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APPENDICES

APPENDIX A

THE EMPIRICAL ESTIMATION RESULTS

Table 10a Empirical Estimation of Bhutan's Trade

Variables	Coefficient (α)				
	Eq(1)	Eq(2)	Eq(3)	Eq(4)	Eq(5)
Constant term	-7.5425	-6.4877	-5.9725	-7.8680	-5.4145
LOG(GDPI?*GDPJ?)	0.7951* (3.1960)	0.6138* (5.4287)	0.5653* (5.4625)	0.4701* (6.3188)	0.5569* (5.6545)
LOG(PCGDPI?*PCGDPJ?)	-0.3015 (-1.4803)	-0.2234 (-1.5224)	-0.2285 (-1.5633)		
LOG(PCGDPD?)	0.4814* (3.2512)	0.4559* (3.0664)	0.4574* (3.0277)		
LOG(OPENI?)	0.5671* (3.9395)	0.5711* (3.9940)	0.5820* (3.9477)	0.4707* (2.9586)	
LOG(OPENJ?)	0.3520 (1.4263)	0.2099 (1.2161)	0.1501 (0.8927)	0.2836** (2.0539)	
LOG(DIST?)	-1.9195* (-4.0419)	-1.6947* (-4.0809)	-1.6145* (-4.7399)	-1.0462* (-4.8679)	-1.1928* (-3.3151)
TA?	3.8180* (5.2821)	3.9674* (5.6343)	3.9365* (7.8284)	3.8857* (10.1334)	3.4731* (6.1901)
TB?	-0.1044 (-0.1077)	0.0469 (0.0481)			-0.0185 (-0.0181)
SAPTA?	-0.1157 (-1.1159)	-0.1346 (-1.3549)			-0.0582 (-0.4360)
T?*(LOG(GDPI?*GDPJ?))	-0.0035 (-0.5655)				
T?*(LOG(PCGDPI?*PCGDPJ?))	0.0036 (0.4126)				
R square	0.9089	0.9085	0.9054	0.8951	0.8773
Adjusted R square	0.9055	0.9057	0.9031	0.8932	0.8751
Durbin Watson	2.3475	2.3524	2.3589	2.3487	2.3260
F-statistic	270.1017	324.5461	393.7271	470.6582	394.4455
Signif F	0.0000	0.0000	0.0000	0.0000	0.0000
Panel observation	338	338	338	338	338

Note: *, ** and *** indicate significance of variables at 1 %, 5 % and 10 % respectively, t-ratios shown in the parenthesis.

Dependent Variable: logarithm of total trade (export + import) between i and j.
Independent variables (except for dummies) are expressed in natural logarithms.
1st order AR model.

Table 11a Empirical Estimation of Trade with Asian Countries

Variables	Coefficient (α)			
	Eq(1)	Eq(2)	Eq(3)	Eq(4)
Constant Term	-17.0887	-8.2418	-4.7853	-7.3926
LOG(GDPI?*GDPJ?)	0.7677**	0.4389**	0.3676*	0.3275*
	(2.0325)	(2.3532)	(4.6501)	(3.2982)
LOG(PCGDPI?*PCGDPJ?)	-0.5372***	-0.0699		
	(-1.7770)	(-0.3336)		
LOG(PCGDPD?)	0.0279	0.3206***	0.4615*	
	(0.1508)	(1.7034)	(3.0173)	
LOG(OPENI?)	0.6212*		0.5991*	0.5036*
	(5.1043)		(4.1104)	(3.5407)
LOG(OPENJ?)	0.4645***		0.0441	0.2692
	(1.6595)		(0.2784)	(1.5872)
LOG(DIST?)	0.3403	-0.6777	-1.5917*	-0.6585**
	(0.3937)	(-0.8455)	(-3.9738)	(-2.0196)
TA?	3.2363*	4.1451*	3.9525*	3.4860*
	(3.0971)	(4.2384)	(9.9892)	(7.9385)
TB?	1.9052	1.4346		
	(1.5455)	(1.1855)		
SAPTA?	-0.0661	-0.0304		
	(-0.7959)	(-0.2349)		
T?*(LOG (GDPI?*GDPJ?))	-0.0026			
	(-0.2756)			
T?*(LOG(PCGDPI?*PCGDPJ?))	0.0039			
	(0.2765)			
R square	0.9659	0.9489	0.9579	0.9544
Adjusted R square	0.9624	0.9454	0.9553	0.9520
Durbin Watson	2.1099	2.1855	2.1398	2.1061
F	276.8959	270.4259	375.2020	397.8185
Signif F	0.0000	0.0000	0.0000	0.0000
Panel observation	141			

Note: *, ** and *** indicate significance of variables at 1 %, 5 % and 10 % respectively, t-ratios shown in the parenthesis.

Dependent Variable: logarithm of total trade (export + import) between i and j.

Independent variables (except for dummies) are expressed in natural logarithms.

2nd order AR model.

