REFERENCES

Abel, A.B. & Bernanke, B.S. 2005. *Macroeconomics*, 5th ed. New York: Pearson Education Inc.

Acemoglu, D., & Zilibotti, F. 1997. Was Prometheus Unbound by Chance? Risk, Diversification, and Growth. *Journal of Political Economy*, Vol.105, No.4, pp.709-51.

Agenor, P. 2004. *Economic Adjustment and Growth*. 2nded. Cambridge, M.A: Harvard University Press.

Akanbi, O.A., & Beddies, C.H. 2008. Accumulating Debt Post Debt Relief: How Fast is Safe? *Unpublished IMF Working Paper*. IMF, Washington D.C.

Allen, C.B., & Nixon, J. 1997. Two Concepts of the NAIRU. In Allen, C.B. and Hall, S.G. (eds), *Macroeconomic Modelling in a Changing World: Towards a Common Approach*. Chichester: John Wiley and Sons.

Appelbaum, E., & Schettkat, R. 1993. *Employment Developments in Industrialized Economies: Explaining Common and Diverging Trends*. Discussion Paper, FS 193-313, Berlin, Wissenschaftszentrum Berlin fur Sozialforschung.

Ayogu, M. 2007. Infrastructure and Economic Development in Africa: a Review. *Journal of African Economies,* Vol.16, AERC Supplement 1, pp.75-126.

Azariadis, C., & Stachurski, J. 2005. Poverty Traps. *In Handbook of Economic Growth*, P. Aghion and S.N. Durlauf. North-Holland.

Azariadis, C.,& Drazen, A. 1990. Threshold Externalities in Economic Development. *Quarterly Journal of Economics,* Vol.105, No.2, pp.501-26.

Baily, M.N. & Gordon, R.J. 1988. The Productivity Slowdown, Measurement Issues, and the Explosion of Computer Power. *Brookings Papers on Economic Activity*, Vol.2,pp.347-420.

Baily, M.N. 1982. Productivity and the Services of Capital and Labour. *Brookings Papers on Economic Activity,* Vol.2,pp.423-54.

Barro, R.J. & Sala-i-Martin, X. 2004. *Economic Growth*, 2nd ed. MIT Press.

Barro, R.J. 1997. *Determinants of Economic Growth: Cross-Country Empirical Study*. The MIT Press, London.

Barro, R.J. & Sala-i-Martin, X. 1992. Convergence. *Journal of Political Economy*, Vol.100, No.2, pp.223-51.

Barro, R.J. 1991. Economic Growth in a Cross Section of Countries. *Quarterly Journal of Economics,* Vol.106, No.2, pp.407-43.

Barro, R.J. & Sala-i-Martin, X. 1990. Economic Growth and Convergence Across the United States. *National Bureau of Economic Research (NBER), Working Paper*, No.3419.

Barro, R.J. 1990. Government Spending in a Simple Model of Endogenous Growth. *Journal of Political Economy,* Vol.98, No.5, Part 2, pp.103-25.

Bayraktar, N., & Fofack, H. 2007. Specification of Investment Functions in Sub-Saharan Africa. *World Bank Policy Research Working Paper*, No.4171.

Becker, G.S., Murphy, K.M., and Tamura, R. 1990. Human Capital, Fertility, and Economic Growth. *Journal of Political Economy*, Vol.98, No.5, Part 2, pp.12-37.

Beddies, C.H. 1999. Investment, Capital Accumulation, and Growth: Some Evidence from Gambia 1964-1998. *IMF Working Paper*, No.99/117.

Bernanke, B.S., & Gurkaynak, R.S. 2001. Is Growth Exogenous? Taking Mankiw, Romer, and Weil seriously. *NBER Working Paper*, No.8365.

Berthelemy, J.C. & Varoudakis, A. 1997. Financial Development, Policy and Economic Growth, in: R, Lensink & N. Hermes (Eds) *Financial Development and Growth: Theory and Experiences from Developing Countries* (London: Routledge Publications).

Bishop, J.H. 1989. Is the Test Score Decline Responsible for the Productivity Growth Decline? *American Economic Review*, Vol.79,No.1,pp.178-97.

Blackwood, D.L. & Lynch, R.G. 1994. The Measurement of Inequality and Poverty: a Policy Maker's Guide to the Literature. *World Development*, Vol.22,No.4,pp.567-78.

Bloom, D.E., Canning, D., Sevilla, J. 2003. Geography and Poverty Traps. *Journal of Economic Growth,* Vol.8, pp.355-378.

Brezis, E.S., Krugman, P.R., and Tsiddon, D. 1993. Leapfrogging in International Competition: A Theory of Cycles in National Technological Leadership. *American Economic Review*, Vol.83, No.5, pp.1211-19.

Budd, A., & Hobbis, S. 1989. Cointegration, Technology and the Long run Production Function. *Centre for Economic Forecasting Discussion Paper*.

Calvo, G., Leiderman L. and Reinhart, C.M. 1993. Capital Inflows and Real Exchange Rate Appreciation in Latin America: The Role of External Factors, *IMF Staff Papers* 40, 108-151.

Canagarajah, S. & Thomas, S. 2001. Poverty in a wealthy economy: the case of Nigeria. Journal of African Economies,Vol.10,No.2,pp.143-173.

Canagarajah, S., Ngwafon, J. and Thomas, S. 1997. The Evolution of Poverty and Welfare in Nigeria 1985-92. *Policy Research Working Paper* No.1715, Washington DC: World Bank.

Cass, D. 1965. Optimum Growth in an Aggregative Model of Capital Accumulation. *Review of Economic Studies*, Vol.32, pp.233-40.

Chletsos, M. 2005. *The Socio-Economic Determinants of Labour Demand in Greece: 1980-2001*. Department of Economics, University of Ioannina, Greece.

Ciccone, A., & Matsuyama, K. 1996. Start-up Costs and Pecuniary Externalities as Barriers to Economic Development. *Journal of Development Economics,* Vol.49, pp.33-59.

Collier, P. 1988. Oil Shocks and Food Security in Nigeria. *International Labour Review*, Vol. 127, No.6,pp.761-782.

Darby, J., & Wren-Lewis, S. 1991. Trends in Labour Productivity in UK Manufacturing. *Oxford Economic Papers*, Vol.43, pp.424-442.

Denison, E. 1985. Trends in American Economic Growth, 1929-1982. *Brookings Institute*, Washington, DC.

Diamond, P.A. 1982. Aggregate Demand Management in Search Equilibrium. *Journal of Political Economy,* Vol.90, No.5, pp.881-94.

Dike, E. 1995. Sources of Long-run Economic Growth in Nigeria: A Study in Growth Accounting. *African Development Review*, Vol.7, No.1,pp.76-87.

Disney, R., & Kiang, H.S. 1990. Do Real Wages Matter in an Open Economy? The Case of Singapore 1966-1987. *Oxford Economic Papers*, Vol.42, No.3, pp.635-657.

Domar, E. 1957. *Essays in the Theory of Economic Growth*. Oxford University Press.

Dornbusch, R. 1980. Exchange Rate Economics: Where Do We Stand? *Brookings Papers on Economic Activity,* 1980(1), pp. 143 – 185.

Du Toit, C., Koekemoer, R., and Ground, M. 2008. *Estimating Technological Progress for South Africa.* Unpublished. Department of Economics, University of Pretoria.

Du Toit, C.B., & Moolman, E. 2004. A Neoclassical Investment Function of the South African Economy. *Economic Modelling*, Vol.21, pp.647-660.

Du Toit, C.B. 1999. *A Supply-side Model of the South African Economy: Critical Policy Implications.* Unpublished Doctoral thesis. Pretoria: University of Pretoria.

Easterly, W., and Revelo, S. 1993. Fiscal Policy and Economic Growth. *Journal of Monetary Economics*, Vol.32, pp.417-458.

Ekundare, R.O. 1971. Nigeria's Second National Development Plan as a Weapon of Social Change. *African Affairs*, Vol.70, No.279,pp.146-58.

Enders W. 2004. *Applied Econometric Time Series*, 2nd ed. New York: John Wiley and Sons.

Engle, R. & Granger, C. 1987. Cointegration and Error Correction: Representation, Estimation, and Testing. *Econometrica*, Vol.55,pp.251-76.

Focus, 2007. *Integrated social development as the accelerator of shared growth*. Compiled by the Bureau for Economic Policy and Analysis (BEPA), Department of Economics, University of Pretoria, no.55.

Frankel, J.A. 1979. On the Mark: A Theory of Floating Exchange Rates Based on Real Interest Differentials. *American Economic Review*, Vol. 69, No. 4 (Sep., 1979), pp. 610 – 622.

Greenwood, J. & Yorukoglu, M. 1997. "1974". *Carnegie-Rochester Conference Series on Public Policy*, Vol.46,pp.49-95.

Ghura, D. 1995a. Macro Policies, External Forces, and Economic Growth in Sub-Saharan Africa. *Economic Development and Cultural Change*, Vol.43, No.4, pp.759-78.

Gunter, B.G., Cohen, M.J., and Lofgren, H. 2005. Analysing Macro-poverty Linkages: An Overview. *Development Policy Review*, Vol.23, No.3, pp.243-265.

Hamilton, J.D. 1994. *Time Series Analysis*. United Kingdom: Princeton University Press.

Harrod, R.F. 1953. Full Capacity vs. Full Employment Growth: Comment. *Quarterly Journal of Economics*, Vol.67, No.4, pp.553-59.

Harvey, A.C. 1987. Applications of the Kalman filter in Econometrics, in Bewley, T.F. (ed). *Advances in Econometrics*, Fifth World Congress, Vol.1, Econometric Society Monograph No.13, Cambridge University Press, Cambridge.

Hobijn, B. & Jovanovic, B. 2001. The Information Technology Revolution and the Stock Market: Preliminary Evidence. *American Economic Review*, Vol.91,No.5,pp.1203-20.

Hoeffler, A.E. 2000. The Augmented Solow Model and the African Growth Debate. *Centre for International Development (CID) Working Paper*, No.36.

Human Development Report, 2008. *Human Development Indicators: Country Fact Sheets*. United Nation Development Programme.

IMF, 2007. Nigeria: Poverty Reduction Strategy Paper- Progress Report. *IMF Country Report* No. 07/270.

Jamal V. & Weeks J. 1988. The Vanishing Rural-urban Gap in Sub-saharan Africa. *International Labour Review*, Vol.127, No.3,pp.271-292.

Jorgenson, D. 1990. Productivity and Economic Growth, in E. Berndt and J. Trilett, eds., *Fifty Years of Economic Measurement*, Chicago: University of Chicago Press.

Jorgenson, D. 1963. Capital Theory and Investment Behaviour. *American Economic Review*, Vol.53, No.2, pp.247-259.

Kalman, R.E. 1960. A New Approach to Linear Filtering and Prediction Problems. *Journal of Basic Engineering, Transition of the ASME series D*, Vol.82, pp.35-45.

Kaufmann, D., Kraay, A., and Zoido-Lobaton, P. 1999a. Aggregating Governance Indicators. *World Bank Working Paper* No.2195.

Khan, S.U. 2006. Macro Determinants of Total Factor Productivity in Pakistan. *State Bank of Pakistan Research Bulletin,* Vol.2, No.2, pp.383-401.

Kim, J.I., & Lau L.J. 1994. The Sources of Economic Growth of the East Asian Newly Industrialized Countries. *Journal of Japanese International Economics*, Vol.8,pp.235-271.

King, R.G. & Rebelo, S.T. 1990. Public Policy and Economic Growth: Developing Neoclassical Perspectives*. Journal of Political Economy*, Vol.98, pp.126-50.

Klein, L.R. 1982. The Supply-side of the Economy: A View from the Prospective of the Wharton Model. In Fink, R.F. (ed), *Supply-Side Economics: A Critical Appraisal.* Maryland: University Publications of America.

Koopmans, T.C. 1965. On the Concept of Optimal Economic Growth, in *Study Week on the Econometric Approach to Development Planning.* Amsterdam: North-Holland Pub. Co.

Kraay, A., & Raddatz, C. 2006. Poverty Traps, Aid, and Growth. *Forthcoming, Journal of Development Economics.*

Lau L.J., & Park, J. 2003. *The Sources of East Asian Economic Growth Revisited*. Paper presented at the Conference on International and Development Economics in Honor Henry, Y. Wan, Jr., Cornell University, Ithaca, September 6-7.

Lawson, T. 1980. Adaptive Expectations and Uncertainty. *Review of Economic Studies*, Vol.47, No.2, pp.305-320.

Layard, R. & Nickell, S. 1986. Unemployment in Britain. *Economica*, Vol.53, pp.S12-S169.

Lind, N.C. 1993. A Compound Index of National Development. *Social Indicators Research*, Vol.28, No.3, pp.267-284.

Louw, J. 2008. *Linking Poverty Indices to the Macroeconomy: a Case for South Africa*. Unpublished Masters thesis. Pretoria: University of Pretoria.

Lucas, R.E. 1988. On the Mechanics of Economic Development. *Journal of Monetary Economics*, Vol.22, pp.3-42.

Mackinnon, J.G. 1991. Critical Values for Cointegration Tests, in *Long-run Economic Relationships: Readings in Cointegration*, eds. R. Engle and C. Granger, New York: Oxford University Press, pp.266-276.

Mackowiak, B. 2006. *External Shocks, U.S monetary Policy and Macroeconomic Fluctuations in Emerging Markets.* Humboldt University Berlin.

Mankiw, N.G., Romer, D., and Weil, D.N. 1992. A Contribution to the Empirics of Economic Growth. *Quarterly Journal of Economics*, Vol.107, No.2, pp.407-37.

Marx, I. & Van den Bosch, K. Not Dated. *On Poverty Measurement in the Enlarged EU Context: The Qualified Case for a Budget Standard.* Unpublished. Centre for Social Policy, University of Antwerp.

Matlanyane, A.R. 2005. *A Macroeconometric Model for the Economy of Lesotho: Policy Analysis and Implications*. Unpublished Doctoral Thesis. Pretoria: University of Pretoria.

Matsuyama, K. 2000. *Economic Development with Endogenous Retirement*. Not Known. [Online] Available from: http://kellogg.northwestern.edu/research/math/papers/1237.pdf. [Accessed: 2007-10-15].

Matsuyama, K. Not Dated. *Poverty Trap*. [Online] Available from: http://faculty.wcas.northwestern.edu/~kmatsu/Poverty%20Traps.pdf [Accessed: 2007-10-15].

Mitsui, K., & Inoue, J. 1995. Productivity Effect of Infrastructure. In Mitsui, K. and Ohta, K. (ed), *Productivity of Infrastructure and Public Finance*, Nihon-Hyoron-sya Chapter 3.

National Centre for Economic Management & Administration. Not Dated. *Structural Adjustment Programme in Nigeria: Causes, Processes and Outcomes* (Revised Technical Proposal). [Online] Available from: http://www.gdnet.org/pdf/global_research_projects/understanding_reform/country_studies/proposals/Nigeria_proposal.pdf [Accessed: 2007-3-3].

Nelson, R.R. 1956. A Theory of the Low-level Equilibrium Trap in Underdeveloped Economies. *American Economic Review*, Vol.46, No.5, pp.894-908.

Nordhaus, W. 1982. Economic Policy in the Face of Declining Productivity Growth. *European Economic Review,* Vol.72,No.2,pp,131-58.

Ogwumike, F.O. 2003. An Appraisal of Poverty Reduction Strategies in Nigeria. *Central Bank of Nigeria Economic &Financial Review,* Vol.39,No.4.

Ojo, O., & Oshikoya, T. 1995. Determinants of Long-term Growth: Some African Results. *Journal of African Economies*, Vol.4, No.2, pp.163-91.

Otani, I., & Villanueva, D. 1990. Long-term Growth in Developing Countries and its Determinants: An Empirical Analysis. *World Development*, Vol.18, No.6, pp.769-83.

Pauly, P. 2005. *A Framework for a Macroeconometric Model of a Small Open Emerging Market Economy*. Institute for Policy Analysis, University of Toronto.

Pehkonen, J. 1992. Survey Expectations and Stochastic Trends in Modelling the Employment-output Equation. *Oxford Bulletin of Economics and Statistics*, Vol.54, pp.579-589.

Perron, P. 1989. The Great Crash, the Oil Price Shock, and the Unit Root Hypothesis. *Econometrica*, Vol.57,pp.1361-1401.

Pilvin, H. 1953. Full Capacity vs. Full Employment Growth. *Quarterly Journal of Economics*, Vol.67, No.4, pp.545-52.

Pretorius, C.J. 1998. Gross Fixed Investment in the Macroeconometric Model of the Reserve Bank. *Quarterly Bulletin-March 2002(no.207).* Pretoria, South African Reserve Bank.

Quah, D. 1997. Empirics for Growth and Distribution: Stratification, Polarization, and Convergence Clubs. *Journal of Economic Growth*, Vol.2, pp.27-59.

Quah, D. 1993a. Galton's Fallacy and Tests of the Convergence Hypothesis. *Scandinavian Journal of Economics*, Vol.95, No.4, pp.427-443.

Quah, D. 1993b. Empirical Cross-section Dynamics in Economic Growth. *European Economic Review,* Vol.37, pp.426-434.

Ramsey, F.P. 1928. A Mathematical Theory of Saving. *Economic Journal*, Vol.38, pp.543-49.

Robinson, S., & Lofgren, H. 2005. Macro Models and Poverty Analysis: Theoretical Tensions and Empirical Practice. *Development Policy Review*, Vol.23, No.3, pp.267-283.

Romer, P.M. 1990a. Endogenous Technological Change. *Journal of Political Economy*, Vol.98, pp.71-102.

Romer, P.M. 1989b. Human Capital and Growth: Theory and Evidence. *NBER Working Papers*, No.3173.

Romer, P.M. 1987a. Growth Based on Increasing Returns Due to Specialisation. *American Economic Review,* Vol.77, No.2, pp.56-62.

Romer, P.M. 1986. Increasing Returns and Long-run Growth. *Journal of Political Economy*, Vol.94, No.5, pp.1002-37.

Said, S. & Dickey, D. 1984. Testing for Unit Roots in Autoregressive-moving Average Models with Unknown Order. *Biometrical* Vol.71,pp.599-607.

Saint-Paul, G. 1992. Technological Choice, Financial Markets and Economic Development. *European Economic Review*, Vol.36, pp.763-81.

Senhadji, A. 2000. Sources of Economic Growth: An Extensive Growth Accounting Exercise. *International Monetary Fund Staff Papers*, Vol.47,No.1,pp.129-58.

Soede, A. 2007. *A New Poverty Line Based on Actual Needs*. Unpublished. Netherlands Institute for Social Research/SCP.

Solow, R.M. 1956. A Contribution to the Theory of Economic Growth. *Quarterly Journal of Economics*,Vol.70,No.2, pp.65-94.

Stockey, N.L. 1988. Learning by Doing and the Introduction of New Goods. *Journal of Political Economy*, Vol.96, No.4, pp.701-17.

Swan, T.W. 1956. Economic Growth and Capital Accumulation. *Economic Record*, Vol.32, pp.334-61.

Tahari, A., Ghura, D., Akintoby,B., and Aka, E.B. 2004. Sources of Growth in Sub-Saharan Africa. *International Monetary Fund Working Papers*, No.176. Washington. D.C.

Tobin, J. 1955. A Dynamic Aggregate Model. *Journal of Political Economy*, Vol.63, No.2, pp.103-15.

Tomori S., Akano O., Adebiyi A., Isola W., Lawanson O., and Quadri O. 2005. *Protecting the Poor from Macroeconomic Shocks in Nigeria: An Empirical Investigation and Policy Options*. Not known.

Vera-Martin, M. 1999. *Long-run Growth in Mali, Niger and Senegal*. Unpublished. IMF, Washington D.C.

Wolgin, J.M. 1978. Manufacturing Industry in Nigeria's Third Development Plan. *The Journal of Modern African Studies*, Vol.16,No.4,pp.687-93.

World Bank. 2006. *Poverty Reduction and Growth: Virtuous and Vicious Circles*. Washington D.C.: World Bank.

World Bank, 1996. *Nigeria: Targeting Communities for Effective Poverty Alleviation*. African Region, No.68.

World Bank, 1996. *Nigeria: Poverty in the Midst of Plenty, the Challenge of Growth with Inclusion, a World Bank Poverty Assessment*, World Bank, Washington DC.

World Bank. 1995b. *Labour and the Growth Crisis in Sub-Saharan Africa*. Washington, D.C: The World Bank.

World Bank, 1990. *Poverty. World Development Report*. Oxford University Press.

World Economic and Social Survey (WESS), 2006. *Diverging growth and development*. New York: United Nations.

Yoshino, N., & Nakahigashi, M. 2000. *The Role of Infrastructure in Economic Development* (Preliminary Version). Graduate School of Economics, Keio University.

APPENDIX 1

AN EXPOSITION OF THE DATA UTILISED IN THE MODEL

All the data used in this study were obtained from the IMF (International Financial Statistics), World Bank database: African Development Indicators and World Development Indicators, Worldwide Governance Indicators, and the Central Bank of Nigeria Statistical Bulletin. Annual data series which covers the period 1970-2006 was used to estimate the parameters of the model and where appropriate the variables were transformed into real figures using the GDP deflator (2000=base year). Table A1 presents all the data used in the study.

Due to lack of availability of some time series data, the following time series had to be derived for the variables used in the various structural equations:

i. Rate of Depreciation

The rate of depreciation can take different values for individual country depending on the structure of that particular economy. In general, it is common to assign a higher rate of depreciation to developing or low-income countries. A higher depreciation rate of 20 per cent is adopted in this study since Nigeria allocates much lower revenues to maintenance expenditures (see Bayraktar and Fofack (2007), Beddies (1999), and Vera-Martin (1999)).

ii. Financing of Gross Domestic Investment (Financial Constraint)

In a general equilibrium framework (i.e. system of national accounts), the financing of gross domestic investment equals total gross domestic investment (Du Toit, 1999). Therefore, the financial constraint variable is defined as an identity which enters into the system of equations in the form:

$$finconstr = gds\_nom+capflow+creserv+depr\_value$$

iii. Poverty Index

There are multiple dimensions and measurement of poverty in the literature. The poor are generally classified as those without an adequate income or expenditure to cover their basic necessities. An index of poverty is derived for this study following the basic Foster-Greer-Torbecke(FGT) indices as this is one of the most commonly used poverty indices in the literature[38]. This measure has three components: (a) the incidence of poverty which shows the share of the population that are below the poverty line, (b) the depth of poverty which shows how far the households are from the poverty line, and (c) the severity of poverty relates to the distance separating the poorest households from the poverty line. These indices are calculated as follows:

$$P = \frac{1}{N}\sum_{i=1}^{Q}\left[\frac{Z-Y}{Z}\right]^{\alpha}$$

Where N = Population, Q = % of population living below poverty line (Proxy = Poor population), Z = Poverty line (World Bank estimate), Y = Household Final Consumption Expenditure per capita, α = Poverty aversion parameter. α = 0,1,2 for absolute, depth and severity of poverty respectively.

Since the incidence of poverty measures absolute poverty in an economy, this study adopted the depth of poverty as a measure of poverty gap.

iv. Capital Stock

In the model, the capital stock is derived through a perpetual inventory method. This means that the current stock of capital is equal to the investment in the previous period plus stock of capital from the previous period, net of depreciation. This is shown as:

$$rk\_stock2 = (1 - depr)*rk\_stock2(-1) + gcf(-1)$$

[38] See Louw (2008) for detailed analyses of poverty measures and indices.

Since the initial stock of capital is very important and this is not known, it is assumed to be about 1.5 of the gross domestic product for that particular period.

v. Real Wages

Since capital and labour are the major inputs in the production process. The derivation of the real wages therefore, follows the identity:

$$\frac{rk\_stock2}{rgdp} + \frac{labor\_f}{rgdp} = \frac{rgdp}{rgdp} = 1$$

Therefore,

$$\frac{rk\_stock2 * \text{int}}{rgdp} + \frac{labor\_f * rwage\_lf}{rgdp} = 1$$

$labor\_f * rwage\_lf$ represents the total wage bill in the economy.

This implies,

rwage_lf = (1-(rk_stock2*int/rgdp))*(rgdp/labor_f)

vi. Socio-Economic Index

The derivation of the socio-economic activity index follows Lind's (1993) compound index of national development. This incorporates the human development factor in measuring the value of economic activities of a country. This is represented as:

$$L = b^{w} e^{(1-w)}$$

Where b = Real GDP per capita, e = Life expectancy at birth, w = Proportion of life spent in economic activity (Assume to be 1/6).

vii. User Cost of Capital

In the absence of corporate tax data and a truly long-term yield, a proxy for the user cost of capital was created through an exchange rate adjusted (since most of the investments are from abroad and an exchange rate is a signal to investors of country risk) prime lending rate of return. This is represented as:

ucc = (1+int)*exch

viii. Governance Indicators

The worldwide governance indicators developed by Kaufmann et.al (1999a) was utilized in this study as a measure of governance. The indices covers a broad range of policy and institutional outcomes for large number of countries, which includes; the rule of law, corruption, government effectiveness, regulatory quality, and political instability. Since the governance indicators series are only available from 1996 onward and due to the persistence of governance over time, the average value from 1996-2006 governance scores are used for all previous years (Akanbi and Beddies, 2008). The governance scores ranges -2.5 to +2.5, with -2.5 representing the worst governance and +2.5 the best governance. However, most of the governance scores for Nigeria and especially developing countries are found to be in the negative range.

ix. Labour Employment

Due to lack of time series data on labour employment/unemployment and on any labour market variables (both formal and informal), the study uses the labour force as the closest proxy for labour employment.

