# References

Adema, Y., Meijdam, L. And Verbon, H. 2005. The International Spillover Effects of Pension Reform. CEBR/CESifo Conferenceon Pension Reform, Copenhagen: June 11-12.

Ando, A. and Modigliani, F. 1963. The life cycle hypothesis of saving: Aggregate implications and tests, *The American Economic Review*, vol. 53, March: 55-84.

Aron, J. and Muellbauer, J. 2000. Personal and Corporate Saving in South Africa, *The World Bank Economic Review*, 14(3): 509-544.

Auerbach, A.J. and Kotlikoff, L.J. 1986. Life insurance of the elderly: Adequacy and determinants, ed. Gary Burtless, In *Work, Health and Income among the Elderly*.

Avitabile, C. 2003. PAYG Parametric reforms and labor in the informal sector, University of Salermo.

Balttagi, B.H. 2001. *Econometric Analysis of Panel Data*, John Wiley and sons, Chichester: New York.

Barbone, L. and Sanchez, L.B. 2000. Pension and social security in sub-Saharan Africa – issues and options, *In Social Security in Africa: New Realities and Social Security Documentation,* African Series No. 21. International Social Security Association, Abidjan.

Barr, N. 2002. Reforming pensions: Myths, truths, and policy choices, *International Social Security Review*, vol. 55(2): 1-36.

Barr, N. 2000. Reforming pensions: Myths, truths, and policy choices, *IMF Working Paper WP/00/139*, International Monetary Fund, Washington, DC.

Barrell, R., Davis, E.P. and Pomerantz. 2004. Costs of financial instability, household-sector balance sheets and consumption, *NIESR Discussion Paper*.

Barro, R.J. 1974. Are government bonds net wealth? *Journal of Political Economy*, vol. 82(6), Nov/Dec: 1095-1117.

Barro, R.J. 1978. Social security and private saving – Evidence from the US time series, *In Studies in Social Security and Retirement Policy*, American Enterprise Institute.

_____ 1989. A cross-country study of growth, saving, and government, *NBER Working Paper No 2855*.

Beck, T. and Levine, R. 2004. Stock markets, banks and growth: Panel evidence, *Journal of Banking and Finance*, vol. 28: 423-442.

Becker, G.S. and Barro, R.J. 1986. A reformulation of the economic theory of fertility, Mimeo, University of Chicago, August.

Becker, G.S. and Barro, R.J. 1988. A reformulation of the economic theory of fertility, *Quarterly Journal of Economics*, Vol. CIII(1), February: 1-25.

Becker, G.S., Murphy, K.M. and Tamura, R. 1990. Human capital, fertility and economic growth, *Journal of Political Economy*, vol. 98(5): $S_{12}$-$S_{37}$

Bennett, C.T.F. 1979. The social security benefits structure: Equity considerations of the family as its basis, *American Economic Association*, vol. 69(2), May: 227-231.

Bingley, P., Gupta, N. D. and Pedersen, P. J. 2005. Fiscal Implications of Reforms in Retirement Systems in Denmark (revised in June).

Blundell, R. and Emmerson, C. 2003. Fiscal Effects of Reforming the UK State Pension System. International Social Security Project at NBER and also Programme research by the ESRC Centre for the Micro-Economic Analysis of Public Policy at IFS.

Bok, J.T.; Combs, A.L.; Schieber, S.J.; Vargas, F.A., and Weaver, C.L. 1997. Restoring security to our social security retirement program. *Report of the 1994-1996 Advisory Council on Social Security, Volume I: Findings and Recommendations*, Washington, DC.

Boldrin, M. and Jones, L.E. 2002. Mortality, fertility and saving in Malthusian economy, *Review of Economic Dynamics*, vol. 5: 775-814.

Boldrin, M., De Nardi, M. and Jones, L.E. 2005. Fertility and social security, *Research Department Staff Report 359*, Federal Reserve Bank of Minneapolis.

Borowski, A. 2005. The Revolution that Faltered: Two Decades of Reform of Australia Retirement Income System. *International Social Security Review*, vol. 58(4): 45-65.

Boskin, J.M. and Shoven, J.B. 1984. Concepts and measures of earnings: Replacement during retirement, *NBER Working Paper No 1360*.

Boskin, J.M. and Hurd, M. 1984. The effects of social security on retirement in the early 1970s, *Quarterly Journal of Economics*, vol. 99(4), November: 767-790.

Bosworth, B. and Burtless, G. 2003. Pension Reform and Saving. Conference of the International Forum of the Collaboration Projects, Tokyo: June 17-19.

Breyer, F. 1989. On the intergenerational Pareto efficiency of pay-as-you-go financed pension systems, *Journal for Institutional and Theoretical Economics*, vol. 145(4).

Bryan, D. 2004. Superannuation: The Ricardian Crisis. *Journal of Australian Political Economy*, vol. 53, June: 100-114.

Bun, M.J.G. and Kiviet, J.F. 2001. The accuracy of inference in small samples of dynamic panel data models: Simulation evidence and empirical results, *Tinbergen Institute Discussion Paper*, TI 2001-006/4.

_____. 2004. The effects of dynamic feedbacks on LS and MM estimator accuracy in panel data models, *Tinbergen Institute Discussion Paper*, TI 2002-101/4.

Burger, P. 2004. The Demand for Money in South Africa: Specification and Tests for Instability. *The South African Journal of Economics,* vol. 72(1) March: 1-24.

Catalan, M.; Impavido, G. and Musalem, A. R. 2000. Contractual savings or stock market development: Which leads? *Social security Discussion Paper No. 0020*. The World Bank.

Cesaratto, S. 2003. Three obstacles to the transition from unfunded to funded pension schemes, *Working Paper No. 382*. Universita degli Studi di Siena, Italy.

Cifuentes, R. and Valdes-Prieto, S. 1997. Pension reforms in the presence of credit constraints, In Salvador Valdes-Prieto ed.: *The Economics of Pensions: Principles, Policies, and International Experiences*, Cambridge University Press: Cambridge.

Cigno, A.; Casolaro, L. and Rosati, F.C. 2003. The impact of social security on saving and fertility in Germany. *Finanzarchiv*, vol. 59: 189-211.

Corsetti, G. and Schmidit-Hebbel, K. 1997. Pension reform and growth. In Salvador Vades-Prieto ed.: *The Economics of Pensions: Principles, Policies and International Experience*, Cambridge University Press: Cambridge.

Davis, E.P. 2002. Institutional investors, corporate governance, and the performance of the corporate sector, *Economic Systems*, vol. 26: 203-229.

_____ and Hu, Y. 2004. Saving, Funding and Economic Growth. *Draft Chapter for the Oxford Handbook of Pension and Retirement Income*, Forthcoming, Oxford University Press.

Diamond, P.A. 1965. National debt in a Neoclassical growth model. *The American Economic Review*, vol. 55, December: 1126-1150.

_____1977. A Framework for social security analysis. *Journal of Public Economics*, vol. 8: 275-298.

Diamond, P. 1996. Social Security Reform in Chile: An Economist's Perspective. In P. Diamond, D. Lindeman and H. Young ed., *Social Security: What Role for Future?* Washington, DC. National Academic of Social Insurance.

Diamond, P. 1998. The Economics of Social Security Reforms. In D. Arnold, M. Graetz and A. Munnell ed., *Framing the Social Security Debate: Values, Politics and Economics*. Washington, DC. Brooking Intitution.

Diamond, P. and Valdes-Prieto, S. 1994. Social Security Reforms. In Barry Bosworth, Rudiger Dornbusch, and Raul Labán ed.: *The Chilean Economy: Policy Lessons and Challenges*, The Brooking Institutions Press: Washington, DC.

Disney, R. 1996. *Can We Afford to Grow Older*? MIT Press.

Easterly, W.; Islam, R. and Stiglitz, J. 1999. Shaken and Stirred: Volatility and Macroeconomic Paradigms for Rich and Poor Countries. Michel Bruno Memorial Lecture, XII World Congress of the IEA, Buenos Aires, Argentine, August 27.

Edwards, S. 1995. "Why are Saving Rates so Different Across Countries?" *NBER Working Paper* No 5097.

Efron, B. 1982. The jackknife, the bootstrap, and other resampling plans, *Philadelphia: Society for Industrial and Applied Mathematics*.

Ehrlich, I. and Zhong, J.G. 1998. Social security and the real economy: An inquiry into some neglected issues. *AEA Papers and Proceedings*, vol. 88(2), May: 151-157.

_____ and Lui, F.T. 1991. Intergenerational trade, longevity and economic growth, *Journal of Political Economy*, vol. 99(5): 1029-1059.

_____ and Lui, F.T. 1998. Social security, the family and economic growth, *Economic Enquiry*, vol. 36(3), July: 390-409.

_____ and Kim, J. 2005. Social security, demographic trends, and economic growth: Theory and evidence from the international experience. *NBER Working Paper No 11121*.

ESSPROS Manual. 1996. EUROSTAT: 12

Feldstein, M. 1974. Social security, induced retirement, and aggregate capital accumulation. *Journal of Political Economy*, vol. 82(5), Sept/Oct: 905-926.

_____ 1995. Social security and saving: New time-series evidence. *NBER Working Paper No. 5054*.

_____ 1998. Introduction. In Martin Feldstein, ed. *Privatizing Social Security*. University of Chcago Press: Chicago.

_____ 2005. Structural reform of social security, *NBER Working Paper No. 11098*.

Friedman, M. 1962. Capitalism and freedom, The University of Chicago Press.

Geanakoplos, J.; Mitchell, O.S., and Zeldes, S.P. 1999. Social Security Money's Worth. *NBER Working Paper No 6722*, and in Olivia S. Mitchell, Robert J Myers, and Howard Young, eds., *Prospects for Social Security Reform*. University of Pennsylvania Press: Philadelphia.

Gregoriy, A.W. and Veall, M.R. 1985. Formulating Wald tests of nonlinear restrictions, *Econometrica*, vol. 53: 1465-1468.

Gruber, J. 1997. Social Security and retirement in Canada. *NBER*, Working Paper no. 6308.

Gruber, J. 1996. "Disability Insurance Benefits and Labor Supply of Older Persons". Mimeo. MIT

Gustman, A.L. and Steinmeier, T.L. 1998. Effects of pension on savings: Analysis with data from the health and retirement study.

Hagemejer, K. 2000. Social protection expenditure and performance, *Financial, Actuarial and Statistical Services, International Labour Office*.

Heller, P. 1998. Rethinking public pension initiatives, *Working Paper 98/61*, International Monetary Fund, April.

Holzmann, R. 1997. "Pension reform and national saving: The Chilean experience", Manuscript, University of Saarland, February.

Holzmann, R. 2000. The World Bank Approach to Pension Reform. *International Social Security Review*, vol. 53(1).

Horowitz, J.L. 1995. Bootsrap methods in econometrics: Theory and numerical performance, Paper presented at the Symposium on Bootsrap Methods in Econometrics, 7th World Congress of the Econometric Society - August 1995, Tokio, Japan.

Hu, S.C. 1978. Social security, the supply of labour, and capital accumulation, *The American Economic Review*, vol. 69(3), June: 274-283.

Hu, Y. 2004. Pension reform, economic growth and financial development – An empirical study, mimeo, Brunel University.

Hubbard, R.G. 1986. Pension wealth and individual saving, some new evidence, *Journal of Money Credit and Banking*, vol. 18: 167-178.

Hviding, K. and Mérette, M. 1998. Macroeconomic effects of pension reforms in the context of ageing populations: Overlapping generations model simulations for seven OECD countries. Economics Department, *Working Paper* No 201, OECD, Paris.

Jacob, D. F., Schoeman, N. J. and van Heerden, J. H. 2002. Alternative Definitions of the Budget Deficit and its Impact on the Sustainability of Fiscal Policy in South Africa. *The South African Journal of Economics*, vol. 70(3), March: 543-559.

James, E. 1996. Providing better protection and promoting growth: A defence of averting the old age crisis, *International Social Security Review*, vol. 49(3).

_____ 1998a. Pension reform: An efficiency-equity tradeoff? In Nancy Birdsall, Carol Graham, and Richard Sabot, eds., *Beyond Tradeoffs*. Brookings Institution Press: Washington, D. C.

_____ 1998b. New systems for old age security: Experiences, evidence and unanswered questions, *World Bank Research Observer*, vol. 13(2), August.

Judson, R.A. and Owen, A.L. 1999. Estimating dynamic panel data models: A guide for macroeconomists, *Economics Letters*, vol. 65: 9-15

Kay, S.J. 2001. Politics, economics, and pension reform in the Southern Cone, Paper prepared for the Social Security and Pension Reform Conference. Instituto Tecnologico Autonomo de Mexico (ITAM), March.

Kim, J. 2005. Bias-corrected bootstrap inference for regression models with autocorrelated errors, *Economics Bulletin*, vol. 3(44): 1-8

Kotlikoff, L.J. 1979. Testing the theory of social security and life cycle accumulation, *The American Economic Review*, vol. 69(3), June: 396-410.

_____1987. 'Social security' in The New Palgrave: A dictionary of Economics. John Eatwell, Murray Milgate and Peter Newman, vol. 4: 413-418.

Kritzer, B. E. 2002. Recent Changes to the Chilean System of Individual Accounts. *Social Security Bulletin*, vol. 64(4): 66-70.

Kitzer, B. E. 2000. Social Security Privatisation in Latin America. *Social Security Bulletin*, vol. 63(2): 17-37.

Kritzer, B. E. 1996. Privatising Social Security: The Chilean Experience. *Social Security Bulletin*, vol. 59(3): 45-53.

Lafontaine, F. and White, K.J. 1986. Obtaining any Wald statistic you want. *Economics Letters*, vol. 21: 35-48.

Leimer, R. and Lesnoy, S.D. 1982. Social security and private saving: New time-series evidence, *Journal of Political Economy*, vol. 90(3): 606-629.

Masson, P.; Bayoumi, T. and Samiei, H. 1995. International evidence on the determinants of private saving, *IMF working Paper No. W95/51*, International Monetary Fund.

Myers, R. J. 1992. Chile's Social Security Reform, After Ten Years. *Benefits Quarterly*, vol. 8(3rd quarter): 41-55.

McCarthy, D. and Neuberger, A. 2004. Pensions policy: Evidence on aspects of savings behaviour and capital markets, Centre for Economic Research, London.

Modigliani, F. and Brumberg, R. 1954. Utility analysis and consumption function: An interpretation of cross-section data, *In Post-Keynesian Econometrics*, K. K. Kurihara, New Brunswick, NJ: Rugters University Press.

Mooney, C.Z. and Duval, D.D. 1993. *Bootstrapping: A Nonparametric Approach to Statistical Inference*. Sage Publications, International Educational and Professional Publisher: Newbury, London, New Delhi.

The MIT Dictionary of Modern Economics. 1992. 4th ed. By Pearce, D. W. Pearce, The MIT Press, Cambridge, Massachusetts.

The New Palgrave: A Dictionary of Economics. 1987. edited by Eatweell, J., Milgate, M. and Newman, P. Vol. 1-4. The Macmillan Press Limited, London; The Stockton Press, New York and The Macmillan Press Limited, Japan.

Nhabinde, V.C. and Schoeman, N.J. 2005. Taxes on retirement benefits, consumption and saving in South Africa, Paper Presented in ESSA conference, 7 – 9 September 2005, Durban, RSA.

Oishi, A. S. and Oshio, T. 2006. Financial Implications of Social Security Reforms in Japan (revised version). Chiba University and Graduate School of Economics at Kobe University, May: 1-22.

Olsberg, D. 1997. Ageing and Money: Australia Retirement Revolution. St. Leonards, Allen and Unwin, Australia.

Oliver, M. 2005. Acceptance of social security in Africa, ISSA Regional Conference for Africa, Lusaka, Zambia, August 9-12. International Social Security Association.

Orszig, P.R. 1999. Individual accounts and social security: Does social security really provide a lower rate of return? Centre on Budget and Policy Priorities, March.

Orszag, P.R. and Stiglitz, J. E. 1999. Rethinking pension reform: Ten myths about social security systems, Paper Presented at Conference on "New Ideas About Old Age Security", September 14-15. The World Bank, Washington, D. C.

Pesando, J.E. 1992. The economic effects of private pensions, In *Private Pensions and Public Policy*. Organization for Economic Co-operation and Development, Paris.

Prinsloo, J. W. (1994). Private Sector saving in South Africa, Quarterly Bulletin South Africa Reserve Bank, Sept – Dec & Suppl: 25-35.

_____ (2002). Household Debt, Wealth and Saving, Quarterly Bulletin South Africa Reserve Bank, Sept – Dec: 63-78.

Ramsey, F.P. 1928. A mathematical theory of saving, *Economic Journal*, vol. 38, December: 543-559.

Rocha, R.; Gutierrez, J. and Hinz, R. 1999. Improving the regulation and supervision of pension funds: Are there lessons from the banking sector? *World Bank*, September.

Rossi, N. and Visco, I. 1995. National savings and social security in Italy, Temi tdi Discussione del Servizio Studi , Banca d'Italia, Rome.

SADC. 2003. SADC Social Charter

Samwick, A.A. 1999. Is pension reform conducive to higher saving? World Bank Conference, November.

Samuelson, P. 1958. An exact consumption-loan model of interest with or without the social contrivance of money, *Journal of Political Economy*, vol. 66(6), December: 467-482.

_____ 1975. Optimum social security in a life cycle growth model, *International Economic Review*, vol. 16(3), October: 539-544.

Scherman, K. G. 1999. The Swedish Pension Reform. Social Security Department at International Labour Office, Geneva.

Schmidit-Hebbel, K. 1999a. Does pension reform really spur productivity, saving, and growth?, The 1998 Latin American Meetings of the Econometric Society, and at Pension Reform Conference Organised by the governments of Mexico, Malaysia and the Czech Republic.

_____ 1999b. Chile's Pension Revolution Coming of Age. The World Bank.

Schneider, F. and Enste, D. (2000). Shadow Economies: size, causes and consequences, *Journal of Economic Literature*, vol. XXXVIII, March: 77-114.

Sephton, B. 1990. *A Guide to Pension and Provident Funds*. Labour Law Unit, University of Cape Town, Cape Town.

Solow, R.M. 1956. A contribution to the theory of economic growth, *Quarterly Journal of Economics*, vol. LXX(1), February: 65-94.

Schulz, J. 2005. Old-Age Income Security: Australia Tries a Different Way. www.aarp.org. AARP Public Policy Institute, Washington, DC 20049.

Stanford, J. D. 2003. Are Superannuation Safe? The Background and the Issues. *The Australian Economic Review*, vol. 36(1): 79-88.

UNCTAD. 1998. Trade Development. The United Nations Publications, Sales No. E. 98.11.D.6, New York and Geneva.

UNCTAD. 2000. Capital Flows and Growth in Africa. UNCTAD/GDS/MPDB/7, United Nations, New York and Geneva.

United Nations. 2006. *Human Development Report*.

Van Giersbergen, N.P.A and Kiviet, J.F. 2002. How to implement the bootstrap in stactic or stable dynamic regression models: Test statistic versus confidence region approach, *Journal of Econometrics*, vol. 108: 133-156.

Walker, E. and Lefort, F. 2002. Pension reform and capital markets: Are there any (hard) links? *Social Protection Discussion Paper No. 0201*. The World Bank, January

Weller, C. E. 2004. The Future of Public Pensions in the OECD. *Cambridge Journal of Economics,* vol. 28(4): 489-504.

Wigger, B.U. 1998. Pay-as-you-go financed public pension in a model of endogenous growth and fertility, *Journal of Population Economics*, vol. 12: 625-640.

Williamson, J. B. 2005. An Update on Chile Experience with Partial Privatisation and Individual Accounts. www.aarp.org. AARP Public Policy Institute, Washington, DC 20049.

Williamson, J. B. 2001. Privatising Public Pension Systems: Lessons from Latin America. *Journal of Aging Studies*, vol. 25: 285-302.

World Bank. 1994. *Averting the Old Age Crisis*, Published for the World Bank Oxford University Press, New York.

World Bank. 2003. World Development Indicators, CD-ROM

World Bank. *African Development Indicators, various issues*. Drawn from the World Bank Data Base., Washington, DC 20433, USA.

Zhang, J. 1995. Social security and endogenous growth, *Journal of Public Economics*, vol. 58: 185-213.