Table 12a Empirical Estimation of Trade with Industrialized Countries

Variables	Coefficient (α)		
	Eq(1)	Eq(2)	Eq(3)
Constant Term	-12.4139	-6.8399	-15.1797
LOG(GDPI?*GDPJ?)	0.7877* (3.0571)	0.3303*** (1.7421)	0.3369** (2.3239)
LOG(PCGDPI?*PCGDPJ?)	-0.6519 (-1.2645)	0.0648 (0.1342)	
LOG(PCGDPD?)	0.0389 (0.0390)	-0.6609 (-0.6757)	
LOG(OPENI?)	-0.2460 (-0.3970)	-0.3023 (-0.4851)	
LOG(OPENJ?)	0.0048 (0.0093)	-0.0392 (-0.0904)	
LOG(DIST?)	0.2545 (0.2237)	0.2598 (0.2182)	0.3957 (0.4757)
T?*(LOG(GDPI?*GDPJ?))	-0.0305* (-2.6697)		
T?*(LOG(PCGDPI?*PCGDPJ?))	0.0397* (2.6881)		
AR(1)	0.3041 (4.7450)	0.3707 (6.2238)	0.3695 (6.3374)
R square	0.8576	0.8538	0.8441
Adjusted R square	0.8503	0.8480	0.8415
Durbin Watson	2.0844	2.1665	2.1342
F	117.1277	147.7006	326.6847
Signif F	0.0000	0.0000	0.0000
Panel observation	185		

Note: *, ** and *** indicate significance of variables at 1 %, 5 % and 10 % respectively, t-ratios shown in the parenthesis.

Dependent Variable: logarithm of total trade (export + import) between i and j.

Independent variables (except for dummies) are expressed in natural logarithms.

1st order AR model.

Table 13a Empirical Estimation for Export

Variables	Coefficient (α)			
	Eq(1)	Eq(2)	Eq(3)	Eq(4)
Constant Term	-18.8146	-13.8052	-9.3330	-8.4063
LOG(GDPI?)	3.5887* (3.9533)	0.3113 (0.8403)		
LOG(GDPJ?)	-0.6283 (-1.4740)	0.3566 (0.9682)	0.5748** (2.0723)	0.6843* (3.0905)
LOG(PCGDPI?)	-2.5941* (-4.4587)			
LOG(PCGDPJ?)	0.9482 (1.1644)			
LOG(PCGDPD?)	-0.4816 (-1.3136)			
LOG(OPENI?)	0.8027* (3.8557)	0.6450** (2.5460)	0.7102* (2.7266)	0.6754** (2.6010)
LOG(OPENJ?)	-0.4135 (-1.0649)	0.5057 (1.6412)		0.4474*** (1.7544)
LOG(EX?)	0.3925** (2.1885)	0.4073** (2.0722)	0.3054 (1.5137)	
LOG(DIST?)	0.7691 (0.5798)	-0.4990 (-0.5635)	-0.9635 (-1.3043)	-1.5506* (-2.9984)
TA?	8.8327* (7.0865)	6.4330* (5.9237)	5.1734* (5.7121)	5.6002* (6.6779)
TB?	5.9434* (4.6062)	4.4356* (3.2192)	3.5710* (2.6977)	3.3180* (3.0937)
SAPTA?	-0.0697 (-0.4875)	-0.0222 (-0.1246)		
R square	0.9093	0.8937	0.8856	0.8653
Adjusted R square	0.9020	0.8873	0.8808	0.8597
Durbin Watson	2.1574	2.2492	2.2342	2.1844
F-statistic	124.1905	137.9304	184.6497	153.2755
Signif F	0.0000	0.0000	0.0000	0.0000
Panel observation	175	175	175	175

Note: *, ** and *** indicate significance of variables at 1 %, 5 % and 10 % respectively, t-ratios shown in the parenthesis.

Dependent Variable: logarithm export from i to j.

