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9. APPENDIX

Data description

The data covers the period 1970 to 2004. Annual data were used since quarterly data are not available for some series.

LAGRIC. The log of agricultural output. The data were from 1970 to 1980 were obtained from Hartman (1986) and Cornwell, Leistner and Esterhuysen (1991). Data between 1981 and 2004 were obtained from various issues of the annual reports and quarterly bulletins of the Bank of Namibia. The data are converted to real using 1995 as a base year.

LRCOMP. The log of real commodity prices. The real commodity price index was constructed to reflect the role of primary products in Namibia's trade structure. The variable was computed as the weighted average of Namibia's main commodities export nominal prices (beef, fish, metals or uranium ore, copper and live animals which are mainly sheep) deflated by trade weighted price index from developed countries. Diamond, which is the main commodity exported by Namibia is excluded because its price series is not available. This study follows Cashin *et al*. (2004) to construct the commodity price variable. The construction of the real commodity price is as follows:

The average total value of primary commodity export is calculated for the period 1980 to 2004. The weights of the five commodities are calculated by dividing the average value of each individual commodity export by the average total value of primary commodity export. The data on individual and total commodity exports is sourced from the Central Bureau of Statistics of Namibia and the Bank of Namibia. Once the individual commodity exports are calculated, they are held fixed over time and are used to weight the individual price indices of the same commodities, which are obtained from IMF's International Financial Statistics, to form a geometric weighted average index of USA dollar based nominal commodity-export prices. The base year is set at 1995. The real

commodity price is then obtained by deflating the nominal commodity price index by the index of unit value of developed country manufactured exports.

LEXPORT. The log of total export of goods and services. The data was obtained from the Central Bureau of Statistics of Namibia and Bank of Namibia. The data before 1980 was sourced from Hartman (1986), and Cornwell, Leistner and Esterhuysen (1991). The data was converted into real using the consumer price index and the base year was set at 1995.

LREER. The log of real effective exchange rate. The REER is calculated by using the geometric average formula as: $REER=NEER*(CPI/CPIF)^{wj}$, where NEER is the nominal effective exchange rate, CPI is domestic consumer price index, *wj* is the weight of the respective trading partner, and CPIF is the consumer price index of respective trading partners. The main trading partners are South Africa, Japan, United Kingdom, Germany, USA, and Spain. These data are also published by the Bank of Namibia and the International Monetary Fund (IMF). An increase in REER is an appreciation and a decrease is depreciation.

LGOV. The log of government expenditure. The data between 1970 and 1979 is obtained from Hartman (1986), and Cornwell, Leistner and Esterhuysen (1991). The data for the period 1980 to 2004 is sourced from the Bank of Namibia and Central Bureau of Statistics of Namibia.

LINVGDP. The log of gross domestic investment to GDP. The data between 1970 and 1979 is obtained from Hartman (1986), and Cornwell, Leistner and Esterhuysen (1991). The data for the period 1980 to 2004 is sourced from the Bank of Namibia and Central Bureau of Statistics of Namibia.

LOPEN. The log of openness of the economy. This variable is used as a proxy for trade and exchange restriction. It is computed as the sum of export and imports divided by

GDP. Data between 1970 and 1979 is obtained from Hartman (1986), and Cornwell, Leistner and Esterhuysen (1991). The data for the period 1980 to 2004 is sourced from the Bank of Namibia and Central Bureau of Statistics of Namibia.

LTOT. Log of terms of trade. This variable is computed as the ratio of export price index to import price index and it is used to represent changes in international economic environment. This data is obtained from the Bank of Namibia and Central Bureau of Statistics of Namibia. Data for computation of this variable is also obtained from the Bank of Namibia and Central Bureau of Statistics of Namibia. Data between 1970 and 1979 is obtained from Hartman (1986), and Cornwell, Leistner and Esterhuysen (1991).

MISALIGNMENT. Real exchange rate misalignment computed as the difference between actual and equilibrium real exchange rates.

LRESBAL. Log of resource balance. It is computed as (IMPORTS-EXPORT)/GDP. It is used as a proxy for capital flows and controls. The data was obtained from Cornwell, Leistner and Esterhuysen (1991) and the Bank of Namibia.

LPERCAPI. Log of real GDP per capita. This variable is used as a proxy for productivity or technology. The data was obtained from Cornwell, Leistner and Esterhuysen (1991) and the Bank of Namibia.

