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and  
Visiting Fellow, University of Chicago

# Social Security Administration

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**October, 2024**

## Current Research Papers at

- Webpage: [Dr. Lakshmi K. Raut \(lakshmiraut.netlify.app\)](http://lakshmiraut.netlify.app)
- Alternative: [Dr. Lakshmi K. Raut \(lakshmiraut.github.io\)](http://lakshmiraut.github.io)
- **SSRN:** <http://ssrn.com/author=41951>
- **Google Scholar:** <http://scholar.google.com/citations?user=RNIYZsEAAAJ&hl=en>
- **Research Gate:** [https://www.researchgate.net/profile/Lakshmi\\_Raut](https://www.researchgate.net/profile/Lakshmi_Raut)

**CITIZENSHIP: U.S. A.**

## RESEARCH AREAS

*Machine Learning, Microeconomics, Health and Human Capital, Ageing; International Capital Flows, Industrial Exports and R&D; Economic Growth and Development;*

***COURSES TAUGHT (UCSD, AND UHM, Yale, CSUF)***

- **(Graduate Courses)** *Microeconomic Theory; Development Economics; Labor Economics; Mathematics for Economists.*
- **(Undergraduate Courses)** *Labor Economics; Development Economics; International Trade; Economic Growth; Econometrics; Economics of Population Growth; Linear and Non-Linear Programming.*

## EDUCATION

- Ph.D. [Economics], 1985, Yale University, New Haven, CT.
- M. Phil. [Economics], 1983, Yale University, New Haven, CT.
- M. A. [Economics], 1982, Yale University, New Haven, CT.
- M. Stat. [Econometrics and Planning], 1978, Indian Statistical Institute, Calcutta, India.
- B. Sc. [Honors in Statistics], 1975, University of Calcutta, India.

## FELLOWSHIPS, HONORS, AND AWARDS

- Performance Award, February 7, 2019, Office of Program Evaluation and Modeling, US Social Security Administration
- Performance Award, June 21, 2018, Office of Program Evaluation and Modeling, US Social Security Administration
- Performance Award, July 19, 2017, Office of Program Evaluation and Modeling, US Social Security Administration
- Who's Who in America, 2007-!
- Pacific Rim Research Grant, 1990-1991, Office of the President, University of California, Berkeley.
- Hewlett Post Doctorate Fellowship, 1986-1987, University of Chicago.
- Yale Fellowship, 1980-1984.
- Junior Research Fellowship, 1978-1980, Indian Statistical Institute, New Delhi, India.
- National Scholarship, 1976-1978, being second out of 105 students in the B.Sc. Honors Examination, Department of Statistics, University of Calcutta, India.
- Valedictorian of the graduating Class of 1978 at the Indian Statistical Institute, Calcutta, India.
- Valedictorian of the graduating Class of 1975 at the University of Calcutta, Calcutta, India.

### ***PROFESSIONAL AFFILIATIONS***

American Economic Association, Econometric Society, Society for Promotion of Economic Theory, European Society for Population Economics, Royal Economic Society

### ***EDITORIAL SERVICES***

- **Editorial Board**, Associate Editor for Studies in Microeconomics, Journal of Microeconomics (discontinued now) Journal of Education Quality, International Society for Education
- **Refereed for:** Econometrica, American Economic Review, Economic Journal, Journal of Political Economy, International Economic Review, Journal of Development Economics, Review of Development Economics, Journal of Population Economics, Journal of Economic Theory, Economic Theory, Journal of Human Resources, Scandinavian Journal of Economics, Review of Economics and Statistics, Contemporary Economic Policy, Studies in Microeconomics, B.E. Journal of Theoretical Economics, Nature Computational Science

### ***POSITIONS***

|                              |  |
|------------------------------|--|
| 2017-                        | Visiting Fellow, University of Chicago, Center for the Economics of Human Development<br>1126 E. 59th St., Chicago, IL 60637, USA              |
| 2016-2018<br>Udaipur, India. | (One month each year) Visiting Professor, Indian Institute of Management (IIM)   |
| 2004-                        | Economist, Social Security Administration.   |
| 2000-2005                    | Associate Professor, California State University at Fullerton.   |
| 1999-2000                    | Visiting Fellow, (teaching), Department of Economics, Yale University.   |
| 1998-1999                    | Research Associate, Department of Economics, University of Chicago.  |
| 1997                         | (summer) Visiting fellow at the Rand Corporation, Santa Monica, USA.   |
| 1995-1998                    | Associate Professor, University of Hawaii-Manoa, Department of Economics.  |
| 1994,95,96                   | (summer) Visiting (Teaching) Professor, Center for International Economics, Faculty of Economics, Chulalongkorn University, Bangkok, Thailand. |
| 1992                         | (January-June) Visitor, University of Pennsylvania.  |