Independent variables (except for dummies) are expressed in natural logarithms.
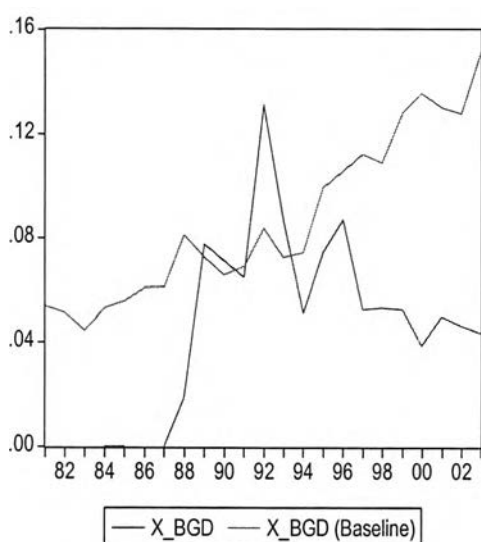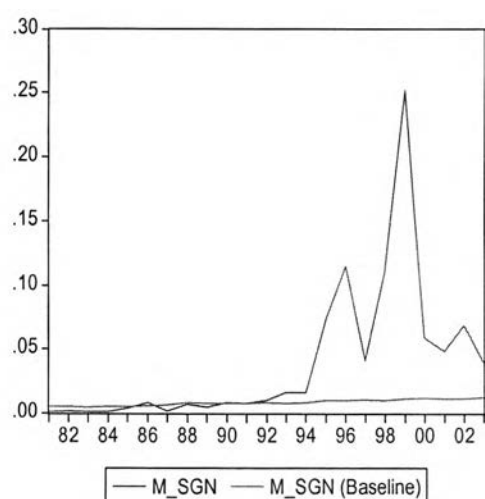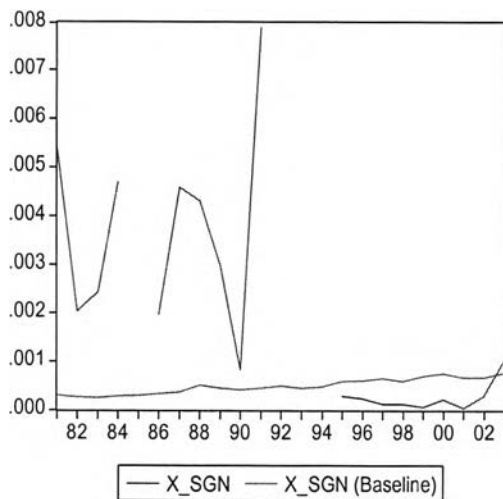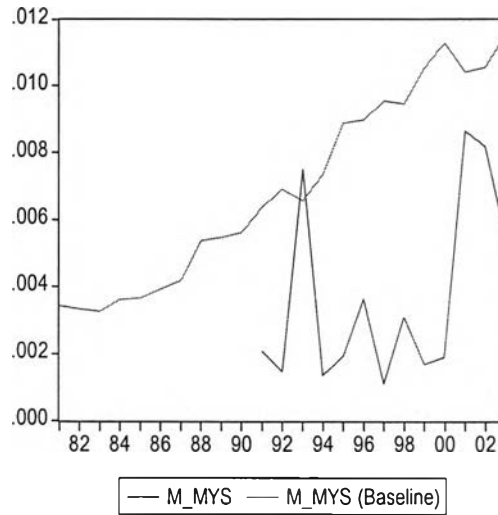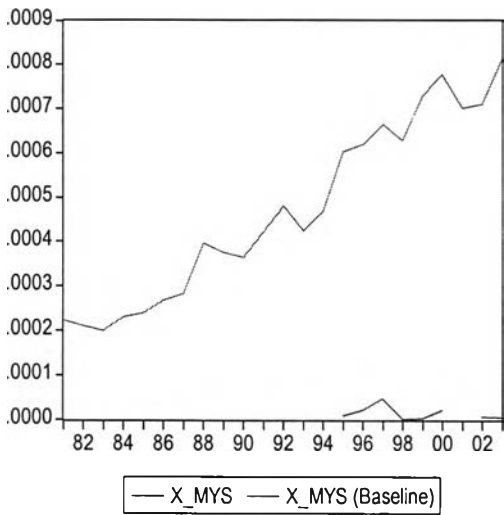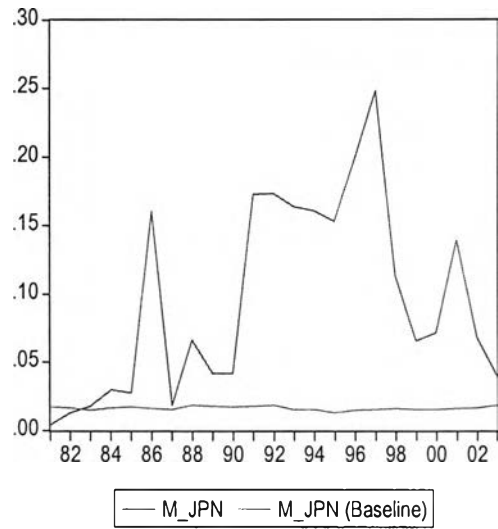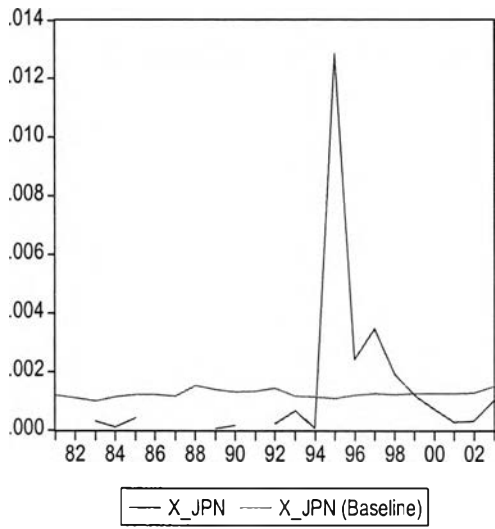
1st order AR model.

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Appendix B

ACTUAL AND PREDICTED EXPORTS AND IMPORTS

List of Countries in the Sample						
SL.No.		Country	ABR	SL.No.		Country	ABR
1	Asia	India	IND	9	Europe	Austria	AUT
2		Bangladesh	BGD	10		Denmark	DNK
3		Nepal	NPL	11		France	FRA
4		Thailand	THA	12		Germany	GER
5		Malaysia	MYS	13		Italy	ITA
6		Japan	JPN	14		Netherlands	NDL
7		Singapore	SGN	15		Switzerland	SW
8		South Korea	SK	16		United Kingdom	UK
				17	Others	United States of America	USA