Zhang, I. and Zhang, J. 2004. How does social security affect economic growth? Evidence from cross-country data, *Journal of Population Economics*, vol. 17: 473-500

www.bancomoc.mz. Banco de Mocambique. Central Bank of Mozambique website.

www.resbank.co.za. South African Reserve Bank.

www.socialsecurity.gov

# Annexures

## List of Countries included in the this study

01. Benin
02. Cameron
03. Ethiopia
04. Ghana
05. Ivory Coast
06. Kenya
07. Lesotho
08. Mali
09. Mozambique
10. Nigeria
11. Senegal
12. South Africa
13. Zambia
14. Zimbabwe

# Annexure 1: Regulatory Framework and Coverage

| Country | Type of social security system: Type of Regulation | Year (first regulation) | Coverage |
|---|---|---|---|
| Mauritius | Dual:<br>1. non-contributory<br>and<br>2. social insurance system. | First law: 1951<br><br>Current law: 1976 (national pension) with amendments. | Basic pension (non-contributory): All resident aged 60 or older.<br><br>Earnings-related pension (contributory): All employees older than age 18.<br><br>Voluntary affiliation under the earnings-related program for those not covered compulsorily, including the self-employed and non-employed persons.<br><br>Special system for public-sector employees and certain occupations with equivalent private programs. |
| Nigeria | Social insurance system | First law: 1961 (provident fund).<br><br>Current law: 1993 (social insurance), implemented in July 1994. | Employees of firms with 5 or more workers.<br><br>Exclusions: Civil servants, diplomats, non-citizens covered by an equivalent program in another country, self-employed persons, and clergy.<br><br>Voluntary coverage for some excluded categories of worker under specified conditions.<br>Special system for pensionable public-sector employees. |
| Senegal | Social insurance system | First and current law: 1975 (convention of the 1958 non-statutory program) | Employed persons, including domestic workers, seasonal workers, and day workers.<br><br>Special system for civil servants. |
| Sierra Leone | Social insurance system | First and current law: 2001 (social security and national insurance), implemented in 2002. | All employees in the public and private sectors.<br><br>The self-employed can be covered on a voluntary basis. |
| Ghana | Social insurance system | First law: 1965<br><br>Current law: 1991 (social security). | Employed persons<br><br>Voluntary affiliation for self-employed; non-employed formerly insured persons may contribute voluntarily as if self-employed.<br><br>Special system for members of the armed force. |
| Tanzania | Separate provident fund and Social insurance system | First law: 1964 (provident fund).<br><br>Current laws: 1975 (provident fund) and 1978 (parastatal pensions), with 2001 amendment. | Provident fund: Employees in the public and private sectors.<br><br>Exclusion: Domestic employees.<br><br>Social insurance: All employees from parastatal organisations, government agencies, private companies, and self-employed pensions including informal workers. |
| | | First law: 1965 (provident fund). | Employed person, Including agricultural workers, domestic servants in urban areas, apprentices, and all employees who joined the public service and local authorities on or after February 1, 2000.<br>Exclusions: Workers under age 15 or older than age |

| | | | |
|---|---|---|---|
| Zambia | Social insurance system | Current law: 1996 (pension scheme) | 55, as well as those earning less than k15, 000.<br><br>Voluntary affiliation for the self-employed and other categories of worker in the informal sector.<br><br>Special system for public-sector and local government employees who joined before February 1, 2000. |
| Zimbabwe | Social insurance system | First law: 1993<br><br>Current law: 1995, 1998, 2001, 2002, and 2003. | Compulsory coverage for all employed persons between ages 16 and 65 who are citizens or resident of Zimbabwe.<br><br>**Note:** Universal coverage to be achieved in phases. The first completed phase provided coverage to employees in all sectors with the exception of domestic workers and civil servants. The second completed phase provided coverage to civil servants. The third phase will cover domestic workers, and the fourth phase will cover self-employed workers and informal sector employees. |
| Sao Tome and Principe | Social insurance system | First and current laws: 1979 and 1990 (social security). | Employed persons.<br><br>Exclusions: Domestic workers<br><br>Voluntary program for the self-employed. |
| Botswana | Universal old-age pension program | First and current law: 1996. | All citizens of Botswana aged 65 or older.<br><br>Special system for public-sector employees. |
| South Africa | Social insurance system | First laws: 1928 (old-age), 1936 (Blindness), and 1946 (disability).<br><br>Current law: 1992 (social assistance), with amendments. | Citizens of limited means<br><br>Special system for public-sector employees. |
| Swaziland | Provident fund system | First and current law: 1974. | Employed persons.<br><br>Exclusions: casual employees, domestic servants, and non-citizens.<br><br>Special system for public-sector employees. |
| Seychelles | Social insurance system | First laws: 1971 (provident fund); abolished in 1978 and replaced in 1979 (social security fund) .<br><br>Current laws: 1987 (social security fund) and 1990 (Seychelles pension scheme supplements the social security fund) | Social security fund: Employed persons, the self-employed, non-employed persons with unearned income, and public-sector employees.<br><br>Seychelles pension scheme: All full-time workers (25 hours a week or more); the self-employed, part-time workers, and the unemployed may join voluntary. |
| Burkina Faso | Social insurance system | First law: 1960<br><br>Current law: 1972 | Employed persons, technical students, and apprentices.<br><br>Voluntary insurance is available to self-employed persons who were previously covered as employed persons.<br><br>Exclusions: Temporary workers; temporary |

| | | | |
|---|---|---|---|
| | | | employed aliens covered in another country.<br><br>Special system for public-sector employees. |
| Cameroon | Social insurance system | First law: 1969<br><br>Current laws: 1984 and 1990. | Employed persons.<br><br>Voluntary coverage is available for non-covered workers (not yet implemented).<br>Special system for civil servants. |
| Central African Republic | Social insurance system | First law: 1963<br><br>Current law: 1981 | Employed persons, including government officials, members of public groups (if not otherwise covered), students in professional schools, trainees and apprentices (even if non-salaried), members of religious orders, and domestic workers. |
| DR Congo | Social insurance system | First law: 1956.<br><br>Current law: 1961 (1988 social security code, not implemented). | Employed persons, including domestic workers, casual workers, and some categories of boat workers.<br><br>Voluntary coverage for non-employed persons who have at least 5 years of covered employment and who request to be covered within the 6-month period after the cessation of paid employment.<br><br>Special system for public-sector employees. |
| Ivory Cost | Social insurance system | First law: 1960<br><br>Current laws: 1968, 1971, 1988, and 1999. | Salaried workers in all sectors.<br><br>Special system for civil servants |
| Kenya | Provident fund system | First and current law: 1965. | Employed persons<br><br>Exclusion: Casual workers<br><br>Special pension system for public-sector employees |
| Benin | Social insurance system | First law: 1970<br><br>Current law: 2003 | Employed persons<br><br>Special system for public-sector employees<br><br>Special system for informal economy workers<br><br>Voluntary provident fund for citizens working abroad. |
| Chad | Social insurance system | First and current law: 1977, implemented in 1984. | Salaried workers regulated by the labour code |
| Ethiopia | Social insurance system | First and current laws: 1963 (public employees) and 1975 (employees of government owned enterprises) | Public-sector employees and employees of government-owned enterprises |
| Congo (Brazzaville) | Social insurance system | First law: 1962<br><br>Current law: 1986 | Employed persons |
| Gabon | Social insurance system | First law: 1963<br><br>Current law: 1975 | Employed persons<br><br>Separate system for self-employed and state workers under contract<br><br>Special system for public employees |
| Guinea | Social insurance system | First law: 1958<br>Current law: 1994 | Employed persons |

Source: www.socialsecurity.gov

## Annexure 2: The Source of Retirement Funds and Qualifying Conditions for Benefit Payments

| Country | Source of Retirement Funds | | Qualifying Conditions | | |
|---|---|---|---|---|---|
| | Employee | Employer | Retirement Age | Benefit | |
| | | | | Worker (Insured person) | Survivor/Orphans |
| Zambia | 5% of earnings | 5% of payroll;<br><br>***Government***: None;<br><br>Maximum earnings for contribution purposes are 4 times national average earnings.<br><br>Both employee and employer contributions finance funeral grants | ***Old-age pension***: 55 with at least 180 months contributions and retired from regular employment.<br><br>***Survivor pension***: the death of an insured person with at least 5 years contributions or who was receiving the old-age pension or disability pension<br><br>***Lump-sum benefit***: for those who do not meet the eligibility criteria for pension | ***Old-age pension***: A monthly pension equal to the insured's average indexed monthly earnings times the accrual rate and multiplied by the number of the contributions;<br><br>***Lump-sum benefit (old-age)***: the total insured employee and employer contributions plus accrued interest | ***Survivor pension***: If the insured was employed at the time of death, the pension is equal to the compensation for lost work-years plus the greater of the monthly calculated pension or a minimum pension. If the insured was receiving an old-age or disability pension, the pension is converted to a survivor pension. The pension is payable to the spouse or dependent children up to age 18; 25 if in full-time education;<br><br>***Funeral grant***: Equal to 10 times the minimum pension, payable to the survivor;<br><br>***Lump-sum benefit (survivor)***: The total indexed employee and employer contributions plus accrued interest |
| | 3 per cent of earnings | 3 per cent of payroll<br><br>***Government***: None;<br><br>The maximum | ***Old-age pension***: 60 (age55 for arduous employment) with at least 10 years of contributions. If aged 49 or older as of October 1994, up to 7 years of contributions may be | ***Old-age pension***: 3 per cent of monthly insurable earnings multiplied by the number of years of contributions up to 30 years, plus an additional 2.25 per cent of monthly insurable earnings multiplied by the number | ***Survivor pension***: 3 per cent of monthly insurable earnings multiplied by the number of years of contributions up to 30 years, plus an additional |

| | | | | | |
|---|---|---|---|---|---|
| Zimbabwe | | monthly earnings for contribution purposes are Z$8,000 | credited.<br><br>***Deferred retirement***: Up to age 65.<br><br>***Retirement grant***: The insured person has between one and ten years of contributions.<br><br>***Survivor benefit***: The insured was receiving, or met the qualifying conditions for, the old-age pension or disability pension at the time of death and had not reached retirement age<br><br>***Survivor grant***: The insured met the qualifying conditions for the retirement grant or disability. | of years of contributions over 30 years.<br><br>***Retirement grant***: A lump sum equal to 1/12 of annual insurable earnings times the number of years of contributions up to 10 years. | 2.25 per cent of yearly insurable earnings multiplied by the number of years over 30 years.<br><br>***Survivor grant***: A lump sum of 40 per cent of the insured's entitlement to a retirement or disability grant for a widow(er); 40 per cent for children until age 18 (age 25 if student); 12 per cent for parents; 8 per cent for other eligible dependents.<br><br>***Funeral grant***: A lump sum of Z$4,500. The insured person must have contributed for a minimum of one year. |
| Sao Tome and Principe | 4 per cent of earnings | 6 per cent of payroll;<br><br>***Government***: None | ***Old-age pension***: 62 (men) and 57 (women) with 120 months of contribution. Retirement is not necessary.<br><br>***Survivor pension***: The insured was a pensioner or eligible for a pension at the time of death, with at least 60 months of recorded earnings. | ***Old-age pension***: 35 per cent of average earnings in the best 5 years out of the last calendar years, plus one per cent for each year of coverage up to 25 years and 2 per cent for each year of coverage beyond 25.<br><br>***Deferred pension***: The pension is increased by 3 per cent for each year of coverage after the normal retirement age.<br><br>Minimum pension is 30 per cent of the national minimum wage.<br><br>***Benefit adjustment***: Benefits are indexed to wage increases. | ***Survivor pension***: 60 per cent of the insured's pension is paid for one dependent, 80 per cent for two, and 100 per cent for three or more. The pension is payable to a widow(er), children under age 18 (no limit is disabled) and dependent parents.<br><br>***Funeral grant***: A lump sum equal to the cost of funeral. |
| Botswana | None | None;<br><br>***Government***: Total | ***Old-age pension***: 65 and resident | ***Old-age pension***: A flat-rate monthly pension of 151 pula. | |

| | | | | | |
|---|---|---|---|---|---|
| | | cost. | | | |
| South Africa | None (means-tested)<br><br>7.5 per cent (statutory) | None (Means-tested)<br><br>15 per cent (Statutory)<br><br>***Government***: Total cost (Means-tested) | ***Old-age pension (Means-tested)***: 65 (men) and 60 (women) and a resident citizen at the time of application.<br><br>***War veteran grant (Means-tested)***: 60 or disabled and a resident citizen at the time of the application. Eligibility is restricted to veterans of the Second World War and Korean War. | ***Old-age pension (Means-tested)***: Up to 640 rand a month (married couples may receive double the amount) plus 130 rand a month for frail and chronically ill pensioners requiring full time care.<br><br>***War veteran grant (Means-tested)***: up to 658 rand a month plus 130 rand a month for frail and chronically ill veterans requiring full-time care | |
| Swaziland | 5 per cent of earnings | 5 per cent of payroll;<br><br>***Government***: None.<br><br>A ceiling is placed on the maximum monthly earnings for contribution and benefit purposes | ***Old-age pension***: 50; 45 and retired from regular salaried employment, or any age if emigrating permanently<br><br>***Survivor pension***: The death of the fund member prior to retirement.<br><br>There is provision for reciprocal agreements with other countries operating a provident fund. | ***Old-age benefit***: Total employee and employer contributions, plus at least 3 per cent interest rate per year. The benefit may be paid as lump sum or converted to an annuity providing periodic payments. | ***Survivor benefit***: Total employee and employer contributions, plus at least 3 per cent of interest per year. The benefit may be paid as a lump sum or converted to an annuity providing periodic payments. The benefit is payable to widow, other dependents, or other persons designated by the fund member. |
| | ***Social security fund***: 5 per cent of earnings; the self-employed contribute through the tax | ***Social security fund***: 10 per cent on the first Rs1,000 of monthly wages, 20 per cent on second Rs1,000, 35 per cent on the next Rs8,000, and 40 per | ***Social security fund***: 63 with 5 years of residence immediately preceding the date of retirement. (The residence requirement may be waived by the Minister of Finance under special circumstances.) | ***Old-age pension (social security fund):*** Rs1, 100 a month.<br><br>Benefit adjustment: Benefits are reviewed and adjusted each year for cost-of-living changes.<br><br>***Old-age pension (Seychelles pension*** | ***Survivor pension (social security fund):*** Rs825 a month for one year if the widow is aged 45 or older or has a dependent child under 15 (over age |

| | | | | | |
|---|---|---|---|---|---|
| Seychelles | system.<br><br>***Seychelles pension scheme***: voluntary contributions of at least 10 rupees; there is no maximum contribution | cent on wages in excess of Rs10,000<br><br>***Seychelles pension scheme***: Rs50 a month for each full-time employee.<br><br>***Government***: None | ***Seychelles pension scheme***: 63 with 5 years of residence immediately preceding the date of retirement. (The residence requirement may be waived by the Minister of Finance under special circumstances.)<br><br>***Survivor pension***<br>***Social security fund***: Five years of residence.<br><br>***Seychelles pension scheme***: Five years of residence. | ***Scheme):*** Benefits are based on the value of the insured's voluntary contributions.<br><br>***Funeral grant***: Rs1, 500. If death occurs before retirement, a lump sum equal to 50 per cent of the compulsory contributions paid to the social security fund and 100 per cent of voluntary contributions paid to the Seychelles pension scheme. If death occurs after retirement, the grant equals the old-age pension. | 15 if student). The pension is also payable to a dependent widower<br><br>***Orphan's pension***: Rs500 a month |
| Burkina Faso | 4.5 per cent of earnings | 4.5 per cent of payroll;<br><br>***Government***: None.<br><br>The maximum monthly earnings for contribution and benefit purposes are 200,000 CFA francs. | ***Old-age pension***: 55 (age 50 if prematurely aged or 53 if civil servant) with 180 months of coverage. Retirement from gainful employment is necessary.<br><br>Pension payable abroad.<br><br>***Old-age settlement***: 55 and not entitled to a pension. Retirement from gainful employment is necessary.<br><br>***Survivor pension***: The insured person met the old-age or disability pension qualifying requirements or was a pensioner at the time of death. The pension is payable to a widow who was married to the insured for at least one year or who is caring for child | ***Old-age pension***: 20 per cent of average monthly earnings in the last 3 or 5 years (whichever is higher), plus 1.33 per cent for every 12-month period of coverage beyond 180 months.<br><br>The minimum pension is 60 per cent of the national minimum wage.<br><br>The maximum pension is 80 per cent of the insured's average monthly earnings.<br><br>***Old-age settlement***: If ineligible for the old-age pension, a lump sum equal to one month's regular pension for every 6-month period of coverage is payable at age 55.<br><br>***Benefit adjustment***: Pensions are adjusted to the cost-of-living changes. | ***Survivor pension***: 50 per cent of the pension paid or accrued to the insured person.<br><br>***Orphan's pension***: 25 per cent of the insured's pension for each orphan under age 14 (age 18 if an apprentice; 21 if a student or disabled); 40 per cent for each full orphan.<br><br>The maximum survivor pension is 100 per cent of the insured's pension.<br><br>***Survivor settlement***: If the insured person did not meet the qualifying conditions for a pension, a lump sum equal to one month's old-age pension for every 6-month |

| | | | | | |
|---|---|---|---|---|---|
| | | | or is pregnant. The pension is also payable to a dependent disabled widower. The pension ceases on re-marriage. | | period of coverage is payable.<br><br>***Benefit adjustment***: Pensions are adjusted to cost-of-living changes. |
| Cameroon | 2.8 per cent of earnings | 4.2 per cent of payroll;<br><br>***Government***: None.<br><br>The maximum monthly earnings for contribution and benefit purposes are 300,000 CFA francs. | ***Old-age pension***: 60 with 20 years of insurance coverage and 180 months of contributions, including 60 months in the last 10 years. Retirement from employment is necessary. The pension is payable abroad if there is a reciprocal agreement.<br><br>***Early pension***: 50<br><br>***Old-age grant***: 60 (50 in the case of early retirement) with at least 12 months of contributions.<br><br>***Survivor pension***: The insured person was a pensioner or met the pension requirements at the time of death.<br><br>***Survivor grant***: The insured person met the requirements for the old-age grant. | ***Old-age pension***: 30 per cent of average monthly earnings in the last 3 or 5 years (whichever is higher) plus 1 per cent for every year of contributions beyond 180 months.<br><br>The minimum pension is 50 per cent of the legal minimum wage.<br><br>The maximum pension is 80 per cent of average monthly earnings<br><br>***Old-age grant***: A lump sum equal to the insured's average monthly earnings times the number of 12-month periods average. | ***Survivor pension***: 50 per cent of the insured's old-age pension is payable to all non-divorced spouses regardless of age.<br><br>***Orphan's pension***: 15 per cent of the insured's old-age pension each; 25 per cent for each full orphan.<br><br>***Dependent parents***: 10 per cent of the insured's old-age pension.<br><br>***Other eligible survivors***: The pension is divided equally among other relatives if there are no survivors in the above mentioned categories.<br><br>The maximum survivor pension is 100 per cent of the insured's pension.<br><br>***Survivor grant***: A lump sum equal to 1 month of the base pension for each 6-monh contribution period. |
| | 2 per cent of earnings | 3 per cent of payroll; | ***Old-age pension***: 55 (men) and 50 (women) with 20 years of | ***Old-age pension***: 30 per cent of coverage monthly earnings in the last 3 or 5 years | ***Survivor pension***: 50 per cent of the insured's pension is |

| | | | | | |
|---|---|---|---|---|---|
| Central African Republic | | ***Government***: None | coverage and 60 months of contributions during the last 10 years. The pension is payable 5 years earlier if the insured person is prematurely aged. Retirement from gainful employment is necessary.<br><br>The pension is payable abroad only if there is a reciprocal agreement.<br><br>***Old-age allowance***: 55 (age50 if prematurely aged) with at least 12 months of coverage but ineligible for an old-age pension.<br><br>Survivor pension: The insured person met the requirements for a pension or was a pensioner at the time of death.<br><br>Survivor Settlement: Paid to the survivor if the insured person did not meet the requirements for a pension. | (whichever is higher), plus 1 per cent for each 12 month period of contributions beyond 240 months.<br><br>The minimum pension is 60 per cent of the highest regional minimum wage.<br><br>The maximum pension is 80 per cent of average monthly earnings.<br><br>***Old-age allowance***: If ineligible for an old-age pension, a lump sum calculated on the basis of the insured's average monthly earnings for each 12 month period of coverage. | paid to a widow age 50 (age 45 is prematurely aged) or age 30 if caring for child of disabled and provided that she was married at least 2 years prior to the death of the insured. If there is more than one widow, the amount is divided equally. The pension is also payable to a dependent widower age 55 (age 50 if prematurely aged).<br><br>***Orphan's pension***: 50 per cent of the insured's pension; 100 per cent for each full orphan.<br><br>The maximum survivor pension is 100 per cent of the insured's pension.<br><br>Survivor Settlement: A lump sum of 1 month's old-age pension for every 6-month period of the insurance coverage, if the insured person was ineligible for a person. |

| | | | | | |
|---|---|---|---|---|---|
| | 3.5 per cent of earnings; voluntarily insured contribute 7 percent of the most recent 6 months' | 3.5 per cent of payroll.<br><br>***Government***: Annual subsidy up to a legally set fixed amount. | ***Old-age pension***: 65 (men) and 60 (women); 55 (men and women) if prematurely aged, with 60 months of insurance coverage in the last 10 years. Retirement from paid employment is necessary.<br><br>The pension is payable abroad | ***Old-age pension***: An annual benefit of 1/60 of average monthly covered earnings times the number of months of insurance coverage.<br><br>The minimum pension is 50 per cent of the legal minimum wage.<br><br>***Old-age settlement***: A lump sum equal to 10 | ***Survivor pension***: 40 per cent of the insured's person is payable to a widow aged 50 or older or disabled. The pension is also payable to a dependent disabled widower.<br><br>***Survivor grant***: If the insured |