Table A1: Data Description and Calculation

Series	Natural logarithms	Variable names	Data source/calculation
agric_elep	ln_agric_elep	Ratio of agricultural production to electricity production (index)	index_agric/index_elep
aid	ln_aid	Official aid (constant 2000)	(aidgcf/100)*gcf
aidgcf		Official aid as a per centage of real gross capital formation	World Bank: African Development Indicators
aidpop	ln_aidpop	Official aid per capita	aid/pop
capflow	ln_capflow	Capital flow	World Bank: World Development Indicator
cpi	ln_cpi	Consumer Price Index	World Bank: World Development Indicator
cpi_us	ln_cpi_us	Consumer Price Index (United State)	World Bank: World Development Indicator
creserv		Change in reserve	World Bank: World Development Indicator
cu_oil	ln_cu_oil	Capacity utilisation in the oil sector	rgdp_oil/potrgdp_oil
cu_tot	ln_cu_tot	Capacity utilisation in the total economy	rgdp/potrgdp
dcredit	ln_dcredit	Domestic credit	IMF: International Financial Statistics
depr		Rate of depreciation	Assumed to be 20%
depr_value	ln_depr_value	Value of depreciation	depr*gcf_nom

dis_rate	ln_dis_rate	Discount rate	IMF: International Financial Statistics
dum		Dummy: oil price shocks	n.a
dum_oil		Dummy: structural breaks for real GDP oil sector	n.a
dum_povd		Dummy: poverty index	n.a
dum_tfp		Interactive dummy: tfp_tot	n.a
dummy_m		Dummy: military rule	n.a
dumoil		Interactive dummy: structural breaks for real GDP oil sector	n.a
dumtfp		Dummy: tfp_tot	n.a
elep	ln_elep	Electricity production (kwh)	Central Bank of Nigeria Statistical Bulletin
eleppop	ln_eleppop	Electricity production per capita	elep/pop
excessd	ln_excessd	Excess demand	gne_nom/gdp
exch	ln_exch	Official exchange rate (Naira per US$, period average)	World Bank: World Development Indicators
expt		Export of goods and services (current prices)	World Bank: World Development Indicators
fdi	ln_fdi	Flow of foreign direct investment (constant 2000)	Central Bank of Nigeria Statistical Bulletin
fdigcf	ln_fdigcf	Ratio of foreign direct investment to gross capital formation	fdi/gcf
finconstr	ln_finconstr	Financial constraint: Measure of financial development	gds_nom+capflow+creserv+depr_value

gcf_nom		Gross capital formation (current prices) = Investment	World Bank: World Development Indicators
gcf	ln_gcf	Gross capital formation (constant 2000) = Investment	gcf_nom/gdp_def
gcfgdp	ln_gcfgdp	Ratio of gross capital formation to real GDP	gcf/rgdp
gcfpot		Potential gross capital formation	Hodrick-Prescott filter application
gdp	ln_gdp	Gross domestic product (current prices)	World Bank: World Development Indicators
gdp_def		Gross domestic product deflator (2000=100)	IMF: International Financial Statistics
gds_nom	ln_gds_nom	Gross domestic savings (current prices)	World Bank: World Development Indicators
ge		Governance indicator: Government effectiveness	Worldwide Governance Indicators
gne_nom	ln_gne_nom	Gross national expenditure (current prices)	World Bank: World Development Indicators
govcongdp	ln_govcongdp	Ratio of general government final consumption expenditure to real GDP.	govtcons/rgdp
govtcons	ln_govtcons	General government final consumption expenditure (Constant 2000)	World Bank: World Development Indicators
hh_rconexp	ln_hh_rconexp	Household real consumption expenditure	World Bank: World Development Indicators
hh_rgdp	ln_hh_rgdp	Household real disposable income (total economy)	rgdp(1-taxr)
hh_rgdp_rest	ln_hh_rgdp_rest	Household real disposable income (rest of the economy)	rgdp_rest(1-taxr)

imp		Import of goods and services (current prices)	World Bank: World Development Indicators
imp_p	ln_imp_p	Import price index	World Bank: World Development Indicators
index_agric	ln_index_agric	Index of agricultural production	Central Bank of Nigeria Statistical Bulletin
index_elep	ln_index_elep	Index of electricity production	(elep/1738.3)*100; 1738.3=year 2000 value
int	ln_int	Lending rate = Interest rate	IMF: International Financial Statistics
labor_f	ln_labor_f	Labour force = Employment	World Bank: World Development Indicators
labor_pot	ln_labor_pot	Potential employment	Hodrick-Prescott filter application
labprod_rest	ln_labprod_rest	Labour productivity in the rest of the economy	rgdp_rest/labor_f
labprod_tot	ln_labprod_tot	Labour productivity in the total economy	rgdp/labor_f
land	ln_land	Agricultural land (% of land area)	World Bank: World Development Indicators
m2	ln_m2	Monetary aggregate 2 (current prices)	IMF: International Financial Statistics
m2_us	ln_m2_us	Monetary aggregate 2;United State (current prices)	IMF: International Financial Statistics
oil_p	ln_oil_p	Crude oil prices	IMF: International Financial Statistics
open	ln_open	Openness of the economy	(rexp+rimp)/rgdp
pi		Governance indicator: Political instability	Worldwide Governance Indicators

pop	ln_pop	Total population	World Bank: World Development Indicators
potrgdp		Potential real GDP in the total economy	See estimation
potrgdp_oil		Potential real GDP in the oil sector	Hodrick-Prescott filter application
povertyd_index	ln_povertyd_index	Poverty index	FGT Index
ppi	ln_ppi	Industrial production index (2000=100) = Production price index	IMF: International Financial Statistics
relcpi	ln_relcpi	Relative prices	cpi/cpi_us
relrgdp	ln_relrgdp	Relative gross domestic product	rgdp/rgdpus
relm2	ln_relm2	Relative money supply	m2/m2_us
rexp	ln_rexp	Export of goods and services (constant 2000)	expt/gdp_def
rexpsocial	ln_rexpsocial	Government expenditure on social development (constant 2000)	Central Bank of Nigeria Statistical Bulletin
rgdp	ln_rgdp	Gross domestic product (constant 2000)	gdp/gdp_def
rgdp_oil	ln_rgdp_oil	Crude oil production (constant 2000): Proxy for GDP oil sector	Central Bank of Nigeria Statistical Bulletin
rgdp_rest	ln_rgdp_rest	Gross domestic product rest of the economy (constant 2000)	rgdp-rgdp_oil
rgdpus	ln_rgdpus	Gross domestic product; United States (constant 2000)	IMF: International Financial Statistics
rimp	ln_rimp	Import of goods and services (constant 2000)	imp/gdp_def
rk_stock2	ln_rk_stock2	Capital stock (constant 2000)	rk_stock2 = (1 - depr)*rk_stock2(-1) + gcf(-1)

rk_stock2pot	ln_rk_stock2pot	Potential capital stock	rk_stock2pot = (1 - depr)*rk_stock2pot(-1) + gcfpot(-1)
rm2	ln_rm2	Real monetary aggregate 2	m2/gdp_def
rwage_lf	ln_rwage_lf	Real wages (constant 2000)	(1-(rk_stock2*int/rgdp))*(rgdp/labor_f)
se_index_b	ln_se_index_b	Socio-economic index (2000=100)	See Lind (1993)
sv_dum_oil1		Time varying coefficient for dum_oil	Kalman Filter application
sv_rk_stock2_oil		Time varying coefficient for capital stock	Kalman Filter application
taxr		Tax rate	Non_oil revenue/gdp
tfp_oil	ln_tfp_oil	Total factor productivity in the oil sector	Kalman Filter application
tfp_rest	ln_tfp_rest	Total factor productivity in the rest of the economy	tfp_tot-tfp_oil
tfp_tot	ln_tfp_tot	Total factor productivity in the total economy	Kalmer Filter application
tfp_totpot	ln_tfp_totpot	Potential total factor productivity in the total economy	Hodrick-Prescott filter application
totgovexp	ln_totgovexp	Total government expenditure	Central Bank of Nigeria Statistical Bulletin
tran_pubexp_ratio	ln_tran_pubexp_ratio	Ratio of transfer to public expenditure	transfer/rpubexp
transfer	ln_transfer	Government transfer payments	Central Bank of Nigeria Statistical Bulletin

ucc	ln_ucc	User cost of capital	(1+int)*exch
wage_labor	ln_wage_labor	Ratio of real wages to employment	rwage_lf/labor_f
wage_lf	ln_wage_lf	Wages (current prices)	rwage_lf*gdp_def
wagelfucc	ln_wagelfucc	Ratio of nominal wage to user cost of capital	wage_lf/ucc

APPENDIX 2

ORDER OF INTEGRATION

As discussed in Chapter 4 the univariate characteristics of the data was analysed using the Augmented Dickey-Fuller tests to establish the order of integration since the actual data generating process is not known.

The maximum lag structure that is used follows Said and Dickey (1984) who suggested a lag order equal to $T^{1/3}$ with T the number of observations, which in this case is 37 (years 1970 to 2006). Therefore, the maximum lag structure of 4 is used in the testing procedure.

The test is implemented through the usual t-statistic of γ denoted as τ_τ. Under the null hypothesis, τ_τ will not follow the standard t-distribution and the adjusted critical values computed by MacKinnon (1991) are used for evaluation. If τ_τ is significant, the null of non-stationarity is rejected and the data series is stationary.

If τ_τ is insignificant, the joint null hypothesis of $a_2 = \gamma = 0$, using the F-statistic denoted as ϕ_3 is tested (Equation 4.18). The relevant critical values from Dickey and Fuller are used to evaluate the test statistic ϕ_3. If ϕ_3 is significant, the unit root test is repeated, now using the critical values of the standard t-distribution.

If the trend is not significant in the model, the next step is to estimate Equation 4.18 without a trend ($a_2 = 0$). The unit root test is carried out denoting the t-statistic of γ as τ_μ and using the relevant critical values from MacKinnon. If the null hypothesis is rejected, the series is stationary.

If the null hypothesis of non-stationarity is not rejected, the joint null hypothesis of $a_0 = \gamma = 0$, using the F-statistic denoted as ϕ_1 is tested and the critical values reported by Dickey and Fuller are used. If ϕ_1 is significant, the unit root test is repeated using the standard normal distribution.

If ϕ_1 is insignificant, the Dickey-Fuller τ test is carried out without a constant and trend in the testing equation, testing the joint hypothesis of $a_0 = a_2 = 0$. If the test statistic (τ) is less than the MacKinnon critical value, the null hypothesis of non-stationarity is rejected and the series is stationary.

Moreover, if we have concluded that the variables in level form are non-stationary, we would need to go ahead and repeat the process for the first difference form. But if we concluded that most of the variables in level are stationary (trend stationary), then there is no need to perform a unit root test for the first difference. Hence, we conclude that these series are stationary or I(0) series.

The results of the ADF-tests for all the variables used in the estimations are reported in Table A2.1 and Table A2.2. The first column shows the list of all the variables that are tested. The second column (model) shows whether the equation that is estimated for the testing purpose involves a trend and a constant (Tend), or a constant only (Constant), or neither a constant nor trend (None). The third column shows the number of lags that are used for each model and they are significant at 10 per cent level. The fourth column is the ADF t-statistic, called τ_τ (for Trend and a Constant), τ_μ (for only Constant), and τ (for neither Trend nor Constant). The last column is the F-statistic ϕ_3 (ϕ_1), testing whether the trend (constant) is significant under the null hypothesis of no unit root.

From the result in Table A2 it is clear that most of the variables are non-stationary in level form. However, there are a couple of variables that seem to be stationary in level form, but since the testing of a unit root is associated with problems and inference guidelines, it is obvious that these variables are not stationary in level form (Du Toit, 1999: A108). The results of the stationarity tests in first difference form are presented in Table A2.2 and this reveals a stationary series.

Table A2.1: Augmented Dickey-Fuller tests for non-stationarity, levels, 1970-2006

Series	Model	Lags	τ_τ, τ_μ, τ	ϕ_3, ϕ_1
ln_aid	Trend	0	-1.39	2.23
	Constant	0	0.07	0.01
	None	0	1.16	
ln_capflow	Trend	1	-2.57	2.73
	Constant	0	-0.37	0.13
	None	0	2.14	
ln_cpi	Trend	1	-2.51	7.50**
	Constant	1	-0.30	7.02*
	None	1	0.67	
ln_cpi_us	Trend	8	-5.99***	39.93***
	Constant	2	-4.60***	49.15***
	None	2	1.73	
creserv	Trend	3	2.50	4.55
	Constant	3	3.61	5.89**
	None	3	4.04	
ln_dcredit	Trend	1	-2.71	2.73
	Constant	0	-0.96	0.92
	None	0	2.28	
ln_elep	Trend	0	-3.05	5.34
	Constant	0	-2.01	4.05
	None	0	1.64	
ln_exch	Trend	0	-2.40	3.37
	Constant	0	0.21	0.04
	None	0	1.71	
ln_fdi	Trend	1	-2.18	9.19**
	Constant	1	-1.29	11.23***
	None	1	-0.41	

*(**)[***] Significant at a 10(5)[1]% level.

a At a 10(5)[1]% significance level, the MacKinnon critical values are -3.18(-3.50)[-4.15] when a trend and a constant are included (τ_τ), and -2.60(-2.93)[-3.58] when only a constant is included (τ_μ), and -1.61(-1.95)[-2.62] when neither is included (τ). The standard normal critical value is -1.697(-2.04)[-2.75].

b At a 10(5)[1]% significance level, the Dickey-Fuller critical values are 5.91(7.24)[10.61] when a trend and a constant are included (ϕ_3) and 4.12(5.18)[7.88] when only a constant is included (ϕ_1).

Table A2.1 (cont.): Augmented Dickey-Fuller tests for non-stationarity, levels, 1970-2006

Series	Model	Lags	τ_τ, τ_μ, τ	ϕ_3, ϕ_1
ln_gcf	Trend	0	-2.82	4.39
	Constant	0	-2.63*	6.93**
	None	0	1.17	
ln_gdp	Trend	1	-1.81	2.62
	Constant	1	0.41	1.94
	None	1	3.32	
ln_gds_nom	Trend	0	-1.70	1.86
	Constant	0	0.34	0.11
	None	0	3.01	
ge	Trend	0	-1.43	1.78
	Constant	0	-0.03	0.00
	None	0	-1.34	

ln_gne_nom	Trend	1	-1.91	3.61
	Constant	1	0.11	3.21
	None	1	2.90	
ln_govtcons	Trend	2	-4.16***	4.92
	Constant	0	-1.88	3.55
	None	0	1.87	
ln_hh_rconexp	Trend	0	-4.05**	8.31**
	Constant	0	-3.62***	13.09***
	None	0	0.44	
ln_imp_p	Trend	1	-1.55	2.65
	Constant	1	-1.50	3.94
	None	1	0.71	
ln_index_agric	Trend	0	-2.83	5.12
	Constant	0	0.10	0.01
	None	0	1.47	
ln_int	Trend	0	-1.11	0.91
	Constant	0	-1.21	1.45
	None	0	-1.29	

*(**)[***] Significant at a 10(5)[1]% level.

a At a 10(5)[1]% significance level, the MacKinnon critical values are -3.18(-3.50)[-4.15] when a trend and a constant are included (τ_τ), and -2.60(-2.93)[-3.58] when only a constant is included (τ_μ), and -1.61(-1.95)[-2.62] when neither is included (τ). The standard normal critical value is -1.697(-2.04)[-2.75].

b At a 10(5)[1]% significance level, the Dickey-Fuller critical values are 5.91(7.24)[10.61] when a trend and a constant are included (ϕ_3) and 4.12(5.18)[7.88] when only a constant is included (ϕ_1).

Table A2.1 (cont.): Augmented Dickey-Fuller tests for non-stationarity, levels, 1970-2006

Series	Model	Lags	τ_τ, τ_μ, τ	ϕ_3, ϕ_1
ln_labor_f	Trend	2	-2.95	3.35
	Constant	0	0.70	0.49
	None	0	12.97	
ln_land	Trend	4	-3.89**	5.47
	Constant	1	-0.93	5.53**
	None	1	1.04	
ln_m2	Trend	1	-1.78	2.06
	Constant	1	-1.60	2.80
	None	0	1.76	
ln_m2_us	Trend	4	-3.50**	9.79***
	Constant	1	-1.73	16.64***
	None	1	2.28	
ln_oil_p	Trend	0	-3.38*	5.72
	Constant	0	-0.37	0.13
	None	0	2.87	
pi	Trend	1	-2.77	3.31
	Constant	1	-2.94	5.09
	None	0	0.22	
ln_pop	Trend	3	0.54	2692.4***
	Constant	3	-4.86***	3442.49***
	None	4	-0.21	
ln_ppi	Trend	0	-3.85**	10.23**
	Constant	0	-3.47**	12.03***

	None	0	2.34	
ln_rexpsocial	Trend	0	-4.83***	14.85***
	Constant	0	-5.53***	30.60***
	None	0	1.03	

*(**)[***] Significant at a 10(5)[1]% level.
a At a 10(5)[1]% significance level, the MacKinnon critical values are -3.18(-3.50)[-4.15] when a trend and a constant are included (τ_τ), and -2.60(-2.93)[-3.58] when only a constant is included (τ_μ), and -1.61(-1.95)[-2.62] when neither is included (τ). The standard normal critical value is -1.697(-2.04)[-2.75].
b At a 10(5)[1]% significance level, the Dickey-Fuller critical values are 5.91(7.24)[10.61] when a trend and a constant are included (ϕ_3) and 4.12(5.18)[7.88] when only a constant is included (ϕ_1).

Table A2.1 (cont.): Augmented Dickey-Fuller tests for non-stationarity, levels, 1970-2006

Series	Model	Lags	τ_τ, τ_μ, τ	ϕ_3, ϕ_1
ln_rgdp	Trend	0	-3.33*	6.17*
	Constant	0	-2.41	5.81**
	None	0	2.15	
ln_rgdp_oil	Trend	0	-3.10	5.25
	Constant	0	-2.68*	7.21**
	None	0	1.32	
ln_rgdp_rest	Trend	0	-3.28*	5.61
	Constant	0	-2.67*	7.10**
	None	0	0.99	
ln_rgdpus	Trend	8	-4.03**	3.28
	Constant	0	-0.49	0.24
	None	0	9.49	
ln_rk_stock2	Trend	1	-3.40*	13.80***
	Constant	1	-2.11	14.58***
	None	1	1.50	
ln_rpubexp	Trend	2	-4.52***	5.88
	Constant	0	-2.17	4.73*
	None	0	1.66	
ln_totgovexp	Trend	0	-1.83	1.68
	Constant	0	-1.06	1.12
	None	0	1.96	
ln_transfer	Trend	0	-3.18*	5.07
	Constant	0	-0.44	0.20
	None	0	2.59	

*(**)[***] Significant at a 10(5)[1]% level.
a At a 10(5)[1]% significance level, the MacKinnon critical values are -3.18(-3.50)[-4.15] when a trend and a constant are included (τ_τ), and -2.60(-2.93)[-3.58] when only a constant is included (τ_μ), and -1.61(-1.95)[-2.62] when neither is included (τ). The standard normal critical value is -1.697(-2.04)[-2.75].
b At a 10(5)[1]% significance level, the Dickey-Fuller critical values are 5.91(7.24)[10.61] when a trend and a constant are included (ϕ_3) and 4.12(5.18)[7.88] when only a constant is included (ϕ_1).

Table A2.2: Augmented Dickey-Fuller tests for non-stationarity, first differences, 1970-2006

Series	Model	Lags	τ_τ, τ_μ, τ	ϕ_3, ϕ_1
Δ ln_aid	Trend	0	-6.06***	18.37***

	Constant	0	-5.59***	31.26***
	None	0	-5.52***	
Δ ln_capflow	Trend	0	-4.73***	11.2***
	Constant	0	-4.77***	22.77***
	None	0	-4.35***	
Δ ln_cpi	Trend	0	-2.98	4.49
	Constant	0	-3.04**	9.25***
	None	0	-1.75*	
Δ ln_cpi_us	Trend	1	-5.02***	10.12**
	Constant	1	-2.68***	5.16**
	None	0	-1.02	
Δ creserv	Trend	2	-3.68**	8.54***
	Constant	0	-4.34***	18.84***
	None	0	-4.25***	
Δ ln_dcredit	Trend	0	-5.18***	13.51***
	Constant	0	-5.20***	27.05***
	None	0	-4.52***	
Δ ln_elep	Trend	0	-7.95***	31.59***
	Constant	0	-7.77***	60.39***
	None	0	-7.02***	
Δ ln_exch	Trend	0	-5.30***	14.08***
	Constant	0	-5.31***	28.18***
	None	0	-4.57***	
Δ ln_fdi	Trend	0	-11.76***	69.26***
	Constant	0	-11.86***	140.66***
	None	0	-12.02***	

*(**)[***] Significant at a 10(5)[1]% level.

a At a 10(5)[1]% significance level, the MacKinnon critical values are -3.18(-3.50)[-4.15] when a trend and a constant are included (τ_τ), and -2.60(-2.93)[-3.58] when only a constant is included (τ_μ), and -1.61(-1.95)[-2.62] when neither is included (τ). The standard normal critical value is -1.697(-2.04)[-2.75].

b At a 10(5)[1]% significance level, the Dickey-Fuller critical values are 5.91(7.24)[10.61] when a trend and a constant are included (ϕ_3) and 4.12(5.18)[7.88] when only a constant is included (ϕ_1).

Table A2.2 (cont.): Augmented Dickey-Fuller tests for non-stationarity, first differences, 1970-2006

Series	Model	Lags	τ_τ, τ_μ, τ	ϕ_3, ϕ_1
Δ ln_gcf	Trend	0	-5.29***	14.00***
	Constant	0	-5.33***	28.45***
	None	0	-5.27***	
Δ ln_gdp	Trend	0	-4.16***	8.66**
	Constant	0	-4.13***	17.03***
	None	0	-2.12**	
Δ ln_gds_nom	Trend	0	-5.12***	13.09***
	Constant	0	-5.13***	26.33***
	None	0	-4.23***	
Δ ge	Trend	0	-5.74***	16.56***
	Constant	0	-5.59***	31.24***
	None	0	-5.39***	
Δ ln_gne_nom	Trend	0	-3.71***	6.89*
	Constant	0	-3.73***	13.92***
	None	0	-1.96**	

Δ ln_govtcons	Trend Constant None	0 0 0	-5.38*** -5.42*** -5.05***	14.46*** 29.37***
Δ ln_hh_rconexp	Trend Constant None	0 0 0	-7.54*** -7.61*** -7.66***	28.5*** 57.96***
Δ ln_imp_p	Trend Constant None	0 0 0	-3.91** -4.00*** -3.93***	7.81** 16.01***
Δ ln_index_agric	Trend Constant None	0 0 0	-4.68*** -4.77*** -4.52***	11.49*** 22.79***
Δ ln_int	Trend Constant None	0 0 0	-5.49*** -5.46*** -5.39***	15.09*** 29.85***

*(**)[***] Significant at a 10(5)[1]% level.

a At a 10(5)[1]% significance level, the MacKinnon critical values are -3.18(-3.50)[-4.15] when a trend and a constant are included (τ_τ), and -2.60(-2.93)[-3.58] when only a constant is included (τ_μ), and -1.61(-1.95)[-2.62] when neither is included (τ). The standard normal critical value is -1.697(-2.04)[-2.75].

b At a 10(5)[1]% significance level, the Dickey-Fuller critical values are 5.91(7.24)[10.61] when a trend and a constant are included (ϕ_3) and 4.12(5.18)[7.88] when only a constant is included (ϕ_1).

Table A2.2 (cont.): Augmented Dickey-Fuller tests for non-stationarity, first differences, 1970-2006

Series	**Model**	**Lags**	τ_τ, τ_μ, τ	ϕ_3, ϕ_1
Δ ln_labor_f	Trend Constant None	2 2 1	-1.36 -1.91 0.74	3.62 4.81*
Δ ln_land	Trend Constant None	0 0 0	-3.26* -3.14** -2.98***	5.42 9.88***
Δ ln_m2	Trend Constant None	0 0 0	-4.28*** -4.35*** -4.05***	9.16** 18.89***
Δ ln_m2_us	Trend Constant None	0 0 1	-3.18* -2.89* -1.55	5.24 8.39***
Δ ln_oil_p	Trend Constant None	0 0 0	-6.29*** -6.39*** -4.74***	19.77*** 40.78***
Δ pi	Trend Constant None	1 1 1	-5.02*** -4.94*** -4.98***	8.98** 12.91***
Δ ln_pop	Trend Constant None	2 3 3	-2.45 -0.20 -1.15	409.70*** 314.78***
Δ ln_ppi	Trend Constant None	0 0 0	-6.20*** -6.05*** -5.49***	19.53*** 36.65***
Δ ln_rexpsocial	Trend Constant	0 0	-5.38*** -5.25***	14.63*** 27.58***

	None	0	-5.20***	

*(**)[***] Significant at a 10(5)[1]% level.

a At a 10(5)[1]% significance level, the MacKinnon critical values are -3.18(-3.50)[-4.15] when a trend and a constant are included (τ_τ), and -2.60(-2.93)[-3.58] when only a constant is included (τ_μ), and -1.61(-1.95)[-2.62] when neither is included (τ). The standard normal critical value is -1.697(-2.04)[-2.75].

b At a 10(5)[1]% significance level, the Dickey-Fuller critical values are 5.91(7.24)[10.61] when a trend and a constant are included (ϕ_3) and 4.12(5.18)[7.88] when only a constant is included (ϕ_1).