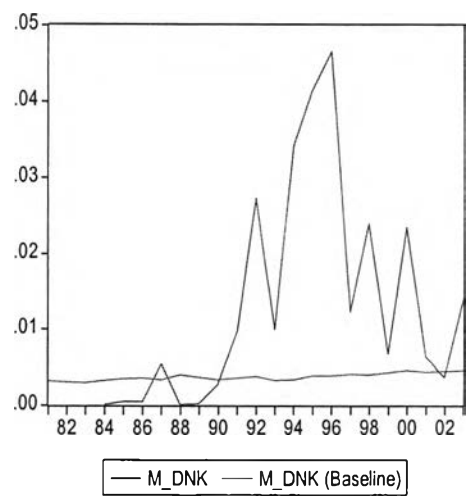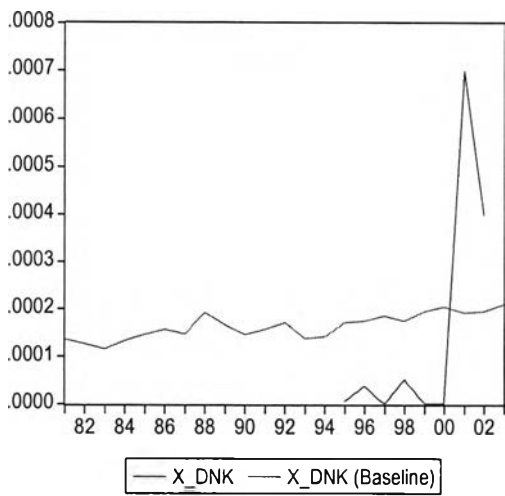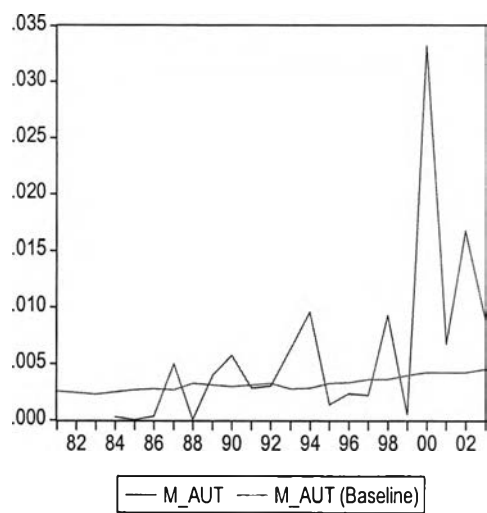The figure below presents the actual and predicted exports and imports between Bhutan and its trading partners. It can be seen that trade with these countries fluctuate a great deal and model fails to depict precise estimation. Baseline indicates the predicted exports(X) or imports (M).

X_NPL   X_NPL (Baseline)

M_NPL   M_NPL (Baseline)

X_THA   X_THA (Baseline)

M_THA   M_THA (Baseline)

X_SGN   X_SGN (Baseline)

M_SGN   M_SGN (Baseline)

- X_JPN — X_JPN (Baseline)
- M_JPN — M_JPN (Baseline)
- X_MYS — X_MYS (Baseline)
- M_MYS — M_MYS (Baseline)
- X_UK — X_UK (Baseline)
- M_UK — M_UK (Baseline)

— X_FRA — X_FRA (Baseline)

— M_FRA — M_FRA (Baseline)

— X_GER — X_GER (Baseline)

— M_GER — M_GER (Baseline)

— X_ITA — X_ITA (Baseline)