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|-----------|---|
| 1990      | (summer), Visiting Scientist, joint appointment Stat-Math, and Economic Research Unit, Indian Statistical Institute, Calcutta.  |
| 1987-1995 | Assistant Professor, University of California - San Diego.  |
| 1986-1987 | Hewlett Post Doctorate Fellow, Economic Research Center/NORC, University of Chicago.  |
| 1985-1986 | Consultant, DRDDS, The World Bank, Washington, D.C. Project title: "Determinants of Savings in LDCs -- A Comparative Study". Main supervisor: Surjit Bhalla.  |
| 1984-1985 | Researcher, DRDEI, The World Bank, Washington, D.C., Project on rural income distribution. Main supervisor: Deepak Mazumdar.  |
| 1983-1984 | Consultant, The World Bank, New Delhi, India. Project title: "Country Report". Main supervisor: Roger Grawe.  |
| 1981-1983 | Research Assistant, a National Science Foundation project on "International and Domestic Determinants of LDC Technology Choice: Contrasting Agriculture and Industrial Experience", (my work was on India), Yale University. Main supervisor: Robert Evenson. |

## **PUBLICATIONS**

### **Books**

1. "Trade, Growth and Development: Essays in honor of Professor T.N. Srinivasan", (joint *editor*, *Gustav Ranis*), Elsevier Science B.V., North-Holland, Amsterdam, 1999.
2. "Theory of Games and its Applications to Economics and Politics", (*jointly with Lloyd Shapley*), Macmillan, New Delhi, India, 1981.

### **Published Papers (ordered chronologically):** [\(Click on the link to view the paper\)](#)

1. Lakshmi K Raut (2024). "[Determinants and Predictions of Risks of Diseases in Mid Ages: Logistic Regression Models versus Deep Neural Network Models.](#)" Chapter 12 in (eds) Probal Ghosh et al. (2024), "Practical Economic Analysis and Computation: A Festschrift in Honor of Professor Kirit Parikh", Springer Nature. Final draft URL: [https://lakshmiraut.netlify.app/publication/workpaper/2024-10-23\\_early\\_childhood\\_factors\\_and\\_health/](https://lakshmiraut.netlify.app/publication/workpaper/2024-10-23_early_childhood_factors_and_health/)
2. "Long-term Effects of Preschool on School Performance, Earnings and Social Mobility," *Studies in Microeconomics*, SAGE Publications, 2018, 6, 24-49, DOI: <https://doi.org/10.1177/2321022218802023>.
3. "Intergenerational Long Term Effects of Preschool - Structural Estimates from a Discrete Dynamic Programming Model," (jointly with James J. Heckman), *Journal of Econometrics*, Volume 191, Issue 1, March 2016, Pages 164-175, url: [10.1016/j.jeconom.2015.10.001](https://doi.org/10.1016/j.jeconom.2015.10.001); also NBER Discussion Paper: <http://www.nber.org/papers/w19077>.