Table A2.2 (cont.): Augmented Dickey-Fuller tests for non-stationarity, first differences, 1970-2006

Series	Model	Lags	τ_τ, τ_μ, τ	ϕ_3, ϕ_1
Δ ln_rgdp	Trend	0	-5.63***	15.89***
	Constant	0	-5.60***	31.36***
	None	0	-5.10***	
Δ ln_rgdp_oil	Trend	0	-5.21***	13.57***
	Constant	0	-5.23***	27.37***
	None	0	-5.09***	
Δ ln_rgdp_rest	Trend	0	-6.26***	19.65***
	Constant	0	-6.30***	39.74***
	None	0	-6.21***	
Δ ln_rgdpus	Trend	0	-4.68***	10.95***
	Constant	0	-4.74***	22.49***
	None	0	-2.13**	
Δ ln_rk_stock2	Trend	0	-3.01	4.77
	Constant	0	-3.04**	9.24**
	None	0	-2.58**	
Δ ln_rpubexp	Trend	0	-5.35***	14.29***
	Constant	0	-5.34***	28.50***
	None	0	-5.04***	
Δ ln_totgovexp	Trend	0	-6.01***	18.07***
	Constant	0	-6.10***	37.25***
	None	0	-5.60***	
Δ ln_transfer	Trend	0	-7.61***	28.97***
	Constant	0	-7.73***	59.68***
	None	0	-6.15***	

*(**)[***] Significant at a 10(5)[1]% level.

a At a 10(5)[1]% significance level, the MacKinnon critical values are -3.18(-3.50)[-4.15] when a trend and a constant are included (τ_τ), and -2.60(-2.93)[-3.58] when only a constant is included (τ_μ), and -1.61(-1.95)[-2.62] when neither is included (τ). The standard normal critical value is -1.697(-2.04)[-2.75].

b At a 10(5)[1]% significance level, the Dickey-Fuller critical values are 5.91(7.24)[10.61] when a trend and a constant are included (ϕ_3) and 4.12(5.18)[7.88] when only a constant is included (ϕ_1).

APPENDIX 3

ESTIMATIONS OUTPUTS

Table A3.1: Model A

Long-Run (Cointegration Equation)

Production Function (Total Economy)

Dependent Variable: LN_RGDP

Method: Maximum likelihood (Marquardt)

Sample: 1970 2005

	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	0.176113	0.191056	0.921790	0.3566
C(7)	-5.448819	0.218887	-24.89335	0.0000

	Final State	Root MSE	z-Statistic	Prob.
SV1	9.781871	0.083425	117.2531	0.0000

Log likelihood	16.82217	Akaike info criterion	-0.956269
Parameters	2	Schwarz criterion	-0.863753
Diffuse priors	1	Hannan-Quinn criter.	-0.926111

ln_rgdp=c(1)*ln_rk_stock2+(1-c(1))*ln_labor_f+sv1+[var=exp(c(7))]
sv1=sv1(-1)+[var=exp(c(7))]
sv1 = Time varying coefficient representing technology
c(7) = Variances of the error terms of the observation and state equations

Short-Run (Error Correction Model)

Production Function (Total Economy)

Dependent Variable: D_LN_RGDP

Method: Least Squares

Sample (adjusted): 1973 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESIDUAL_RGDP_TOT1_1	-0.138877	0.050737	-2.737181	0.0106
D_LN_RK_STOCK2	0.118594	0.048330	2.453826	0.0206
D_LN_RWAGE_LF	0.820447	0.031845	25.76381	0.0000
D_LN_LABOR_F	0.568914	0.275354	2.066115	0.0482
D_LN_CPI(-2)	-0.077556	0.028170	-2.753128	0.0102
C	0.021167	0.010923	1.937845	0.0628

R-squared	0.983101	F-statistic	325.7824
Adjusted R-squared	0.980083	Prob(F-statistic)	0.000000
Durbin-Watson stat	2.046571		

Diagnostic Tests:

Normality	3.810792	0.148764
Serial Correlation	0.151497	0.8602
Hetroschedasticity	1.733360	0.1597
Stability	0.166626	0.6863

Production Function (Oil Sector)

Dependent Variable:LN_RGDP_OIL
Method: Maximum likelihood (Marquardt)
Sample: 1970 2006

	Coefficient	Std. Error	z-Statistic	Prob.
C(17)	-34.94872	7.02E-10	-4.98E+10	0.0000
C(18)	0.915696	9.80E-15	9.34E+13	0.0000
C(19)	-0.085844	1.96E-19	-4.38E+17	0.0000
C(20)	-34.31234	2.92E-12	-1.18E+13	0.0000
C(21)	-0.395280	4.81E-13	-8.23E+11	0.0000
C(22)	-0.021711	2.18E-13	-9.96E+10	0.0000
C(23)	-29.85372	2.72E-12	-1.10E+13	0.0000

	Final State	Root MSE	z-Statistic	Prob.
SV1	2.887169	3.39E-06	850878.7	0.0000
SV2	0.667849	2.93E-07	2276086.	0.0000
SV3	-0.457963	3.37E-07	-1357898.	0.0000

Log likelihood	-1.8E+308	Akaike info criterion	9.7E+306
Parameters	7	Schwarz criterion	9.7E+306
Diffuse priors	3	Hannan-Quinn criter.	9.7E+306

ln_rgdp_oil=sv2*ln_rk_stock2+(1-sv2)*ln_labor_f+sv1+sv3*dum
sv1=sv1(-1)+[var=exp(c(17))]
sv2 = c(18)+C(19)*SV1(-1) + [var=exp(C(20))]
sv3 = c(21)+C(22)*SV1(-1) + [var=exp(C(23))]

sv1, sv2, and sv3 = Time varying coefficients representing technology, capital stock, and dummy variable respectively.
c(17) to c(23) = Variances of the error terms of the observation and state equations.

Production Function (Oil Sector)

Dependent Variable: D_LN_RGDP_OIL
Method: Least Squares
Sample (adjusted): 1972 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESIDUAL_RGDP_OIL_1	-0.307895	0.111819	-2.753513	0.0104
D_LN_CAPFLOW(-1)	-0.101167	0.028136	-3.595620	0.0013
D_LN_CPI	-0.873676	0.148722	-5.874543	0.0000
D_LN_OIL_P	0.911629	0.051352	17.75242	0.0000
D_LN_RWAGE_LF(-1)	-0.536847	0.142383	-3.770437	0.0008
D_LN_RM2	0.403761	0.115772	3.487548	0.0017
DUMMY_M	0.089220	0.045784	1.948715	0.0618
DUM	-0.120577	0.045960	-2.623496	0.0141

R-squared	0.943671	Durbin-Watson stat	1.727258
Adjusted R-squared	0.929067		

Diagnostic Tests:

Normality	1.827985	0.400920
Serial Correlation	0.246996	0.7830
Hetroschedasticity	1.725249	0.1984
Stability	0.001506	0.9693

Labour Demand

Dependent Variable: LN_LABOR_F
Method: Least Squares
Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_RGDP_REST	0.687782	0.087082	7.898115	0.0000
LN_RWAGE_LF	-0.569611	0.112231	-5.075331	0.0000
LN_SE_INDEX_B	0.911231	0.435405	2.092834	0.0444
DUM	-0.129847	0.059362	-2.187356	0.0361
DUMMY_M	-0.220239	0.052431	-4.200554	0.0002

R-squared	0.791798
Adjusted R-squared	0.765773

Labour Demand

Dependent Variable: D_LN_LABOR_F
Method: Least Squares
Sample (adjusted): 1979 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_LABOR_1	-0.020519	0.009030	-2.272434	0.0382
D_LN_RGDP_REST(-3)	0.016037	0.007698	2.083176	0.0548
D_LN_RWAGE_LF(-3)	0.163101	0.047578	3.428082	0.0037
D_LN_LABOR_F(-3)	-0.930285	0.248504	-3.743545	0.0020

Durbin-Watson stat	0.745603

D_LN_AGRIC_ELEP(-2)	0.026870	0.005483	4.900618	0.0002
D_LN_CPI(-5)	-0.066981	0.009341	-7.171014	0.0000
D_LN_SE_INDEX_B(-8)	0.246130	0.037022	6.648119	0.0000
D_LN_CU_TOT(-3)	-0.254760	0.053642	-4.749221	0.0003
D_LN_EXCH(-7)	0.015652	0.004207	3.720596	0.0021
D_LN_IMP_P(-3)	0.015746	0.006893	2.284420	0.0373
D_LN_RK_STOCK2	-0.049325	0.019326	-2.552333	0.0221
D_LN_REXPSOCIAL(-6)	0.005301	0.001913	2.771545	0.0143
C	0.064965	0.007176	9.053556	0.0000

R-squared	0.939495	F-statistic	19.40939
Adjusted R-squared	0.891091	Prob(F-statistic)	0.000001
Durbin-Watson stat	2.243828		

Diagnostic Tests:

Normality	3.097046	0.212562
Serial Correlation	0.376732	0.6934
Hetroschedasticity	0.796760	0.3806
Stability	0.176826	0.6964

Real Wages

Dependent Variable: LN_RWAGE_LF

Method: Least Squares

Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_LABPROD_REST	0.745313	0.098439	7.571336	0.0000
DUMMY_M	-0.172642	0.054389	-3.174192	0.0032
DUM_OIL	0.132359	0.051444	2.572863	0.0148
C	3.150154	1.104874	2.851143	0.0075

R-squared	0.647728	F-statistic	20.22588
Adjusted R-squared	0.615703	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.998292		

Real Wages

Dependent Variable: D_LN_RWAGE_LF
Method: Least Squares
Sample (adjusted): 1973 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_RWAGE_NEW_1	-0.179116	0.064551	-2.774823	0.0101
D_LN_CPI	-0.112168	0.044423	-2.524975	0.0180
D_LN_LABPROD_REST	0.284137	0.095117	2.987247	0.0061
D_LN_OIL_P	0.090183	0.030867	2.921635	0.0071
D_LN_SE_INDEX_B	3.891884	0.649320	5.993785	0.0000
D_LN_TRAN_PUBEXP_RATIO(-2)	0.062086	0.019923	3.116349	0.0044
D_LN_OPEN(-2)	-0.085002	0.039787	-2.136447	0.0422
DUM	-0.039482	0.018483	-2.136177	0.0422

R-squared	0.940203
Adjusted R-squared	0.924104
Durbin-Watson stat	1.863386

Diagnostic Tests:

Normality	1.221375	0.542977
Serial Correlation	1.509162	0.2413
Hetroschedasticity	0.130737	0.7201
Stability	1.925155	0.1775

Investment

Dependent Variable: LN_GCF

Method: Least Squares

Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_RGDP	0.972006	0.022691	42.83754	0.0000
LN_UCC	-0.074014	0.022144	-3.342452	0.0022
PI	0.323701	0.184370	1.755716	0.0890
LN_CU_TOT	0.496816	0.144981	3.426761	0.0017
DUMMY_M	-0.349581	0.084671	-4.128723	0.0003
DUM	-0.540648	0.095111	-5.684395	0.0000

R-squared	0.907419	Durbin-Watson stat	1.516507
Adjusted R-squared	0.892486		

Investment

Dependent Variable: D_LN_GCF

Method: Least Squares

Sample (adjusted): 1975 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_INV_1	-0.537726	0.115013	-4.675368	0.0001
D_LN_RGDP	1.146649	0.181015	6.334558	0.0000
D_LN_OIL_P	-0.324343	0.062818	-5.163247	0.0000
D_LN_CAPFLOW(-2)	0.111214	0.022017	5.051308	0.0001
D_LN_EXCH	0.166503	0.080438	2.069957	0.0510
D_LN_PPI(-1)	0.883835	0.210097	4.206796	0.0004
D_LN_RWAGE_LF(-2)	1.226132	0.526766	2.327660	0.0300
D_LN_OPEN(-3)	-0.368711	0.077496	-4.757822	0.0001
D_LN_GCF(-1)	0.420187	0.087073	4.825694	0.0001
D_LN_CU_TOT(-2)	-1.094030	0.606676	-1.803317	0.0857
D_LN_HH_RGDP(-4)	-0.291696	0.109062	-2.674576	0.0142

R-squared	0.930124	Durbin-Watson stat	1.856226
Adjusted R-squared	0.896850		

Diagnostic Tests:

Normality	0.238388	0.887635
Serial Correlation	2.314055	0.1174
Hetroschedasticity	0.003339	0.9543
Stability	1.343907	0.2624

Total Factor Productivity (Total Economy)

Dependent Variable: LN_TFP_TOT1

Method: Least Squares

Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.

Total Factor Productivity (Total Economy)

Dependent Variable: D_LN_TFP_TOT1

Method: Least Squares

Sample (adjusted): 1971 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.

LN_POVERTYD_INDEX	-0.276592	0.110935	-2.493287	0.0182
LN_GCFGDP	0.127461	0.052271	2.438464	0.0207
LN_FINCONSTR	0.034384	0.010420	3.299905	0.0024
DUM_TFP	0.411404	0.159645	2.576984	0.0149
DUMTFP	-4.496443	1.737189	-2.588344	0.0146
C	9.394842	0.188032	49.96396	0.0000

R-squared	0.659579	F-statistic	12.01277
Adjusted R-squared	0.604673	Prob(F-statistic)	0.000002
Durbin-Watson stat	0.707632		

RESID_TFP_TOT_1	-0.245419	0.112779	-2.176096	0.0373
D_LN_POVERTYD_INDEX	-0.346988	0.156297	-2.220059	0.0339
D_LN_SE_INDEX_B	1.142799	0.231909	4.927789	0.0000
DUM_TFP	0.214239	0.075179	2.849741	0.0077
DUMTFP	-2.319164	0.817755	-2.836011	0.0080

R-squared	0.675749	Durbin-Watson stat	1.510620
Adjusted R-squared	0.633910		

Diagnostic Tests:

Normality	0.213131	0.898916
Serial Correlation	2.040171	0.1443
Hetroschedasticity	0.792371	0.3815
Stability	1.929841	0.1801

Total Factor Productivity (Oil Sector)

Dependent Variable: LN_TFP_OIL
Method: Least Squares
Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_DCREDIT	0.951431	0.403558	2.357606	0.0247
LN_FDI	0.045328	0.393016	0.115333	0.9089
LN_OIL_P	0.295148	0.407195	0.724831	0.4738
DUMMY_M	2.590847	0.821094	3.155359	0.0035
C	-13.05096	4.961980	-2.630191	0.0130

R-squared	0.717969	Durbin-Watson stat	0.335480
Adjusted R-squared	0.682715		
F-statistic	20.36566		
Prob(F-statistic)	0.000000		

Total Factor Productivity (Oil Sector)

Dependent Variable: D_LN_TFP_OIL
Method: Least Squares
Sample (adjusted): 1974 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_TFP_OIL_1	-0.315440	0.045736	-6.896991	0.0000
D_LN_DCREDIT	0.584360	0.176632	3.308353	0.0039
D_LN_TFP_OIL(-1)	0.323899	0.090021	3.598039	0.0021
D_LN_TFP_OIL(-3)	0.440375	0.106569	4.132301	0.0006
D_LN_RK_STOCK2	-4.282490	1.252265	-3.419796	0.0031
D_LN_SE_INDEX_B(-1)	-29.12714	7.885989	-3.693531	0.0017
D_LN_REXPSOCIAL	-0.762298	0.152465	-4.999832	0.0001
D_LN_RM2	-1.145366	0.477742	-2.397456	0.0276
D_LN_CU_TOT(-1)	8.580464	2.045029	4.195766	0.0005
D_LN_GCF(-2)	0.742166	0.247618	2.997225	0.0077
D_LN_HH_RGDP(-3)	2.778251	0.725042	3.831846	0.0012
DUMMY_M	-0.146373	0.078995	-1.852943	0.0804
D_LN_FDI(-3)	0.198044	0.077096	2.568817	0.0193

R-squared	0.929789	Mean dependent var	0.125944
Adjusted R-squared	0.875180	S.D. dependent var	0.785058
S.E. of regression	0.277360	Akaike info criterion	0.575952
Sum squared resid	1.384711	Schwarz criterion	1.256183
Log likelihood	5.496790	Hannan-Quinn criter.	0.804829
Durbin-Watson stat	1.421533		

Diagnostic Tests:

Normality	1.049380	0.591739
Serial Correlation	1.525458	0.2459
Hetroschedasticity		

	0.231905	0.6336
Stability	0.012487	0.9123

Consumer Prices

Dependent Variable: LN_CPI

Method: Least Squares

Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_PPI	0.964454	0.405104	2.380754	0.0238
LN_IMP_P	0.791153	0.251889	3.140883	0.0038
LN_EXCH	0.893697	0.075618	11.81861	0.0000
LN_EXCESSD	0.179694	0.947616	0.189627	0.8509
DUMMY_M	0.453542	0.245543	1.847096	0.0746
DUM_OIL	-0.247312	0.154180	-1.604045	0.1192
C	-7.455257	1.441331	-5.172481	0.0000

R-squared	0.968336	F-statistic	152.9104
Adjusted R-squared	0.962004	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.756745		

Consumer Prices

Dependent Variable: D_LN_CPI

Method: Least Squares

Sample (adjusted): 1975 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_CPI_1	-0.054380	0.010049	-5.411374	0.0000
D_LN_CPI(-1)	0.061703	0.033613	1.835679	0.0821
D_LN_EXCESSD	-0.149378	0.053229	-2.806320	0.0113
D_LN_IMP_P(-4)	0.039443	0.021199	1.860606	0.0783
D_LN_PPI	-0.164863	0.050941	-3.236362	0.0043
D_LN_WAGE_LF	0.938521	0.034026	27.58232	0.0000
D_LN_INT(-4)	-0.062425	0.026563	-2.350051	0.0297
D_LN_TRANSFER(-3)	0.033780	0.008949	3.774837	0.0013
D_LN_RGDP	-1.140638	0.054789	-20.81885	0.0000
D_LN_EXCH	0.060282	0.011384	5.295320	0.0000
D_LN_ELEPPOP(-4)	0.078148	0.031026	2.518755	0.0209
D_LN_CAPFLOW(-2)	0.028130	0.006917	4.066715	0.0007
C	0.012813	0.007924	1.617078	0.1223

R-squared	0.989372	F-statistic	147.3999
Adjusted R-squared	0.982660	Prob(F-statistic)	0.000000
Durbin-Watson stat	1.739353		

Diagnostic Tests:

Normality	2.561184	0.277873
Serial Correlation	0.665996	0.5267
Hetroschedasticity	1.045902	0.3149
Stability	0.952172	0.3421

Producer Prices

Dependent Variable: LN_PPI

Method: Least Squares

Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_WAGE_LF	0.007109	0.039112	0.181762	0.8569
LN_OIL_P	0.076239	0.035855	2.126325	0.0413
LN_CU_TOT	0.484784	0.094025	5.155923	0.0000
LN_INT	0.197271	0.072017	2.739219	0.0100
C	4.466082	0.298851	14.94419	0.0000

R-squared	0.921229	F-statistic	93.55980
Adjusted R-squared	0.911382	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.998865		

Producer Prices

Dependent Variable: D_LN_PPI
Method: Least Squares
Sample (adjusted): 1977 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_PPI_1	-0.288706	0.074891	-3.855031	0.0014
D_LN_INT	0.179374	0.041582	4.313717	0.0005
D_LN_CU_TOT	0.179187	0.037589	4.767034	0.0002
D_LN_WAGE_LF	0.243482	0.036182	6.729386	0.0000
D_LN_GCF	0.233823	0.040797	5.731339	0.0000
D_LN_PPI(-3)	0.449360	0.089123	5.042045	0.0001
D_LN_RGDP	-0.647062	0.128723	-5.026792	0.0001
D_LN_ELEPPOP(-6)	0.257701	0.059774	4.311280	0.0005
D_LN_GCFGDP(-1)	0.174178	0.036120	4.822217	0.0002
D_LN_FINCONSTR	0.089649	0.013710	6.539002	0.0000
D_LN_EXCESSD(-3)	0.152510	0.078472	1.943490	0.0698
D_LN_WAGE_LF(-6)	0.057629	0.021247	2.712304	0.0154
D_LN_GCF(-2)	-0.077860	0.023541	-3.307456	0.0044
D_LN_RGDP_REST(-6)	-0.122511	0.053777	-2.278133	0.0368

R-squared	0.933281		
Adjusted R-squared	0.879071		
Durbin-Watson stat	2.266264		
Diagnostic Tests:			
Normality		0.587906	0.745311
Serial Correlation		0.335602	0.7205
Hetroschedasticity		0.014766	0.9042
Stability		0.947065	0.3459

Socio-Economic Activity

Dependent Variable: LN_SE_INDEX_B
Method: Least Squares
Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_HH_RGDP_REST	0.030940	0.016507	1.874366	0.0700
LN_REXPSOCIAL	0.032528	0.004763	6.829768	0.0000
LN_ELEPPOP	0.022355	0.011749	1.902763	0.0661
DUMMY_M	0.037452	0.010102	3.707218	0.0008
C	-0.543475	0.325743	-1.668418	0.1050

R-squared	0.829443	Durbin-Watson stat	1.170655
Adjusted R-squared	0.808123		
F-statistic	38.90500		
Prob(F-statistic)	0.000000		

Socio-Economic Activity

Dependent Variable: D_LN_SE_INDEX_B
Method: Least Squares
Sample (adjusted): 1973 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_SE_REST_1	-0.329734	0.057513	-5.733180	0.0000
D_LN_CAPFLOW	-0.006750	0.001518	-4.445621	0.0002
D_LN_REXPSOCIAL	0.011303	0.002195	5.149289	0.0000
D_LN_RGDP(-2)	0.047847	0.007557	6.331458	0.0000
D_LN_HH_RGDP	0.134396	0.008260	16.27146	0.0000
D_LN_ELEPPOP	-0.010816	0.005214	-2.074412	0.0489
D_LN_EXCESSD(-1)	-0.053352	0.012159	-4.387941	0.0002
D_LN_POVERTYD_INDEX(-1)	-0.074722	0.027936	-2.674739	0.0133
DUM	0.009144	0.002391	3.824671	0.0008
DUMOIL	-5.47E-09	1.13E-09	-4.848493	0.0001

R-squared	0.970915		
Adjusted R-squared	0.960009		
Durbin-Watson stat	2.351897		
Diagnostic Tests:			
Normality		0.654540	0.720889
Serial Correlation		0.719718	0.4980
Hetroschedasticity		0.096717	0.7579
Stability		1.725422	0.2013

Disposable Income (Rest of Economy)

Dependent Variable: LN_HH_RGDP_REST
Method: Least Squares
Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_RWAGE_LF	0.876241	0.120386	7.278594	0.0000
LN_TRANSFER	0.110486	0.013818	7.995734	0.0000
DUMMY_M	0.115174	0.064841	1.776251	0.0852
DUMOIL	-1.19E-07	3.52E-08	-3.378026	0.0019
C	3.476751	1.364878	2.547298	0.0159

R-squared	0.828022	Durbin-Watson stat	1.387012
Adjusted R-squared	0.806525		
F-statistic	38.51767		
Prob(F-statistic)	0.000000		

Disposable Income (Rest of Economy)

Dependent Variable: D_LN_HH_RGDP_REST
Method: Least Squares
Sample (adjusted): 1975 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_HH_REST_1	-0.263604	0.121832	-2.163666	0.0416
D_LN_RWAGE_LF	1.012605	0.131858	7.679484	0.0000
D_LN_CAPFLOW(-4)	-0.045298	0.019722	-2.296806	0.0315
D_LN_TRANSFER(-3)	0.166261	0.034884	4.766105	0.0001
D_LN_RK_STOCK2(-4)	0.390019	0.172500	2.260988	0.0340
D_LN_FINCONSTR	-0.125216	0.038293	-3.269971	0.0035
D_LN_CU_TOT(-4)	0.175539	0.097390	1.802429	0.0852
D_LN_PPI	-0.381874	0.204526	-1.867121	0.0753
D_LN_INDEX_AGRIC(-2)	0.968760	0.207588	4.666739	0.0001
DUMOIL	-3.66E-08	1.97E-08	-1.854812	0.0771

R-squared	0.894303	Durbin-Watson stat	1.552035
Adjusted R-squared	0.851064		
Diagnostic Tests:			
Normality		1.651074	0.438000
Serial Correlation		0.882692	0.4300
Hetroschedasticity		0.861965	0.3609
Stability		0.251604	0.6214

Poverty

Dependent Variable: LN_POVERTYD_INDEX

Method: Least Squares

Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_CPI	0.237591	0.040575	5.855542	0.0000
LN_INDEX_AGRIC	-0.541746	0.184387	-2.938089	0.0062
LN_HH_RGDP_REST	-0.151928	0.068281	-2.225043	0.0335
LN_AIDPOP	-0.002034	0.024612	-0.082640	0.9347
LN_ELEPPOP	-0.073436	0.064789	-1.133462	0.2657
C	3.028525	1.542574	1.963293	0.0586