— M_ITA — M_ITA (Baseline)
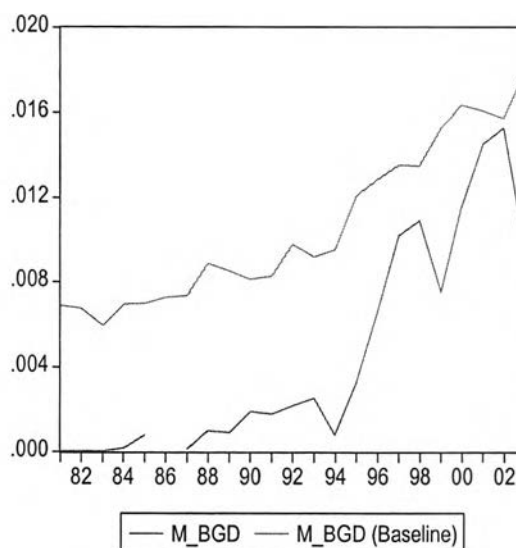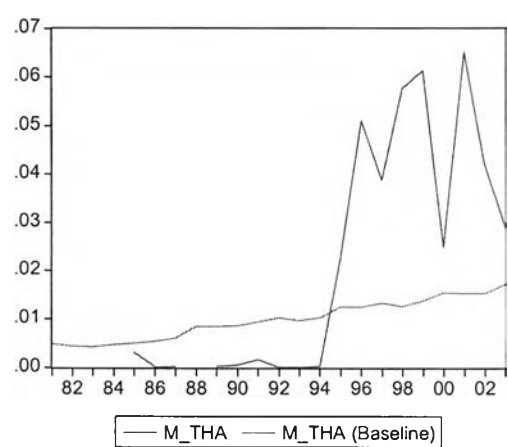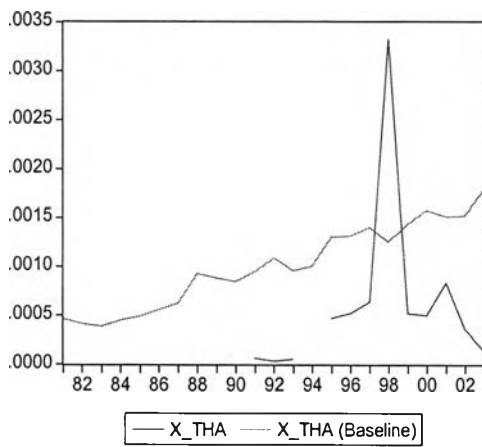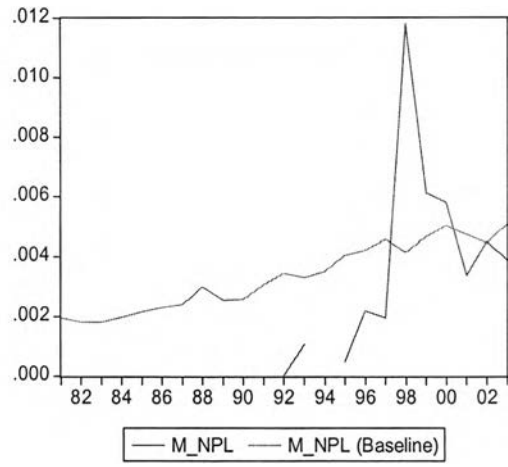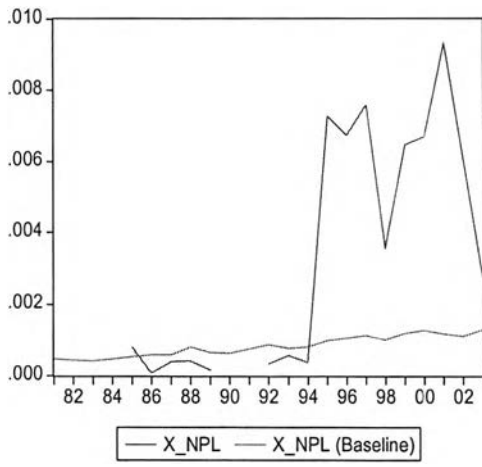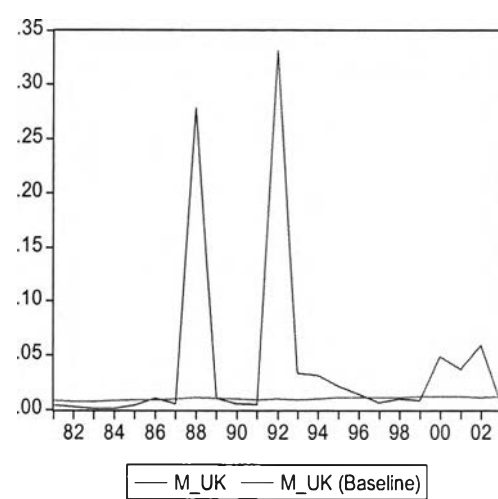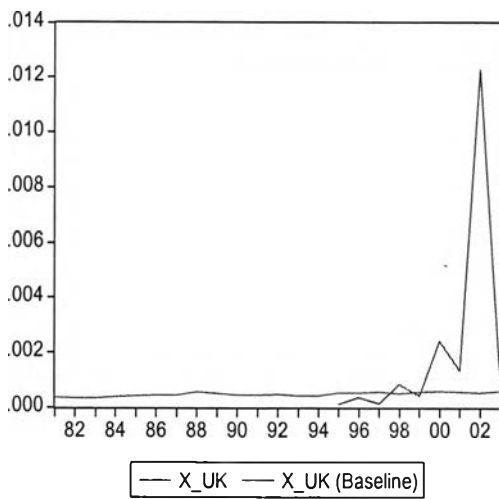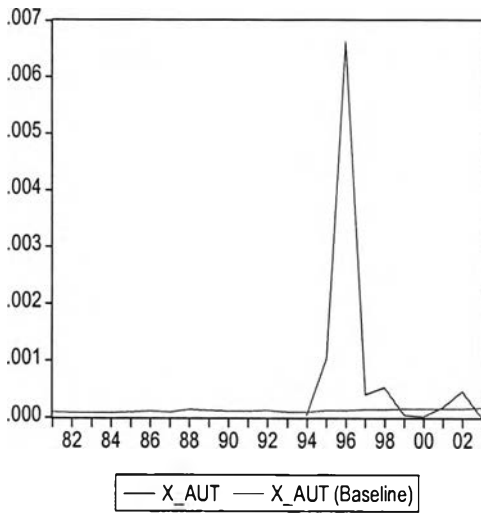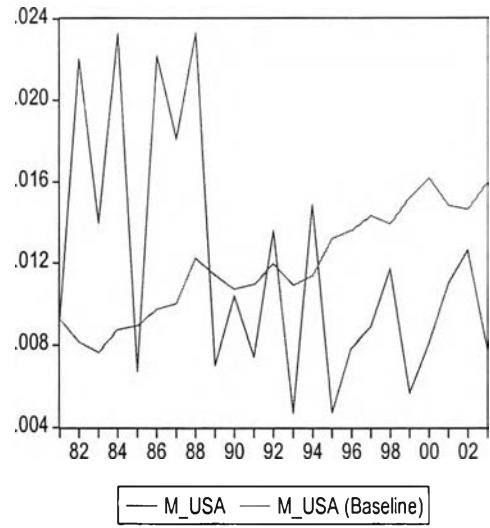