| | | | | | |
|---|---|---|---|---|---|
| DR Congo | covered earnings, according to three wage classes. | | only if there is a reciprocal agreement.<br><br>***Old-age settlement***: The insured person does not meet the qualifying conditions for an old-age pension. The settlement is payable from age 58. Retirement from paid employment is necessary.<br><br>***Survivor pension***: The insured person met the pension requirements or was a pensioner at the time of death.<br><br>***Survivor grant***: The insured person did not meet the qualifying conditions for pension. | times the annual pension, based on the number of complete years of insurance coverage.<br><br>The minimum settlement must not be less than 50 per cent of the minimum pension.<br>***Benefit Adjustment***: Pensions are indexed to changes in wages. | person did not meet the qualifying conditions for a pension, a lump sum equal to 12 months of the insured's pension.<br>***Orphan's pension***: A lump sum equal to 25 per cent of the survivor grant for each orphan under 16 (age 25 if a student; no limit if disabled); 50 per cent for each full orphan.<br><br>The maximum orphan's pension is 100 per cent of the survivor grant.<br><br>***Benefit adjustment***: pensions are indexed to changes in wage |
| Ivory Cost (Cote d'Ivoire) | 3.2 per cent of earnings | 4.8 per cent of payroll<br><br>***Government***: None. Maximum monthly earnings for contribution purposes are 1,647,315 CFA francs, which is equal to 45 times the guaranteed minimum wage. The minimum is 36,607 CFA francs. | ***Old-age pension***: age 55 with 15 years of contributions and 15 years of covered employment after the program began. Retirement from gainful activity is necessary. The pension is payable abroad.<br><br>***Early retirement***: A reduced pension is payable at age 50.<br><br>***Old-age allowance***: Older than age 55 with more than 3 years of employment but less than 15 years of contributions.<br><br>***Survivor pension***: The insured | ***Old-age pension***: 1.33 per cent of average earnings times the number of years of effective or deemed coverage January 1, 2000, and 1.70 per cent for each year of coverage after this date. (some periods of employment before the program began are credited.)<br><br>***Early retirement***: The pension is reduced by 5 per cent for each year that the pension is taken before 55.<br><br>***Child's supplement***: 10 per cent of the insured's pension for each child under age 16, up to a maximum of 30 per cent of the insured's pension. | ***Survivor pension***: 50 per cent of the insured's pension is payable to widow(er) age 50 or older. There is no age requirement if the widow(er) was married for at least 2 years or has a dependent child.<br><br>***Orphan's pension***: 20 per cent of the insured's pension for each full orphan under age 16 (age 21 if student). The maximum orphan's pension is 100 per cent of the insured's pension. |

| | | | | | |
|---|---|---|---|---|---|
| | | | was a pensioner of met the requirement for pension at the time of death. | ***Old-age allowance***: A lump sum payment.<br><br>***Benefit adjustment***: Pensions are adjusted annually to changes in the average salary subject to contributions. | |
| Kenya | 5 per cent of earnings | 5 per cent of payroll;<br><br>***Government***: None.<br><br>The maximum monthly earnings for contribution purposes are 4,000 shillings. | ***Old-age pension***: 55 and substantial retirement from regular employment. The benefit is payable at age 50 if not in insured employment or at any age if emigrating permanently.<br><br>***Survivor benefit***: The death of the fund member prior to retirement. | ***Old-age benefit***: A lump sum equal to total employee and employer contributions, plus interest. | ***Survivor benefit***: A lump sum equal to total employee and employer contributions, plus interest. The benefit is payable to the spouse and children or, if none, to other dependent relatives. |
| Benin | 3.6 per cent of earnings | 6.4 per cent of payroll;<br><br>***Government***: None | ***Old-age pension***: 55 with 180 months of contributions. Retirement from gainful employment is necessary.<br><br>***Survivor pension***: The insured was a pensioner or met the pension requirements at the time of death or had 180 months of insurance coverage.<br>All pensions are payable abroad if there is a reciprocal agreement. | ***Old-age pension***: 20 per cent of average monthly earnings during the last 10 years. An increment of 2 per cent is paid for every year of the insurance coverage beyond 15 years.<br><br>The minimum pension is 60 per cent of the guaranteed minimum wage.<br><br>The maximum pension is 60 per cent of average monthly earnings.<br>***Old-age settlement***: If ineligible for an old-age pension at age 55 but with at least 12 months of contributions, the settlement is equal to 1 month's wages for each year of insurance coverage.<br><br>***Benefit adjustment***: Pensions are adjusted for cost-of-living changes, depending on the financial resources of the system. | ***Survivor pension***: 40 per cent of the insured's pension is paid to a widow. The pension is also payable to dependent disabled widower if married at least 1 year before the death of the spouse.<br><br>***Orphan's pension***: 20 per cent of the insured's pension for one orphan, 40 per cent for two or more orphans; 30 per cent for full orphan who is single child.<br><br>The maximum survivor pension is 80 per cent of the insured's pension.<br><br>***Survivor settlement***: If the insured person failed to meet the qualifying conditions for pension, 1 month of the |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | insured's accrued pension for each 6-month period of insurance coverage. In the absence of an eligible spouse or orphans, the settlement is paid to the insured's parents.<br><br>***Benefit adjustment***: Pensions are adjusted for cost-of-living changes, depending on the financial resources of the system. |
| Chad | 2 per cent of earnings | 4 per cent of payroll;<br><br>***Government***: None<br><br>Worker's incomes are determined by the provisions of the labour code | ***Old-age pension***: 55 (age 50 if prematurely aged) with 180 months of insurance coverage or 60 months of contributions during the last 10 years. Retirement from gainful employment is necessary.<br><br>***Old-age settlement***: 55 (age 50 if prematurely aged) and ineligible for the old-age pension.<br><br>***Survivor pension***: The insured pension met the pension requirements, was a pensioner, or had 180 months of insurance coverage at the time of death.<br><br>***Survivor settlement***: Paid to a survivor if the insured person was ineligible for a pension. | ***Old-age pension***: 30 per cent of average monthly earnings during the last 3 or 5 years (whichever is higher), plus an increment of 1.2 per cent for every 12-month period of insurance coverage beyond 180 months.<br><br>The minimum pension is 60 per cent of the highest minimum wage.<br><br>The maximum pension is 80 per cent of the earnings.<br><br>***Old-age settlement***: If ineligible for the old-age pension, a lump sum equal to 1 month's wages for each year of insurance coverage. | ***Survivor pension***: 50 per cent of the insured's pension is paid to a widow aged 40 or older, caring for a child, pregnant or disabled, provided that she was married at least 1 year prior to the insured's death. If there is more than one widow, the pension is divided equally. A pension is also payable to a dependent disabled widower if he was married at least 1 year prior to the insured's death.<br><br>***Orphan's pension***: 25 per cent of the insured's insured pension for each orphan; 40 per cent for full orphan.<br><br>***Survivor settlement***: A lump sum payment is the insured was ineligible for a pension. |

| | | | | | |
|---|---|---|---|---|---|
| Ethiopia | 4 per cent of basic salary | 6 per cent (civilian) or 16 per cent (military) of payroll;<br><br>***Government***: None | ***Old-age pension***: 55 with a minimum of 10 years of service and contributions.<br><br>***Old-age settlement***: 55 for those who do not meet the qualifying conditions for the old-age pension.<br><br>***Survivor pension***: the insured met the contribution conditions for the old-age pension or was a pensioner at the time of the death. | ***Old-age pension***: 30 per cent of the average monthly salary during the last 3 years, plus an increment of 1 per cent (civilian) or 1.5 per cent (military) of the average monthly salary for each year of service beyond 10 years.<br><br>The maximum benefit is 60 per cent of the average monthly salary.<br><br>***Old-age settlement***: A lump sum payment. | ***Survivor pension***: The widow(er) receives 50 per cent of the insured's pension. Entitlement to the pension ceases on re-marriage. On remarriage, a lump sum of 2 years' pension is paid.<br><br>***Orphan's pension***: 10 per cent of the insured's pension each; 20 per cent each for full orphans.<br><br>***Dependent parents***: 10 to 20 per cent of the insured's pension. |
| Congo (Brazzaville) | 2.4 per cent of earnings. | 3.6 per cent of payroll;<br><br>***Government***: None<br><br>The minimum monthly earnings for contributions and benefit purposes are 23,500 CFA francs. There is no maximum earnings level for contribution and benefit purposes. | ***Old-age pension***: 55 (or age 50 if prematurely aged) with insurance coverage during the last 20 years, or 240 months' total insurance of which 60 months were in the last 5 years. The pension is proportionately reduced if the insured person has between 60 and 239 months of contributions. Retirement from paid employment is necessary.<br>The pension is payable to insured non citizens who leave the country only if there is a reciprocal agreement.<br><br>***Old-age settlement***: The insured person does not meet the qualifying conditions for a pension. | ***Old-age pension***: 40 per cent of average monthly earnings in the last 3 or 5 years (whichever is higher), plus 2 per cent of average monthly earnings for every 12-month period of insurance beyond 240 months. The years chosen for benefit calculation purposes must be in the 10-years period prior to the date of eligibility for pension.<br><br>The minimum pension is 60 per cent of the highest guaranteed minimum wage.<br><br>The maximum pension is 80 per cent of earnings.<br><br>***Old-age settlement***: A lump sum equal to the insured's average monthly earnings for every 12-month insurance period credited at age 55 (age 50 if prematurely aged) if ineligible for a pension. | ***Survivor pension***: 30 per cent of the insured's pension is payable to the widow(er).<br><br>Orphan's pension: 50 per cent of the insured's pension.<br><br>The maximum survivor pension is 80 per cent of the insured's pension.<br><br>***Survivor settlement***: If the insured person did not qualify for a pension, 1 month's basic old-age pension for each 6-month period of contributions.<br><br>***Benefit adjustment***: Pensions are adjusted for cost-of-living changes. |

| | | | | | |
|---|---|---|---|---|---|
| | | | ***Survivor pension***: The insured person met the qualifying conditions for a pension or was a pensioner at the time of death.<br><br>***Survivor settlement***: the insured person did not qualify for a pension | ***Benefit adjustment***: Pensions are adjusted for cost-of-living changes. | |
| | | | ***Old-age pension***: 55 (age 50 if prematurely aged) with 20 years of insurance and 120 months of contributions during the last 20 years; for those insured since May 1, 1964, 60 months of contributions during the last 10 years.<br><br>Retirement is payable abroad only if there is a reciprocal agreement.<br><br>Foreign workers who permanently leave the country may have their contribution reimbursed.<br><br>***Old-age settlement***: The insured person is ineligible for an old-age pension.<br><br>***Survivor pension***: The insured person had 120 months of contributions, met the contribution conditions for pension, or was a pensioner at the time of death.<br><br>***Survivor settlement***: The insured person worked until age 55 but | ***Old-age pension***: 40 per cent of average earnings during the last 3 or 5 years (whichever is higher), plus an increment of 1 per cent of the earnings for each 12-month period of contributions beyond 240 months.<br><br>The maximum pension is 85 per cent of average earnings.<br><br>***Old-age settlement***: A lump sum equal to 50 per cent of average monthly earnings for each 6-month period of contributions, if the insured person is ineligible for the pension. | ***Survivor pension***: 50 per cent of the insured's old-age pension is paid to a nonworking or disabled; also payable to a dependent disabled widower. If there is more than one widow, the pension is divided equally.<br><br>***Orphan's pension***: 20 per cent of the insured's pension for each orphan; 30 per cent for a full orphan.<br><br>An orphan's mother who is ineligible for the widow's pension receives 35 per cent of insured's pension.<br><br>The maximum survivor pension is 85 per cent of the insured's pension.<br><br>***Survivor settlement***: A lump sum equal to 100 per cent of insured's monthly old-age pension for each 6-month period of contributions, if ineligible for the survivor |

| | | | | | |
|---|---|---|---|---|---|
| | | | did not have 120 months of contributions. | | pension. |
| | | | ***Old-age pension***: 55 (age 50 if unable to work) with 15 years of contributions. Retirement from gainful employment is necessary.<br><br>***Early pension***: age 50.<br><br>***Survivor pension***: The insured person was a pensioner or in insured employment at the time of death. | ***Old-age pension***: about 2 per cent of base earnings times the number of years of insurance coverage (some periods of incapacity are credited).<br><br>The maximum number of years for benefit calculation purposes is 30.<br><br>***Early pension***: The pension is reduced by between 5 per cent and 10 per cent for each year that the pension is received before age 55. | ***Survivor pension***: 50 per cent of the pension paid of accrued to the insured if caring for child or age 50 or older at any age if the widow of an old-age pensioner.<br><br>***Orphan's pension***: 10 per cent of the insured's pension to each orphan; 20 per cent for each full orphan.<br><br>The maximum orphan's pension is 100 per cent of the insured's pension.<br><br>***Funeral grant***: A lump sum of 90 days' earnings, but no less than 2,500francs. |
| | | | Old-age pension<br><br>***Basic pension (non-contributory)***: 60 with 12 years of residence after age 18 for Mauritian nationals. There is no residence qualification if aged 70 or older. Non-citizens must have lived in the country for 15 years since age 40, including the 3 years immediately prior to the date of claim. The basic pension is not income-tested or retirement-tested. | Old-age pension<br><br>***Basic pension (non-contributory)***: The value of the pension increases with age. For ages 60 to 89, Rs1, 700 an month; for ages 90 to 99, Rs6, 400; and if aged 100 or older, Rs 7,300.<br><br>***Enhanced basic pension***: An additional Rs 1,205 is payable if blind or 100 per cent disabled or need of the constant care and attention of another person.<br><br>***Earnings-related pension (social security)***: The pension is calculated on the basis of pension points that are awarded in exchange | Survivor benefit<br><br>***Basic widow's pension (non-contributory)***: Rs 1, 700 a month.<br><br>***Child allowance***: Allowances are paid for the first three children of the widows under age 60. children must be under age 15 (20 if in full-time education). The allowance is Rs555 a month for a child under age 10 and 595 if aged 10 or older. The |

| | | | | | |
|---|---|---|---|---|---|
| | | | ***Earnings-related pension (contributory)***: 60 and insured.<br><br>Survivor pension<br><br>***Basic widow's pension (non-contributory)***: The pension is paid to a widow under age 60. non-citizen widows must have 5 years of residence during the 10 years of preceding the claim and must have been resident during the year preceding the claim. Entitlement to the pension ceases on remarriage.<br><br>***Earnings-related widow's pension (contributory)***: The widow's spouse met the requirements for a pension or was a pensioner at the time of death.<br><br>***Earnings-related orphan's pension (contributory)***: Paid to an orphan under age 15 (age 18 is in full-time education) if either of the deceased parents had paid contributions. | for contributions. At retirement, the pension points are converted to pension. The value of pension points is set by government.<br><br>***Benefit adjustment***: Pensions are adjusted for cost-of-living changes. | allowance continues even if the child's mother remarries.<br><br>***Orphan's pension (non-contributory)***: Rs725 a month up to age 15 (age 20 if in full-time education).<br><br>***Guardian allowance (non-contributory)***: Rs320 a month to the person looking after an orphan.<br><br>***Earnings-related widow's pension***: for a widow younger than age 60, the maximum pension is 20 times the average annual number of pension points times the value of one pension point divided by 12. the value of pension points is set by the Government. The pension is reduced by one-third after 12 months if there are no dependent children. A widow aged 60 or older receives 100 per cent of the insured's pension.<br><br>***Remarriage settlement***: A lump sum equal to 12 months' widow's pension is payable on remarriage.<br><br>***Earnings-related orphan's pension***: 15 per cent of the |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | insured's pension.<br><br>***Benefit adjustment***: Pensions are adjusted for cost-of-living changes. |
| Nigeria | 3.5 per cent of gross salary (gross salary includes basic salary and housing and transport allowances). | 6.5 per cent of gross salary (gross salary includes basic salary and housing and transport allowances);<br><br>***Government***: None<br><br>The maximum annual earnings for contribution and benefit purposes are 48,000 naira | ***Old-age pension***: 60 with 120 months of contributions. Retirement from regular employment is necessary.<br><br>***Retirement grant***: 60 with at least 12 months of contributions. Retirement from regular employment is necessary.<br><br>***Survivor pension***: The insured was eligible for the old-age or disability pension at the time of death.<br><br>***Survivor grant***: The insured person was eligible for the retirement or disability grant at the time of death.<br><br>***Funeral grant***: The insured person was receiving the retirement or disability pension or had 60 months of contributions. | ***Old-age pension***: 30 per cent of average monthly insurable earnings, plus 1.5 per cent of those earnings for each 12-month period of paid or credited contributions exceeding 120 months of contributions.<br><br>The minimum pension is 4,400 naira a month (80 per cent of the national minimum wage).<br><br>The maximum pension is 65 per cent of average monthly contributions.<br><br>***Retirement grant***: A lump sum equal to the final month's contributions multiplied by the number of months of contributions. | ***Survivor pension***: 100 per cent of the insured's pension. The pension is payable to a survivor spouse or other dependent relatives.<br><br>***Survivor grant***: 100 per cent of the insured's retirement grant or disability grant.<br><br>***Funeral grant***: A lump sum of 2,000 naira. |
| | 4.8 per cent earnings; management personnel contribute an additional 2 per cent for | 7.2 per cent of payroll; management personnel contribute an additional 3 per cent of earnings up to 600,000 CFA francs a month for | ***Old-age pension***: 55 with 1 year of contributions. Retirement from employment is necessary.<br><br>***Early pension***: A reduced pension is payable from age 53. | ***Old-age pension***: about 1.33 per cent of base earnings times the number of years of insurance coverage, according to a point system. The maximum number of years for benefit calculation purposes is 30. Periods of employment completed before the implementation of the current program are | ***Survivor pension***: The pension is payable to a widow aged 50 or to a widower aged 55 or disabled. The pension is 50 per cent of the insured's pension if the survivor is aged 50 or older |

| | | | | | |
|---|---|---|---|---|---|
| Senegal | supplementary benefits. | supplementary benefits;<br><br>***Government***: None<br><br>The maximum monthly earnings for contribution and benefit purposes are 300,000 CFA francs. | ***Means-tested allowance***: if eligible for the old-age pension, the allowance is payable at age 55 to persons born before 1922 with at least 10 years of employment as domestic worker.<br><br>***Survivor pension***: The insured person was a pensioner or met the contribution requirements for a pension at the time of death. | credited toward insurance coverage if the insured person has at least 10 years of covered employment before or after the program began. (Credited employment periods are given for periods of incapacity for work).<br><br>***Early pension***: The old-age pension is reduced by 5 per cent for each year the person is awarded before age 55.<br><br>***Child's supplement***: 5 per cent of the insured's pension for each dependent child under age 18.<br><br>The maximum supplement is 15 per cent of the insured's pension.<br><br>***Means-tested allowance***: A variable cash benefit. | (payable up to 5 years earlier with 5 per cent reduction per year) or caring for two dependent children under age 18.<br><br>***Orphan's pension***: 20 per cent of the insured's pension for each full orphan under age 18.<br><br>The maximum survivor pension is 100 per cent of the insured's pension. |
| Sierra Leone | 5 per cent of earnings; the self-employed contribute 15 per cent of income. | 10 per cent of payroll;<br><br>***Government***: None | ***Old-age pension***: 60 with at least 15 years of insurance coverage.<br><br>***Survivor pension***: The insured person met the qualifying conditions or was receiving an old-age or disability pension or had at least 5 years of contributions of which 12 months were paid in the 3 years preceding death. | ***Old-age pension***: The pension is calculated on the basis of 30 per cent of the insured's average earnings for the first 15 years of coverage, plus 2 per cent of the insured's average earnings for each additional 12-month period.<br><br>Periods of employment before the introduction of the new scheme may be credited.<br><br>The minimum pension is not less than 50 per cent of the minimum wage.<br><br>The maximum pension is 80 per cent of the insured's average earnings. | ***Survivor pension***: 40 per cent of the insured's pension is payable to a widow(er). In the case of more than one widow, the pension is shared equally. The widow's pension ceases on remarriage.<br><br>***Orphan's pension***: 60 per cent of the insured's pension for an orphan up to age 18 (23 if in full-time education; no limit if disabled).<br><br>***Other eligible survivors (in his absence of the above)***: A lump sum equal to 12 |

| | | | | | |
|---|---|---|---|---|---|
| | | | | ***Early pension***: A reduced pension is payable from age 55. The pension is reduced by 4 per cent for each yea that the pension is taken before age 60.<br><br>***Deferred pension***: The insured person can continue working after age 60. The maximum number of insurable years is 40.<br><br>***Retirement grant***: If the insured person is of pensionable age but has insufficient contributions to qualify for an early retirement pension, a grant equal to 1.5 times the insured's average monthly earnings for each 12-month period of contributions is paid.<br><br>***Benefit adjustment***: Pensions are adjusted annually according to trust fund income. | months' pension is payable to parent who is employed or receiving a pension; 24 months' pension to a parent who is not employed or receiving a pension.<br><br>The maximum survivor pension is 100 per cent of the insured's pension.<br><br>***Survivor grant***: If the qualifying conditions for a survivor pension are not met, a grant equal to 1.5 times the insured's average monthly earnings for each 12-month period of contributions is paid.<br><br>Benefit adjustment: pensions are adjusted annually according to trust fund income. |
| Ghana | 5 per cent of earnings; self-employed contribute 17.5 per cent of income. | 12.5 per cent of payroll;<br><br>***Government***: None | ***Old-age pension***: 60 (55 to 59 for underground mine workers, steel mill workers, or employees engaged in other types of hazardous employment) with at least 240 months of contributions.<br><br>***Early pension***: A reduced pension is payable from ages 55 to 59.<br><br>***Old-age grant***: for insured persons with insufficient contributions for the old age | ***Old-age pension***: The minimum pension is 50 per cent of the average annual salary in the 3 best years of earnings. The pension is increased by 1.5 percentage point for each 12-month period of contribution beyond 240 months.<br><br>The maximum pension is not to exceed 80 per cent of the average earnings of the top 5 per cent of contributing members.<br><br>The insured person may opt to take 25 per cent of the pension as a lump sum. | Survivor pension: If the insured was a pensioner at the time of death, the benefit is payable as lump sum calculated on the present value of the pension that would have been received after the date of death until age 72. if the insured was not a pensioner but had 240 months of contributions, a lump sum benefit equal to the present proportional value of |