LTUNITCOT. Log of total unit labour cost. Since wages and salaries are not available for the Namibian economy, total remuneration of employees was taken as a proxy for wages. Remuneration of employees was divided by total output of the Namibian economy. The data was obtained from the Central Bureau of Statistics. Data for the period 1970 to 1979 was taken from Cornwell, Leister and Esterhuysen (1991).

Table 12. Unit root test

Variable	Model	ADF	Joint Test(F-statistic)	Conclusion
LAGRIC	constant and trend	-2.595	2.925	
	constant	-2.773*		I(0)
LRCOMP	constant and trend	-3.669**		I(0)
LEXPORT	constant and trend	-3.079	3.654	
	constant	-2.283	2.020	
	none	1.077		I(1)
LREER	constant and trend	-0.824	Φ_3=1.065	
	constant	-1.417		
	none	-1.144	Φ_1=1.629	I(1)
LGOV	constant and trend	-1.515	Φ_3=2.207	
	constant	-1.543		
	none	7.678	Φ_1=2.382	I(1)
LINVGDP	constant and trend	-2.044	Φ_3=1.606	
	constant	-1.723		
	none	-0.548	Φ_1=1.700	I(1)
LOPEN	constant and trend	-2.058	Φ_3=3.838	
	constant	-0.280		
	none	-1.146	Φ_1=2.087	I(1)
LTOT	constant and trend	-3.291*		I(0)
MISALIGNMENT (Fundamental model)	constant and trend	-0.367	Φ_3=2.686	
	constant	-0.614		
	none	0.731	Φ_1=0.377	I(1)
MISALIGNMENT (Cashin *et al*)	constant and trend	-2.939	Φ_3=3.618	
	constant	-3.058**		I(0)
LPERCAPI	constant and trend	-2.022	Φ_3=2.009	
	constant	-1.495		
	none	0.974	Φ_1=0.494	I(1)
LRESBAL	constant and trend	-3.888**		I(0)
	constant			
	none			
LTUNITCOST	constant and trend	-3.158	Φ_3=5.862	
	constant	-0.921		
	none	2.044	Φ_1=1.993	I(1)

*/**/*** Significant at 10/5/1 percent significance level

Critical values for the Φ_3 and Φ_1 are from Dickey and Fuller (1981: 1063)

"General to specific" iterative procedure in Enders (2004: 213) is used

Table 13. Diagnostic statistics on the VAR of the fundamentals approach model

	H_0	Test	Statistic	Probability
Serial correlation	No serial correlation	LM test-χ^2 (lag 3)	21.932	0.145
Normality	Error terms are normally distributed	JB-Joint	14.107	0.079
		Kurtosis – Joint	13.739	0.008
		Skewness – Joint	0.369	0.989
Heteroscedasticity	No heteroscedasticity	χ^2	227.711	0.706

Table 14. Diagnostic statistics of the reduced for VAR of the Cashin *et al.* model

	H_0	Test	Statistic	Probability
Serial correlation	No serial correlation	LM test-χ^2 (lag 4)	14.314	0.112
Normality	Error terms are normally distributed	JB-Joint	6.077	0.415
		Kurtosis – Joint	4.936	0.177
		Skewness – Joint	1.140	0.767
Heteroscedasticity	No heteroscedasticity	χ^2	154.229	0.265

Table 15. Diagnostic statistics of the VAR on the real exchange rate misalignment and economic performance from the fundamental appproach model

	H_0	Test	Statistic	Probability
Serial correlation	No serial correlation	LM test-χ^2 (lag 1)	18.735	0.283
Normality	Error terms are normally distributed	JB-Joint	9.076	0.334
		Kurtosis – Joint	2.273	0.689
		Skewness - Joint	6.803	0.147
Heteroscedasticity	No heteroscedasticity	χ^2	94.173	0.133

Table 16. Diagnostic statistics of the VAR on real exchange rate misalignment and economic performance from the Cashin *et al* model

	H_0	Test	Statistic	Probability
Serial correlation	No serial correlation	LM test-χ^2 (lag 1)	18.735	0.283
Normality	Error terms are normally distributed	JB-Joint	9.076	0.336
		Kurtosis – Joint	2.273	0.683
		Skewness – Joint	6.803	0.147
Heteroscedasticity	No heteroscedasticity	χ^2	94.173	0.133