R-squared	0.866594	F-statistic	40.27474
Adjusted R-squared	0.845077	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.420307		

Poverty

Dependent Variable: D_LN_POVERTYD_INDEX

Method: Least Squares

Sample (adjusted): 1975 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_POVERTYD_NEW1_1	-0.093114	0.041593	-2.238701	0.0356
D_LN_WAGE_LABOR(-2)	0.045429	0.016574	2.740952	0.0119
D_LN_POVERTYD_INDEX(-1)	0.742858	0.074000	10.03864	0.0000
D_LN_CPI(-1)	0.066169	0.025902	2.554574	0.0181
D_LN_LABOR_F	0.559386	0.208033	2.688929	0.0134
D_LN_LABOR_F(-3)	-0.806361	0.261309	-3.085857	0.0054
D_LN_CAPFLOW(-2)	-0.014158	0.003853	-3.674003	0.0013
D_LN_ELEPPOP(-2)	0.023840	0.012336	1.932658	0.0663
DUM_POVD	0.004247	0.001908	2.226074	0.0366
D_LN_AIDPOP(-4)	-0.026275	0.006917	-3.798492	0.0010

R-squared	0.900523	Durbin-Watson stat	1.889975
Adjusted R-squared	0.859829		

Diagnostic Tests:

Normality	0.204793	0.902671
Serial Correlation	0.461347	0.6391
Hetroschedasticity	0.470891	0.4980
Stability	0.006292	0.9378

Agricultural Production

Dependent Variable: LN_INDEX_AGRIC
Method: Least Squares
Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_PPI	-0.137146	0.255780	-0.536189	0.5955

Agricultural Production

Dependent Variable: D_LN_INDEX_AGRIC
Method: Least Squares
Sample (adjusted): 1975 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_AGRIC_1	-0.190114	0.041999	-4.526639	0.0002

LN_ELEP	0.400086	0.116814	3.424985	0.0017
LN_LAND	0.580866	0.111595	5.205121	0.0000
DUM	-0.556776	0.080179	-6.944134	0.0000
DUMMY_M	-0.165237	0.075582	-2.186186	0.0362

R-squared	0.833988
Adjusted R-squared	0.813237
Durbin-Watson stat	1.016386

D_LN_CPI	0.187988	0.040180	4.678665	0.0001
D_LN_RK_STOCK2(-1)	-0.697646	0.094154	-7.409635	0.0000
D_LN_LAND(-4)	-4.701944	0.904099	-5.200698	0.0000
D_LN_AID(-2)	-0.033844	0.016108	-2.101111	0.0479
D_LN_UCC(-3)	0.107544	0.020942	5.135263	0.0000
D_PI(-4)	-0.322952	0.058495	-5.520980	0.0000
D_LN_INDEX_AGRIC(-1)	0.181145	0.087838	2.062251	0.0518
D_LN_OPEN(-4)	0.123404	0.030306	4.071859	0.0005
D_LN_PPI	0.151371	0.070958	2.133254	0.0449
D_LN_ELEP(-1)	-0.104568	0.027112	-3.856829	0.0009

R-squared	0.879103
Adjusted R-squared	0.821533
Durbin-Watson stat	1.423088

Diagnostic Tests:

Normality	2.351871	0.308530
Serial Correlation	1.672980	0.2129
Hetroschedasticity	0.913922	0.3470
Stability	0.266558	0.6110

Infrastructure

Dependent Variable: LN_ELEP
Method: Least Squares
Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_RGDP	1.430276	0.164295	8.705542	0.0000
GE	0.845762	0.448987	1.883712	0.0684
DUM	0.404438	0.149918	2.697728	0.0109
C	-13.57408	2.847999	-4.766181	0.0000

R-squared	0.823067	Durbin-Watson stat	0.832361
Adjusted R-squared	0.806982		
F-statistic	51.17032		
Prob(F-statistic)	0.000000		

Infrastructure

Dependent Variable: D_LN_ELEP
Method: Least Squares
Sample (adjusted): 1975 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_ELEP_1	-0.354742	0.075172	-4.719048	0.0001
D_GE	1.520223	0.454856	3.342206	0.0025
D_LN_ELEP(-4)	0.394435	0.157986	2.496649	0.0192
D_LN_RGDP_REST(-3)	-0.444890	0.138632	-3.209132	0.0035
D_LN_UCC(-4)	0.324727	0.062449	5.199857	0.0000
D_LN_SE_INDEX_B(-3)	1.982076	1.106360	1.791529	0.0849

R-squared	0.841910	Durbin-Watson stat	2.084017
Adjusted R-squared	0.811508		

Diagnostic Tests:

Normality	1.057963	0.589205
Serial Correlation	0.011305	0.9888
Hetroschedasticity		

			0.076137	0.7846
			Stability	0.995962	0.3297

Household Consumption Expenditure

Dependent Variable: LN_HH_RCONEXP
Method: Least Squares
Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_HH_RGDP_REST	0.972615	0.081643	11.91300	0.0000
LN_RM2	0.004293	0.086403	0.049685	0.9607
RINT	0.007445	0.217317	0.034257	0.9729
DUMMY_M	0.142686	0.087794	1.625236	0.1139
DUM	0.184128	0.082003	2.245369	0.0318

R-squared	0.818465	Durbin-Watson stat	2.140756
Adjusted R-squared	0.795773		

Household Consumption Expenditure

Dependent Variable: D_LN_HH_RCONEXP
Method: Least Squares
Sample (adjusted): 1975 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_CONS_1	-0.916454	0.149502	-6.130052	0.0000
D_LN_HH_RGDP_REST	1.294527	0.137080	9.443605	0.0000
D_RINT(-3)	-0.004270	0.001607	-2.657629	0.0129
D_LN_HH_RCONEXP(-4)	-0.211070	0.069695	-3.028496	0.0052

R-squared	0.876526	Durbin-Watson stat	2.358821
Adjusted R-squared	0.863296		

Diagnostic Tests:

Normality	1.157963	0.389205
Serial Correlation	1.016767	0.375700
Hetroschedasticity	0.176137	0.4846
Stability	1.466505	0.249193

Exports

Dependent Variable: LN_REXP
Method: Least Squares
Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_RGDPUS	0.749785	0.041429	18.09791	0.0000
LN_OIL_P	0.338712	0.087149	3.886571	0.0004
LN_RELCPI	-0.203701	0.123205	-1.653351	0.1075

Exports

Dependent Variable: D_LN_REXP
Method: Least Squares
Sample (adjusted): 1975 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_EXP_1	-0.552230	0.123824	-4.459792	0.0001
D_LN_OIL_P	0.306532	0.084548	3.625534	0.0012
D_LN_RGDPUS(-4)	2.462485	1.429793	1.722268	0.0969
D_LN_EXCH(-2)	-0.275570	0.109583	-2.514709	0.0184

R-squared	0.824577	Durbin-Watson stat	0.665997
Adjusted R-squared	0.814258		

DUM	-0.224912	0.085258	-2.638008	0.0139
D_LN_PPI	1.032138	0.406294	2.540373	0.0174

R-squared	0.695505	Durbin-Watson stat	2.593351
Adjusted R-squared	0.636949		

Diagnostic Tests:

Normality	0.700557	0.704492
Serial Correlation	2.212771	0.100771
Hetroschedasticity	0.655355	0.762070
Stability	1.782459	0.178600

Imports

Dependent Variable: LN_RIMP

Method: Least Squares

Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_RGDP	1.390517	0.214155	6.493052	0.0000
LN_RELCPI	0.213230	0.132165	1.613361	0.1168
LN_EXCH	-0.206131	0.100828	-2.044387	0.0495
DUM	-0.478356	0.158213	-3.023486	0.0050
DUMMY_M	-0.321161	0.139370	-2.304366	0.0281
C	-6.396372	3.353126	-1.907585	0.0657

R-squared	0.863437	F-statistic	39.20041
Adjusted R-squared	0.841411	Prob(F-statistic)	0.000000
Durbin-Watson stat	1.148905		

Imports

Dependent Variable: D_LN_RIMP

Method: Least Squares

Sample (adjusted): 1973 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_IMP_1	-0.581142	0.187438	-3.100444	0.0043
D_LN_RGDP	1.231038	0.270035	4.558807	0.0001
D_LN_RIMP(-1)	0.401320	0.147816	2.714999	0.0110
D_LN_OIL_P	-0.176863	0.093238	-1.896902	0.0678
D_LN_INT(-2)	0.474030	0.294296	1.610726	0.1181

R-squared	0.543925	Durbin-Watson stat	1.861622
Adjusted R-squared	0.481018		

Diagnostic Tests:

Normality	1.805803	0.405392
Serial Correlation	0.097716	0.907226
Hetroschedasticity	0.430651	0.916330
Stability	0.095489	0.961845

Interest Rate

Dependent Variable: LN_INT

Method: Least Squares

Date: 03/17/09 Time: 10:49

Sample: 1970 2006

Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_RGDP	0.489271	0.087215	5.609922	0.0000
LN_RM2	-0.256578	0.055728	-4.604146	0.0001
LN_DIS_RATE	0.777294	0.041146	18.89114	0.0000
C	-7.693613	0.779270	-9.872851	0.0000

R-squared	0.964472	F-statistic	298.6167
Adjusted R-squared	0.961242	Prob(F-statistic)	0.000000
Durbin-Watson stat	1.858574		

Interest Rate

Dependent Variable: D_LN_INT

Method: Least Squares

Sample (adjusted): 1974 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_INT_1	-0.718833	0.147979	-4.857677	0.0000
D_LN_DIS_RATE	0.550220	0.068943	7.980770	0.0000
D_LN_INT(-3)	0.243390	0.098365	2.474357	0.0192

R-squared	0.737095	Durbin-Watson stat	1.608142
Adjusted R-squared	0.719568		

Diagnostic Tests:

Normality	0.820171	0.663594
Serial Correlation	1.060172	0.359893
Hetroschedasticity	0.879971	0.523205
Stability	0.672593	0.518437

Exchange Rate

Dependent Variable: LN_EXCH

Method: Least Squares

Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_RELRGDP	-1.111410	0.579148	-1.919043	0.0639
LN_RELM2	0.781134	0.465380	1.678485	0.1030
LN_RELCPI	0.375075	0.479249	0.782632	0.4396
DUM	-0.683912	0.295259	-2.316314	0.0271
C	8.498273	2.698539	3.149212	0.0035

R-squared	0.946120	F-statistic	140.4770

Exchange Rate

Dependent Variable: D_LN_EXCH

Method: Least Squares

Sample (adjusted): 1973 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_EXCH_1	-0.294147	0.069126	-4.255230	0.0003
D_LN_RELCPI	0.925168	0.200107	4.623356	0.0001
D_LN_OIL_P	0.717931	0.063274	11.34641	0.0000
D_LN_RELINT	0.379537	0.102486	3.703311	0.0011
D_LN_GCF	0.781741	0.129814	6.022016	0.0000
D_LN_RELRGDP	-0.737525	0.243273	-3.031679	0.0058
D_LN_AID(-2)	0.152819	0.062702	2.437234	0.0226

Adjusted R-squared	0.939385	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.672903		

D_LN_RELREMIT	-0.096521	0.032830	-2.940050	0.0072
D_LN_M2_US	-3.373332	0.671654	-5.022421	0.0000
DUM	0.230886	0.067560	3.417507	0.0023

R-squared	0.870187	Durbin-Watson stat	2.033036
Adjusted R-squared	0.821507		

Diagnostic Tests:

Normality	0.683645	0.710474
Serial Correlation	0.083990	0.919734
Hetroschedasticity	1.488649	0.226296
Stability	0.872594	0.568433

Foreign Direct Investment

Dependent Variable: LN_FDI

Method: Least Squares

Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_RGDP	0.681613	0.029886	22.80747	0.0000
LN_CPI	-0.496629	0.218464	-2.273274	0.0301
LN_OPEN	0.075962	0.439911	0.172677	0.8640
LN_EXCH	0.288011	0.228836	1.258591	0.2176
DUMMY_M	1.168249	0.320932	3.640174	0.0010
DUM	0.978211	0.400298	2.443708	0.0204

R-squared	0.621662	Durbin-Watson stat	2.152807
Adjusted R-squared	0.560640		

Foreign Direct Investment

Dependent Variable: D_LN_FDI

Method: Least Squares

Sample (adjusted): 1974 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_FDI_1	-0.590600	0.235782	-2.504858	0.0183
D_LN_FDI(-1)	-0.373373	0.145780	-2.561209	0.0161
D_LN_FDI(-3)	0.217317	0.106820	2.034415	0.0515
D_LN_GCF(-3)	-0.792694	0.362943	-2.184073	0.0375
D_LN_OPEN(-3)	0.665368	0.398410	1.670058	0.1061

R-squared	0.697786	Durbin-Watson stat	1.965139
Adjusted R-squared	0.654613		

Diagnostic Tests:

Normality	0.022571	0.988778
Serial Correlation	0.321537	0.727876
Hetroschedasticity	1.122641	0.389563
Stability	1.876953	0.173214

Table A3.2: Model B

Labour Demand

Dependent Variable: LN_LABOR_F

Method: Least Squares

Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_RGDP	0.831114	0.012311	67.50851	0.0000
LN_RWAGE_LF	-0.790810	0.016080	-49.18101	0.0000
LN_SE_INDEX_B	0.088369	0.075262	1.174145	0.2485

R-squared	0.993518	Durbin-Watson stat	0.859577
Adjusted R-squared	0.993137		

Labour Demand

Dependent Variable: D_LN_LABOR_F

Method: Least Squares

Sample (adjusted): 1979 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_LABOR_1	-0.123946	0.051508	2.406351	0.0286
D_LN_RGDP(-1)	-0.027298	0.011727	-2.327725	0.0334
D_LN_RWAGE_LF(-3)	0.221453	0.049104	4.509851	0.0004
D_LN_LABOR_F(-3)	-0.259916	0.222787	-1.166657	0.2604
D_LN_AGRIC_ELEP(-2)	0.023013	0.005651	4.072247	0.0009
D_LN_CPI(-5)	-0.065162	0.010865	-5.997158	0.0000
D_LN_SE_INDEX_B(-8)	0.264947	0.040923	6.474235	0.0000
D_LN_CU_TOT(-3)	-0.300010	0.061788	-4.855470	0.0002
D_LN_EXCH(-7)	0.015525	0.004703	3.301418	0.0045
D_LN_IMP_P(-3)	0.015016	0.007485	2.006038	0.0621
D_LN_REXPSOCIAL(-6)	0.005680	0.002167	2.621457	0.0185
C	0.046328	0.006314	7.337186	0.0000

R-squared	0.917644	F-statistic	16.20706
Adjusted R-squared	0.861024	Prob(F-statistic)	0.000001
Durbin-Watson stat	2.144370		

Diagnostic Tests:

Normality	3.147047	0.312567
Serial Correlation	0.267672	0.5449
Hetroschedasticity	0.987610	0.53806
Stability	0.136821	0.47964

Real Wages

Dependent Variable: LN_RWAGE_LF

Method: Least Squares

Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.

Real Wages

Dependent Variable: D_LN_RWAGE_LF

Method: Least Squares

Sample (adjusted): 1973 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.

LN_LABPROD_TOT	0.984090	0.001466	671.4456	0.0000
DUMMY_M	0.056499	0.019175	2.946473	0.0058
DUM	0.049768	0.021904	2.272108	0.0295

R-squared	0.951400	Durbin-Watson stat	0.412683
Adjusted R-squared	0.948541		

RESID_RWAGE_1	-0.179116	0.064551	-2.774823	0.0101
D_LN_CPI	-0.112168	0.044423	-2.524975	0.0180
D_LN_LABPROD_REST	0.284137	0.095117	2.987247	0.0061
D_LN_OIL_P	0.090183	0.030867	2.921635	0.0071
D_LN_SE_INDEX_B	3.891884	0.649320	5.993785	0.0000
D_LN_TRAN_PUBEXP_RATIO(-2)	0.062086	0.019923	3.116349	0.0044
D_LN_OPEN(-2)	-0.085002	0.039787	-2.136447	0.0422
DUM	-0.039482	0.018483	-2.136177	0.0422

R-squared	0.940203	Durbin-Watson stat	1.863386
Adjusted R-squared	0.924104		

Diagnostic Tests:

Normality	1.321575	0.442979
Serial Correlation	1.719163	0.3013
Hetroschedasticity	0.310740	0.8401
Stability	1.955160	0.2785

Socio-Economic Activity

Dependent Variable: LN_SE_INDEX_B

Method: Least Squares

Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_HH_RGDP	0.033612	0.018544	1.812510	0.0793
LN_REXPSOCIAL	0.031832	0.004963	6.413442	0.0000
LN_ELEPPOP	0.016514	0.013962	1.182830	0.2456
DUMMY_M	0.042125	0.009833	4.284199	0.0002
C	-0.655900	0.391973	-1.673328	0.1040

R-squared	0.828340	F-statistic	38.60380
Adjusted R-squared	0.806883	Prob(F-statistic)	0.000000
Durbin-Watson stat	1.140892		

Socio-Economic Activity

Dependent Variable: D_LN_SE_INDEX_B

Method: Least Squares

Sample (adjusted): 1973 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_SE_TOT_1	-0.337387	0.059553	-5.665315	0.0000
D_LN_CAPFLOW	-0.006572	0.001524	-4.312964	0.0002
D_LN_REXPSOCIAL	0.010968	0.002194	4.999692	0.0000
D_LN_RGDP(-2)	0.045796	0.007602	6.024204	0.0000
D_LN_HH_RGDP	0.132844	0.008477	15.67056	0.0000
D_LN_ELEPPOP	-0.012664	0.005283	-2.396820	0.0247
D_LN_EXCESSD(-1)	-0.043506	0.012429	-3.500407	0.0018
D_LN_POVERTYD_INDEX(-1)	-0.056549	0.027131	-2.084292	0.0479
DUM	0.010223	0.002496	4.096116	0.0004
DUMOIL	-5.97E-09	1.13E-09	-5.274068	0.0000

R-squared	0.970514	Durbin-Watson stat	2.375418

	Adjusted R-squared 0.959457 **Diagnostic Tests:** Normality 0.554564 0.731898 Serial Correlation 0.735719 0.5080 Hetroschedasticity 0.106712 0.6589 Stability 1.473421 0.2117

Poverty

Dependent Variable: LN_POVERTYD_INDEX

Method: Least Squares

Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_CPI	0.205810	0.039710	5.182826	0.0000
LN_INDEX_AGRIC	-0.421465	0.179931	-2.342372	0.0255
LN_HH_RGDP	-0.003912	0.041696	-0.093814	0.9258
LN_AIDPOP	-0.014419	0.023295	-0.618968	0.5403
LN_ELEPPOP	-0.097905	0.063607	-1.539218	0.1336

R-squared	0.845099	Durbin-Watson stat	0.256567
Adjusted R-squared	0.825737		

Poverty

Dependent Variable: D_LN_POVERTYD_INDEX

Method: Least Squares

Sample (adjusted): 1974 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_POVERTYD_NEW1_1	-0.092791	0.036299	-2.556272	0.0180
D_LN_WAGE_LABOR(-2)	0.049153	0.015822	3.106674	0.0051
D_LN_AIDPOP(-2)	-0.010651	0.006016	-1.770473	0.0905
D_LN_POVERTYD_INDEX(-1)	0.630599	0.070281	8.972565	0.0000
D_LN_CPI(-1)	0.063179	0.024464	2.582521	0.0170
D_LN_LABOR_F	0.373708	0.154627	2.416828	0.0244
D_LN_CAPFLOW(-2)	-0.014798	0.003682	-4.018639	0.0006
D_LN_EXCESSD(-3)	0.067526	0.028774	2.346764	0.0283
D_LN_REXPSOCIAL(-2)	0.010650	0.004613	2.308421	0.0308
DUM_POVD	0.006822	0.001838	3.711841	0.0012
DUMMY_M	-0.022579	0.005778	-3.907861	0.0008

R-squared	0.913777	Durbin-Watson stat	2.421918
Adjusted R-squared	0.874584		
Diagnostic Tests:			
Normality		0.214891	0.924673
Serial Correlation		0.516137	0.3319
Hetroschedasticity		0.571891	0.7984
Stability		0.016292	0.5375

Disposable Income (Total Economy)

Dependent Variable: LN_HH_RGDP

Method: Least Squares

Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_RWAGE_LF	0.979738	0.042600	22.99854	0.0000
LN_TRANSFER	0.144799	0.004440	32.61527	0.0000
DUM	0.092152	0.024877	3.704261	0.0008
C	2.297017	0.482710	4.758582	0.0000

R-squared	0.984526	F-statistic	699.8866
Adjusted R-squared	0.983120	Prob(F-statistic)	0.000000
Durbin-Watson stat	1.828508		

Disposable Income (Total Economy)

Dependent Variable: D_LN_HH_RGDP

Method: Least Squares

Sample (adjusted): 1971 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_HH_TOT_1	-0.245771	0.114452	-2.147366	0.0392
D_LN_RWAGE_LF	0.869462	0.039113	22.22951	0.0000
C	0.030977	0.006511	4.757665	0.0000

R-squared	0.937430	F-statistic	247.2047
Adjusted R-squared	0.933638	Prob(F-statistic)	0.000000
Durbin-Watson stat	2.341542		

Diagnostic Tests:

Normality	1.341171	0.216024
Serial Correlation	0.802762	0.4471
Hetroschedasticity	0.762965	0.3819
Stability	0.261604	0.6514

Household Consumption Expenditure

Dependent Variable: LN_HH_RCONEXP

Method: Least Squares

Sample: 1970 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_HH_RGDP	0.654117	0.219981	2.973521	0.0056
LN_RM2	0.154979	0.158868	0.975524	0.3366
DUMMY_M	0.296432	0.112627	2.631978	0.0130
DUMOIL	-1.43E-07	5.61E-08	-2.545232	0.0159
C	2.409168	1.817799	1.325321	0.1944

R-squared	0.646445	F-statistic	14.62729
Adjusted R-squared	0.602250	Prob(F-statistic)	0.000001
Durbin-Watson stat	1.821887		

Household Consumption Expenditure

Dependent Variable: D_LN_HH_RCONEXP

Method: Least Squares

Sample (adjusted): 1975 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID_CONS_1	-0.761895	0.190059	-4.008736	0.0005
D_RINT(-3)	-0.008939	0.003046	-2.935000	0.0069
D_LN_RM2	0.697276	0.296747	2.349732	0.0267
D_LN_HH_RCONEXP(-4)	-0.331278	0.127381	-2.600698	0.0151
DUMOIL	-2.14E-07	5.81E-08	-3.678653	0.0011
C	0.118381	0.059289	1.996668	0.0564

R-squared	0.660811	F-statistic	10.13067
Adjusted R-squared	0.595582	Prob(F-statistic)	0.000018

Durbin-Watson stat	1.624581		
Diagnostic Tests:			
Normality		1.103913	0.200215
Serial Correlation		0.916768	0.175711
Hetroschedasticity		0.096197	0.1546
Stability		1.114515	0.104190

Figure A3.1: Long-Run Residuals (Model A)