| | | | | | |
|---|---|---|---|---|---|
| | | | benefit.<br><br>***Survivor benefit***: The death of the insured person before age 72. | ***Old-age grant***: a lump sum equal to the full refund of contributions plus interest set at 50 per cent of the prevailing government treasury rate. | 12 years' pension. (The present value of the pension is calculated using 50 per cent of the prevailing treasury bill rate of interest.) The pension is payable to named dependents. |
| Tanzania | ***Provident fund***: 10 per cent of wages.<br><br>***Social insurance***: 5 or 10 per cent of wages | ***Provident fund***: 10 per cent of payroll.<br><br>***Social insurance***: 10 per cent of payroll.<br><br>In both cases, ***Government***: None. | ***Provident fund***: 55 and retired from regular employment. The full benefit is also payable at any age in to workers emigrating permanently. Benefit is payable to workers under age 55 who are unemployed or have been in non-contributory employment for at least 6 months.<br><br>***Survivor benefit***: The death of the insured worker before retirement or emigration.<br><br>***Social insurance***: 55 with at least 10 years of contributions.<br><br>***Old-age gratuity***: 55 and entitled to an old-age pensioner if the insured person ceases employment for reasons other than dismissal or medical grounds and does not meet the qualifying conditions for an old-age pension.<br><br>***Survivor benefit***: Paid to the insured's estate if the insured has at least 10 years of contributions.<br><br>***Death benefit***: Paid to the legal | Provident fund<br>***Old-age benefit***: A lump sum equal to total employee and employer contributions, plus accrued interest. For a worker under age 55 who is unemployed or who has been in non-contributory employment for at least 6 months, 1/3 of the total benefit is payable after 6 months and the remaining 2/3 after 12 months. The benefit is payable in full to workers who retire from employment to live in a village.<br><br>Social insurance<br><br>***Old-age benefit***: A monthly pension. The pension is guaranteed for 3 years.<br><br>***Old-age gratuity***: A lump sum equal to the insured's and the employer's total contributions. | Provident fund<br>***Survivor benefit***: A lump sum equal to the insured's and the employer's total contributions, plus accrued interest. The benefit is payable to surviving relatives or other heirs.<br><br>Social insurance<br><br>***Survivor benefit***: A monthly pension<br><br>***Death benefit***: a lump sum.<br><br>***Education benefit***: The benefit varies according to family circumstances.<br><br>***Survivor settlemen***t: A lump sum. |

| | | | | | |
|---|---|---|---|---|---|
| | | | representative of an insured person who dies while in service.<br><br>***Education benefit***: Paid to meet part of the education costs of the children of a person who dies in service. The benefit is payable for up to four children and covers cost for nursery, primary, and secondary education.<br><br>***Survivor settlement***: Paid to the insured's estate if the insured did not meet the qualifying conditions for a pension. | | |
| Mauritius | ***Social insurance*:** 3 per cent of earnings<br>***Basic pension*** (Non-contributory): None | ***Social insurance***: 6 per cent payroll; 10.5 per cent for millers and large employers in sugar industry (also it finance work injury benefits).<br><br>***Government*:** **Universal pension** (non-contributory): Total cost;<br><br>Social insurance: government cover any deficit (minimum earning for contribution is Rs975 and the maximum contribution is Rs6, 435 | ***Basic pension (non-contributor):*** Age 60 with 12 years of residence after age 18 for Mauritian nationals. No residence qualifications for age 70 and older. Non-citizens qualifying conditions is that an individual must have lived in the country 15 years since age 40, including the three years preceding the date of claim.<br><br>***Social insurance (contributory)*:** Age 60 and he/she must be insured. | Old-age pension<br>***Basic pension (non-contributory):*** the value of pension increase with age. For age 60 to 89, Rs1, 700 a month; age 90 to 99, Rs6, 400; and for age 100 and older, Rs7, 300.<br><br>***Enhanced basic pension:*** An additional Rs1, 205 is payable if blind or 10 per cent disabled or need of the constant care and attention of another person.<br><br>***Social insurance (contributory)*:** The pension is calculated on the base of pension points that are awarded in exchange for contributions. At retirement, the pension points are converted to a pension. The value of pension points is set by the government.<br><br>***Benefit adjustment:*** Pensions are adjusted for cost-of-living changes. | Survivor pension<br>***Basic widow's pension (non-contributory):*** Rs1, 700 a month.<br><br>***Child allowance***: allowances are paid for the first three children of widows under age 60. Children must be under age 15 (age 20 if in full education). The allowance is Rs555 a month for a child under 10 and Rs 595 for age 10 and older. The allowance continues even if the child's mother remarries.<br><br>***Orphan's pension (non-contributory):*** Rs725 a month up to age 15 (age 20 if in full education). |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | ***Guardian allowance (non-contributory):*** Rs320 a month to a person looking after an orphan.<br><br>***Social insurance widow's pension*:** for widow younger than age 60, the maximum pension is 20 times the average annual number of pension points times the value of one pension point times by 12. The value of the pension point is set by the government. The pension is reduced by one-third after 12 months if there are no dependent children. A widow aged 60 or older receives 100 per cent of the insured's pension.<br><br>***Remarriage settlement:*** A lump-sum equal to 12 months' widow's pension is payable on remarriage.<br><br>***Social insurances orphan's pension:*** 15 per cent of the insured's pension.<br><br>***Benefit adjustment:*** Pensions are adjusted for cost-of-living changes. |

Source: www.socialsecurity.gov

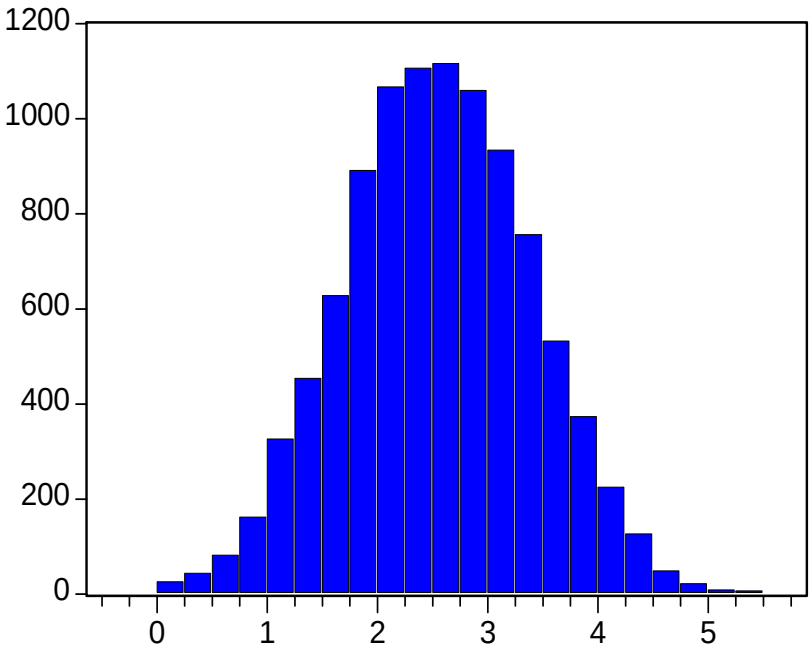
# Annexure 3: Saving Regression in SADC Countries

## 3.1 Growth of per capita GDP

### 3.1.1 Bootstrapped coefficient in the SADC countries saving regression

The results of the bootstrapped coefficient in the growth of per capita GDP show that the coefficient is right hand skewed with a mean 2.5517. The results above show that Jarque-Bera test is 8.1687 with p-value = 0.0168, rejecting the standard normality assumptions and therefore the bootstrapped results are preferable. This approach was used in analysing all the results present in this study.

Figure 3.1: EDF of the coefficient for the Growth of Per Capita GDP in SADC




### 3.1.2 Results of the empirical distribution test for the growth of per capita GDP coefficient in the SADC countries saving regression

The results of the empirical distribution test on the growth of per capita GDP coefficient reject the standard normality ($\mu=0$ and $\sigma=1$) but the normality passes for $\mu= 2.5517$ and $\sigma=0.0010$ values based on the results shown in figure 3.1. This test justifies even further the use of bootstrapping of the LSDV regression results. This approach was used in analysing all the results present in this study.

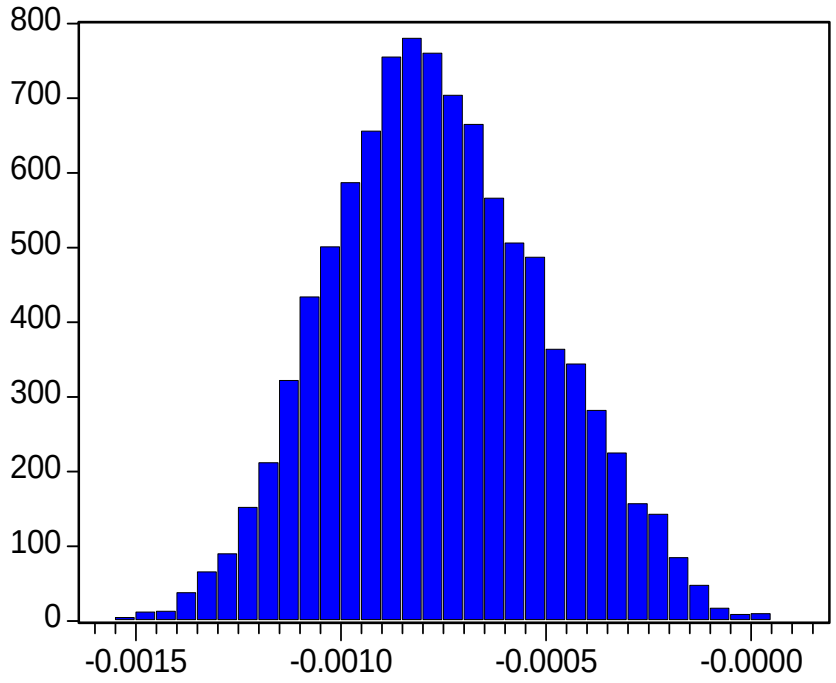
Table 3.1

| Empirical Distribution Test for GGDPPC | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.038552 | 3.859834 | 0.0000 | |
| Kolmogorov (D-) | 0.039197 | 3.924487 | 0.0000 | |
| Kolmogorov (D) | 0.039197 | 3.924487 | 0.0000 | |
| Kuiper (V) | 0.077749 | 7.787143 | 0.0000 | |
| Cramer-von Mises (W2) | 7.042912 | 7.043577 | 0.0000 | |
| Watson (U2) | 7.042482 | 7.043035 | 0.0000 | |
| Anderson-Darling (A2) | 59.83453 | 59.83453 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | 2.551700 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -12790.19 | Mean dependent var. | | 2.551671 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.848665 |
| * Fixed parameter value | | | | |

## 3.2 Inflation

### 3.2.1 Bootstrapped coefficient in the SADC countries saving regression

Figure 3.2: EDF of the Inflation coefficient in SADC



### 3.2.2 Results of the empirical distribution test for the inflation coefficient in the SADC countries saving regression

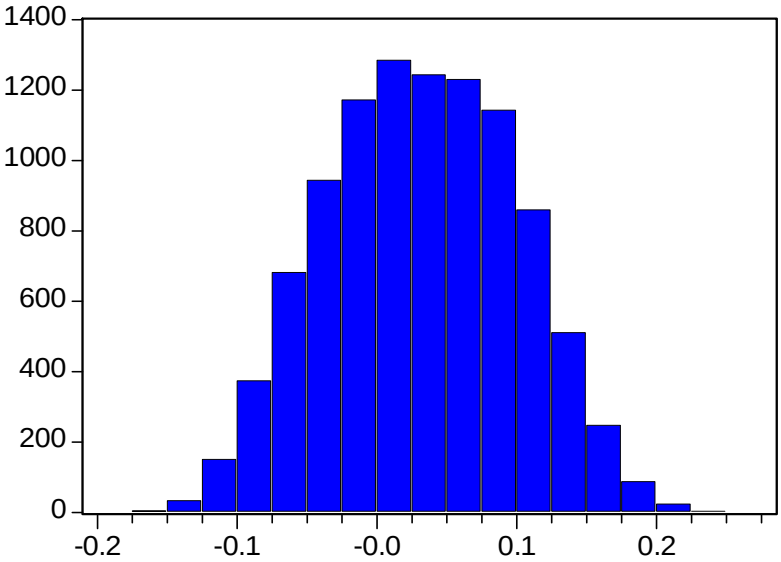
Table 3.2

| Empirical Distribution Test for INFL | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.276191 | 27.65250 | 0.0000 | |
| Kolmogorov (D-) | 0.293175 | 29.35300 | 0.0000 | |
| Kolmogorov (D) | 0.293175 | 29.35300 | 0.0000 | |
| Kuiper (V) | 0.569366 | 57.02617 | 0.0000 | |
| Cramer-von Mises (W2) | 359.7319 | 359.7678 | 0.0000 | |
| Watson (U2) | 359.7312 | 359.7599 | 0.0000 | |
| Anderson-Darling (A2) | 1913.684 | 1913.684 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.000760 | * | NA | NA |
| SIGMA | 0.001000 | * | NA | NA |
| Log likelihood | 59546.26 | Mean dependent var. | | -0.000760 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.000262 |
| * Fixed parameter value | | | | |

## 3.3 Benefit payments to GDP ratio

### 3.3.1 Bootstrapped coefficient in the SADC countries saving regression

Figure 3.3: EDF of the coefficient for the Benefit Payments to GDP ratio in SADC



### 3.3.2 Results of the empirical distribution test for the Benefit payments to GDP ratio coefficient in the SADC countries saving regression

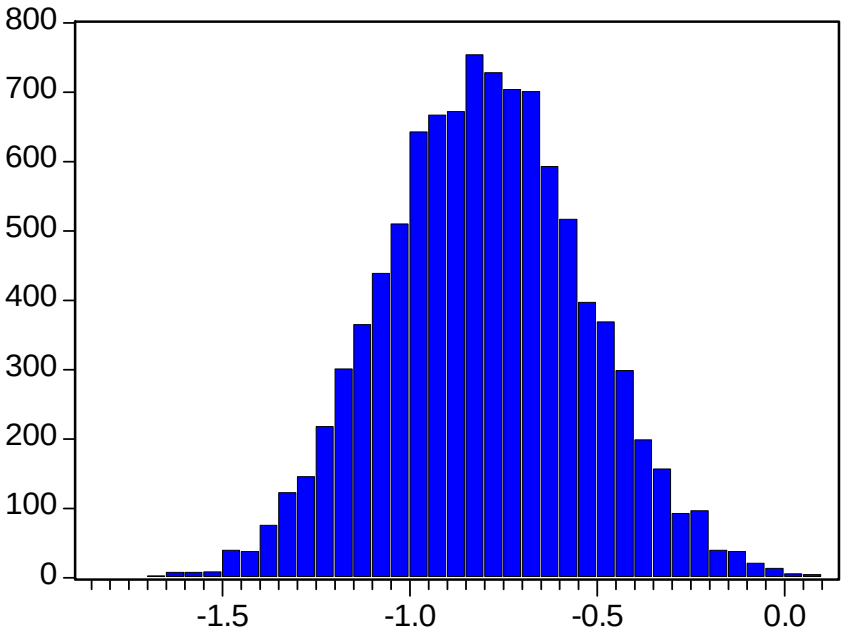
Table 3.3

| Empirical Distribution Test for RATIOBEN | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.433451 | 43.39761 | 0.0000 | |
| Kolmogorov (D-) | 0.434065 | 43.45911 | 0.0000 | |
| Kolmogorov (D) | 0.434065 | 43.45911 | 0.0000 | |
| Kuiper (V) | 0.867517 | 86.88821 | 0.0000 | |
| Cramer-von Mises (W2) | 686.5644 | 686.6330 | 0.0000 | |
| Watson (U2) | 686.5644 | 686.6193 | 0.0000 | |
| Anderson-Darling (A2) | 3274.654 | 3274.654 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | 0.032173 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -9212.283 | Mean dependent var. | | 0.032173 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.067676 |
| * Fixed parameter value | | | | |

### 3.4 Net exports to GDP ratio

### 3.4.1 Bootstrapped coefficient in the SADC countries saving regression

Figure 3.4: EDF of the Net Exports to GDP ratio coefficient in




SADC

### 3.4.2 Results of the empirical distribution test for the net exports to GDP ratio coefficient in the SADC countries saving regression

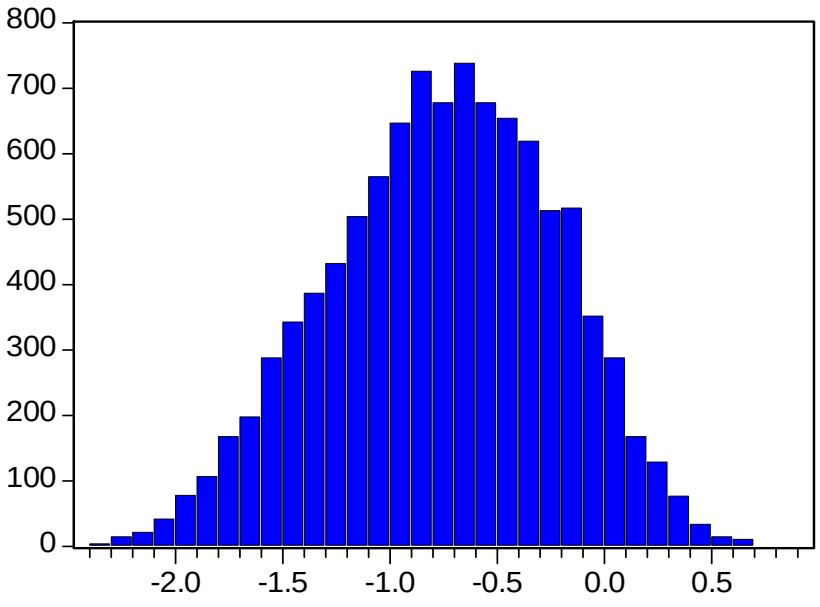
Table 3.4

| Empirical Distribution Test for RATIONX | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.280364 | 28.07034 | 0.0000 | |
| Kolmogorov (D-) | 0.281645 | 28.19858 | 0.0000 | |
| Kolmogorov (D) | 0.281645 | 28.19858 | 0.0000 | |
| Kuiper (V) | 0.562009 | 56.28933 | 0.0000 | |
| Cramer-von Mises (W2) | 353.7051 | 353.7405 | 0.0000 | |
| Watson (U2) | 353.7051 | 353.7334 | 0.0000 | |
| Anderson-Darling (A2) | 1885.043 | 1885.043 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.800397 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -9547.597 | Mean dependent var. | | -0.800397 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.267674 |
| * Fixed parameter value | | | | |

## 3.5 Government deficit to GDP ratio

### 3.5.1 Bootstrapped coefficient in the SADC countries saving regression

Figure 3.5: EDF of the Government Deficit to GDP ratio coefficient in SADC



### 3.5.2 Results of the empirical distribution test for the government deficit to GDP ratio coefficient in the SADC countries saving regression

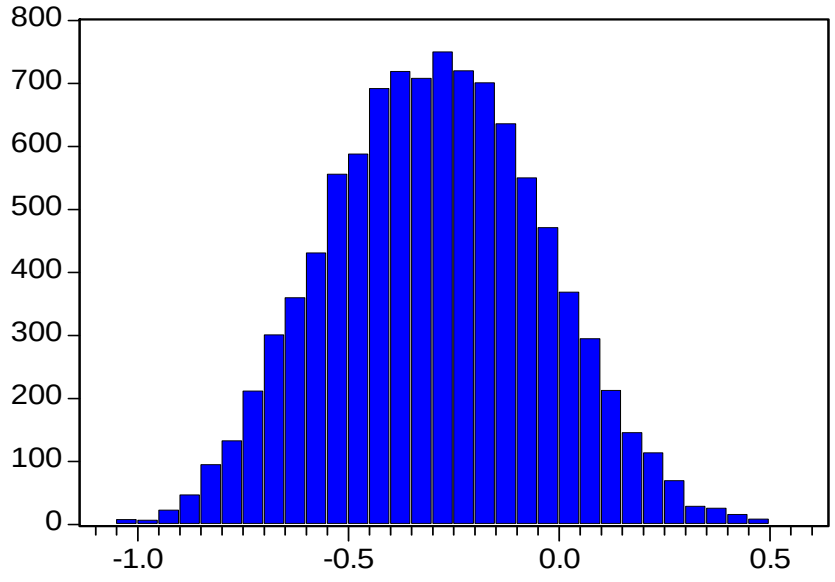
Table 3.5

| Empirical Distribution Test for RDEF | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.156098 | 15.62869 | 0.0000 | |
| Kolmogorov (D-) | 0.136534 | 13.66991 | 0.0000 | |
| Kolmogorov (D) | 0.156098 | 15.62869 | 0.0000 | |
| Kuiper (V) | 0.292632 | 29.30922 | 0.0000 | |
| Cramer-von Mises (W2) | 103.8734 | 103.8838 | 0.0000 | |
| Watson (U2) | 103.8572 | 103.8655 | 0.0000 | |
| Anderson-Darling (A2) | 681.5729 | 681.5729 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.752300 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -10591.55 | Mean dependent var. | | -0.752300 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.529586 |
| * Fixed parameter value | | | | |

