean dependent var	0.037048
Adjusted R-squared	0.633628	S.D. dependent var	0.030863
S.E. of regression	0.018681	Sum squared resid	0.009074
Durbin-Watson stat	2.035967		

Equation: DLOG(DFLAGOBTOT) = C(27)*DLOG(DCON(-1)) + C(29) *DLOG(DFLAGOBTOT(-1)) + C(32) + C(34)*D85 + C(37)*DLOG(POIL(-1)) + C(38)*PNBREALGAP(-1) + C(39)*D(FEDFUND(-1))+C(40) *DLOG(DFLAGOBTOT(-2))
Observations: 35

R-squared	0.464962	Mean dependent var	0.020386
Adjusted R-squared	0.326249	S.D. dependent var	0.026854
S.E. of regression	0.022043	Sum squared resid	0.013119
Durbin-Watson stat	1.909001		

Equation: DLOG(DLEFLAINVTOT1) = + C(43)*DLOG(DLEFLAINVTOT1(-1)) + C(45) + C(46)*D00 + C(47)*D85 + C(49)*D07 + C(50)*DLOG(POIL(-1)) + C(51)*DLOG(POIL(0))
Observations: 36

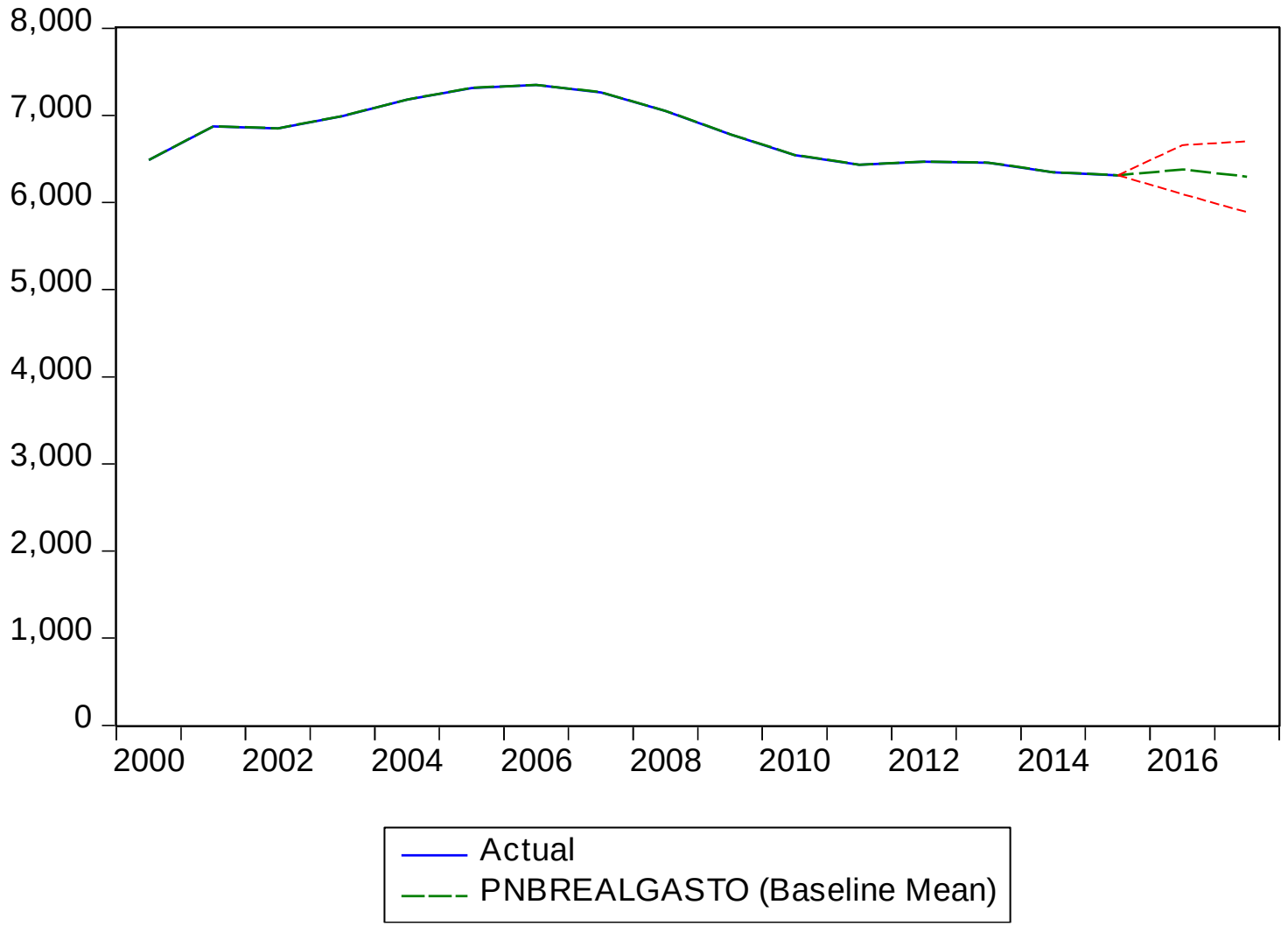
R-squared	0.636401	Mean dependent var	0.021172
Adjusted R-squared	0.561174	S.D. dependent var	0.027827
S.E. of regression	0.018434	Sum squared resid	0.009854
Durbin-Watson stat	2.009377		

Equation: DLOG(DPNB) = + C(57)*DLOG(DPNB(-1)) +C(59) + C(61)*D00 + C(65)*DLOG(POIL(-1)) + C(66)*PNBREALGAP(-2) + C(67) *D(FEDFUND(0)) +C(68)*D02 +C(69)*D07*@TREND
Observations: 34