FIGURE 1: RESIDUALS RGDP TOTAL ECONOMY

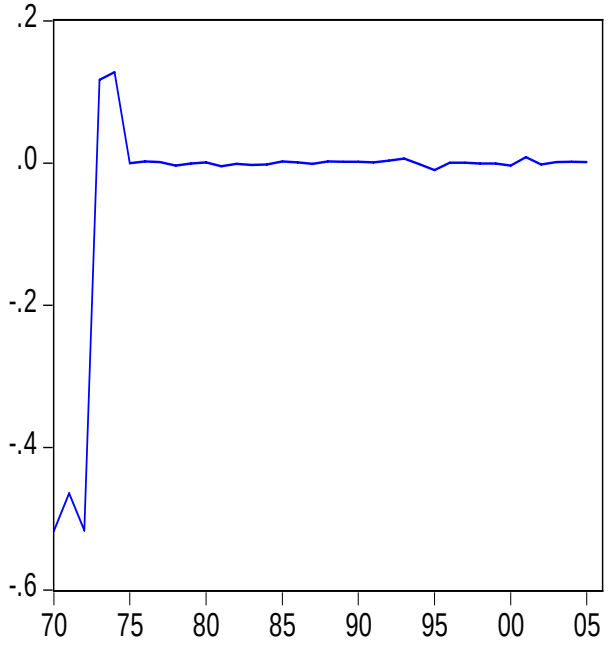


FIGURE 2: RESIDUALS RGDP OIL SECTOR

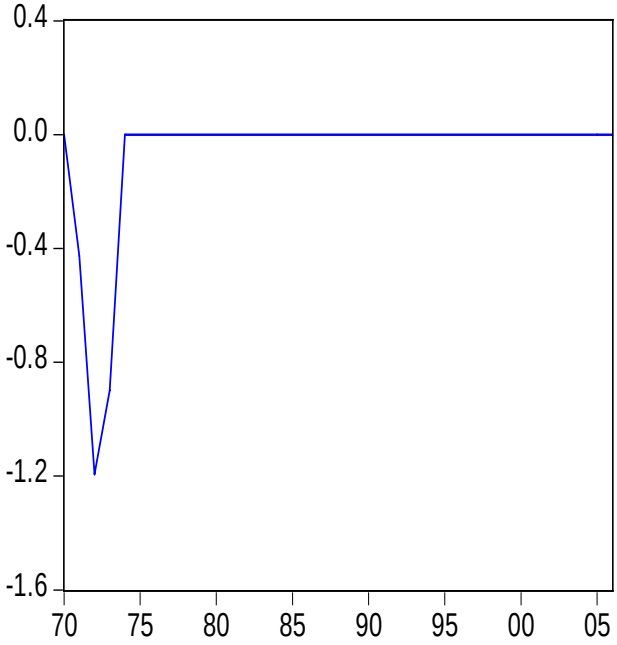


FIGURE 3: RESIDUALS LABOUR DEMAND

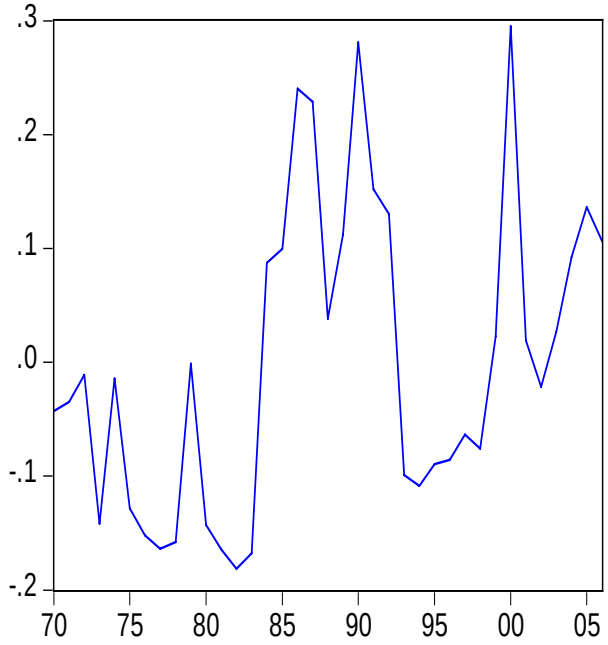


FIGURE 4: RESIDUALS REAL WAGE

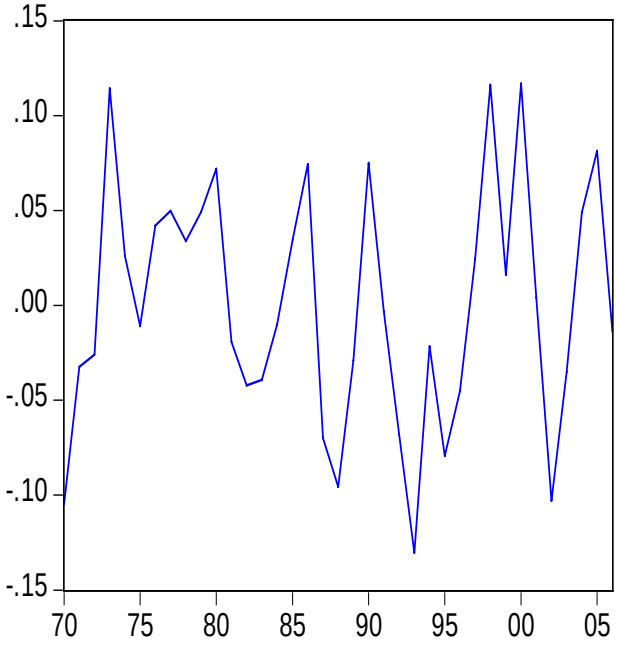


FIGURE 5: RESIDUALS INVESTMENT

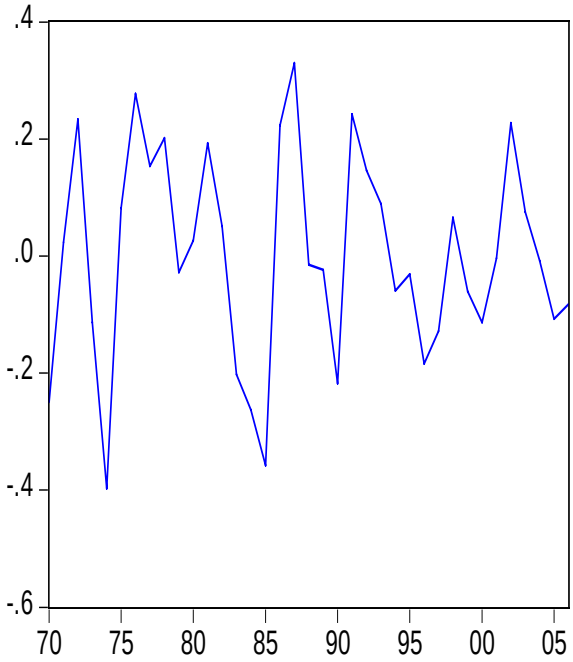


FIGURE 6: RESIDUALS TFP TOTAL ECONOMY

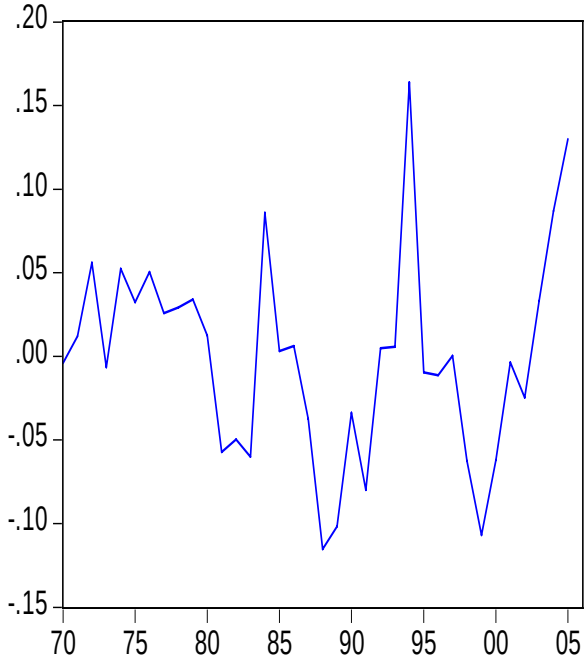


FIGURE 7: RESIDUALS TFP OIL SECTOR

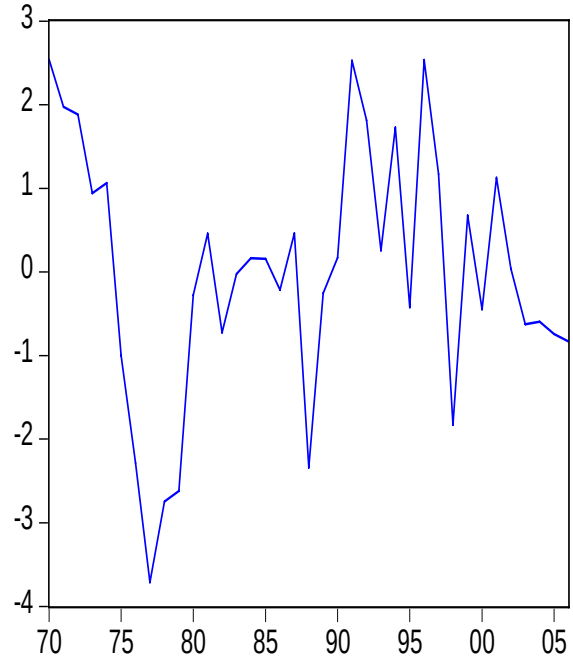


FIGURE 8: RESIDUALS CPI

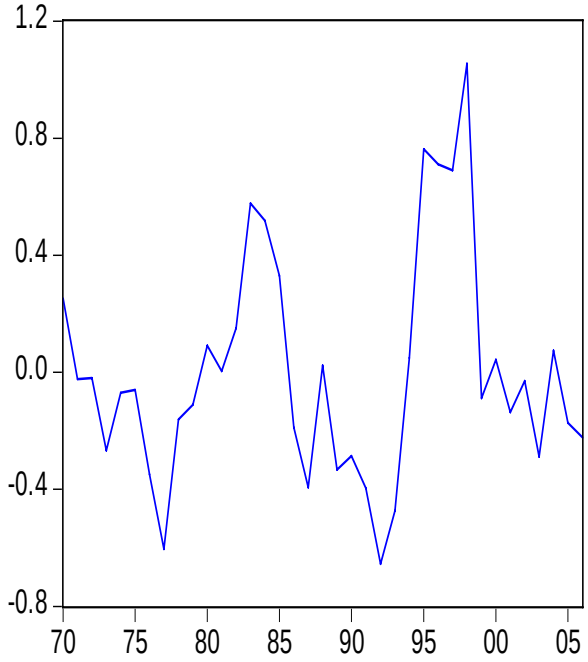


FIGURE 9: RESIDUALS PPI

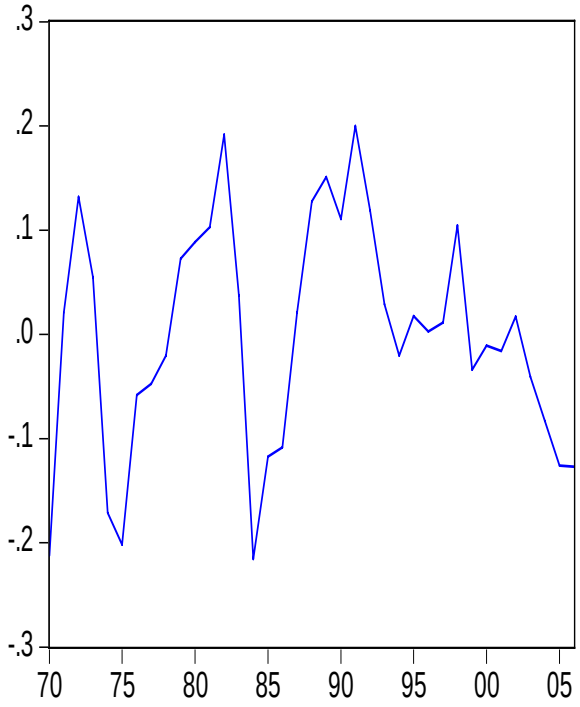


FIGURE 10: RESIDUALS SOCIO-ECONOMIC ACTIVITY

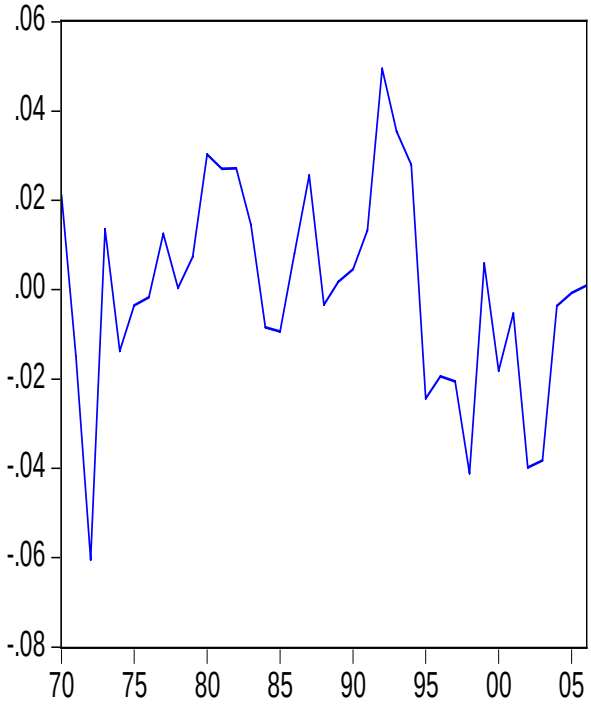


FIGURE 11: RESIDUALS HOUSEHOLD DISPOSABLE INCOME

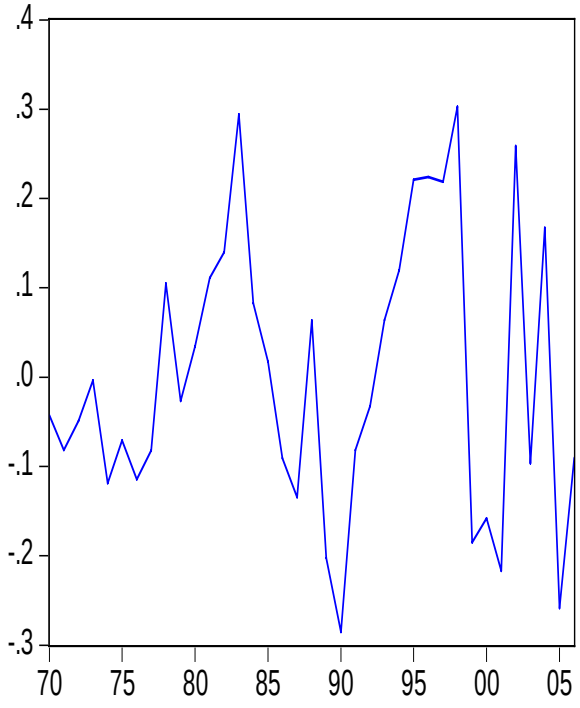


FIGURE 12: RESIDUALS POVERTY

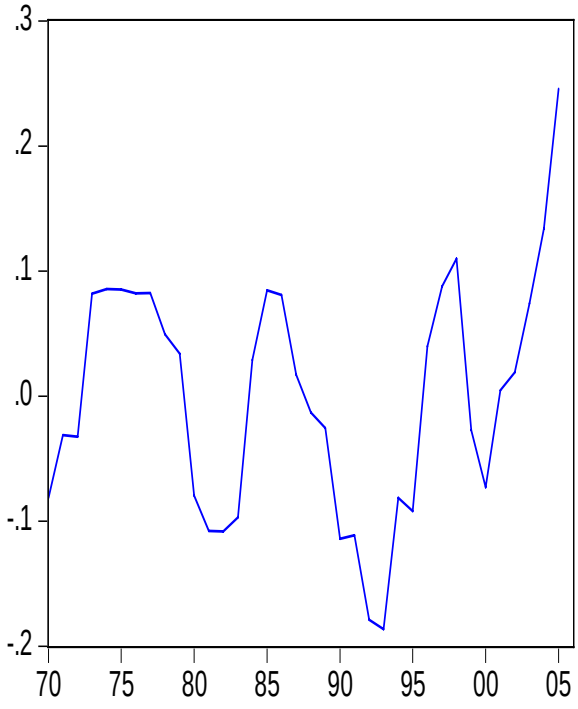


Figure 13: Residuals Agricultural Production

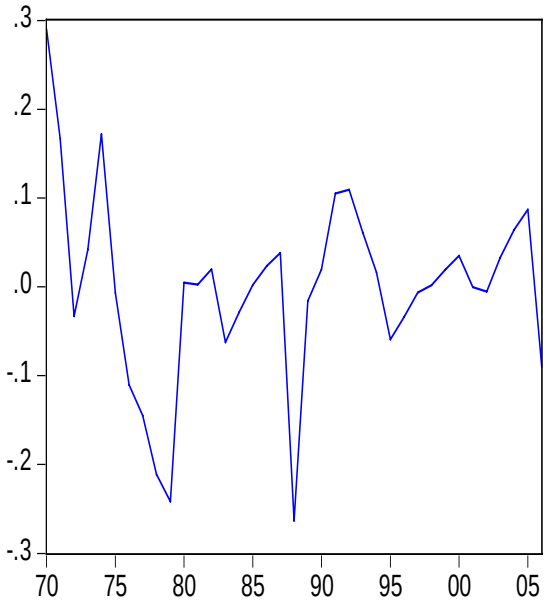


Figure 14: Residuals Infrastructure

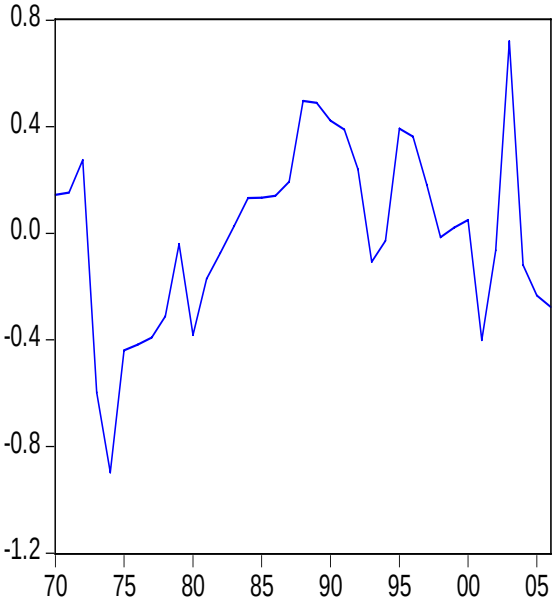


Figure 15: Residuals Exchange Rate

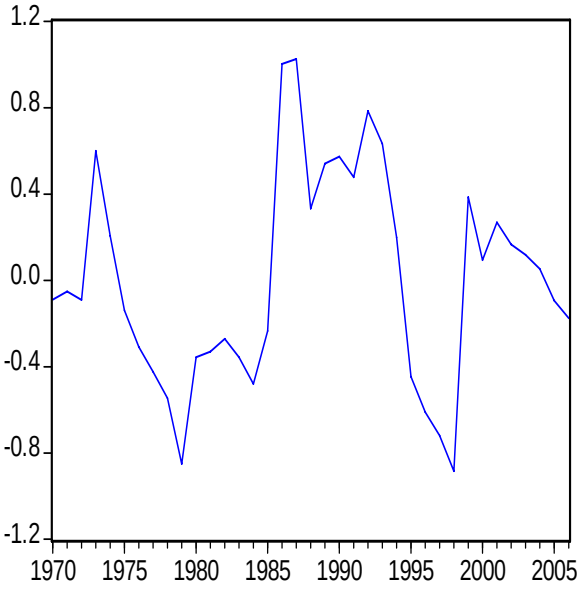


Figure 16: Residuals Interest Rate

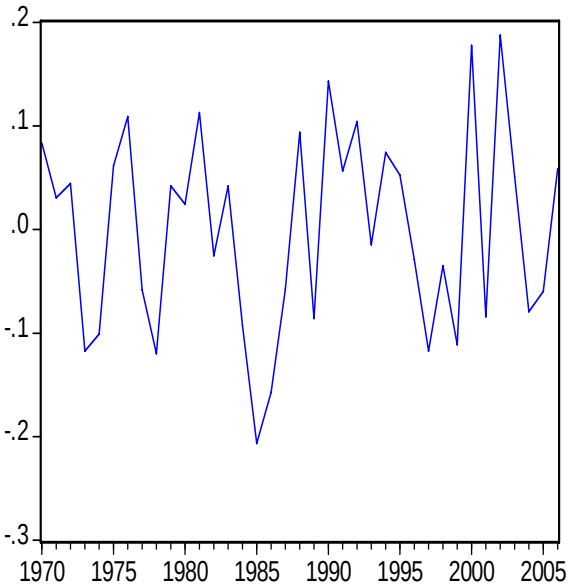


Figure 17: Residuals Exports

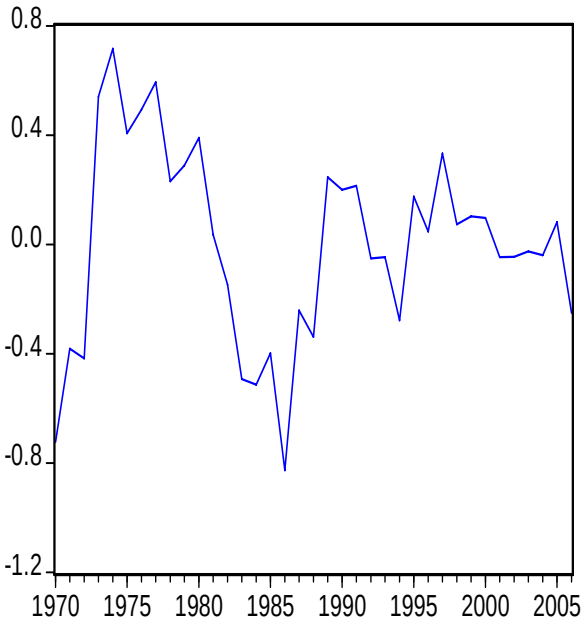


Figure 18: Residuals Imports

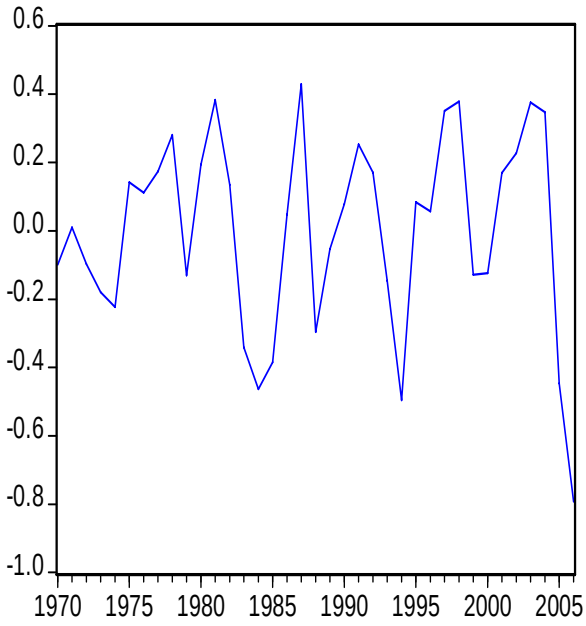


Figure 19: Residuals Consumption

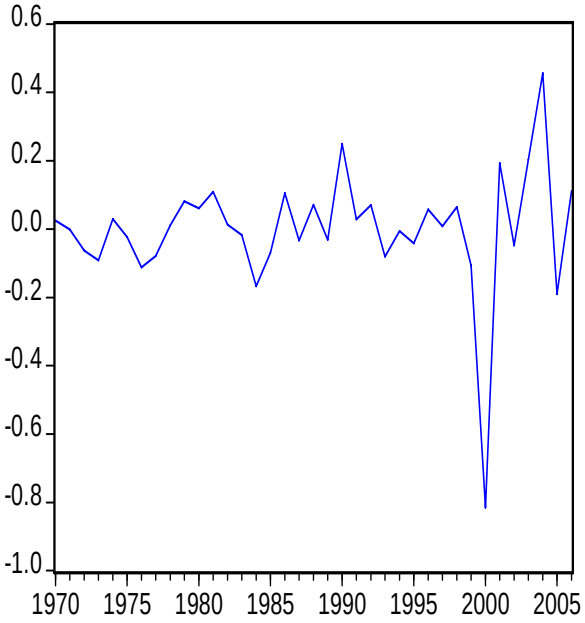


Figure 20: Residuals FDI

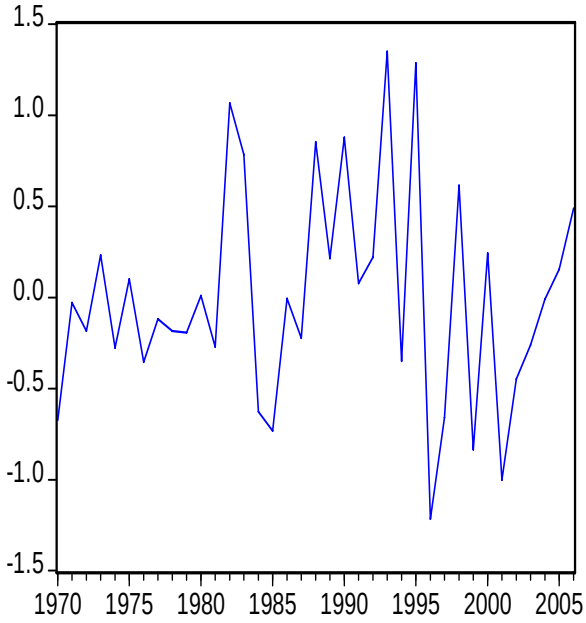


Figure A3.2: Long-Run Residuals (Model B)