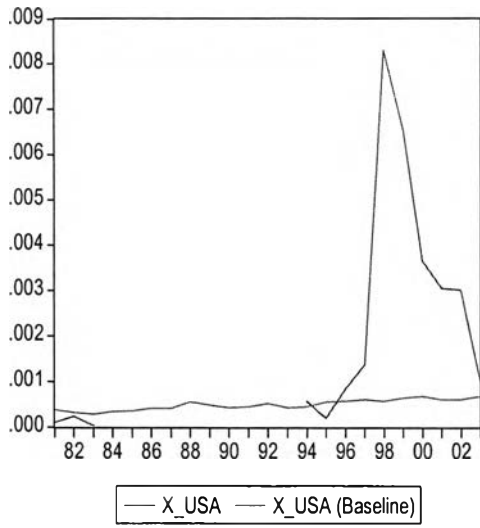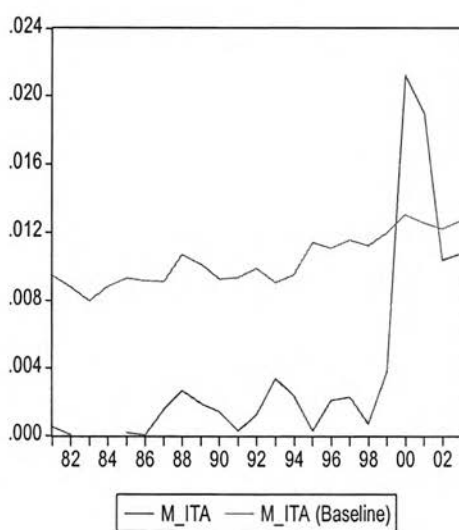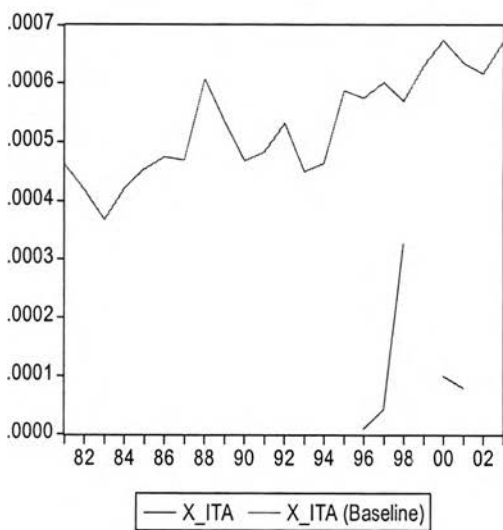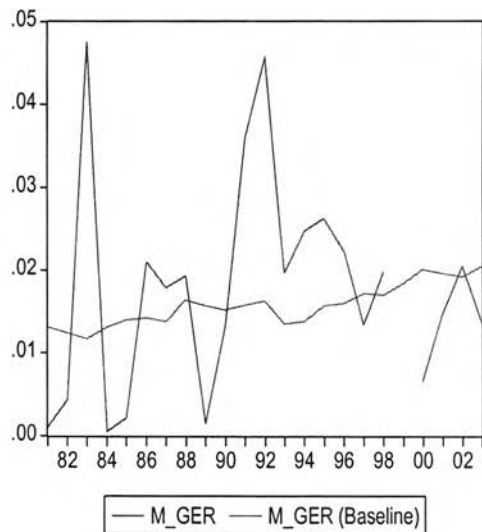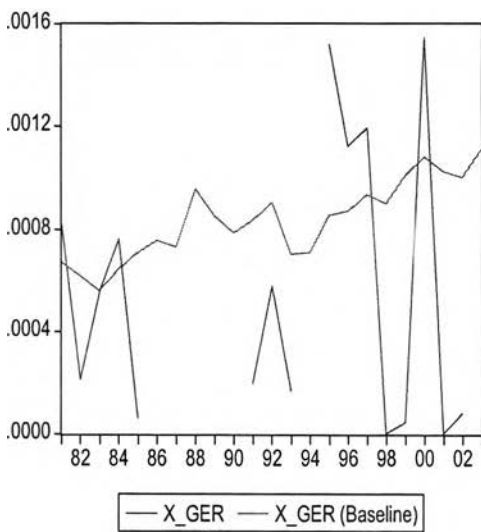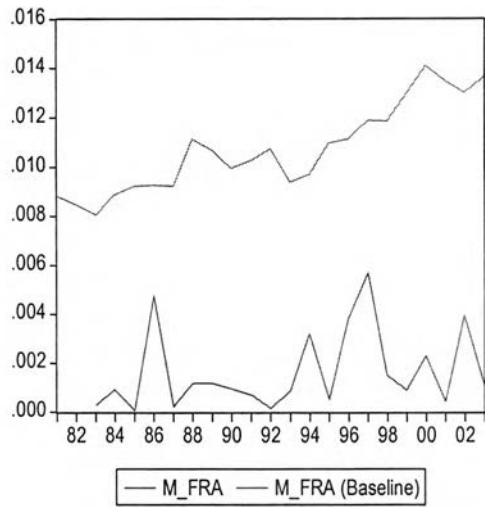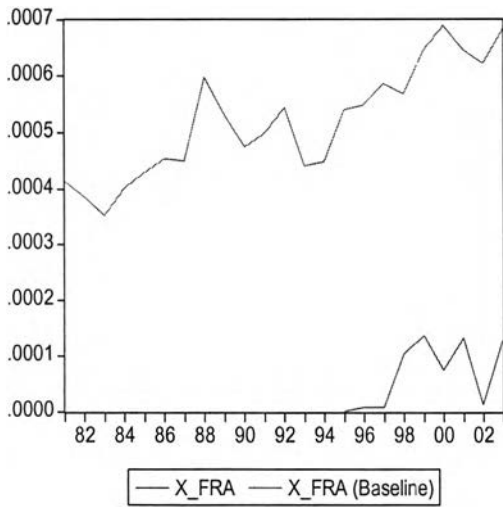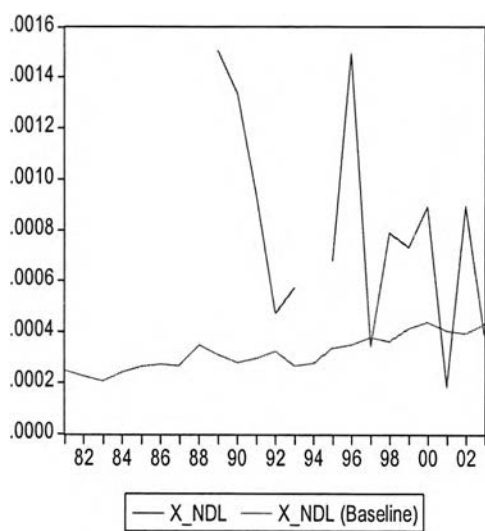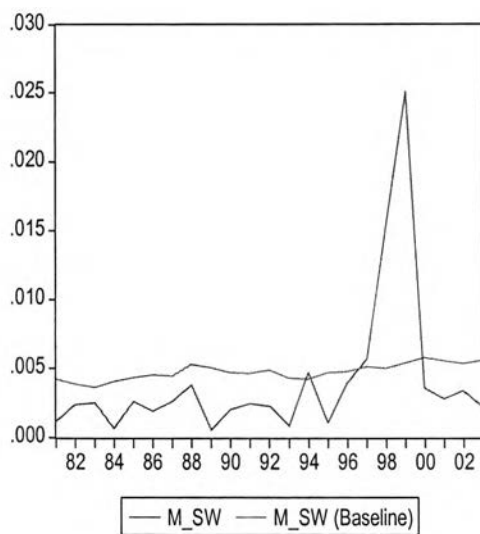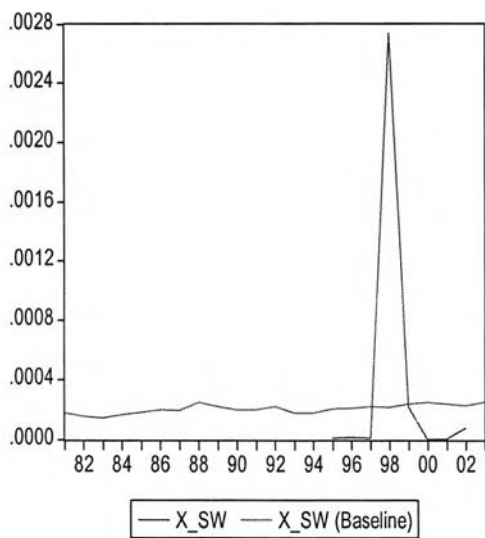
Appendix C