### 3.6 Government consumption to GDP ratio

### 3.6.1 Bootstrapped coefficient in the SADC countries saving regression

Figure 3.6: EDF of the Government Consumption to GDP ratio coefficient in SADC



### 3.6.2 Results of the empirical distribution test for the government consumption to GDP ratio coefficient in the SADC countries saving regression

Table 3.6

| Empirical Distribution Test for RGCONS | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.289560 | 28.99111 | 0.0000 | |
| Kolmogorov (D-) | 0.292920 | 29.32749 | 0.0000 | |
| Kolmogorov (D) | 0.292920 | 29.32749 | 0.0000 | |
| Kuiper (V) | 0.582481 | 58.33974 | 0.0000 | |
| Cramer-von Mises (W2) | 369.4880 | 369.5249 | 0.0000 | |
| Watson (U2) | 369.4880 | 369.5175 | 0.0000 | |
| Anderson-Darling (A2) | 1957.120 | 1957.120 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.292143 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -9510.893 | Mean dependent var. | | -0.292143 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.253590 |
| * Fixed parameter value | | | | |

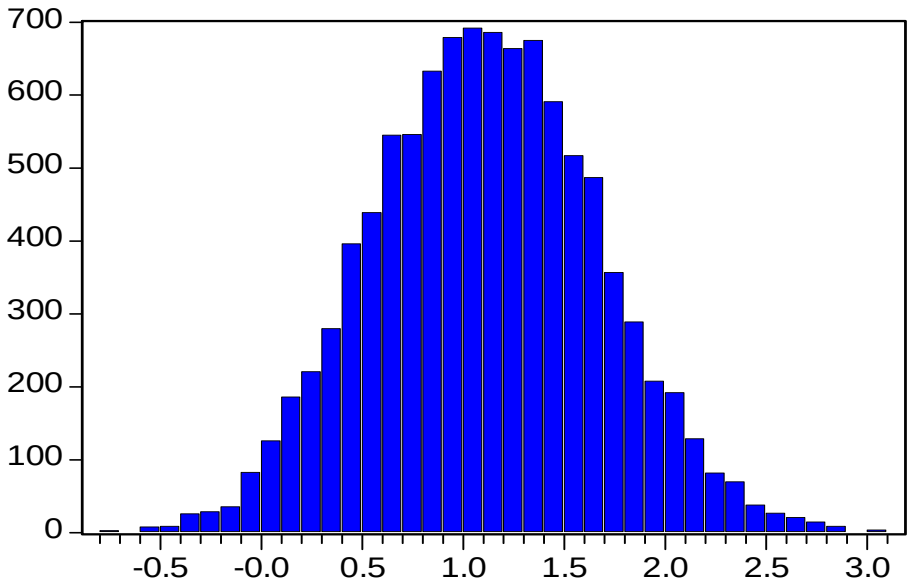
## Annexure 4: Saving Regression in West African Countries

### 4.1 Growth of per capita GDP

### 4.1.1 Bootstrapped coefficient in the West African countries saving regression

The results of the bootstrapped coefficient in the growth of per capita GDP show that the coefficient is right hand skewed with a mean 1.1118. The results above show that Jarque-Bera test is 12.1740 with p-value = 0.0023, rejecting the standard normality assumptions and therefore the bootstrapped results are preferable. This philosophy was used in analysing all the results present in this study.

Figure 4.1: EDF of the coefficient for the Growth of per Capita GDP in West Africa




### 4.1.2 Results of the empirical distribution test for the growth of per capita GDP coefficient in the West African countries saving regression

The results of the empirical distribution test on the growth of per capita GDP coefficient reject the standard normality (μ=0 and σ=1) but the normality passes for μ= 1.1118 and σ=0.0010 values based on the results shown in figure 5.1. This test justifies even further the use of bootstrapping of the LSDV regression results. This approach was used in analysing all the results present in this study.

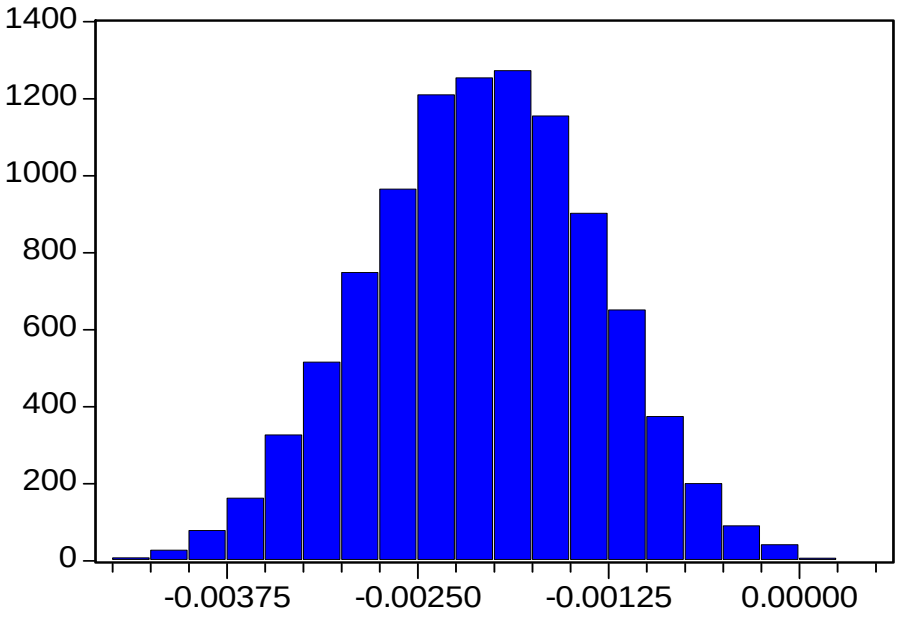
Table 4.1

| Empirical Distribution Test for GGDPPC | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.139035 | 13.92037 | 0.0000 | |
| Kolmogorov (D-) | 0.138572 | 13.87393 | 0.0000 | |
| Kolmogorov (D) | 0.139035 | 13.92037 | 0.0000 | |
| Kuiper (V) | 0.277607 | 27.80438 | 0.0000 | |
| Cramer-von Mises (W2) | 92.84354 | 92.85278 | 0.0000 | |
| Watson (U2) | 92.84099 | 92.84840 | 0.0000 | |
| Anderson-Darling (A2) | 609.1907 | 609.1907 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | 1.111800 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -10749.52 | Mean dependent var. | | 1.111837 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.558621 |
| * Fixed parameter value | | | | |

## 4.2 Inflation

### 4.2.1 Bootstrapped coefficient in the West African countries saving regression

Figure 4.2: EDF of the coefficient for Inflation in West Africa




### 4.2.2 Results of the empirical distribution test for the inflation coefficient in the West African countries saving regression

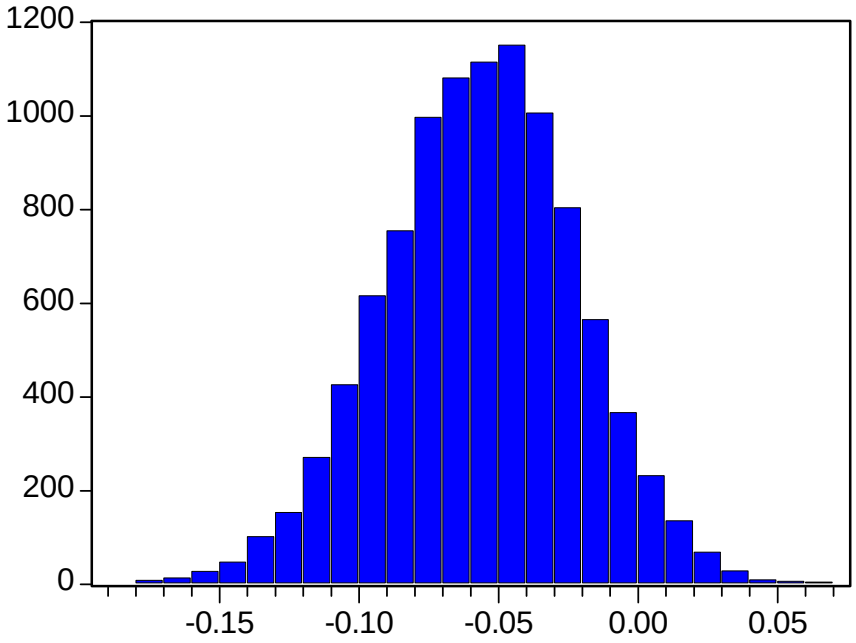
Table 4.2

| Empirical Distribution Test for INFL | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.423827 | 42.43399 | 0.0000 | |
| Kolmogorov (D-) | 0.422127 | 42.26380 | 0.0000 | |
| Kolmogorov (D) | 0.423827 | 42.43399 | 0.0000 | |
| Kuiper (V) | 0.845953 | 84.72850 | 0.0000 | |
| Cramer-von Mises (W2) | 674.3892 | 674.4566 | 0.0000 | |
| Watson (U2) | 674.3892 | 674.4431 | 0.0000 | |
| Anderson-Darling (A2) | 3225.460 | 3225.460 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.002073 | * | NA | NA |
| SIGMA | 0.010000 | * | NA | NA |
| Log likelihood | 36834.71 | Mean dependent var. | | -0.002073 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.000743 |
| * Fixed parameter value | | | | |

## 4.3 Benefit payments to GDP ratio

### 4.3.1 Bootstrapped coefficient in the West African countries saving regression

Figure 4.3: EDF of the coefficient for the Benefit Payments to GDP ratio in West Africa




### 4.3.2 Results of the empirical distribution test for the Benefit payments to GDP ratio coefficient in the West African countries saving regression

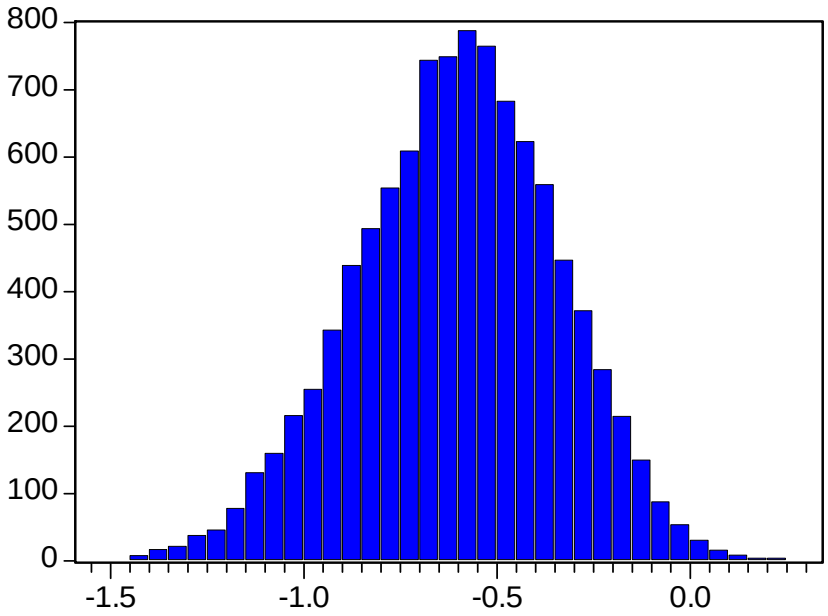
Table 4.3

| Empirical Distribution Test for RATIOBEN | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.461021 | 46.15790 | 0.0000 | |
| Kolmogorov (D-) | 0.457601 | 45.81556 | 0.0000 | |
| Kolmogorov (D) | 0.461021 | 46.15790 | 0.0000 | |
| Kuiper (V) | 0.918622 | 92.00681 | 0.0000 | |
| Cramer-von Mises (W2) | 757.3516 | 757.4273 | 0.0000 | |
| Watson (U2) | 757.3516 | 757.4122 | 0.0000 | |
| Anderson-Darling (A2) | 3558.823 | 3558.823 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.056375 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -9195.405 | Mean dependent var. | | -0.056375 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.034699 |
| * Fixed parameter value | | | | |

## 4.4 Net exports to GDP ratio

### 4.4.1 Bootstrapped coefficient in the West African countries saving regression

Figure 4.4: EDF of the coefficient for the Net Exports to GDP ratio in West Africa




### 4.4.2 Results of the empirical distribution test for the net exports to GDP ratio coefficient in the West African countries saving regression

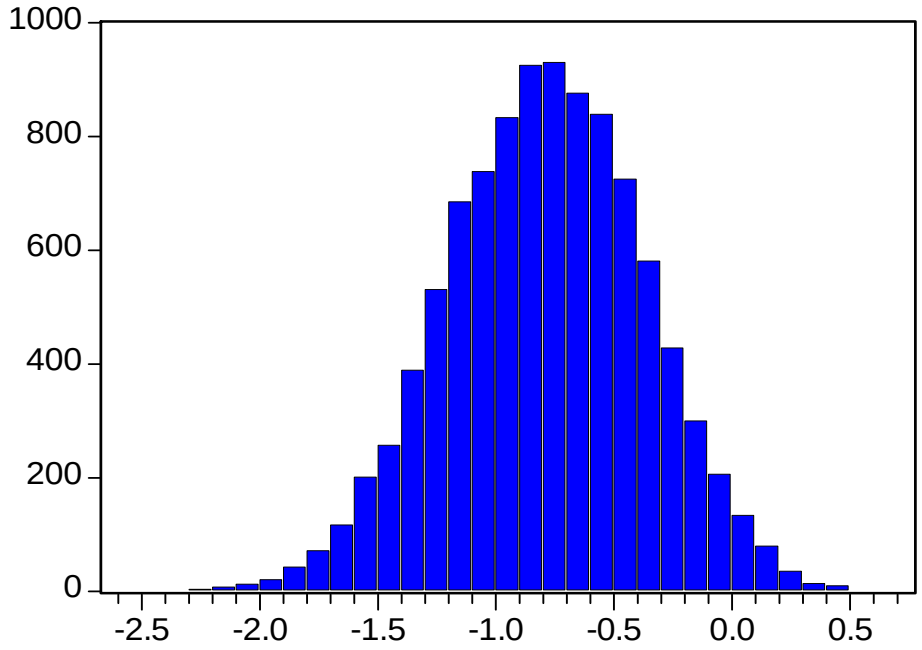
Table 4.4

| Empirical Distribution Test for RATIONX | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.290382 | 29.07341 | 0.0000 | |
| Kolmogorov (D-) | 0.277596 | 27.79324 | 0.0000 | |
| Kolmogorov (D) | 0.290382 | 29.07341 | 0.0000 | |
| Kuiper (V) | 0.567979 | 56.88727 | 0.0000 | |
| Cramer-von Mises (W2) | 362.0563 | 362.0924 | 0.0000 | |
| Watson (U2) | 362.0560 | 362.0850 | 0.0000 | |
| Anderson-Darling (A2) | 1921.968 | 1921.968 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.602720 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -9530.980 | Mean dependent var. | | -0.602720 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.261392 |
| * Fixed parameter value | | | | |

## 4.5 Government deficit to GDP ratio

### 4.5.1 Bootstrapped coefficient in the West African countries saving regression

Figure 4.5: EDF of the coefficient for the Government deficit to GDP ratio in West Africa




### 4.5.2 Results of the empirical distribution test for the government deficit to GDP ratio coefficient in the West African countries saving regression

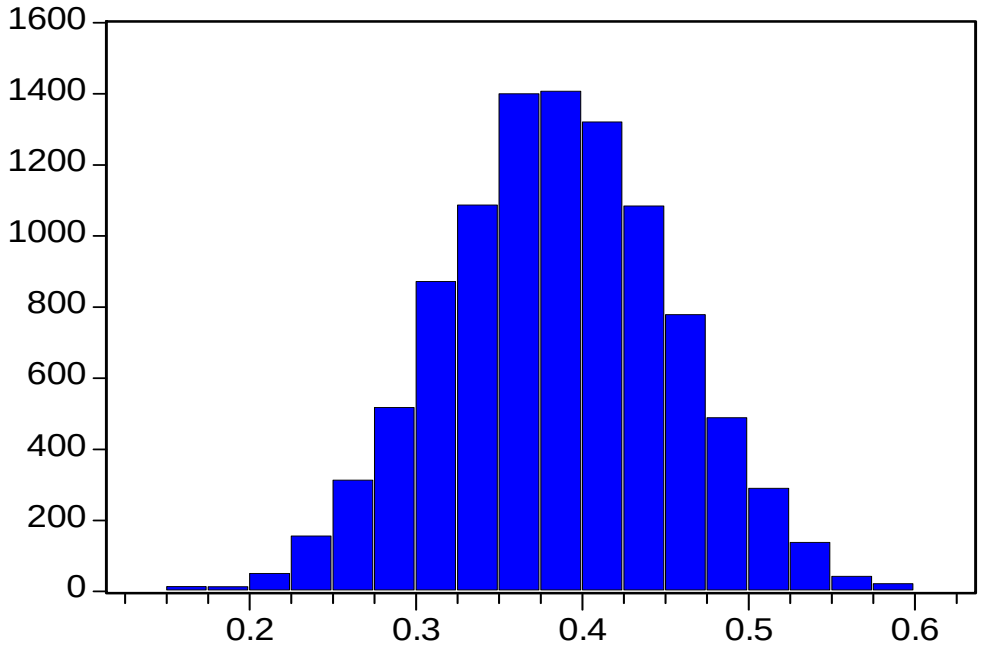
Table 4.5

| Empirical Distribution Test for RDEF | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.201289 | 20.15329 | 0.0000 | |
| Kolmogorov (D-) | 0.197612 | 19.78514 | 0.0000 | |
| Kolmogorov (D) | 0.201289 | 20.15329 | 0.0000 | |
| Kuiper (V) | 0.398901 | 39.95292 | 0.0000 | |
| Cramer-von Mises (W2) | 188.2935 | 188.3123 | 0.0000 | |
| Watson (U2) | 188.2923 | 188.3074 | 0.0000 | |
| Anderson-Darling (A2) | 1114.529 | 1114.529 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.789063 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -10070.74 | Mean dependent var. | | -0.789063 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.419867 |
| * Fixed parameter value | | | | |

## 4.6 Government consumption to GDP ratio

### 4.6.1 Bootstrapped coefficient in the West African countries saving regression

Figure 4.6: EDF of the coefficient for the Government Consumption to GDP ratio in West Africa




### 4.6.2 Results of the empirical distribution test for the government consumption to GDP ratio coefficient in the West African countries saving regression

Table 4.6

| Empirical Distribution Test for RGCONS | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.428404 | 42.89232 | 0.0000 | |
| Kolmogorov (D-) | 0.428487 | 42.90055 | 0.0000 | |
| Kolmogorov (D) | 0.428487 | 42.90055 | 0.0000 | |
| Kuiper (V) | 0.856891 | 85.82397 | 0.0000 | |
| Cramer-von Mises (W2) | 686.2152 | 686.2838 | 0.0000 | |
| Watson (U2) | 686.2152 | 686.2701 | 0.0000 | |
| Anderson-Darling (A2) | 3273.093 | 3273.093 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | 0.385430 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -9212.929 | Mean dependent var. | | 0.385430 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.068624 |
| * Fixed parameter value | | | | |

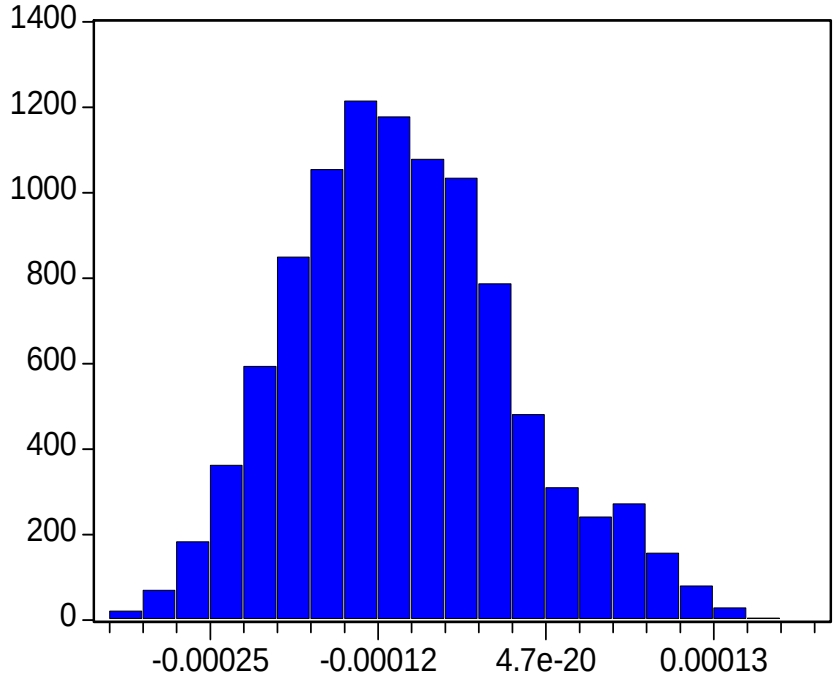
# Annexure 5: Growth Regression in SADC Countries

## 5.1 Inflation

### 5.1.1 Bootstrapped coefficient in the SADC growth regression

The results of the bootstrapped coefficient of inflation show that the coefficients are right hand skewed with a mean -0.000105, implying that the reliance on the standard normal assumptions may lead to wrong conclusions on the validity of the results. The results above show that Jarque-Bera test is 222.1909 with p-value = 0.00000, rejecting the standard normality assumptions and therefore the bootstrapped results are preferable. This approach was used in analysing all the results present in this study.