Figure 1: Residuals Socio-economic Activity

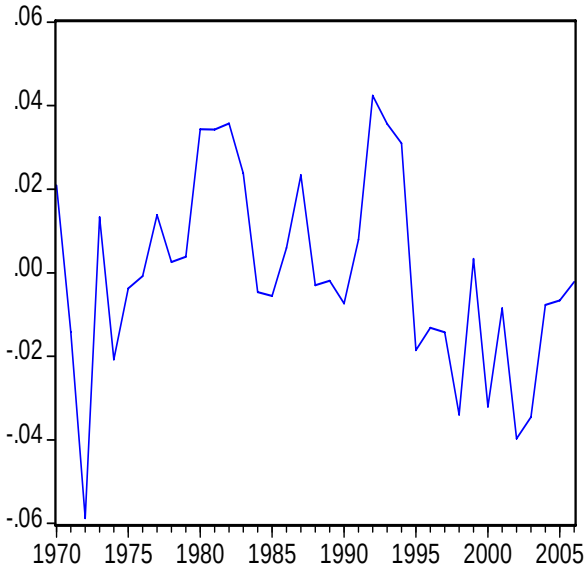


Figure 2: Residuals Poverty

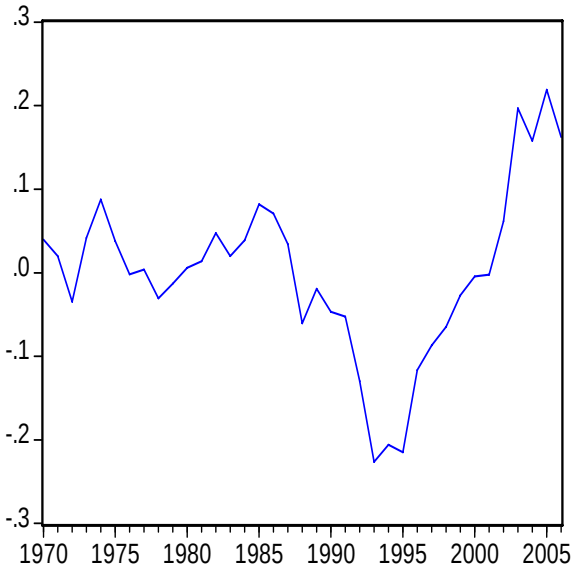


Figure 3: Residuals Disposable Income

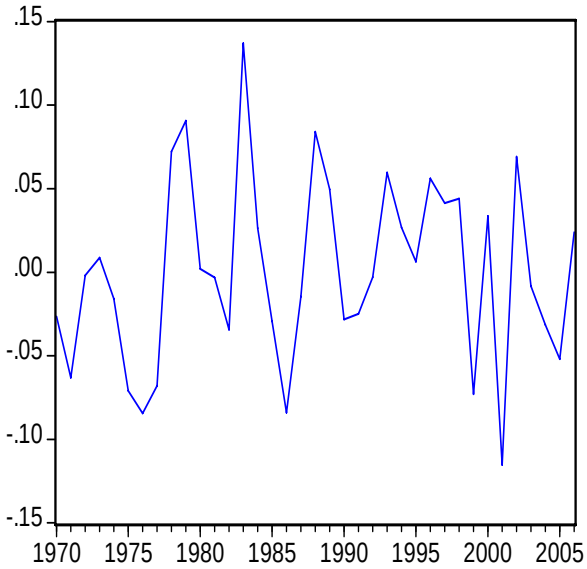
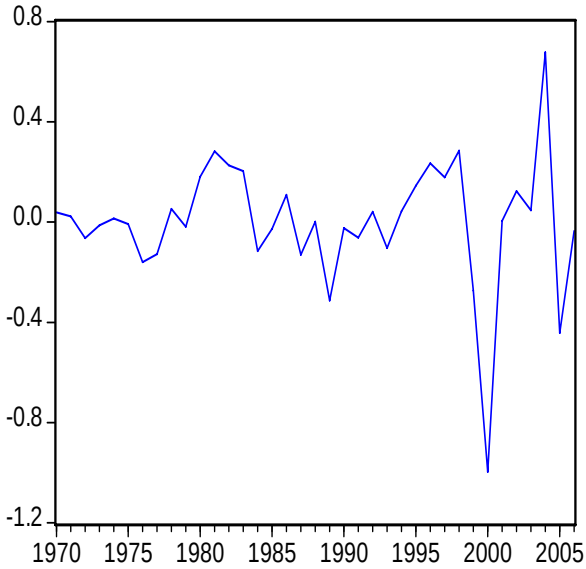