COMPOSITION OF EXPORTS AND IMPORTS

Table below presents the value and proportion of principle commodities exported (1981 to 2003, values in percentage and amount if millions of ngultrum, national currency) of Bhutan according to their proportion in total exports.

Table 15c Export Structure by Principal Commodities

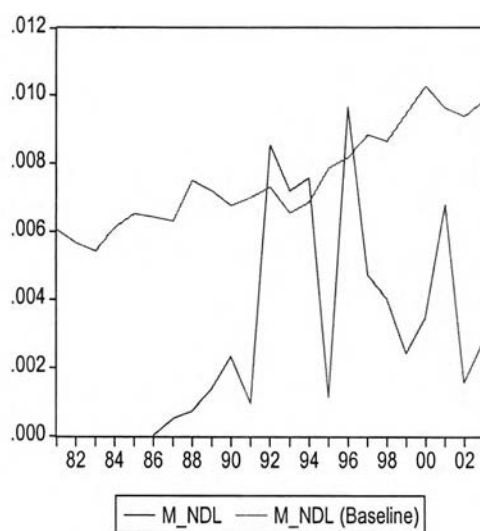| Commodity	1981		1986		1992		2003	
	Amt. Million Nu.	% Share	Amt. Million Nu.	% Share	Amt. Million Nu.	% Share	Amt. Million Nu.	% Share
Electric energy*	0	0	42	11	355	20	2603.5	47.7
Oranges	17	11	18	5	195	11	146	3
Portland cement	35	20	73	19	136	8	406	8
Cardamom	20	11	41	11	65	4		
Sawn timber	16	9	53	14	37	2		
Potatoes	16	9	24	6				
Talcum powder	11	6						
Gum rosin	9	5	19	5				
Menthol	5	3						
Fruit products	5	3	22	6				
Philatelic stamps	4	2						
Block board			21	6	37	2		
Dolomite			11	3				
Calcium carbide*					353	20	641	12
Particle board					121	7	185	3
Mixture of Fruit/ vegetable juice					35	2	100	2
Ferro Silicon*							597	11
Saw logs, hard					48	3		
Mineral & areated water							226	4
Stranded wire like copper not electrically insulated							167	3
Gypsum; anhydrite							104	2
Textured yarn							98	2

Source: RAM, Annual Report.

Table below presents the proportion of exports of Bhutan to India and third countries. Bhutan exports a wide range of items to India. The top listed items according to their value in total exports are electricity, mineral products, products of chemical industries, base metals and products and wood & wood products. Exports to third countries are vegetables and fruits, mineral products (mostly exported to Bangladesh and Nepal) and personnel effects.