R-squared	0.765654	Mean dependent var	0.037744
Adjusted R-squared	0.702561	S.D. dependent var	0.014312
S.E. of regression	0.007805	Sum squared resid	0.001584
Durbin-Watson stat	2.086607		

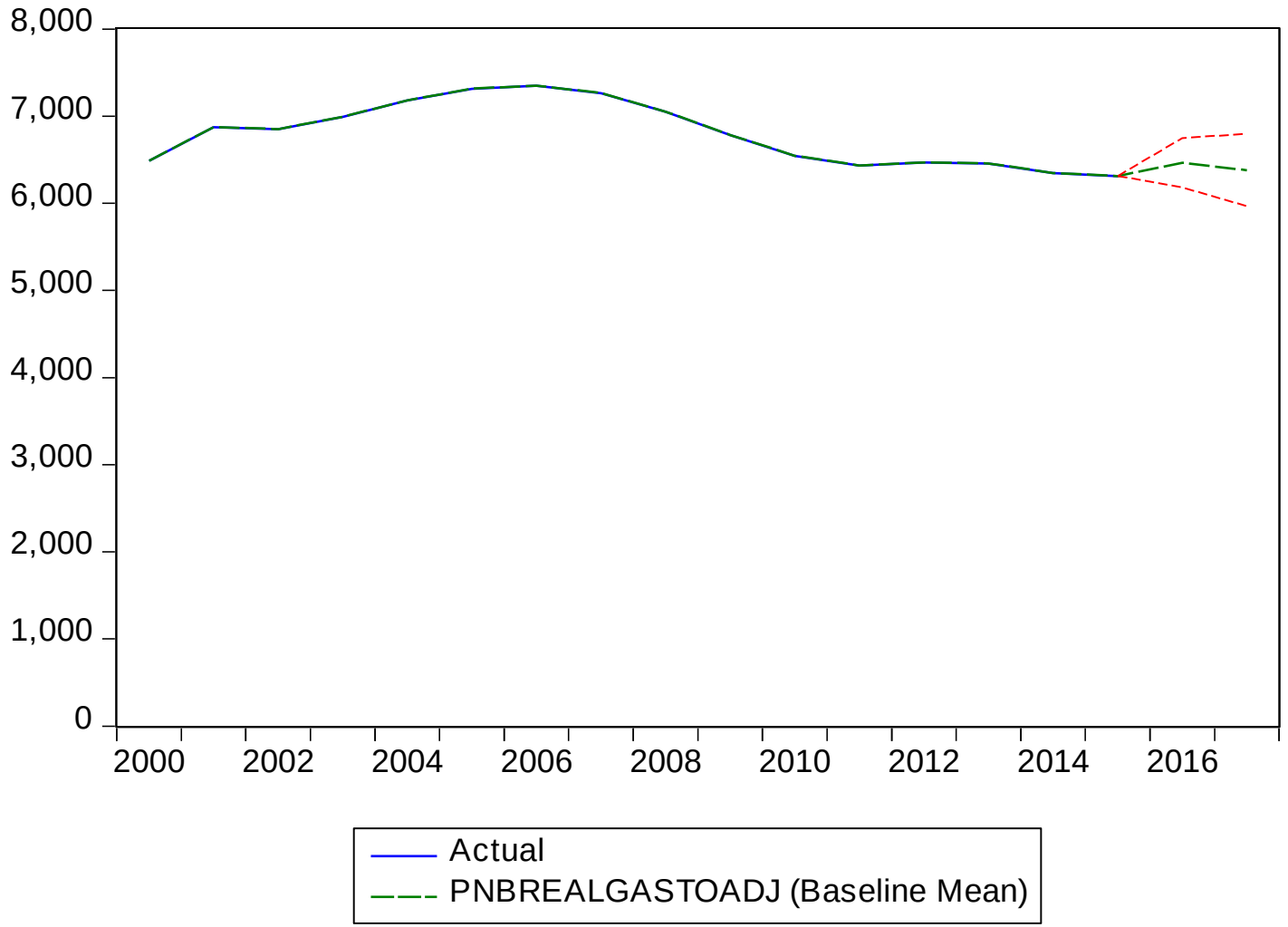
E VIEWS Output

Gross National Product
with aggregated expenditure model in nominal prices



E VIEWS Output

Gross National Product
with aggregated expenditure model in nominal prices



Long term Scenarios

Long Term Projections (10 years): PUERTO RICO ECONOMIC CHALLENGES AND APPROVED FISCAL PLAN COMMITMENTS

- In 2017, the US Treasury Department and the PRPB in their common interest of developed a new long term macroeconomic model (10 year) for Puerto Rico.
- Modeling incorporated the short term NEW ECONOMETRIC DYNAMIC MODEL (of the PRPB) , with variables of change using the OKUN model. Among them:
  - Income Measures: Act #154, Sales and use tax (SUT) Collection (IVU)
  - Expense Measures: Reduction in subsidies, operational expenses, payroll, new health care model and adjusted retirement benefits.

ECONOMIC SCENARIO PRESENTED BY PRPB USING RECOMMENDED GNP

- Additional modeling for 10-year forecast exercises are being performed using OKUN's law based on the ever-changing events inducing PR's economy.

- Applying OKUN's law a revised Real GNP is projected and used as reference in the behavior of other variables applied in the model.

- Data consistency checks are performed to ensure logic, accuracy and validate adequate economy portray.

The Planning Board provides information on three major topics related to development and sustainability: economy, land and human resources. All the information requirements needed to promote the financial stability, economic growth, management responsibility, and service delivery efficiency of Puerto Rico are part of the Planning Board daily agenda.