Figure 4: Residuals Consumption



APPENDIX 4

MODEL SIMULATIONS: ACTUAL AND FITTED VALUES

Figure A4.1: Model A

Figure 1: ln_rgdp

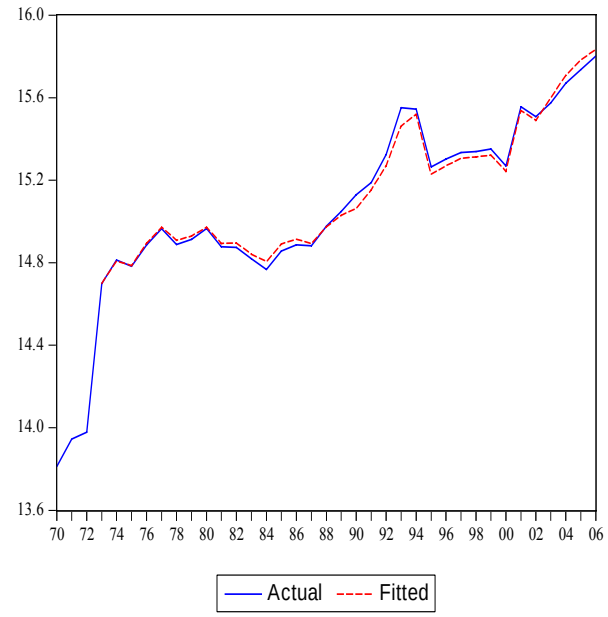


Figure 2: ln_rgdp_oil

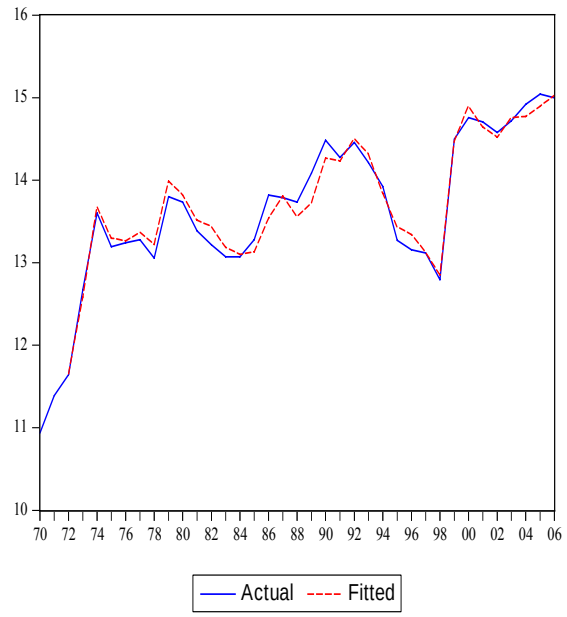


Figure 3: ln_labor_f

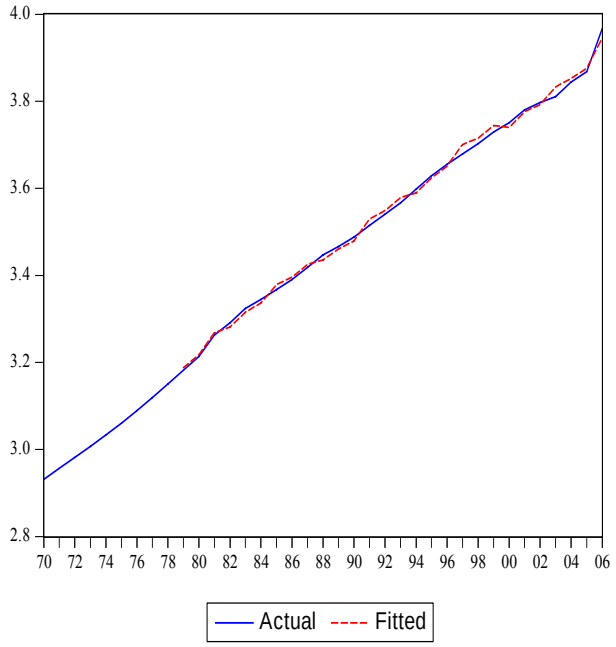


Figure 4: ln_rwage_lf

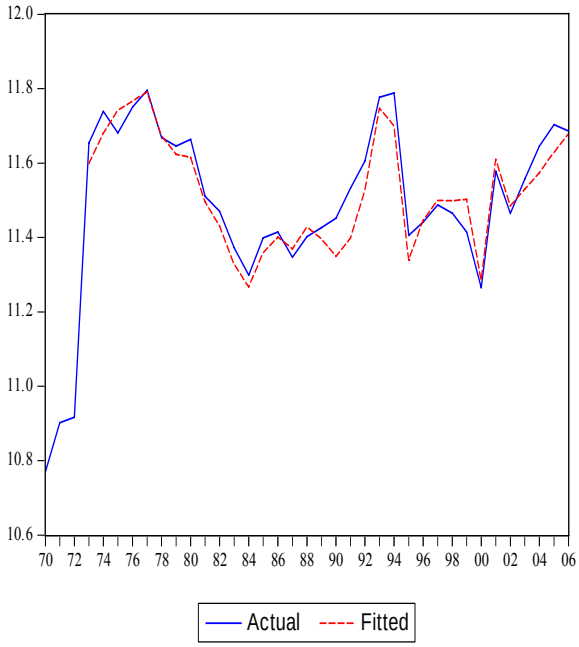


Figure 5: ln_gcf

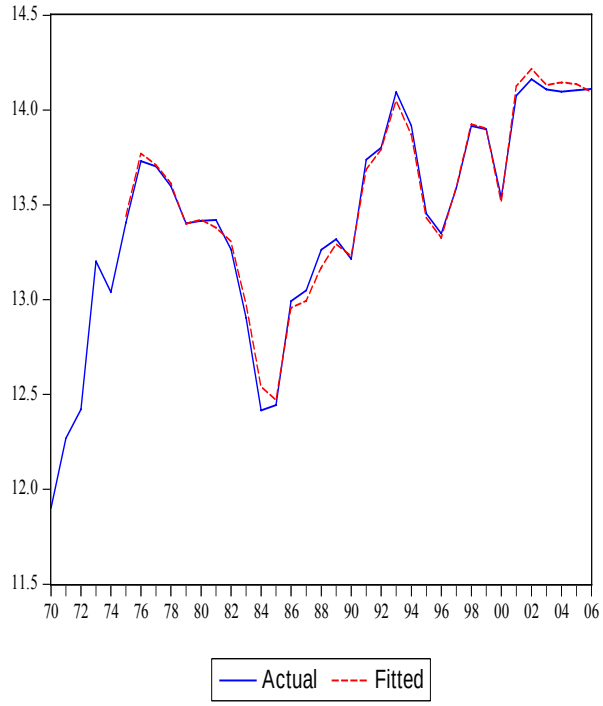


Figure 6: ln_tfp_tot

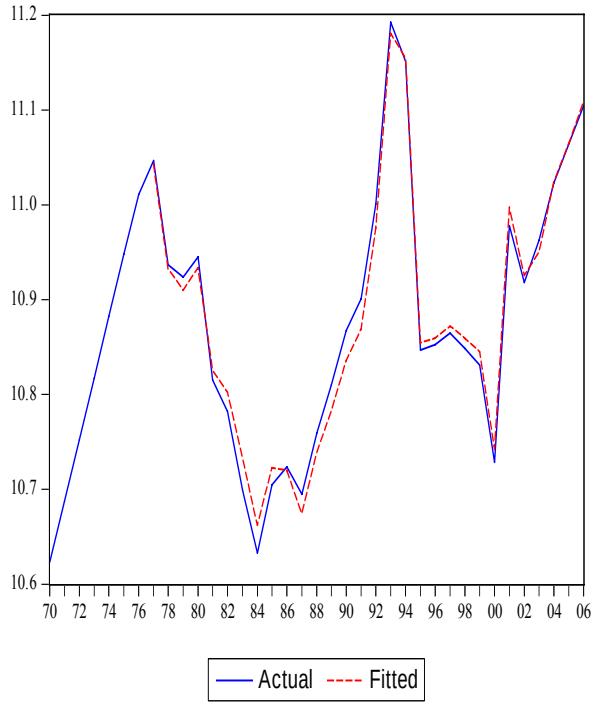


Figure 7: ln_tfp_oil

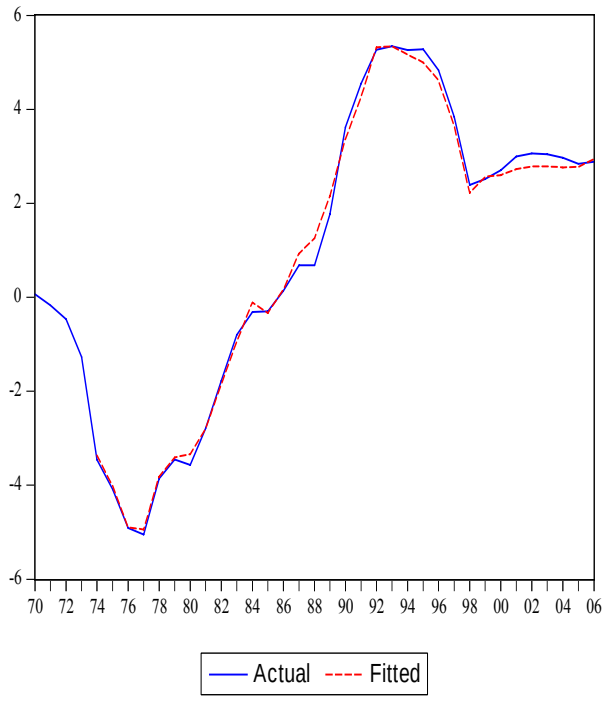


Figure 8: ln_cpi

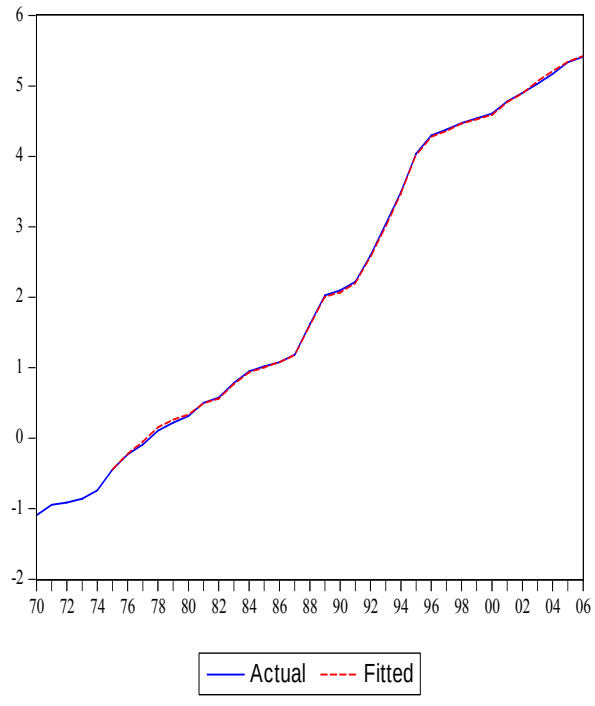


Figure 9: ln_ppi

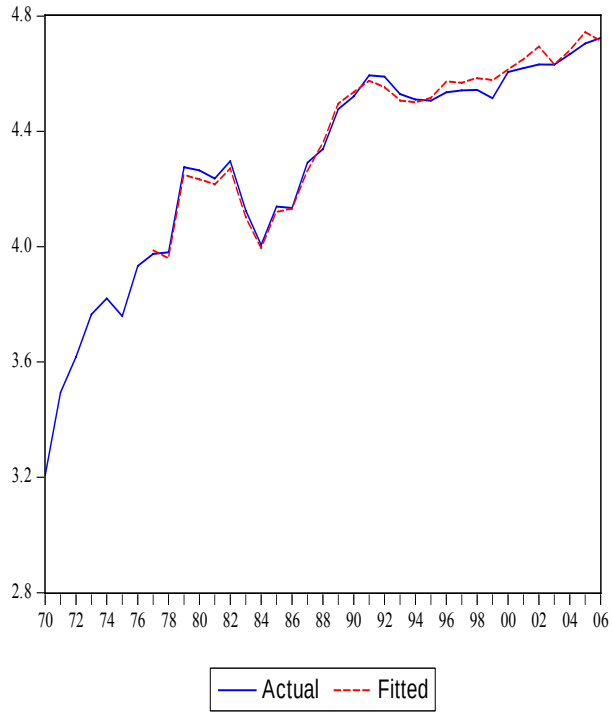


Figure 10: ln_se_index_b

Figure 11: ln_hh_rgdp_rest

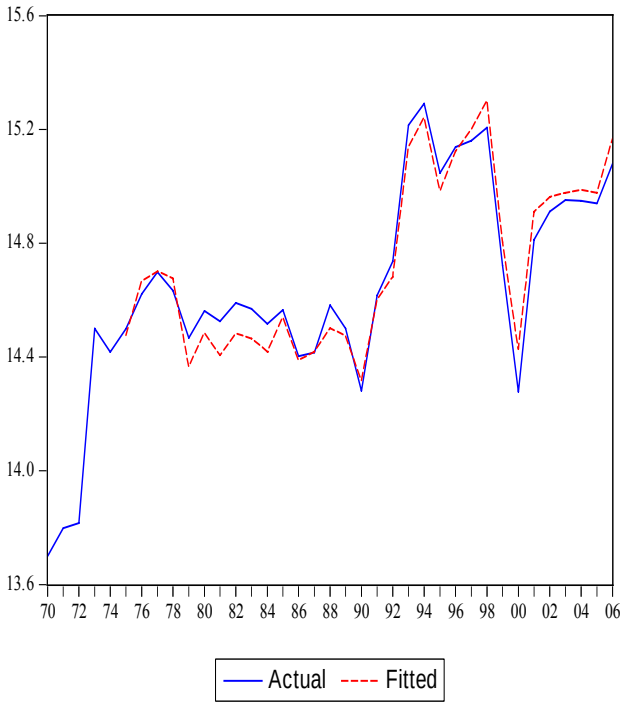


Figure 12: Ln_povertyd_index

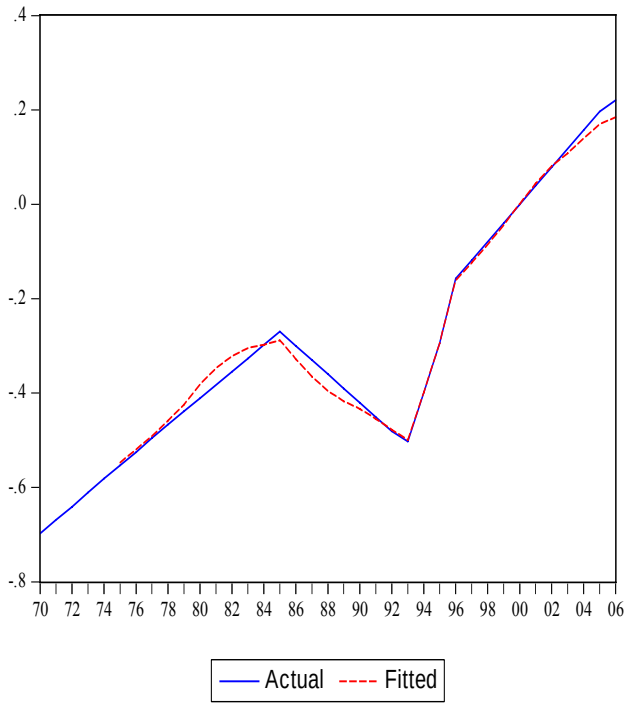


Figure 13: ln_elep

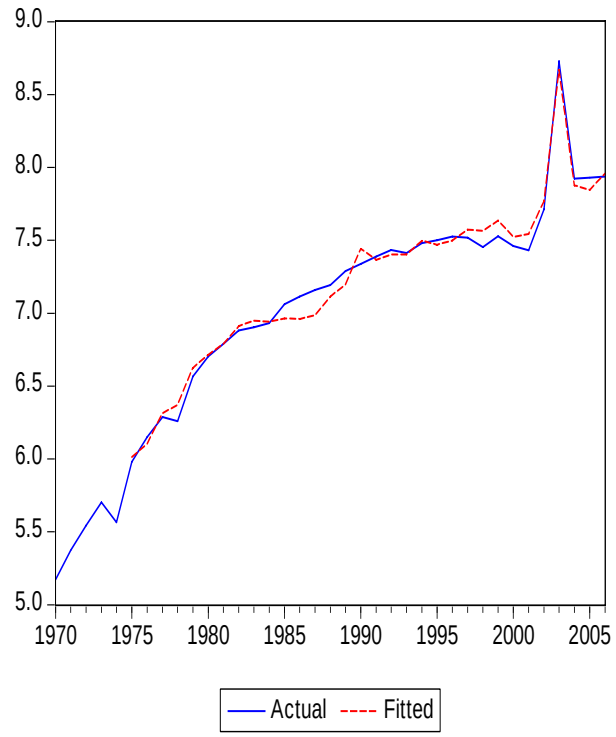


Figure 14: ln_index_agric

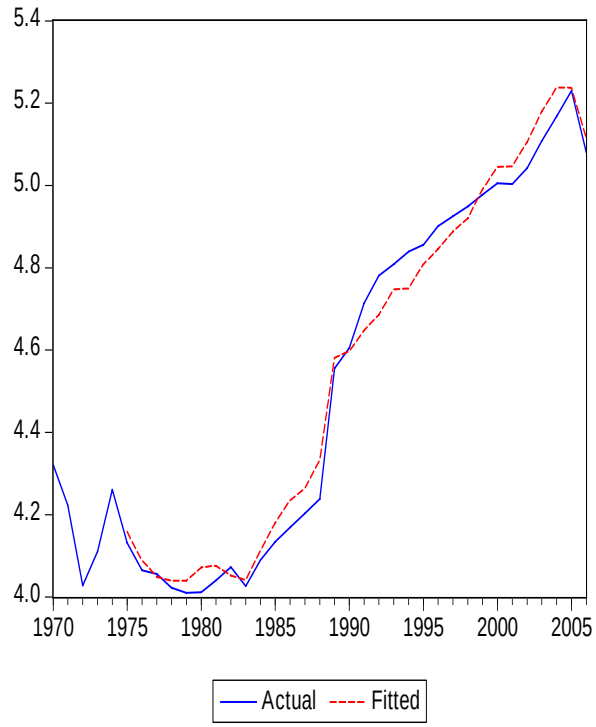


Figure 15: ln_exch

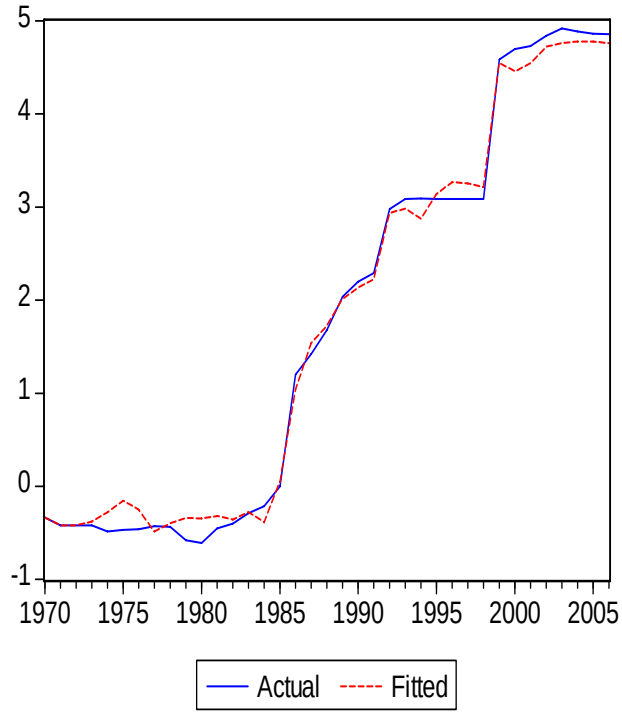


Figure 16: ln_rexp

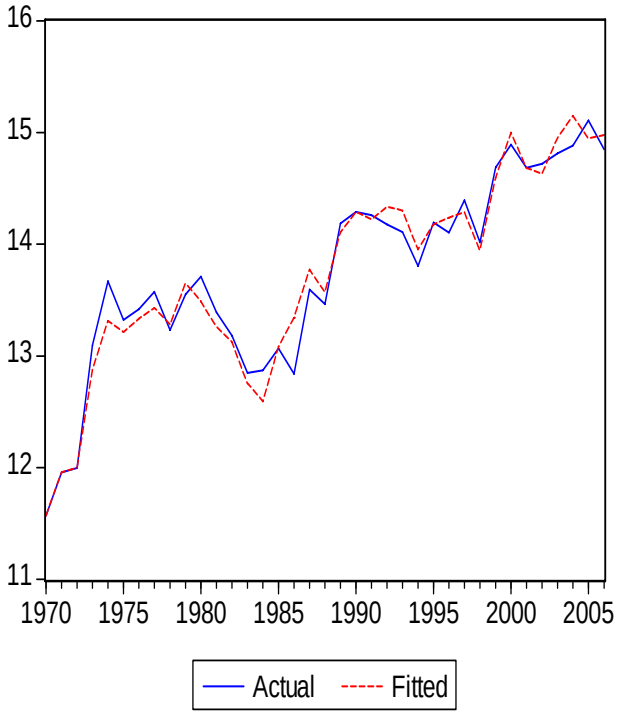


Figure 17: ln_rimp

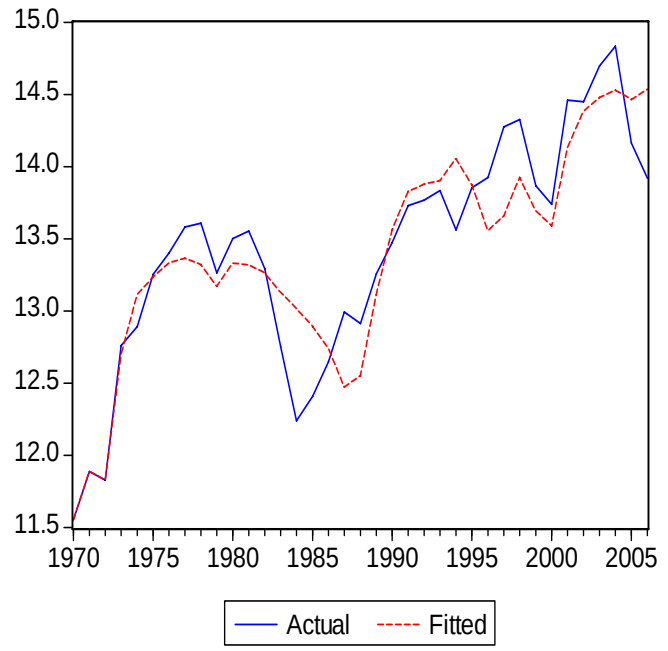


Figure 18: ln_int

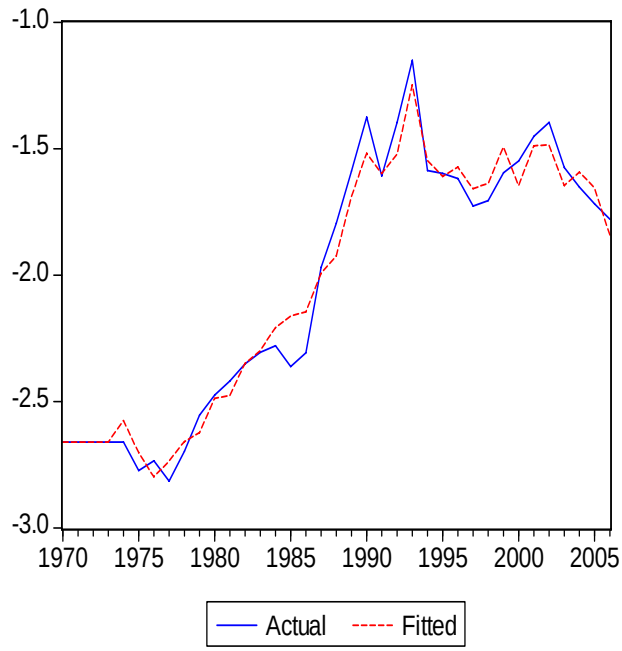


Figure 19: ln_hh_rconexp

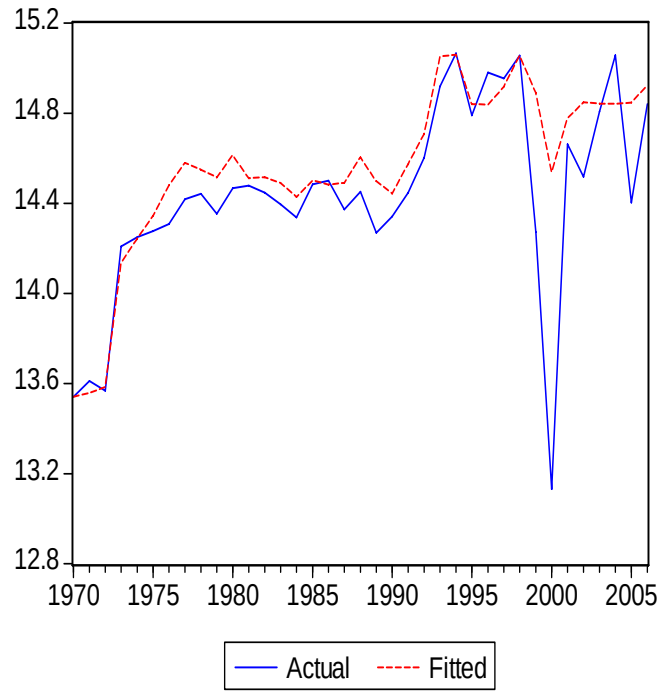


Figure 20: ln_fdi

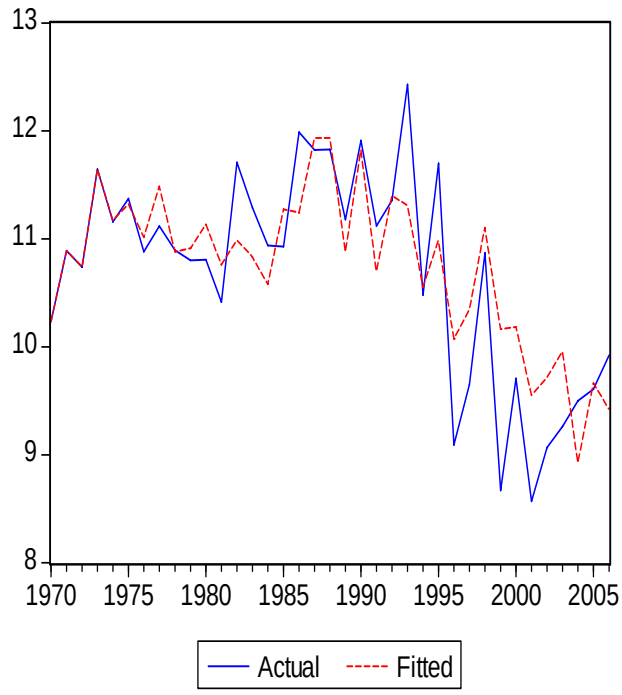


Figure A4.2: Model B

Figure 1: ln_se_index_b

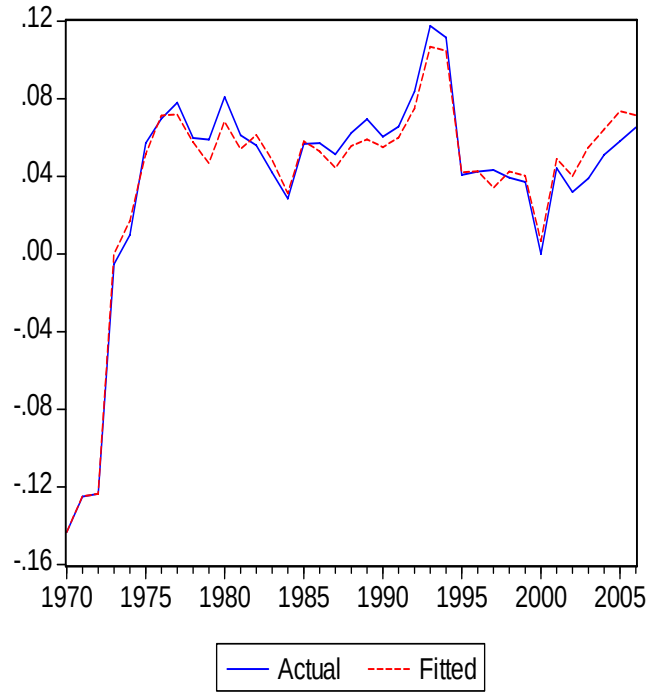


Figure 2 : ln_povertyd_index

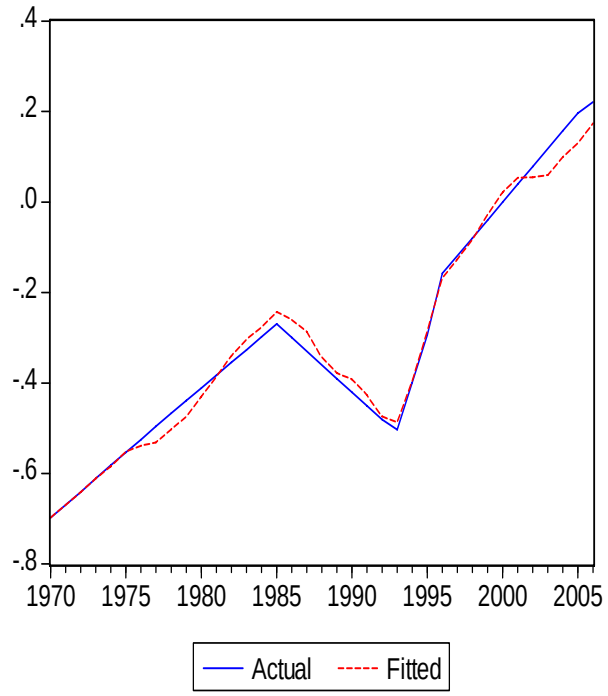


Figure 3 : ln_hh_rgdp

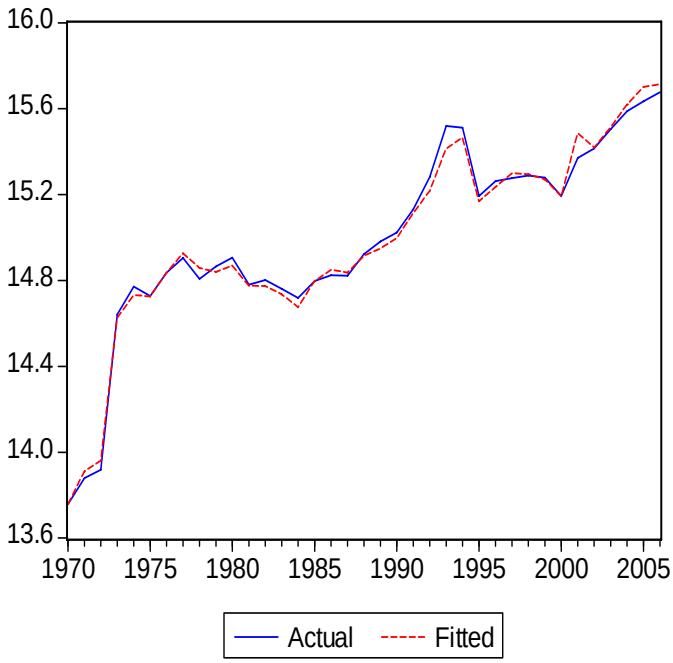


Figure 4 : ln_hh_rconexp

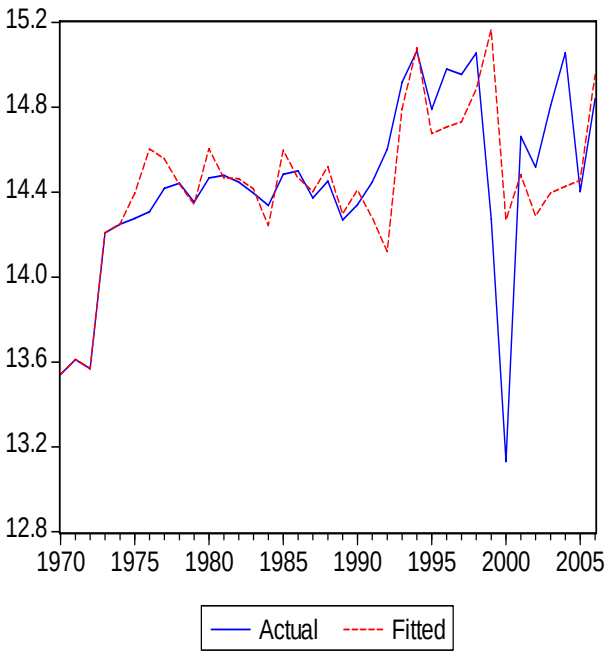


Figure 5 : ln_labor_f

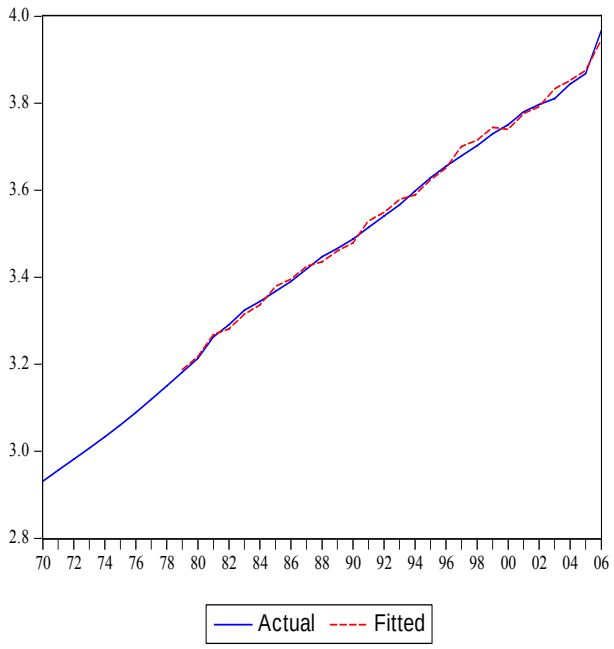
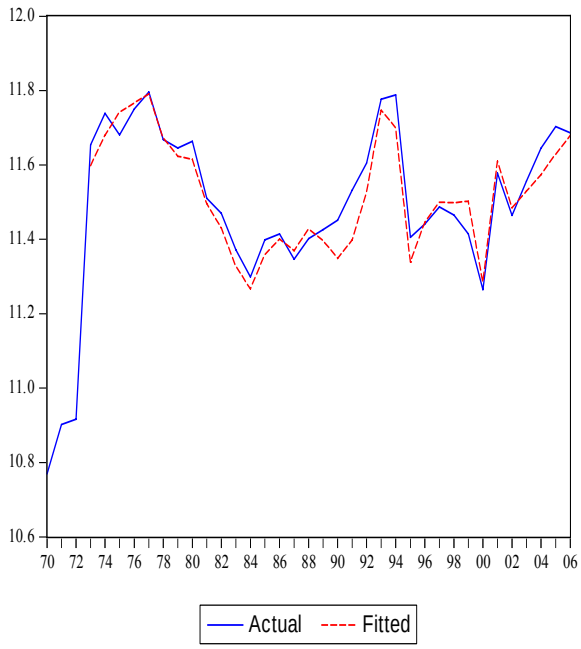


Figure 6 : ln_rwage_lf



APPENDIX 5

EQUATIONS, IDENTITIES, AND ESTIMATED PARAMETERS OF THE FULL SYSTEM

Model A

AGGREGATE SUPPLY

Production Function: Total Economy

residual_rgdp_tot1_1 = ln_rgdp(-1) - (0.179113 * ln_rk_stock2(-1) + (1 - 0.179113) * ln_labor_f(-1) + ln_tfp_tot1(-1))

LN_RGDP = - 0.138877 * RESIDUAL_RGDP_TOT1_1 + 0.118594 * (LN_RK_STOCK2 - ln_rk_stock2(-1)) + 0.820447 * (LN_RWAGE_LF - ln_rwage_lf(-1)) + 0.568914 * (LN_LABOR_F - ln_labor_f(-1)) - 0.077556 * (LN_CPI(-2) - ln_cpi(-3)) + 0.021167 + ln_rgdp(-1)

rgdp = exp(ln_rgdp)

Production Function: Oil Sector

residual_rgdp_oil_1 = ln_rgdp_oil(-1) - (sv_rk_stock2_oil1(-1) * ln_rk_stock2(-1) + (1 - sv_rk_stock2_oil1(-1)) * ln_labor_f(-1) + ln_tfp_oil(-1) + sv_dum_oil1(-1) * dum(-1))

ln_rgdp_oil = - 0.307895 * residual_rgdp_oil_1 - 0.101167 * (ln_capflow(-1) - ln_capflow(-2)) - 0.873676 * (ln_cpi - ln_cpi(-1)) + 0.911629 * (ln_oil_p - ln_oil_p(-1)) - 0.536847 * (ln_rwage_lf(-1) - ln_rwage_lf(-2)) + 0.403761 * (ln_rm2 - ln_rm2(-1)) + 0.089220 * dummy_m - 0.120577 * dum + ln_rgdp_oil(-1)

rgdp_oil = exp(ln_rgdp_oil)

Total Factor Productivity:

Total Economy

resid_tfp_tot_1 = LN_TFP_TOT1(-1) - (-0.276592 * LN_POVERTYD_INDEX(-1) + 0.127461 * LN_GCFGDP(-1) + 0.034384 * LN_FINCONSTR(-1) + 0.411404 * DUM_TFP(-1) - 4.496443 * DUMTFP(-1) + 9.394842)

LN_TFP_TOT1 = - 0.245419 * RESID_TFP_TOT_1 - 0.346988 * (LN_POVERTYD_INDEX - ln_povertyd_index(-1)) + 1.142799 * (LN_SE_INDEX_B - ln_se_index_b(-1)) + 0.214239 * DUM_TFP - 2.319164 * DUMTFP + ln_tfp_tot1(-1)

tfp_tot1 = exp(ln_tfp_tot1)

Oil Sector

LN_TFP_OIL = 0.951431 * LN_DCREDIT + 0.045328 * LN_FDI + 0.295148 * LN_OIL_P - 13.050955 + 2.590847 * DUMMY_M

tfp_oil = exp(ln_tfp_oil)

Labor Demand

resid_labor_1 = ln_labor_f(-1) - (0.687782 * ln_rgdp_rest(-1) - 0.569611 * ln_rwage_lf(-1) + 0.911231 * ln_se_index_b(-1) - 0.129847 * dum(-1) - 0.220239 * dummy_m(-1))

ln_labor_f = - 0.020519 * resid_labor_1 + 0.016037 * (ln_rgdp_rest(-3) - ln_rgdp_rest(-4)) + 0.163101 * (ln_rwage_lf(-3) - ln_rwage_lf(-4)) - 0.930285 * (ln_labor_f(-3) - ln_labor_f(-4)) + 0.026870 * (ln_agric_elep(-2) - ln_agric_elep(-3)) - 0.066981 * (ln_cpi(-5) - ln_cpi(-6)) + 0.246130 * (ln_se_index_b(-8) - ln_se_index_b(-9)) - 0.254760 * (ln_cu_tot(-3) - ln_cu_tot(-4)) + 0.015652 * (ln_exch(-7) - ln_exch(-8)) + 0.015746 * (ln_imp_p(-3) - ln_imp_p(-4)) - 0.049325 * (ln_rk_stock2 - ln_rk_stock2(-1)) + 0.005301 * (ln_rexpsocial(-6) - ln_rexpsocial(-7)) + 0.064965 + ln_labor_f(-1)

labor_f = exp(ln_labor_f)

Investment

resid_inv_1 = ln_gcf(-1) - (0.972006 * ln_rgdp(-1) - 0.074014 * ln_ucc(-1) + 0.323701 * pi(-1) + 0.496816 * ln_cu_tot(-1) - 0.349581 * dummy_m(-1) - 0.540648 * dum(-1))

LN_GCF = - 0.537726 * RESID_INV_1 + 1.146649 * (LN_RGDP - ln_rgdp(-1)) - 0.324343 * (LN_OIL_P - ln_oil_p(-1)) + 0.111214 * (LN_CAPFLOW(-2) - ln_capflow(-3)) + 0.166503 * (LN_EXCH - ln_exch(-1)) + 0.883835 * (LN_PPI(-1) - ln_ppi(-2)) + 1.226132 * (LN_RWAGE_LF(-2) - ln_rwage_lf(-3)) - 0.368711 * (LN_OPEN(-3) - ln_open(-4)) + 0.420187 * (LN_GCF(-1) - ln_gcf(-2)) - 1.094030 * (LN_CU_TOT(-2) - ln_cu_tot(-3)) - 0.291696 * (LN_HH_RGDP(-4) - ln_hh_rgdp(-5)) + ln_gcf(-1)

gcf = exp(ln_gcf)

Real Wage

LN_RWAGE_LF = 0.745313057 * LN_LABPROD_REST - 0.1726417349 * DUMMY_M + 0.1323589493 * DUM_OIL + 3.150153779

'LN_WAGE_LF = 1.027616393 * LN_CPI + 0.6054227737 * LN_LABPROD_REST

rwage_lf = exp(ln_rwage_lf)

AGGREGATE DEMAND

Consumption

resid_cons_1 = LN_HH_RCONEXP(-1) - (0.972615 * LN_HH_RGDP_REST(-1) + 0.004293 * LN_RM2(-1) + 0.007445 * RINT(-1) + 0.142686 * DUMMY_M(-1) + 0.184128 * DUM(-1))

LN_HH_RCONEXP = - 0.916454 * RESID_CONS_1 + 1.294527 * (LN_HH_RGDP_REST - ln_hh_rgdp_rest(-1)) - 0.004270 * (RINT(-3) - rint(-4)) - 0.211070 * (LN_HH_RCONEXP(-4) - ln_hh_rconexp(-5)) + ln_hh_rconexp(-1)

HH_RCONEXP = EXP(LN_HH_RCONEXP)

Export

resid_exp_1 = LN_REXP(-1) - (0.749785 * LN_RGDPUS(-1) + 0.338712 * LN_OIL_P(-1) - 0.203701 * LN_RELCPI(-1))

LN_REXP = - 0.552230 * RESID_EXP_1 + 0.306532 * (LN_OIL_P - ln_oil_p(-1)) - 0.275570 * (LN_EXCH(-2) - ln_exch(-3)) + 1.032138 * (LN_PPI - ln_ppi(-1)) + 2.462485 * (LN_RGDPUS(-4) - ln_rgdpus(-5)) - 0.224912 * DUM + ln_rexp(-1)

rexp = exp(ln_rexp)

Import

RESID_IMP_1 = LN_RIMP(-1) - (1.39051741 * LN_RGDP(-1) + 0.2132304288 * LN_RELCPI(-1) - 0.2061312587 * LN_EXCH(-1) - 0.4783556955 * DUM(-1) - 0.3211606128 * DUMMY_M(-1) - 6.396371801)

LN_RIMP = - 0.5811416067 * RESID_IMP_1 + 1.231037876 * (LN_RGDP - LN_RGDP(-1)) + 0.4013195261 * (LN_RIMP(-1) - LN_RIMP(-2)) - 0.1768633126 * (LN_OIL_P - LN_OIL_P(-1)) + 0.4740304797 * (LN_INT(-2) - LN_INT(-3)) + LN_RIMP(-1)

RIMP = EXP(LN_RIMP)

Interest Rate

RESID_INT_1 = LN_INT(-1) - (0.4892709087 * LN_RGDP(-1) - 0.2565779837 * LN_RM2(-1) + 0.7772942446 * LN_DIS_RATE(-1) - 7.693613293)

LN_INT = - 0.7188328105 * RESID_INT_1 + 0.5502197726 * (LN_DIS_RATE - LN_DIS_RATE(-1)) + 0.2433899603 * (LN_INT(-3) - LN_INT(-4)) + LN_INT(-1)

INT = EXP(LN_INT)

Exchange Rate

resid_exch_1 = LN_EXCH(-1) - (- 1.111410 * LN_RELRGDP(-1) + 0.781134 * LN_RELM2(-1) + 0.375075 * LN_RELCPI(-1) - 0.683912 * DUM(-1) + 8.498273)

LN_EXCH = - 0.294147 * RESID_EXCH_1 + 0.925168 * (LN_RELCPI - ln_relcpi(-1)) + 0.717931 * (LN_OIL_P - ln_oil_p(-1)) + 0.379537 * (LN_RELINT - ln_relint(-1)) + 0.781741 * (LN_GCF - ln_gcf(-1)) - 0.73753 * (LN_RELRGDP - ln_relrgdp(-1)) + 0.152819 * (LN_AID(-2) - ln_aid(-3)) - 0.096521 * (LN_RELREMIT - ln_relremit(-1)) - 3.373332 * (LN_M2_US - ln_m2_us(-1)) + 0.230886 * DUM + ln_exch(-1)

exch = exp(ln_exch)

PRICES

'

'Consumer Price Index

resid_cpi_1 = ln_cpi(-1) - (0.964454 * ln_ppi(-1) + 0.791153 * ln_imp_p(-1) + 0.893697 * ln_exch(-1) + 0.179694 * ln_excessd(-1) + 0.453542 * dummy_m(-1) - 0.247312 * dum_oil(-1) - 7.455257)

ln_cpi = - 0.054380 * resid_cpi_1 + 0.061703 * (ln_cpi(-1) - ln_cpi(-2)) - 0.149378 * (ln_excessd - ln_excessd(-1)) + 0.039443 * (ln_imp_p(-4) - ln_imp_p(-5)) - 0.164863 * (ln_ppi - ln_ppi(-1)) + 0.938521 * (ln_wage_lf - ln_wage_lf(-1)) - 0.062425 * (ln_int(-4) - ln_int(-5)) + 0.033780 * (ln_transfer(-3) - ln_transfer(-4)) - 1.140638 * (ln_rgdp - ln_rgdp(-1)) + 0.060282 * (ln_exch - ln_exch(-1)) + 0.078148 * (ln_eleppop(-4) - ln_eleppop(-5)) + 0.028130 * (ln_capflow(-2) - ln_capflow(-3)) + 0.012813 + ln_cpi(-1)

cpi = exp(ln_cpi)

Producer Price Index

LN_PPI = 0.007109 * LN_WAGE_LF + 0.076239 * LN_OIL_P + 0.484784 * LN_CU_TOT + 0.197271 * LN_INT + 4.466082

ppi = exp(ln_ppi)

OTHER BEHAVIOURAL EQUATIONS

Socio-Economic Activity

resid_se_rest_1 = ln_se_index_b(-1) - (0.030940 * ln_hh_rgdp_rest(-1) + 0.032528 * ln_rexpsocial(-1) + 0.022355 * ln_eleppop(-1) + 0.037452 * dummy_m(-1) - 0.543475)

ln_se_index_b = - 0.329734 * resid_se_rest_1 - 0.006750 * (ln_capflow - ln_capflow(-1)) + 0.011303 * (ln_rexpsocial - ln_rexpsocial(-1)) + 0.047847 * (ln_rgdp(-2) - ln_rgdp(-3)) + 0.134396 * (ln_hh_rgdp - ln_hh_rgdp(-1)) - 0.010816 * (ln_eleppop - ln_eleppop(-1)) - 0.053352 * (ln_excessd(-1) - ln_excessd(-2)) - 0.074722 * (ln_povertyd_index(-1) - ln_povertyd_index(-2)) + 0.009144 * dum - 5.47E-09 * dumoil + ln_se_index_b(-1)

se_index_b = exp(ln_se_index_b)