Figure 5.1: EDF of the coefficient for Inflation in SADC



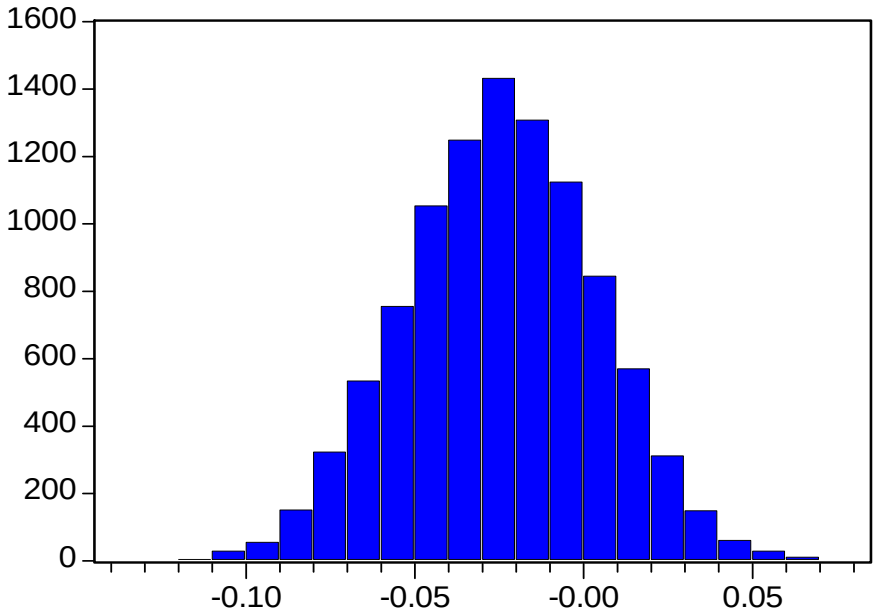

### 5.1.1 Results of the empirical distribution tests for the inflation coefficient in the SADC growth regression

The results of the empirical distribution test on the inflation reject the standard normality ($\mu=0$ and $\sigma=1$) but the normality do not passes the test for empirical normal distribution coefficient for inflation. This test justifies even further the use of bootstrapping of the LSDV regression results.

## 5.2 Openness

### 5.2.1 Bootstrapped coefficient in the SADC growth regression

Figure 5.2: EDF of the coefficient for Openness in SADC




### 5.2.1 Results of the empirical distribution tests for the openness coefficient in the SADC growth regression

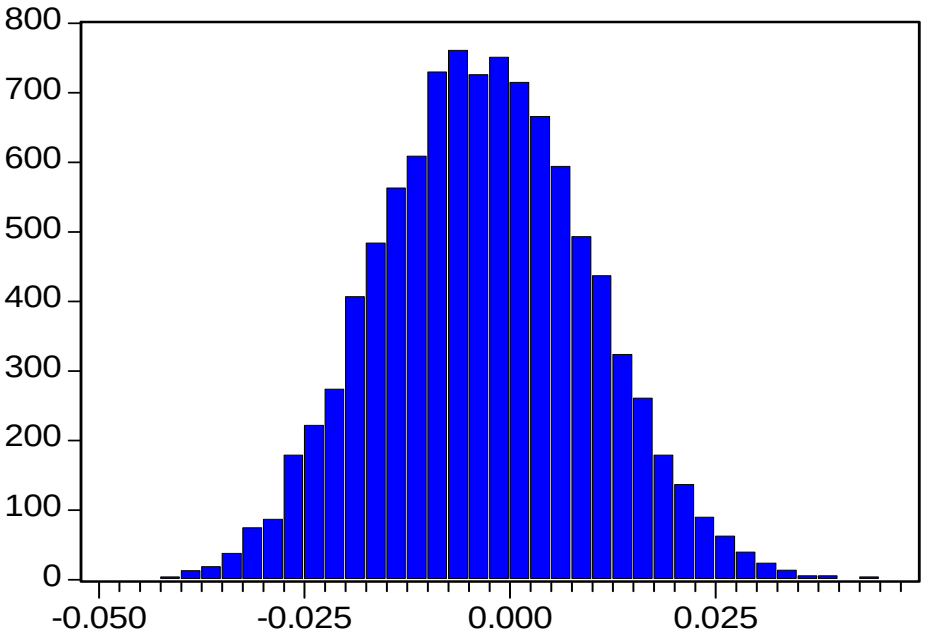
Table 5.1

| Empirical Distribution Test for OPENNESS | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.466523 | 46.70875 | 0.0000 | |
| Kolmogorov (D-) | 0.466656 | 46.72210 | 0.0000 | |
| Kolmogorov (D) | 0.466656 | 46.72210 | 0.0000 | |
| Kuiper (V) | 0.933178 | 93.46472 | 0.0000 | |
| Cramer-von Mises (W2) | 770.7211 | 770.7982 | 0.0000 | |
| Watson (U2) | 770.7211 | 770.7828 | 0.0000 | |
| Anderson-Darling (A2) | 3612.392 | 3612.392 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.024359 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -9193.398 | Mean dependent var. | | -0.024359 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.028330 |
| * Fixed parameter value | | | | |

## 5.3 Benefit payments to GDP ratio

### 5.3.1 Bootstrapped coefficient in the SADC growth regression

Figure 5.3: EDF of the coefficient for the Benefit Payments to GDP ratio in SADC




### 5.3.1 Results of the empirical distribution tests for benefit payments to GDP ratio coefficient in the SADC growth regression

Table 5.2

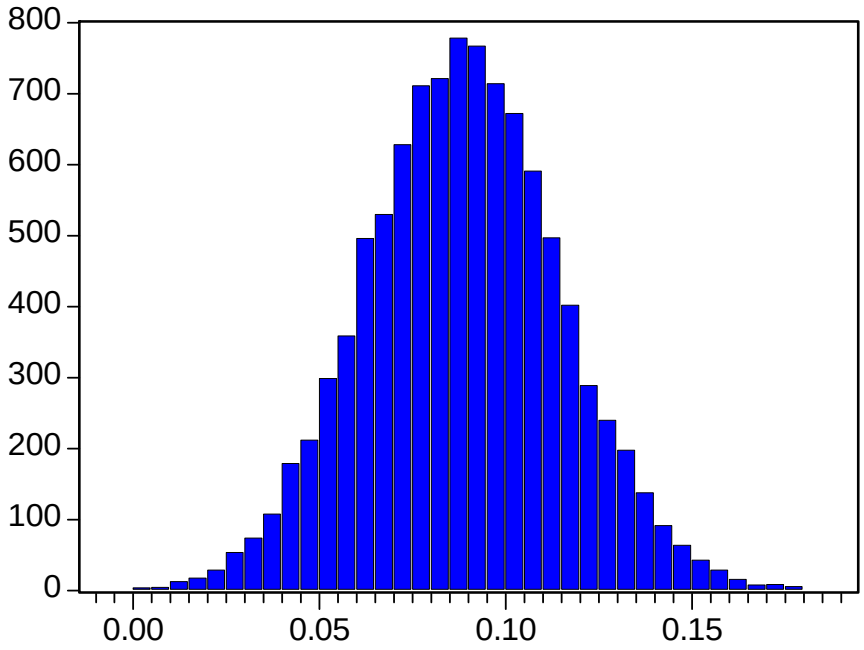
| Empirical Distribution Test for RATIOBEN | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.427505 | 42.80232 | 0.0000 | |
| Kolmogorov (D-) | 0.415935 | 41.64387 | 0.0000 | |
| Kolmogorov (D) | 0.427505 | 42.80232 | 0.0000 | |
| Kuiper (V) | 0.843440 | 84.47680 | 0.0000 | |
| Cramer-von Mises (W2) | 676.7850 | 676.8526 | 0.0000 | |
| Watson (U2) | 676.5065 | 676.5606 | 0.0000 | |
| Anderson-Darling (A2) | 565236.4 | 565236.4 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.003010 | * | NA | NA |
| SIGMA | 0.001000 | * | NA | NA |
| Log likelihood | NA | Mean dependent var. | | -0.003010 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.012856 |

* Fixed parameter value

## 5.4 Investment to GDP ratio

### 5.4.1 Bootstrapped coefficient in the SADC growth regression

Figure 5.4: EDF of the coefficient for the Investment to GDP ratio in SADC




### 5.4.1 Results of the empirical distribution tests for investment to GDP ratio coefficient in the SADC growth regression

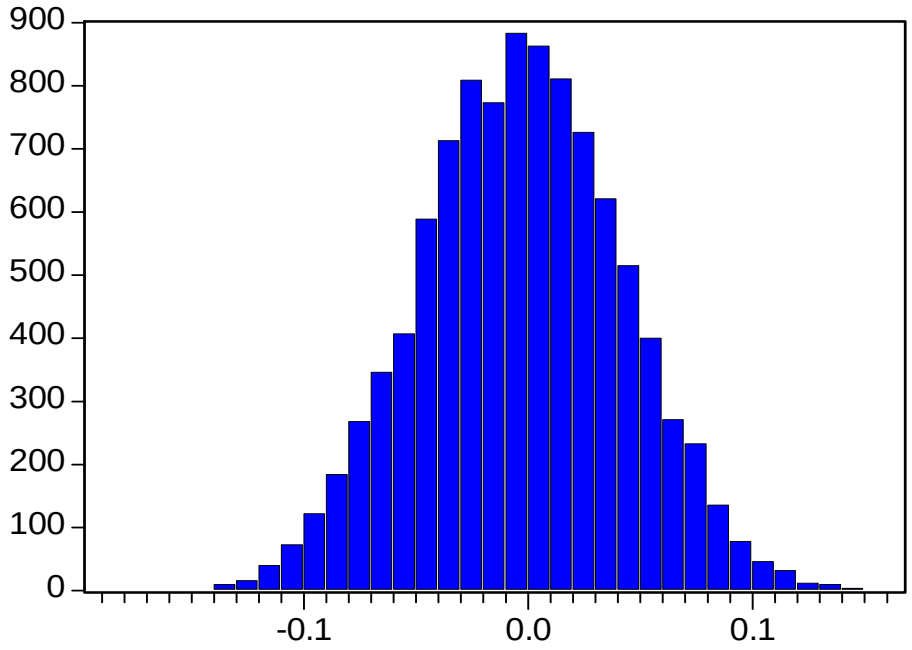
Table 5.3

| Empirical Distribution Test for RATIOINV | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.455513 | 45.60644 | 0.0000 | |
| Kolmogorov (D-) | 0.453918 | 45.44674 | 0.0000 | |
| Kolmogorov (D) | 0.455513 | 45.60644 | 0.0000 | |
| Kuiper (V) | 0.909431 | 91.08619 | 0.0000 | |
| Cramer-von Mises (W2) | 745.0039 | 745.0783 | 0.0000 | |
| Watson (U2) | 744.9940 | 745.0536 | 0.0000 | |
| Anderson-Darling (A2) | 1262278. | 1262278. | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | 0.088627 | * | NA | NA |
| SIGMA | 0.001000 | * | NA | NA |
| Log likelihood | NA | Mean dependent var. | | 0.088627 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.026323 |
| * Fixed parameter value | | | | |

## 5.5 Government consumption to GDP ratio

### 5.5.1 Bootstrapped coefficient in the SADC growth regression

Figure 5.5: EDF of the coefficient for the Government Consumption to GDP ratio in SADC




### 5.5.1 Results of the empirical distribution tests for investment to GDP ratio coefficient in the SADC growth regression

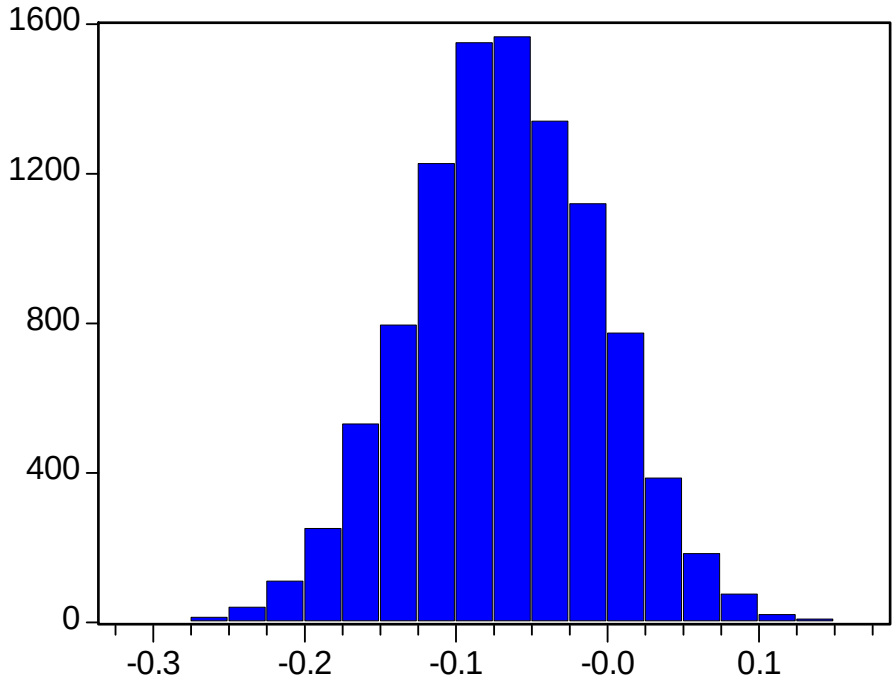
Table 5.4

| Empirical Distribution Test for RGCONS | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.449596 | 45.01409 | 0.0000 | |
| Kolmogorov (D-) | 0.450470 | 45.10158 | 0.0000 | |
| Kolmogorov (D) | 0.450470 | 45.10158 | 0.0000 | |
| Kuiper (V) | 0.900067 | 90.14834 | 0.0000 | |
| Cramer-von Mises (W2) | 734.6809 | 734.7544 | 0.0000 | |
| Watson (U2) | 734.6809 | 734.7397 | 0.0000 | |
| Anderson-Darling (A2) | 3467.926 | 3467.926 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.002870 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -9199.600 | Mean dependent var. | | -0.002870 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.045202 |
| * Fixed parameter value | | | | |

## 5.6 Secondary school enrolment

### 5.6.1 Bootstrapped coefficient in the SADC growth regression

Figure 5.6: EDF of the coefficient for the Secondary School Enrolment in SADC




### 5.6.1 Results of the empirical distribution tests for investment to GDP ratio coefficient in the SADC growth regression

Table5.5

| Empirical Distribution Test for SECENR | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.433506 | 43.40309 | 0.0000 | |
| Kolmogorov (D-) | 0.432088 | 43.26108 | 0.0000 | |
| Kolmogorov (D) | 0.433506 | 43.40309 | 0.0000 | |
| Kuiper (V) | 0.865593 | 86.69559 | 0.0000 | |
| Cramer-von Mises (W2) | 698.9899 | 699.0598 | 0.0000 | |
| Watson (U2) | 698.9899 | 699.0458 | 0.0000 | |
| Anderson-Darling (A2) | 3324.511 | 3324.511 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.067170 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -9208.889 | Mean dependent var. | | -0.067170 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.062460 |
| * Fixed parameter value | | | | |

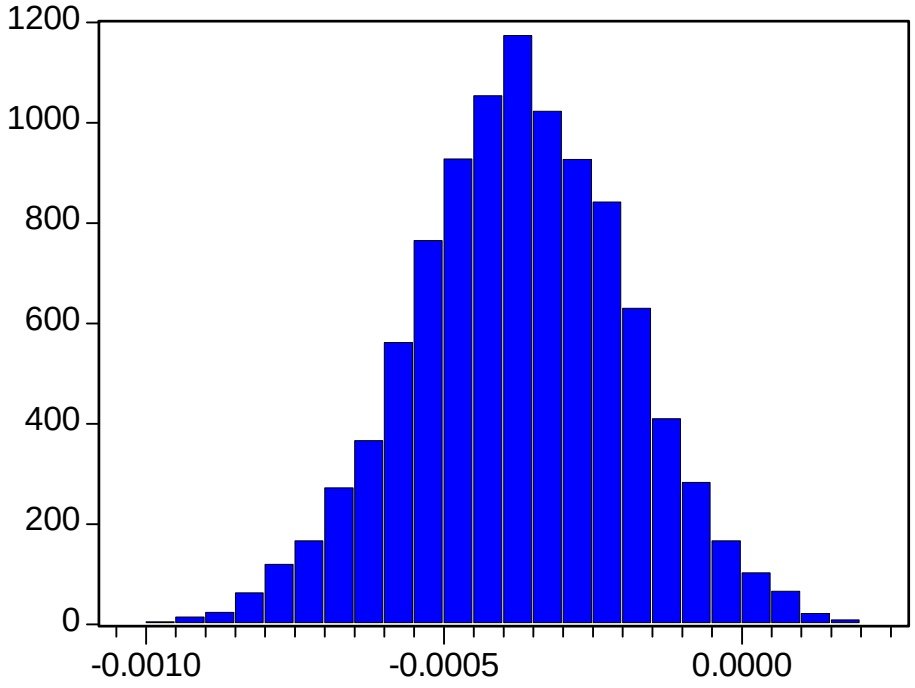
# Annexure 6: Growth Regression in West African Countries

## 6.1 Inflation

### 6.1.1 Bootstrapped coefficient in the West African growth regression

The results of the bootstrapped coefficient in the inflation show that the coefficient is right hand skewed with a mean -0.000372, implying that the reliance on the standard normal assumptions may lead to wrong conclusions on the validity of the results. The results above show that Jarque-Bera test is 6.8339 with p-value = 0.0328, rejecting the standard normality assumptions and therefore the bootstrapped results are preferable. This approach was used in analysing all the results present in this study.

Figure 6.1: EDF of the coefficient for Inflation in West Africa




### 6.1.2 Results of the empirical distribution test for the inflation coefficient in the West African growth regression

The results of the empirical distribution test on the inflation reject the standard normality ($\mu$=0 and $\sigma$=1) but the normality passes for $\mu$= -0.000372 and $\sigma$=0.0010 values based on the results shown in figure 8.1. This test justifies even further the use of bootstrapping of the LSDV regression results.

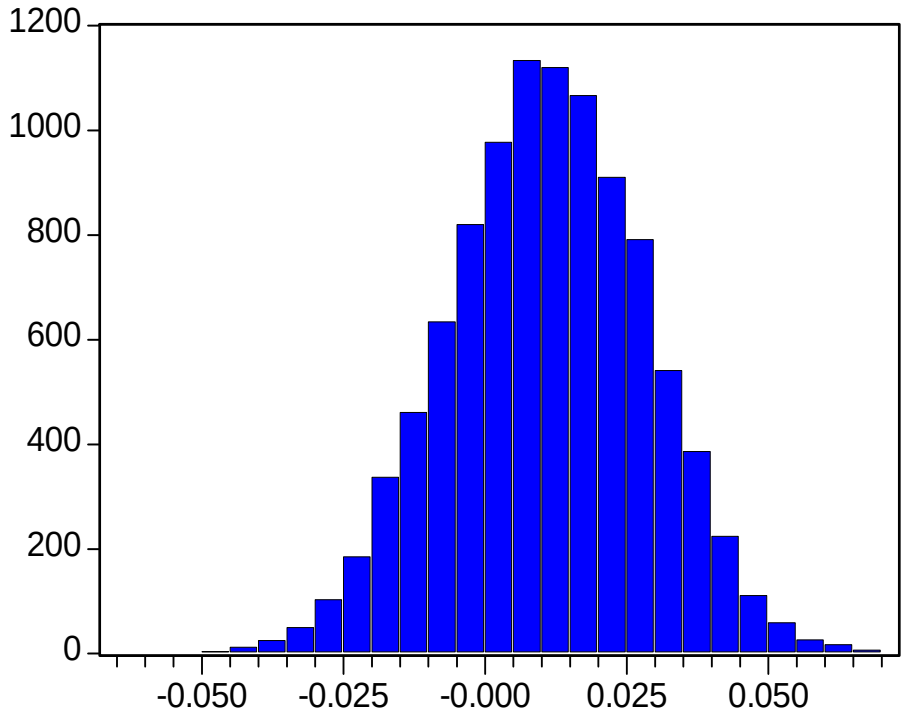
Table 6.1

| Empirical Distribution Test for INFL | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.337809 | 33.82180 | 0.0000 | |
| Kolmogorov (D-) | 0.333108 | 33.35113 | 0.0000 | |
| Kolmogorov (D) | 0.337809 | 33.82180 | 0.0000 | |
| Kuiper (V) | 0.670917 | 67.19729 | 0.0000 | |
| Cramer-von Mises (W2) | 482.1871 | 482.2353 | 0.0000 | |
| Watson (U2) | 482.1870 | 482.2256 | 0.0000 | |
| Anderson-Darling (A2) | 2436.562 | 2436.562 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.000372 | * | NA | NA |
| SIGMA | 0.001000 | * | NA | NA |
| Log likelihood | 59724.12 | Mean dependent var. | | -0.000372 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.000181 |
| * Fixed parameter value | | | | |