Table 16c Composition of Exports to India and Third Countries (share in %)

Item	India				Third Countries			
	1999	2000	2001	2003	1999	2000	2001	2003
Vegetables and Fruits,	63.84	4.5	6	4	63.84	49.3	57.7	53
Prepared foodstuffs	2.91	4.4	4.6	6.9	2.91	6	4.9	3.6
Mineral Products	21.93	12	13	9.6	21.93	31.3	31.3	30.6
Electricity	0	50	44.1	47.7				
Plastics and Rubber Products	0.25	0.2	1.2	3.1	0.25	0		1.3
Raw Hides and Skins	0	0.1	0.1	0.1				
Wood and Wood Products	2.38	5.7	5.1	3.1	2.38		0.4	0.8
Woodpulp Products	0.11	0	0	0	0.11	1.3	2.6	0.3
Textiles	5.85	0	0	1.6	5.85	5.8	1.7	
Household item and personal effects	0.3	0		0	0.3	4.1	2.7	3.6
Stone, Plaster, Cement and Asbestos Products	0	0.3	0.3	0				
Base Metals and Base Metal Products	0	10.3	12.7	13.4	0			
Machinery	2.38	0	0	0.3	2.38	1.8		6.8
Miscellaneous Manufactured Articles	0.05	1	0.4	0.5	0.05			
Product of Chemical Industries	0	11.1	12.5	9.7				
Handicraft Products	0	0	0	0		0.2	0.8	

Source: RMA, Annual Report

Table below presents the value and proportion of principle commodities imported (1981 to 2003, values in percentage and amount if millions of ngultrum, national currency) of Bhutan according to their proportion in total imports.

Table 17c Import Structure by Principle Commodities (share in % and amount in million Nu.)

Commodity	1981		1986		1988		2003	
	Million of Nu.	% Share	Million of Nu.	% Share	Million of Nu.	% Share	Million of Nu.	% Share
Structures and parts	44	9						
Bars and rods of iron	29	6					144	1
Diesel	28	5	55	5	49	3	813	7
Trucks chassis	20	4						
Cement plant parts	18	3						
Rice	16	3	59	5	70	4	459	4
Parts of civil engineering & contractors equipment	15	3	30	3	33	2		
Fabrics	12	2						
Petrol	12	2					255	2
Bitumen	11	2						
Generators			133	11				
Parts of motor vehicle			40	3				
Electric energy			35	3				
Passenger motor car			32	3	42	2		
Edible oil			32	3	38	2		
Tyres and Tubes			31	3	37	2		
Sugar			28	2				
Aircrafts					419	24		
Electric Transformer					85	5		
Beer					34	2	277	2
Parts of hydraulic turbines							931	8
Other generating sets							696	6
Cars petrol below 1000cc							264	2
With steel core							136	1

Source: RMA, Annual Report.

Table below presents the proportion of imports of Bhutan from India and third countries (2001 to 2003). Bhutan imports a wide range of items from India but imports from third countries are machineries and electrical appliances.

Table 18c Composition of major Imports from India and Third Countries

Item	India				Third Countries			
	1999	2000	2001	2003	1999	2000	2001	2003
Animal Products	2.9	2.8	3.9	3.5	0.05	0.1	0.4	0.7
Cereals Vegetables, Fruits, Nuts, Coffee, Tea & Spices	11.9	6.7	8	7	0.61	0.2	0.2	1.4
Vegetables Fats and Oil	2.8	2.3	2.9	1.7	0.66	0.4	0.5	2.5
Prepared foodstuffs	6.7	5.7	7.2	5.7	1.73	2.8		2.6
Mineral Products	14.4	16.5	21.6	18.2	2.86	4.1	0.1	0.1
Products of Chemical Industries	5.5	22.2	7.4	5.5	0.37	0.6	1	2.2
Medicines and Pharmaceuticals					0.98	1.3	1.2	1
Plastics and Rubber Products	3	2	2.3	2.6	3.53	5.1	6.6	7
Raw Hides and Skins	0.1	0	0.1	0				
Wood and Wood Products	1.9	3.2	2.1	1	0.35	0.8	1.1	0.3
Wood pulp Products	2	2	2.2	1.7	1.32	2.3	1.1	1.6
Textiles	2.7	2.1	2.4	1.4	1.81	2.7	3	7.9
Footwear, Headgear and Clothing Accessiories	0.8	1.1	0.7	0.7				
Stone, Plaster, Cement and Asbestos Products	1.5	1.1	2.1	0.2				
Precious or Semi-precious Metal Products	0	0	0	0	0.39	0	0.1	0.5
Base Metals and Base Metal Products	13.1	10.6	13.9	13.9				
Machinery and Mechanical Appliances	18.7	13	14.5	27.6	83.83	77.1	76.9	68.5
Transport Vehicles and Equipment	9.9	6.8	6.5	5.5				
Optical, Photographic and Measuring Equipment	1.1	1	1.3	2.1	0.01		0.1	0.1
Miscellaneous Manufactured Articles	1.1	1.1	1.1	2	0.46	1.7	1.5	3.2
Trekking Equipment, Footwear, Carpets		0			0.38	0.3	0.6	0.4
Tobacco and Cigarettes					0.32	0.3	0.2	0.1
Ceramic and Melamine Products					0.16	0	0.7	0
Personal effects					0.18	0.1	1.1	

Source: RMA, Annual Report.

BIOGRAPHY

Miss. Lhakpa Bhuti was born on 9th of October 1977 in Thimphu, Bhutan. She completed her Bachelors Degree in Economic honours in the year 2000 from Sherubtse College, Bhutan which has academic affiliation to the University of Delhi, India. After graduated she joined National Finance Service, Bhutan and attained a post graduated certificate in Financial Management in 2001 from the Royal Institute of Management, Bhutan. Then she joined Department of Revenue and Customs, Ministry of Finance in 2002 and has been working under the Tax Administration Division. In 2004, she registered to undertake a Masters Degree in International Economics and Finance at the Chulalongkorn University in Bangkok, Thailand under the Thailand International Development Cooperation Agency Scholarship.

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