Infrastrucure

resid_elep_1 = ln_elep(-1) - (1.430276 * ln_rgdp(-1) + 0.845762 * ge(-1) + 0.404438 * dum(-1) - 13.57408)

LN_ELEP = - 0.354742 * RESID_ELEP_1 + 1.520223 * (GE - ge(-1)) + 0.394435 * (LN_ELEP(-4) - ln_elep(-5)) - 0.444890 * (LN_RGDP_REST(-3) - ln_rgdp_rest(-4)) + 0.324727 * (LN_UCC(-4) - ln_ucc(-5)) + 1.982076 * (LN_SE_INDEX_B(-3) - ln_se_index_b(-4)) + ln_elep(-1)

elep = exp(ln_elep)

Poverty

resid_povertyd_new1_1 = LN_POVERTYD_INDEX(-1) - (0.237591 * LN_CPI(-1) - 0.541746 * LN_INDEX_AGRIC(-1) - 0.151928 * LN_HH_RGDP_REST(-1) - 0.002034 * LN_AIDPOP(-1) - 0.073436 * LN_ELEPPOP(-1) + 3.028525)

LN_POVERTYD_INDEX = - 0.093114 * RESID_POVERTYD_NEW1_1 + 0.045429 * (LN_WAGE_LABOR(-2) - ln_wage_labor(-3)) + 0.742858 * (LN_POVERTYD_INDEX(-1) - ln_povertyd_index(-2)) + 0.066169 * (LN_CPI(-1) - ln_cpi(-2)) + 0.559386 * (LN_LABOR_F - ln_labor_f(-1)) - 0.806361 * (LN_LABOR_F(-3) - ln_labor_f(-4)) - 0.014158 * (LN_CAPFLOW(-2) - ln_capflow(-3)) + 0.023840 * (LN_ELEPPOP(-2) -

ln_eleppop(-3)) + 0.004247 * DUM_POVD - 0.026275 * (LN_AIDPOP(-4) - ln_aidpop(-5)) + ln_povertyd_index(-1)

povertyd_index = exp(ln_povertyd_index)

Agric Production

RESID_AGRIC1_1 = LN_INDEX_AGRIC(-1) - (- 0.137146446709 * LN_PPI(-1) + 0.400086304569 * LN_ELEP(-1) + 0.580866145411 * LN_LAND(-1) - 0.556776445008 * DUM(-1) - 0.165236631234 * DUMMY_M(-1))

LN_INDEX_AGRIC = - 0.190114100061 * RESID_AGRIC1_1 + 0.187988440706 * (LN_CPI - ln_cpi(-1)) - 0.697645588961 * (LN_RK_STOCK2(-1) - ln_rk_stock2(-2)) - 4.70194380403 * (LN_LAND(-4) - ln_land(-5)) - 0.033844484003 * (LN_AID(-2) - ln_aid(-3)) + 0.10754425889 * (LN_UCC(-3) - ln_ucc(-4)) - 0.322952206752 * (PI(-4) - pi(-5)) + 0.181144701167 * (LN_INDEX_AGRIC(-1) - ln_index_agric(-2)) + 0.123403670113 * (LN_OPEN(-4) - ln_open(-5)) + 0.151371328198 * (LN_PPI - ln_ppi(-1)) - 0.104567508704 * (LN_ELEP(-1) - ln_elep(-2)) + ln_index_agric(-1)

index_agric = exp(ln_index_agric)

Disposable Income

resid_hh_rest_1 = ln_hh_rgdp_rest(-1) - (0.876241 * ln_rwage_lf(-1) + 0.110486 * ln_transfer(-1) + 0.115174 * dummy_m(-1) - 1.19E-07 * dumoil(-1) + 3.476751)

LN_HH_RGDP_REST = - 0.263604 * RESID_HH_REST_1 + 1.012605 * (LN_RWAGE_LF - ln_rwage_lf(-1)) - 0.045298 * (LN_CAPFLOW(-4) - ln_capflow(-5)) + 0.166261 * (LN_TRANSFER(-3) - ln_transfer(-4)) + 0.390019 * (LN_RK_STOCK2(-4) - ln_rk_stock2(-5)) - 0.125216 * (LN_FINCONSTR - ln_finconstr(-1)) + 0.175539 * (LN_CU_TOT(-4) - ln_cu_tot(-5)) - 0.381874 * (LN_PPI - ln_ppi(-1)) + 0.968760 * (LN_INDEX_AGRIC(-2) - ln_index_agric(-3)) - 3.66e-08 * DUMOIL + ln_hh_rgdp_rest(-1)

hh_rgdp_rest = exp(ln_hh_rgdp_rest)

Foriegn Direct Investment

RESID_FDI_1 = LN_FDI(-1) - (0.6816131507 * LN_RGDP(-1) - 0.4966291681 * LN_CPI(-1) + 0.07596241635 * LN_OPEN(-1) + 0.2880109528 * LN_EXCH(-1) + 1.16824926 * DUMMY_M(-1) + 0.978210767 * DUM(-1))

LN_FDI = - 0.5906001952 * RESID_FDI_1 - 0.3733726592 * (LN_FDI(-1) - LN_FDI(-2)) + 0.2173172107 * (LN_FDI(-3) - LN_FDI(-4)) - 0.7926940282 * (LN_GCF(-3) - LN_GCF(-4)) + 0.6653683842 * (LN_OPEN(-3) - LN_OPEN(-4)) + LN_FDI(-1)

FDI = EXP(LN_FDI)

IDENTITIES AND DEFINITIONS

rgdp_rest = rgdp - rgdp_oil

ln_rgdp_rest = log(rgdp_rest)

tfp_rest = tfp_tot1 - tfp_oil

ln_tfp_rest = log(tfp_rest)

rk_stock2 = (1 - depr) * rk_stock2(-1) + gcf(-1)

ln_rk_stock2 = log(rk_stock2)

total_govexp = rexpsocial + transfer + other_govexp

ln_total_govexp = log(total_govexp)

ln_other_govexp = log(other_govexp)

ln_capflow = log(capflow)

ln_oil_p = log(oil_p)

gcfgdp = gcf / rgdp

ln_gcfgdp = log(gcfgdp)

finconstr = gds_nom + capflow + creserv + depr_value

ln_gds_nom = log(gds_nom)

ln_depr_value = log(depr_value)

ln_finconstr = log(finconstr)

cu_tot = rgdp / potrgdp

ln_cu_tot = log(cu_tot)

ln_aid = log(aid)

ln_pop = log(pop)

ln_rexpsocial = log(rexpsocial)

ln_dcredit = log(dcredit)

govcongdp = govtcons / rgdp

ln_govtcons = log(govtcons)

ln_govcongdp = log(govcongdp)

agric_elep = index_agric / index_elep

index_elep = (elep / 1738.3) * 100

ln_index_elep = log(index_elep)

ln_agric_elep = log(agric_elep)

open = (rexp + rimp) / rgdp

ln_open = log(open)

RINT = INT - INF

INF = ((CPI - CPI(-1)) / CPI(-1))

relcpi = cpi / cpi_us

ln_cpi_us = log(cpi_us)

ln_relcpi = log(relcpi)

relrgdp = rgdp / rgdpus

ln_rgdpus = log(rgdpus)

ln_relrgdp = log(relrgdp)

relm2 = m2 / m2_us

ln_m2_us = log(m2_us)

ln_m2 = log(m2)

```
rm2  = m2  / gdp_def

ln_rm2  = log(rm2)

ln_relm2  = log(relm2)

relint  = int  / int_us

ln_int_us  = log(int_us)

ln_relint  = log(relint)

relremit  = remit  / remit_us

ln_remit  = log(remit)

ln_remit_us  = log(remit_us)

ln_relremit  = log(relremit)

LN_DIS_RATE  = LOG(DIS_RATE)

ln_imp_p  = log(imp_p)

wage_lf  = rwage_lf  * gdp_def

ln_wage_lf  = log(wage_lf)

wagelfucc  = wage_lf  / ucc

ucc  = (1  + int)  * exch

ln_ucc  = log(ucc)

ln_wagelfucc  = log(wagelfucc)

eleppop  = elep  / pop

ln_eleppop  = log(eleppop)

hh_rgdp  = (1  - taxr)  * rgdp

ln_hh_rgdp  = log(hh_rgdp)
```

gdp = rgdp * gdp_def

excessd = gne_nom / gdp

gne_nom = (hh_rconexp + gcf + total_govexp) * gdp_def

ln_gdp = log(gdp)

ln_gne_nom = log(gne_nom)

ln_excessd = log(excessd)

wage_labor = rwage_lf / labor_f

ln_wage_labor = log(wage_labor)

ln_transfer = log(transfer)

ln_land = log(land)

cad = rexp - rimp

labprod_tot = rgdp / labor_f

ln_labprod_tot = log(labprod_tot)

aidpop = aid / pop

ln_aidpop = log(aidpop)

MODEL B

AGGREGATE SUPPLY

Production Function: Total Economy

ln_potrgdp = 0.179113 * ln_rk_stock2pot + (1 - 0.179113) * ln_pop_active + ln_tfp_totpot

potrgdp = exp(ln_potrgdp)

Labour Demand

LN_LABOR_F = 0.831114 * LN_RGDP - 0.790810 * LN_RWAGE_LF + 0.088369 * LN_SE_INDEX_B

labor_f = exp(ln_labor_f)

Investment

resid_inv_1 = ln_gcf(-1) - (0.972006 * ln_rgdp(-1) - 0.074014 * ln_ucc(-1) + 0.323701 * pi(-1) + 0.496816 * ln_cu_tot(-1) - 0.349581 * dummy_m(-1) - 0.540648 * dum(-1))

LN_GCF = - 0.537726 * RESID_INV_1 + 1.146649 * (LN_RGDP - ln_rgdp(-1)) - 0.324343 * (LN_OIL_P - ln_oil_p(-1)) + 0.111214 * (LN_CAPFLOW(-2) - ln_capflow(-3)) + 0.166503 * (LN_EXCH - ln_exch(-1)) + 0.883835 * (LN_PPI(-1) - ln_ppi(-2)) + 1.226132 * (LN_RWAGE_LF(-2) - ln_rwage_lf(-3)) - 0.368711 * (LN_OPEN(-3) - ln_open(-4)) + 0.420187 * (LN_GCF(-1) - ln_gcf(-2)) - 1.094030 * (LN_CU_TOT(-2) - ln_cu_tot(-3)) - 0.291696 * (LN_HH_RGDP(-4) - ln_hh_rgdp(-5)) + ln_gcf(-1)

gcf = exp(ln_gcf)

Total Factor Productivity:Total Economy

resid_tfp_tot_1 = LN_TFP_TOT1(-1) - (-0.276592 * LN_POVERTYD_INDEX(-1) + 0.127461 * LN_GCFGDP(-1) + 0.034384 * LN_FINCONSTR(-1) + 0.411404 * DUM_TFP(-1) - 4.496443 * DUMTFP(-1) + 9.394842)

LN_TFP_TOT1 = - 0.245419 * RESID_TFP_TOT_1 - 0.346988 * (LN_POVERTYD_INDEX - ln_povertyd_index(-1)) + 1.142799 * (LN_SE_INDEX_B - ln_se_index_b(-1)) + 0.214239 * DUM_TFP - 2.319164 * DUMTFP + ln_tfp_tot1(-1)

tfp_tot1 = exp(ln_tfp_tot1)

Real Wage

LN_RWAGE_LF = 0.984090 * LN_LABPROD_TOT + 0.056499 * DUMMY_M + 0.049768 * DUM

rwage_lf = exp(ln_rwage_lf)

AGGREGATE DEMAND

Consumption

resid_cons_1 = LN_HH_RCONEXP(-1) - (0.654117 * LN_HH_RGDP(-1) + 0.154979 * LN_RM2(-1) + 0.296432 * DUMMY_M(-1) - 1.43e-07 * DUMOIL(-1) + 2.409168)

LN_HH_RCONEXP = - 0.761895 * RESID_CONS_1 - 0.008939 * (RINT(-3) - rint(-4)) + 0.697276 * (LN_RM2 - ln_rm2(-1)) - 0.331278 * (LN_HH_RCONEXP(-4) - ln_hh_rconexp(-5)) - 2.14e-07 * DUMOIL + 0.118381 + ln_hh_rconexp(-1)

hh_rconexp = exp(ln_hh_rconexp)

Export

resid_exp_1 = LN_REXP(-1) - (0.749785 * LN_RGDPUS(-1) + 0.338712 * LN_OIL_P(-1) - 0.203701 * LN_RELCPI(-1))

LN_REXP = - 0.552230 * RESID_EXP_1 + 0.306532 * (LN_OIL_P - ln_oil_p(-1)) - 0.275570 * (LN_EXCH(-2) - ln_exch(-3)) + 1.032138 * (LN_PPI - ln_ppi(-1)) + 2.462485 * (LN_RGDPUS(-4) - ln_rgdpus(-5)) - 0.224912 * DUM + ln_rexp(-1)

rexp = exp(ln_rexp)

Import

RESID_IMP_1 = LN_RIMP(-1) - (1.39051741 * LN_RGDP(-1) + 0.2132304288 * LN_RELCPI(-1) - 0.2061312587 * LN_EXCH(-1) - 0.4783556955 * DUM(-1) - 0.3211606128 * DUMMY_M(-1) - 6.396371801)

LN_RIMP = - 0.5811416067 * RESID_IMP_1 + 1.231037876 * (LN_RGDP - LN_RGDP(-1)) + 0.4013195261 * (LN_RIMP(-1) - LN_RIMP(-2)) - 0.1768633126 * (LN_OIL_P - LN_OIL_P(-1)) + 0.4740304797 * (LN_INT(-2) - LN_INT(-3)) + LN_RIMP(-1)

RIMP = EXP(LN_RIMP)

Interest Rate

RESID_INT_1 = LN_INT(-1) - (0.4892709087 * LN_RGDP(-1) - 0.2565779837 * LN_RM2(-1) + 0.7772942446 * LN_DIS_RATE(-1) - 7.693613293)

LN_INT = - 0.7188328105 * RESID_INT_1 + 0.5502197726 * (LN_DIS_RATE - LN_DIS_RATE(-1)) + 0.2433899603 * (LN_INT(-3) - LN_INT(-4)) + LN_INT(-1)

INT = EXP(LN_INT)

Exchange Rate

resid_exch_1 = LN_EXCH(-1) - (- 1.111410 * LN_RELRGDP(-1) + 0.781134 * LN_RELM2(-1) + 0.375075 * LN_RELCPI(-1) - 0.683912 * DUM(-1) + 8.498273)

LN_EXCH = - 0.294147 * RESID_EXCH_1 + 0.925168 * (LN_RELCPI - ln_relcpi(-1)) + 0.717931 * (LN_OIL_P - ln_oil_p(-1)) + 0.379537 * (LN_RELINT - ln_relint(-1)) + 0.781741 * (LN_GCF - ln_gcf(-1)) - 0.73753 * (LN_RELRGDP - ln_relrgdp(-1)) + 0.152819 * (LN_AID(-2) - ln_aid(-3)) - 0.096521 * (LN_RELREMIT - ln_relremit(-1)) - 3.373332 * (LN_M2_US - ln_m2_us(-1)) + 0.230886 * DUM + ln_exch(-1)

exch = exp(ln_exch)

PRICES

Consumer Price Index

resid_cpi_1 = ln_cpi(-1) - (0.964454 * ln_ppi(-1) + 0.791153 * ln_imp_p(-1) + 0.893697 * ln_exch(-1) + 0.179694 * ln_excessd(-1) + 0.453542 * dummy_m(-1) - 0.247312 * dum_oil(-1) - 7.455257)

ln_cpi = - 0.054380 * resid_cpi_1 + 0.061703 * (ln_cpi(-1) - ln_cpi(-2)) - 0.149378 * (ln_excessd - ln_excessd(-1)) + 0.039443 * (ln_imp_p(-4) - ln_imp_p(-5)) - 0.164863 * (ln_ppi - ln_ppi(-1)) + 0.938521 * (ln_wage_lf - ln_wage_lf(-1)) - 0.062425 * (ln_int(-4) - ln_int(-5)) + 0.033780 * (ln_transfer(-3) - ln_transfer(-4)) - 1.140638 * (ln_rgdp - ln_rgdp(-1)) + 0.060282 * (ln_exch - ln_exch(-1)) + 0.078148 * (ln_eleppop(-4) - ln_eleppop(-5)) + 0.028130 * (ln_capflow(-2) - ln_capflow(-3)) + 0.012813 + ln_cpi(-1)

cpi = exp(ln_cpi)

Producer Price Index

LN_PPI = 0.007109 * LN_WAGE_LF + 0.076239 * LN_OIL_P + 0.484784 * LN_CU_TOT + 0.197271 * LN_INT + 4.466082

ppi = exp(ln_ppi)

OTHER BEHAVIOURAL EQUATION

Socio-Economic Activity

resid_se_tot_1 = LN_SE_INDEX_B(-1) - (0.033612 * LN_HH_RGDP(-1) + 0.031832 * LN_REXPSOCIAL(-1) + 0.016514 * LN_ELEPPOP(-1) + 0.042125 * DUMMY_M(-1) - 0.655900)

LN_SE_INDEX_B = - 0.337387 * RESID_SE_TOT_1 - 0.006572 * (LN_CAPFLOW - ln_capflow(-1)) + 0.010968 * (LN_REXPSOCIAL - ln_rexpsocial(-1)) + 0.045796 * (LN_RGDP(-2) - ln_rgdp(-3)) + 0.132844 * (LN_HH_RGDP - ln_hh_rgdp(-1)) - 0.012664 * (LN_ELEPPOP - ln_eleppop(-1)) - 0.043506 * (LN_EXCESSD(-1) - ln_excessd(-2)) - 0.056549 * (LN_POVERTYD_INDEX(-1) - ln_povertyd_index(-2)) + 0.010223 * DUM - 5.97e-09 * DUMOIL + ln_se_index_b(-1)

se_index_b = exp(ln_se_index_b)

Infrastructure

resid_elep_1 = ln_elep(-1) - (1.430276 * ln_rgdp(-1) + 0.845762 * ge(-1) + 0.404438 * dum(-1) - 13.57408)

LN_ELEP = - 0.447038 * RESID_ELEP_1 + 1.857681 * (GE - ge(-1)) + 0.445765 * (LN_ELEP(-4) - ln_elep(-5)) + 0.392417 * (LN_UCC(-4) - ln_ucc(-5)) - 0.045568 + ln_elep(-1)

elep = exp(ln_elep)

Poverty

resid_povertyd_new1_1 = LN_POVERTYD_INDEX(-1) - (0.205810 * LN_CPI(-1) - 0.421465 * LN_INDEX_AGRIC(-1) - 0.003912 * LN_HH_RGDP(-1) - 0.014419 * LN_AIDPOP(-1) - 0.097905 * LN_ELEPPOP(-1))

LN_POVERTYD_INDEX = - 0.092791 * RESID_POVERTYD_NEW1_1 + 0.049153 * (LN_WAGE_LABOR(-2) - ln_wage_labor(-3)) - 0.010651 * (LN_AIDPOP(-2) - ln_aidpop(-3)) + 0.630599 * (LN_POVERTYD_INDEX(-1) - ln_povertyd_index(-2)) + 0.063179 * (LN_CPI(-1) - ln_cpi(-2)) + 0.373708 * (LN_LABOR_F - ln_labor_f(-1)) - 0.014798 * (LN_CAPFLOW(-2) - ln_capflow(-3)) + 0.067526 * (LN_EXCESSD(-3) - ln_excessd(-4)) + 0.010650 * (LN_REXPSOCIAL(-2) - ln_rexpsocial(-3)) + 0.006822 * DUM_POVD - 0.022579 * DUMMY_M + ln_povertyd_index(-1)

povertyd_index = exp(ln_povertyd_index)

Agric Production

RESID_AGRIC1_1 = LN_INDEX_AGRIC(-1) - (- 0.137146446709 * LN_PPI(-1) + 0.400086304569 * LN_ELEP(-1) + 0.580866145411 * LN_LAND(-1) - 0.556776445008 * DUM(-1) - 0.165236631234 * DUMMY_M(-1))

LN_INDEX_AGRIC = - 0.190114100061 * RESID_AGRIC1_1 + 0.187988440706 * (LN_CPI - ln_cpi(-1)) - 0.697645588961 * (LN_RK_STOCK2(-1) - ln_rk_stock2(-2)) - 4.70194380403 * (LN_LAND(-4) - ln_land(-5)) - 0.033844484003 * (LN_AID(-2) - ln_aid(-3)) + 0.10754425889 * (LN_UCC(-3) - ln_ucc(-4)) - 0.322952206752 * (PI(-4) - pi(-5)) + 0.181144701167 * (LN_INDEX_AGRIC(-1) - ln_index_agric(-2)) + 0.123403670113 * (LN_OPEN(-4) - ln_open(-5)) + 0.151371328198 * (LN_PPI - ln_ppi(-1)) - 0.104567508704 * (LN_ELEP(-1) - ln_elep(-2)) + ln_index_agric(-1)

index_agric = exp(ln_index_agric)

Disposable Income

resid_hh_tot_1 = LN_HH_RGDP(-1) - (0.979738 * LN_RWAGE_LF(-1) + 0.144799 * LN_TRANSFER(-1) + 0.092152 * DUM(-1) + 2.297017)

LN_HH_RGDP = - 0.245771 * RESID_HH_TOT_1 + 0.869462 * (LN_RWAGE_LF - ln_rwage_lf(-1)) + 0.030977 + ln_hh_rgdp(-1)

hh_rgdp = exp(ln_hh_rgdp)

Foriegn Direct Investment

RESID_FDI_1 = LN_FDI(-1) - (0.6816131507 * LN_RGDP(-1) - 0.4966291681 * LN_CPI(-1) + 0.07596241635 * LN_OPEN(-1) + 0.2880109528 * LN_EXCH(-1) + 1.16824926 * DUMMY_M(-1) + 0.978210767 * DUM(-1))

LN_FDI = - 0.5906001952 * RESID_FDI_1 - 0.3733726592 * (LN_FDI(-1) - LN_FDI(-2)) + 0.2173172107 * (LN_FDI(-3) - LN_FDI(-4)) - 0.7926940282 * (LN_GCF(-3) - LN_GCF(-4)) + 0.6653683842 * (LN_OPEN(-3) - LN_OPEN(-4)) + LN_FDI(-1)

FDI = EXP(LN_FDI)

IDENTITIES AND DEFINITIONS

rk_stock2 = (1 - depr) * rk_stock2(-1) + gcf(-1)

ln_rk_stock2 = log(rk_stock2)

ln_gcfpot = log(gcfpot)

rk_stock2pot = (1 - depr) * rk_stock2pot(-1) + gcfpot(-1)

ln_rk_stock2pot = log(rk_stock2pot)

ln_pop_active = log(pop_active)

ln_tfp_totpot = log(tfp_totpot)

ucc = (1 + int) * exch

ln_ucc = log(ucc)

cu_tot = rgdp / potrgdp

ln_cu_tot = log(cu_tot)

ln_capflow = log(capflow)

ln_oil_p = log(oil_p)

ln_aid = log(aid)

open = (rexp + rimp) / rgdp

ln_open = log(open)

labprod_tot = rgdp / labor_f

ln_labprod_tot = log(labprod_tot)

gcfgdp = gcf / rgdp

ln_gcfgdp = log(gcfgdp)

finconstr = gds_nom + capflow + creserv + depr_value

ln_finconstr = log(finconstr)

relcpi = cpi / cpi_us

ln_cpi_us = log(cpi_us)

ln_relcpi = log(relcpi)

relrgdp = rgdp / rgdpus

ln_rgdpus = log(rgdpus)

ln_relrgdp = log(relrgdp)

relm2 = m2 / m2_us

ln_m2_us = log(m2_us)

ln_m2 = log(m2)

rm2 = m2 / gdp_def

ln_rm2 = log(rm2)

ln_relm2 = log(relm2)

relint = int / int_us

ln_int_us = log(int_us)

ln_relint = log(relint)

relremit = remit / remit_us

ln_remit = log(remit)

ln_remit_us = log(remit_us)

ln_relremit = log(relremit)

LN_DIS_RATE = LOG(DIS_RATE)

rgdp = hh_rconexp + gcf + total_govexp + rexp - rimp

ln_rgdp = log(rgdp)

excessd = gne_nom / gdp

gne_nom = (rgdp - rexp + rimp) * gdp_def

ln_gne_nom = log(gne_nom)

gdp = rgdp * gdp_def

ln_gdp = log(gdp)

ln_excessd = log(excessd)

total_govexp = rexpsocial + transfer + other_govexp

ln_other_govexp = log(other_govexp)

ln_total_govexp = log(total_govexp)

ln_rexpsocial = log(rexpsocial)

ln_transfer = log(transfer)

eleppop = elep / pop

ln_eleppop = log(eleppop)

ln_pop = log(pop)

wage_labor = rwage_lf / labor_f

ln_wage_labor = log(wage_labor)

ln_land = log(land)

RINT = INT - INF

INF = ((CPI - CPI(-1)) / CPI(-1))

ln_imp_p = log(imp_p)

wage_lf = rwage_lf * gdp_def

ln_wage_lf = log(wage_lf)

ln_labor_pot = log(labor_pot)

cad = rexp - rimp

aidpop = aid / pop

ln_aidpop = log(aidpop)