## 6.2 Openness

### 6.2.1 Bootstrapped coefficient in the West African growth regression

Figure 6.2: EDF of the coefficient for Openness in West Africa



### 6.2.2 Results of the empirical distribution test for the openness coefficient in the West African growth regression

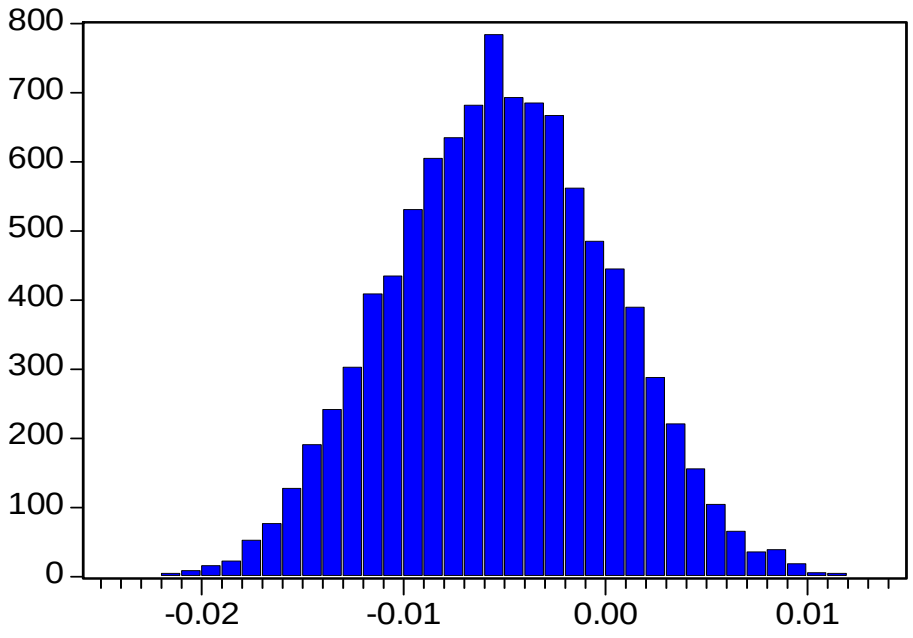
Table 6.2

| Empirical Distribution Test for OPENNESS | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.010029 | 1.004117 | 0.1331 | |
| Kolmogorov (D-) | 0.012710 | 1.272583 | 0.0392 | |
| Kolmogorov (D) | 0.012710 | 1.272583 | 0.0784 | |
| Kuiper (V) | 0.022739 | 2.277526 | 0.0012 | |
| Cramer-von Mises (W2) | 0.389690 | 0.389689 | 0.0769 | |
| Watson (U2) | 0.369109 | 0.369129 | 0.0014 | |
| Anderson-Darling (A2) | 2.847403 | 2.847403 | 0.0327 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | 0.011004 | * | NA | NA |
| SIGMA | 0.017000 | * | NA | NA |
| Log likelihood | 26322.14 | Mean dependent var. | | 0.011004 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.017394 |
| * Fixed parameter value | | | | |

## 6.3 Benefit payments to GDP ratio

### 6.3.1 Bootstrapped coefficient in the West African growth regression

Figure 6.3: EDF of the coefficient for the Benefit Payments to GDP ratio in West Africa



### 6.3.2 Results of the empirical distribution test for the benefit payment to GDP ratio coefficient in the West African growth regression

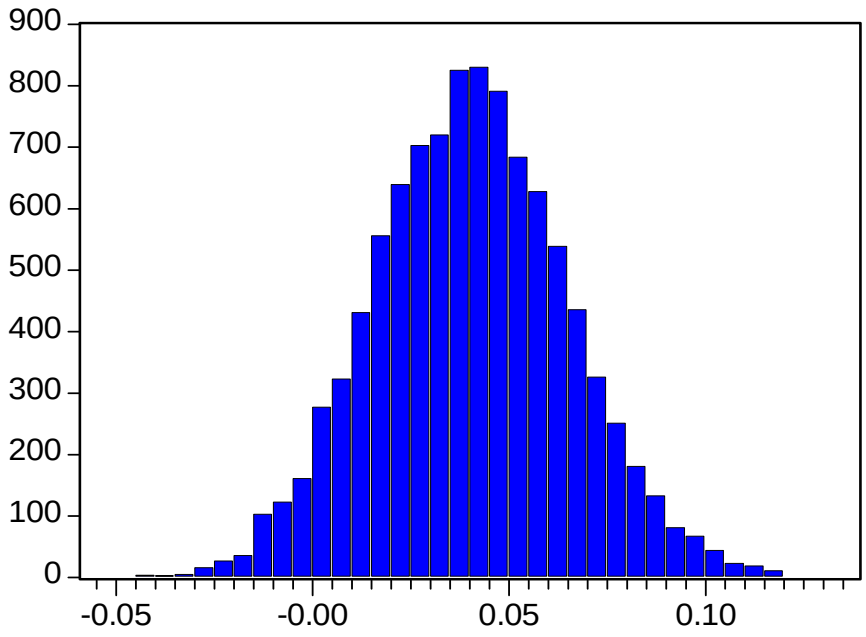
Table 6.3

| Empirical Distribution Test for RATIOBEN | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.144975 | 14.51510 | 0.0000 | |
| Kolmogorov (D-) | 0.143864 | 14.40381 | 0.0000 | |
| Kolmogorov (D) | 0.144975 | 14.51510 | 0.0000 | |
| Kuiper (V) | 0.288839 | 28.92939 | 0.0000 | |
| Cramer-von Mises (W2) | 102.1746 | 102.1848 | 0.0000 | |
| Watson (U2) | 102.1744 | 102.1826 | 0.0000 | |
| Anderson-Darling (A2) | 665.9145 | 665.9145 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.005131 | * | NA | NA |
| SIGMA | 0.010000 | * | NA | NA |
| Log likelihood | 35419.96 | Mean dependent var. | | -0.005131 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.005371 |
| | * Fixed parameter value | | | |

## 6.4 Investment to GDP ratio

### 6.4.1 Bootstrapped coefficient in the West African growth regression

Figure 6.4: EDF of the coefficient for the Investment to GDP ratio in West Africa



### 6.4.2 Results of the empirical distribution test for the investment to GDP ratio coefficient in the West African growth regression

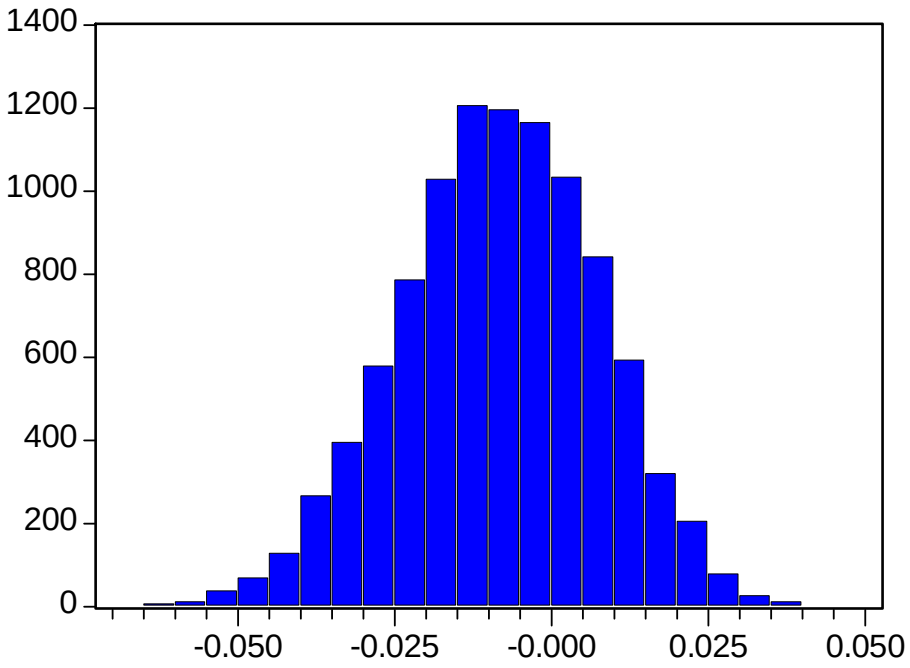
Table 6.4

| Empirical Distribution Test for RATIOINV | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.291123 | 29.14752 | 0.0000 | |
| Kolmogorov (D-) | 0.295603 | 29.59612 | 0.0000 | |
| Kolmogorov (D) | 0.295603 | 29.59612 | 0.0000 | |
| Kuiper (V) | 0.586726 | 58.76494 | 0.0000 | |
| Cramer-von Mises (W2) | 383.2492 | 383.2875 | 0.0000 | |
| Watson (U2) | 383.2491 | 383.2798 | 0.0000 | |
| Anderson-Darling (A2) | 2013.988 | 2013.988 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | 0.040413 | * | NA | NA |
| SIGMA | 0.100000 | * | NA | NA |
| Log likelihood | 13532.48 | Mean dependent var. | | 0.040413 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.024658 |
| * Fixed parameter value | | | | |

## 6.5 Government consumption to GDP ratio

### 6.5.1 Bootstrapped coefficient in the West African growth regression

Figure 6.5: EDF of the coefficient for the Government Consumption to GDP ratio in West Africa



### 6.5.2 Results of the empirical distribution test for government consumption to GDP ratio coefficient in the West African growth regression

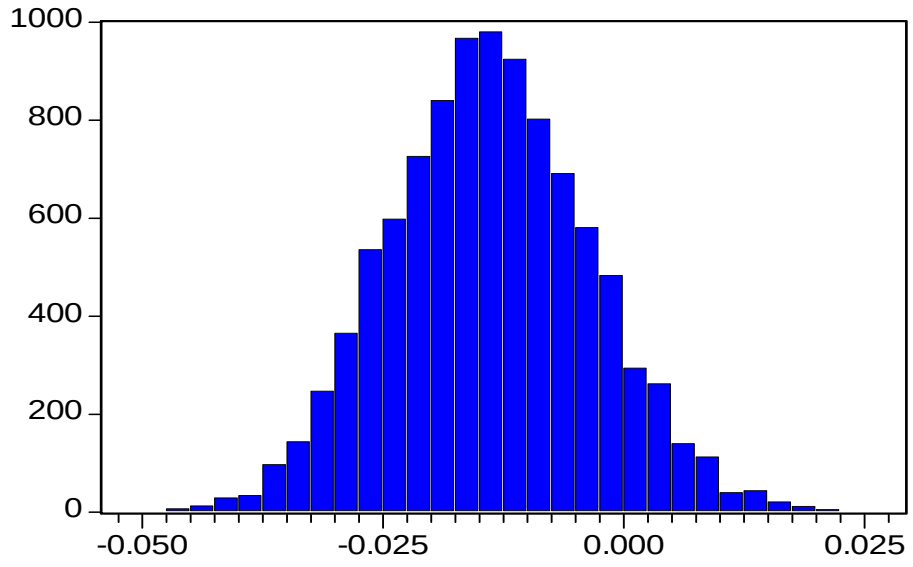
Table 6.5

| Empirical Distribution Test for RGCONS | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.358452 | 35.88859 | 0.0000 | |
| Kolmogorov (D-) | 0.350699 | 35.11233 | 0.0000 | |
| Kolmogorov (D) | 0.358452 | 35.88859 | 0.0000 | |
| Kuiper (V) | 0.709150 | 71.02666 | 0.0000 | |
| Cramer-von Mises (W2) | 517.7664 | 517.8181 | 0.0000 | |
| Watson (U2) | 517.7664 | 517.8078 | 0.0000 | |
| Anderson-Darling (A2) | 2585.780 | 2585.780 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.008346 | * | NA | NA |
| SIGMA | 0.100000 | * | NA | NA |
| Log likelihood | 13710.31 | Mean dependent var. | | -0.008346 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.015885 |
| * Fixed parameter value | | | | |

## 6.6 Secondary School Enrolment

### 6.6.1 Bootstrapped coefficient in the West African growth regression

Figure 6.6: EDF of the coefficient for Secondary School Enrolment in West Africa



### 6.6.2 Results of the empirical distribution test for government consumption to GDP ratio coefficient in the West African growth regression

Table 6.6

| Empirical Distribution Test for SECENR | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.016203 | 1.622311 | 0.0052 | |
| Kolmogorov (D-) | 0.014316 | 1.433333 | 0.0164 | |
| Kolmogorov (D) | 0.016203 | 1.622311 | 0.0104 | |
| Kuiper (V) | 0.030519 | 3.056751 | 0.0000 | |
| Cramer-von Mises (W2) | 0.863673 | 0.863719 | 0.0052 | |
| Watson (U2) | 0.796164 | 0.796218 | 0.0000 | |
| Anderson-Darling (A2) | 7.563023 | 7.563023 | 0.0003 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.013827 | * | NA | NA |
| SIGMA | 0.010000 | * | NA | NA |
| Log likelihood | 31384.43 | Mean dependent var. | | -0.013827 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.010468 |
| * Fixed parameter value | | | | |

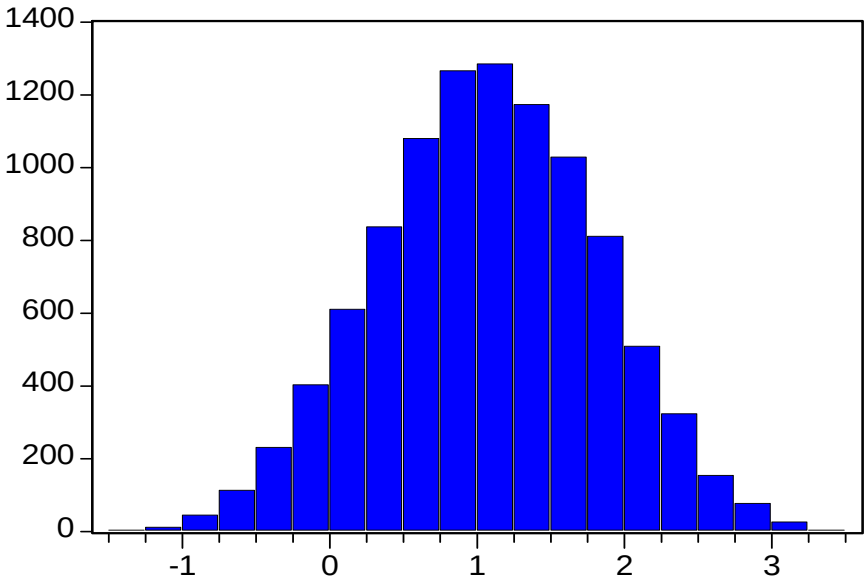
# Annexure 7: Fertility Regression in SADC Countries

## 7.1 Per capita GDP growth

### 7.1.1 Bootstrapped coefficient in the SADC fertility regression

The results of the bootstrapped coefficient in the growth of per capita GDP show that the coefficients are left hand skewed with a mean one, implying that the reliance on the standard normal assumptions may lead to wrong conclusions on the validity of the results. The results above show that Jarque-Bera test is 27.3155 with p-value = 0.00000, rejecting the standard normality assumptions and therefore the bootstrapped results are preferable. This approach was used in analysing all the results present in this study.

Figure 7.1: EDF of the coefficient for Per Capita GDP Growth in SADC




### 7.1.2 Results of the empirical distribution tests for GDPPC in the SADC fertility regression

The results of the empirical distribution test on the growth of per capita GDP reject the standard normality (μ=0 and σ=1) but the normality passes for μ=1 and σ=1 values based on the results shown in figure 9.1. This test justifies even further the use of bootstrapping of the LSDV regression results.

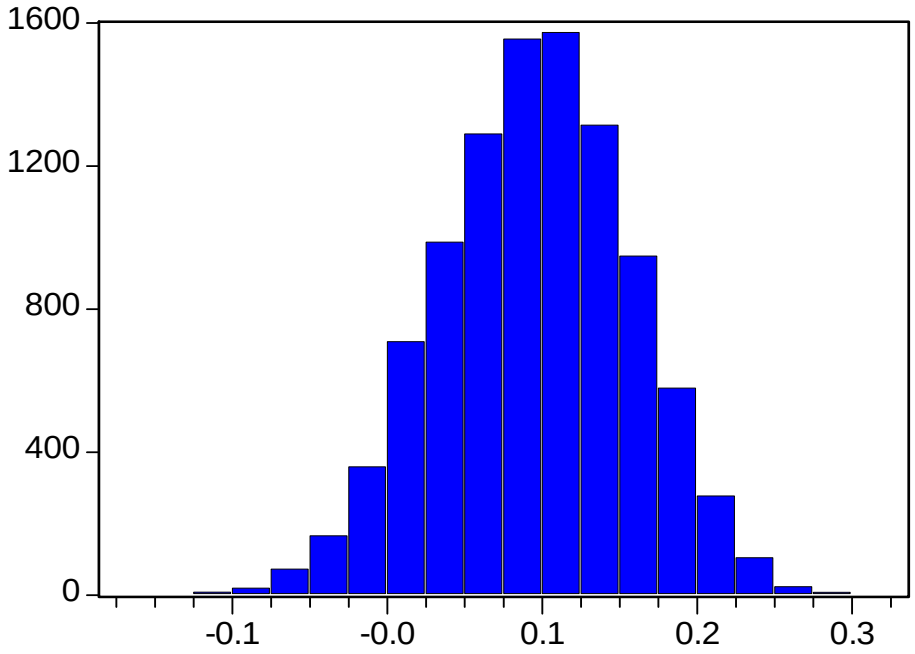
Table 7.1

| Empirical Distribution Test for GGDPPC | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.050597 | 5.065786 | 0.0000 | |
| Kolmogorov (D-) | 0.085680 | 8.578390 | 0.0000 | |
| Kolmogorov (D) | 0.085680 | 8.578390 | 0.0000 | |
| Kuiper (V) | 0.136277 | 13.64912 | 0.0000 | |
| Cramer-von Mises (W2) | 28.47549 | 28.47830 | 0.0000 | |
| Watson (U2) | 22.80651 | 22.80832 | 0.0000 | |
| Anderson-Darling (A2) | 199.0130 | 199.0130 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | 1.000000 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -12036.12 | Mean dependent var. | | 1.072872 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.751062 |
| * Fixed parameter value | | | | |

## 7.2 Benefit payments to GDP ratio

### 7.2.1 Bootstrapped coefficient in the SADC fertility regression

Figure 7.2: EDF of the coefficient for the Benefit Payments to GDP ratio in SADC




### 7.2.2 Results of the empirical distribution tests for benefit payments to GDP ratio in the SADC fertility regression

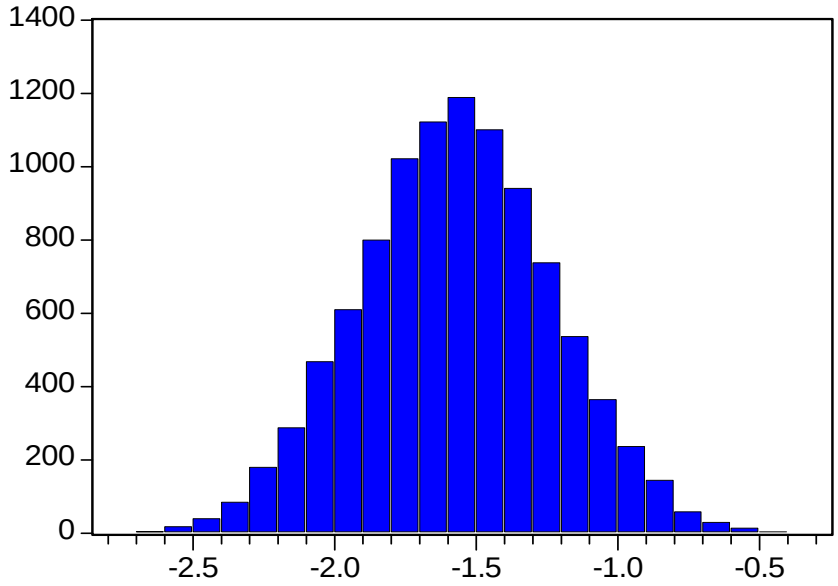
Table 7.2

| Empirical Distribution Test for RATIOBEN | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.438478 | 43.90094 | 0.0000 | |
| Kolmogorov (D-) | 0.430202 | 43.07230 | 0.0000 | |
| Kolmogorov (D) | 0.438478 | 43.90094 | 0.0000 | |
| Kuiper (V) | 0.868680 | 87.00477 | 0.0000 | |
| Cramer-von Mises (W2) | 700.3126 | 700.3826 | 0.0000 | |
| Watson (U2) | 700.2848 | 700.3408 | 0.0000 | |
| Anderson-Darling (A2) | 3329.836 | 3329.836 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | 0.100000 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -9208.535 | Mean dependent var. | | 0.095806 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.061748 |
| * Fixed parameter value | | | | |

## 7.3 Net exports to GDP ratio

### 7.3.1 Bootstrapped coefficient in the SADC fertility regression

Figure 7.3: EDF of the coefficient for the Net Exports to GDP ratio in SADC




### 7.3.2 Results of the empirical distribution tests for net exports to GDP ratio in the SADC fertility regression

Table 7.3

Empirical Distribution Test for RATIONX

Hypothesis: Normal
Sample: 1 10000
Included observations: 10000

| Method | Value | Adj. Value | Probability |
|---|---|---|---|
| Kolmogorov (D+) | 0.261557 | 26.18739 | 0.0000 |
| Kolmogorov (D-) | 0.212702 | 21.29592 | 0.0000 |
| Kolmogorov (D) | 0.261557 | 26.18739 | 0.0000 |
| Kuiper (V) | 0.474259 | 47.50053 | 0.0000 |
| Cramer-von Mises (W2) | 273.4620 | 273.4893 | 0.0000 |
| Watson (U2) | 266.3926 | 266.4139 | 0.0000 |
| Anderson-Darling (A2) | 1514.125 | 1514.125 | 0.0000 |

| Parameter | Value | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| MU | -1.500000 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |

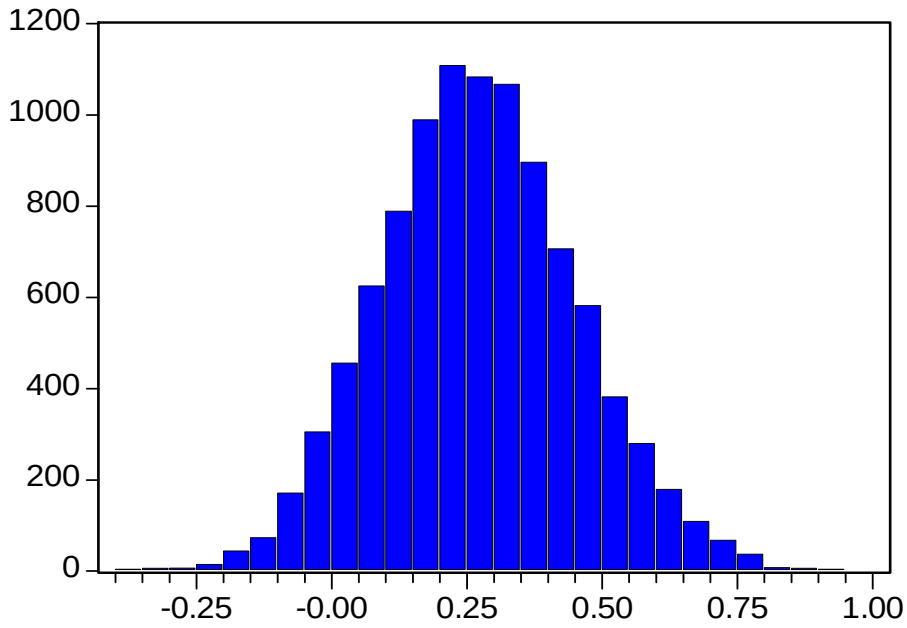
| | | | |
|---|---|---|---|
| Log likelihood | -9794.535 | Mean dependent var. | -1.570432 |
| No. of Coefficients | 0 | S.D. dependent var. | 0.340706 |

* Fixed parameter value

## 7.4 Government consumption to GDP ratio

### 7.4.1 Bootstrapped coefficient in the SADC fertility regression

Figure 7.4: EDF of the coefficient for the Government Consumption to GDP ratio in SADC




### 7.4.2 Results of the empirical distribution tests for government consumption to GDP ratio in the SADC fertility regression

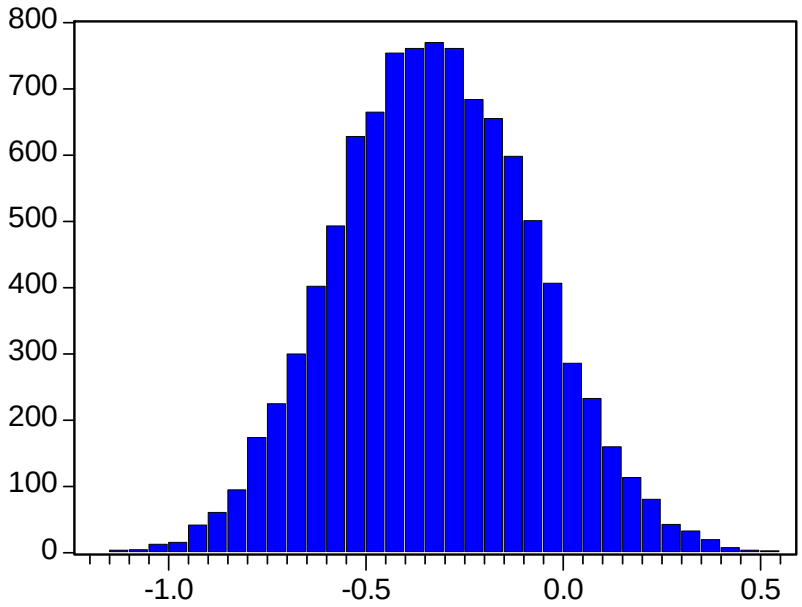
Table 7.4

| Empirical Distribution Test for RGCONS | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.323825 | 32.42174 | 0.0000 | |
| Kolmogorov (D-) | 0.351889 | 35.23156 | 0.0000 | |
| Kolmogorov (D) | 0.351889 | 35.23156 | 0.0000 | |
| Kuiper (V) | 0.675715 | 67.67782 | 0.0000 | |
| Cramer-von Mises (W2) | 482.5658 | 482.6140 | 0.0000 | |
| Watson (U2) | 481.7336 | 481.7721 | 0.0000 | |
| Anderson-Darling (A2) | 2437.582 | 2437.582 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | 0.250000 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -9356.667 | Mean dependent var. | | 0.273362 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.181422 |
| * Fixed parameter value | | | | |

## 7.5 Secondary school enrolment

### 7.5.1 Bootstrapped coefficient in the SADC fertility regression

Figure 7.5: Secondary School Enrolment




### 7.5.2 Results of the empirical distribution tests for secondary school enrolment in the SADC fertility regression

Table 7.5

| Empirical Distribution Test for SECENR | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.298450 | 29.88110 | 0.0000 | |
| Kolmogorov (D-) | 0.287180 | 28.75282 | 0.0000 | |
| Kolmogorov (D) | 0.298450 | 29.88110 | 0.0000 | |
| Kuiper (V) | 0.585630 | 58.65517 | 0.0000 | |
| Cramer-von Mises (W2) | 378.7547 | 378.7925 | 0.0000 | |
| Watson (U2) | 377.9946 | 378.0249 | 0.0000 | |
| Anderson-Darling (A2) | 1995.502 | 1995.502 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.300000 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -9501.621 | Mean dependent var. | | -0.322363 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.248904 |
| * Fixed parameter value | | | | |

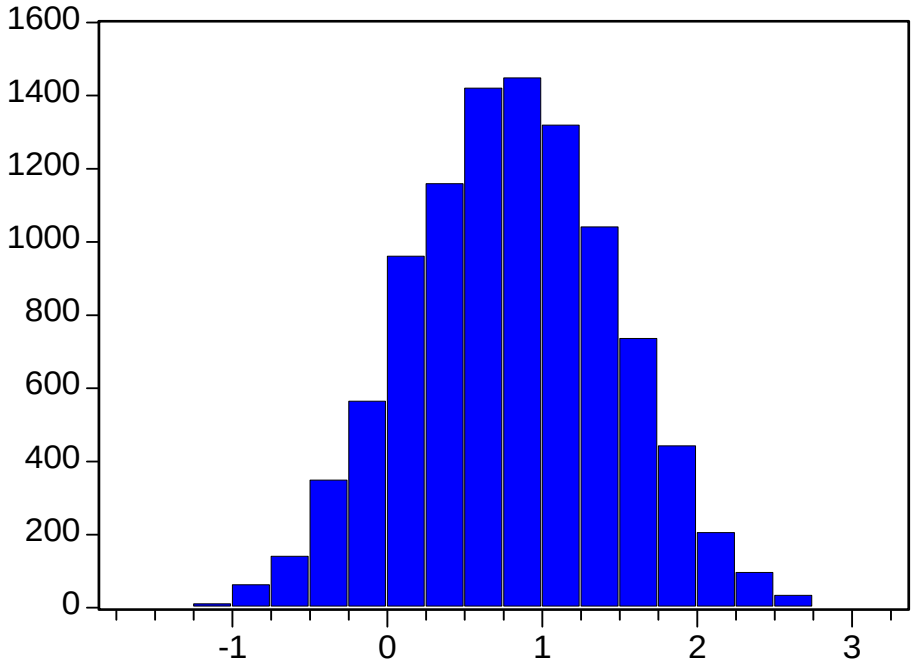
# Annexure 8: Fertility Regression in West African Countries

## 8.1 Per capita GDP growth

### 8.1.1 Bootstrapped coefficient in the West African fertility regression

The results of the bootstrapped coefficient in the growth of per capita GDP show that the coefficients are left hand skewed with a mean one, implying that the reliance on the standard normal assumptions may lead to wrong conclusions on the validity of the results. The results above shows that Jarque-Bera test is 27.0569 with p-value = 0.00000, rejecting the standard normality assumptions and therefore the bootstrapped results are preferable. This approach was used in analysing all the results present in this study.

Figure 8.1: EDF of the coefficient for Per Capita GDP Growth in West Africa




### 8.1.1 Results of the empirical distribution tests for GGDPPC in the West African fertility regression

The results of the empirical distribution test on the growth of per capita GDP reject the standard normality ($\mu$=0 and $\sigma$=1) but the normality passes for $\mu$= 0.8049 and $\sigma$=1 values based on the results shown in figure 11.1. This test justifies even further the use of bootstrapping of the LSDV regression results.

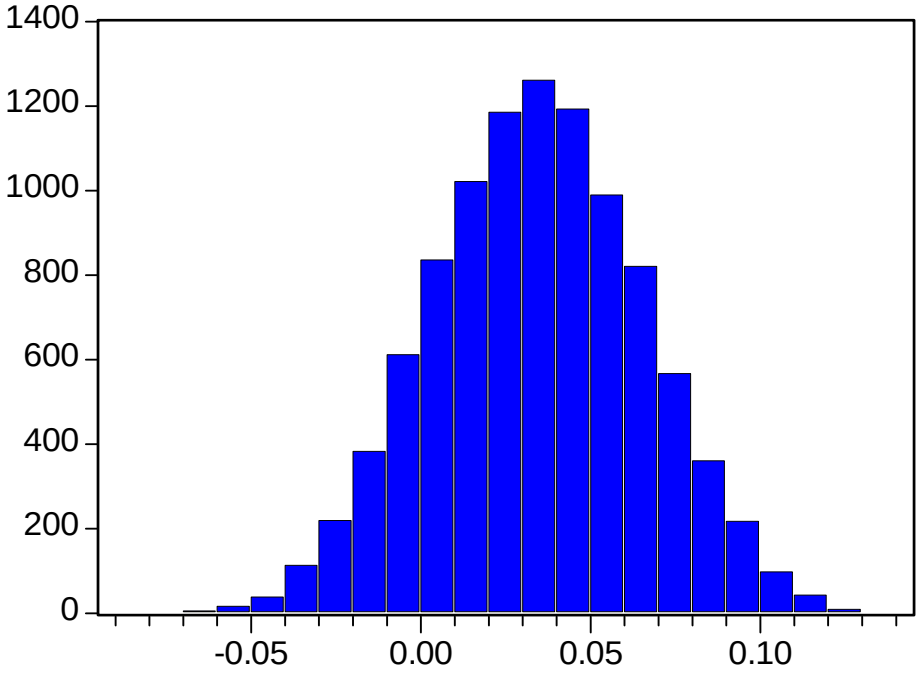
Table 8.1

| Empirical Distribution Test for GGDPPC | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.097574 | 9.769225 | 0.0000 | |
| Kolmogorov (D-) | 0.097745 | 9.786350 | 0.0000 | |
| Kolmogorov (D) | 0.097745 | 9.786350 | 0.0000 | |
| Kuiper (V) | 0.195319 | 19.56267 | 0.0000 | |
| Cramer-von Mises (W2) | 45.69361 | 45.69814 | 0.0000 | |
| Watson (U2) | 45.69349 | 45.69714 | 0.0000 | |
| Anderson-Darling (A2) | 331.9080 | 331.9080 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | 0.804900 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -11376.70 | Mean dependent var. | | 0.804856 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.661443 |
| * Fixed parameter value | | | | |

## 8.2 Benefit payments to GDP ratio

### 8.2.1 Bootstrapped coefficient in the West African fertility regression

Figure 8.2: EDF of the coefficient for the Benefit Payments to GDP ratio in West Africa



### 8.2.1 Results of the empirical distribution tests benefit payment to GDP ratio in the West African fertility regression

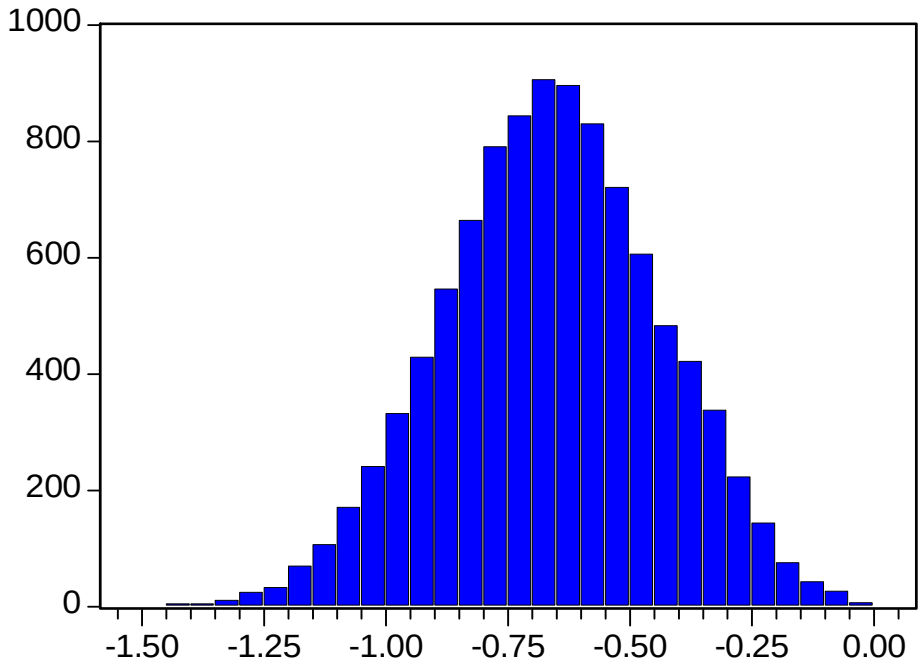
Table 8.2

| Empirical Distribution Test for RATIOBEN | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.464897 | 46.54600 | 0.0000 | |
| Kolmogorov (D-) | 0.465079 | 46.56427 | 0.0000 | |
| Kolmogorov (D) | 0.465079 | 46.56427 | 0.0000 | |
| Kuiper (V) | 0.929976 | 93.14403 | 0.0000 | |
| Cramer-von Mises (W2) | 764.6216 | 764.6980 | 0.0000 | |
| Watson (U2) | 764.6216 | 764.6828 | 0.0000 | |
| Anderson-Darling (A2) | 3587.964 | 3587.964 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | 0.034443 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -9194.214 | Mean dependent var. | | 0.034431 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.031078 |
| * Fixed parameter value | | | | |

## 8.3 Net exports to GDP ratio

### 8.3.1 Bootstrapped coefficient in the West African fertility regression

Figure 8.3: EDF of the coefficient for the Net Exports to GDP ratio in West Africa



### 8.3.1 Results of the empirical distribution tests for the net exports to GDP ratio in the West African fertility regression

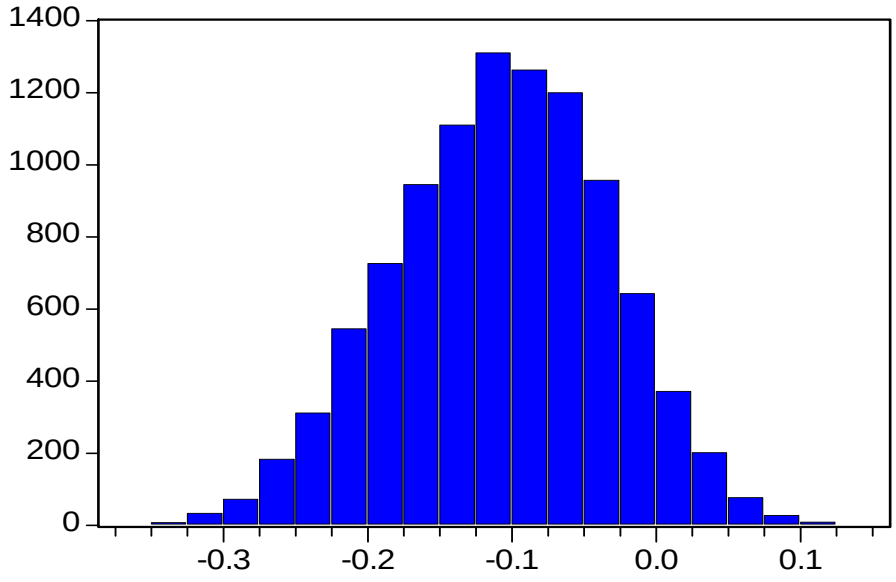
Table 8.3

| Empirical Distribution Test for RATIONX | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.310704 | 31.10805 | 0.0000 | |
| Kolmogorov (D-) | 0.307061 | 30.74326 | 0.0000 | |
| Kolmogorov (D) | 0.310704 | 31.10805 | 0.0000 | |
| Kuiper (V) | 0.617765 | 61.87373 | 0.0000 | |
| Cramer-von Mises (W2) | 416.0030 | 416.0445 | 0.0000 | |
| Watson (U2) | 416.0029 | 416.0362 | 0.0000 | |
| Anderson-Darling (A2) | 2156.643 | 2156.643 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.661426 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -9437.505 | Mean dependent var. | | -0.661426 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.222775 |
| * Fixed parameter value | | | | |

## 8.4 Government consumption to GDP ratio

### 8.4.1 Bootstrapped coefficient in the West African fertility regression

Figure 8.4: EDF of the coefficient for the Government Consumption to GDP ratio in West Africa



### 8.4.1 Results of the empirical distribution tests government consumption to GDP ratio in the West African fertility regression

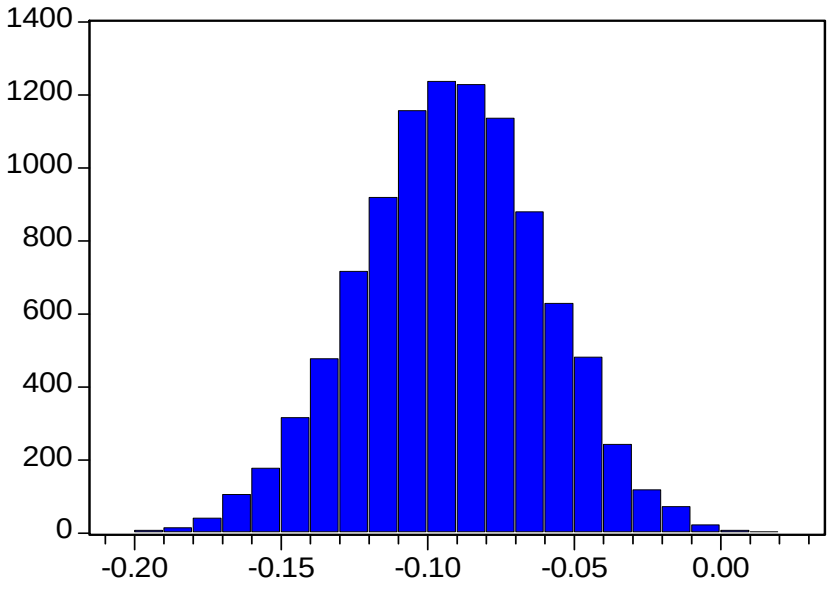
Table 8.4

| Empirical Distribution Test for RGCONS | | | | |
|---|---|---|---|---|
| Hypothesis: Normal | | | | |
| Sample: 1 10000 | | | | |
| Included observations: 10000 | | | | |
| Method | Value | Adj. Value | Probability | |
| Kolmogorov (D+) | 0.426416 | 42.69327 | 0.0000 | |
| Kolmogorov (D-) | 0.422116 | 42.26277 | 0.0000 | |
| Kolmogorov (D) | 0.426416 | 42.69327 | 0.0000 | |
| Kuiper (V) | 0.848533 | 84.98684 | 0.0000 | |
| Cramer-von Mises (W2) | 674.7023 | 674.7697 | 0.0000 | |
| Watson (U2) | 674.7023 | 674.7563 | 0.0000 | |
| Anderson-Darling (A2) | 3226.733 | 3226.733 | 0.0000 | |
| Parameter | Value | Std. Error | z-Statistic | Prob. |
| MU | -0.107058 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |
| Log likelihood | -9216.854 | Mean dependent var. | | -0.107058 |
| No. of Coefficients | 0 | S.D. dependent var. | | 0.074124 |
| * Fixed parameter value | | | | |

## 8.5 Secondary school enrolment

### 8.5.1 Bootstrapped coefficient in the West African fertility regression

Figure 8.5: EDF of the coefficient for Secondary School Enrolment in West Africa



### 8.5.1 Results of the empirical distribution tests for secondary school enrolment in the West African fertility regression

Table 8.5

Empirical Distribution Test for SECENR

Hypothesis: Normal
Sample: 1 10000
Included observations: 10000

| Method | Value | Adj. Value | Probability |
|---|---|---|---|
| Kolmogorov (D+) | 0.463964 | 46.45257 | 0.0000 |
| Kolmogorov (D-) | 0.462887 | 46.34480 | 0.0000 |
| Kolmogorov (D) | 0.463964 | 46.45257 | 0.0000 |
| Kuiper (V) | 0.926851 | 92.83102 | 0.0000 |
| Cramer-von Mises (W2) | 763.7816 | 763.8579 | 0.0000 |
| Watson (U2) | 763.7816 | 763.8427 | 0.0000 |
| Anderson-Darling (A2) | 3584.593 | 3584.593 | 0.0000 |

| Parameter | Value | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| MU | -0.091714 | * | NA | NA |
| SIGMA | 1.000000 | * | NA | NA |

| | | | |
|---|---|---|---|
| Log likelihood | -9194.376 | Mean dependent var. | -0.091714 |
| No. of Coefficients | 0 | S.D. dependent var. | 0.031595 |

* Fixed parameter value