4. "Exits From Disability: Estimates from a Competing Risk Model," *Social Security Bulletin*, 2017, Vol. 77 No. 3, <https://www.ssa.gov/policy/docs/ssb/v77n3/v77n3p15.html>
5. "Cost-effectiveness, Competitiveness and Export Performance of Indian Private Firms," *Studies in Microeconomics*, Vol. 5(1):1-21, 2017. url: [10.1177/2321022216670236](https://doi.org/10.1177/2321022216670236).
6. "Education and Economic Growth: A Comparative Study of China and India," (Chapter 12, in the conference proceedings, Pradeep Agrawal (editor), "Sustaining High Growth in India"), Cambridge University Press, New York. <https://doi.org/10.1017/9781316855584.014>
7. "Family Expansion and Capital Accumulation of a Dynasty," (jointly with Kazuo Nishimura), *Studies in Microeconomics*, Vol 1(1):221-234, 2013. <http://dx.doi.org/10.1177/2321022213501260>
8. "Home Ownership and School Outcomes of Children: Evidence from PSID Child Development Supplement," (jointly with Lisa Mohanty), *American Journal of Economics and Sociology*, Vol. 68, No 2 (April, 2009). <http://dx.doi.org/10.1111/j.1536-7150.2009.00635.x>
9. "Two sided Altruism, Lindahl Equilibrium and Pareto Efficiency in Overlapping Generations Models," *Economic Theory*, Volume 27, Number 3, 729 – 736, April 2006. <http://dx.doi.org/10.1007/s00199-004-0562-9>
10. "School Choice and Intergenerational Poverty Trap" (jointly with Kazuo Nishimura), *Review of Development Economics*, 2006. <http://dx.doi.org/10.1111/j.1467-9361.2007.00411.x>
11. "Parental Human Capital Investment and Old-age transfers from Children: Is it a loan contract or reciprocity for Indonesian Families?" (Jointly with Lien H. Tran), *Journal of Development Economics*, Volume 77:389-414, August 2005. <http://dx.doi.org/10.1016/j.jdeveco.2004.04.003>
12. "Ageing and Elderly Care in an Open Economy," (jointly with Koichi Hamada) in (eds.) Koichi Hamada and Hiromi Kato, "Ageing and the Labor Market in Japan", Edward Elgar Publishing, 2007, 75-90, <http://dx.doi.org/10.4337/9781847204240.00011>
13. "Immigration or Foreign Investment to Cope with Aging Crises of an Aging Open Economy," in (eds.) Koichi Hamada and Hiromi Kato, "Ageing and the Labor Market in Japan," Edward Elgar Publishing, 2007, 91-120. <http://dx.doi.org/10.4337/9781847204240.00012>
14. "Firm's R&D under Rational Expectations," *Indian Economic Review*, 2005, vol. 40(2): 127-144, <http://www.jstor.org/stable/29793840>

15. "Effects of R&D and Competitiveness on Exports of Indian Private Firms," *Indian Economic Journal*, Vol.50 No. 3&4, 2004.  
[https://www.researchgate.net/publication/263661920\\_Effects\\_of\\_RD\\_and\\_Competitiveness\\_on\\_Exports\\_of\\_Indian\\_Private\\_Firms](https://www.researchgate.net/publication/263661920_Effects_of_RD_and_Competitiveness_on_Exports_of_Indian_Private_Firms)
16. "R&D Investment in Evolving Market Conditions," *Investment Management and Financial Innovations*, vol.1:119-133, 2004.  
[http://www.businessperspectives.org/journals\\_free/imfi/2004/imfi\\_en\\_2004\\_01\\_Raut.pdf](http://www.businessperspectives.org/journals_free/imfi/2004/imfi_en_2004_01_Raut.pdf)
17. "Competitiveness, Productivity and Export Performance of Indian Private Firms", *Applied Econometrics and Economic Development*, Vol. 3(3), 2003, pp.25-48.  
<http://www.usc.es/economet/reviews/aeid332.pdf>
18. "Complementarities between exports and human capital in economic growth: evidence from the semi-industrialized countries" (jointly with Andrew Levin) reprinted in (eds) Sir Hans Singer, Neelambar Hatti and Rameshwar Tandon, "Trade and Growth : Models and Methods : Vol. 20, Chapter 26", Delhi, B.R. Publishing Corporation, 2002, xxxv, 1727 p., tables, figs., ISBN 81-7646-228-4
19. "An analysis of Thailand's capital flows," (jointly with W. Paitoon , T.Bangorn, and C. Bundit) in (eds.) J. Behrmann, M. Dutta, S. L. Husted, P. Sumalee, C. Suthiphand "Restructuring Asian Economies for the New Millennium : Volume 9B", November 2001.  
[https://lakshmiraut.netlify.app/publication/published/2001-01-01\\_an\\_analysis\\_of\\_thailandas\\_ca/](https://lakshmiraut.netlify.app/publication/published/2001-01-01_an_analysis_of_thailandas_ca/)
20. "Reciprocity with two-sided altruism in intergenerational transfers: evidence from Indonesian Family Life survey Data," (jointly with Lien H. Tran) in the Proceedings of International Conference on "Economics of Reciprocity, Gift-giving and Altruism", Macmillan, 2000. [https://doi.org/10.1007/978-1-349-62745-5\\_17](https://doi.org/10.1007/978-1-349-62745-5_17)
21. "Aumann-Shapley Random Order Values of Non-atomic Games," *Fields Institute Communications*, American Mathematical Society (AMS), Vol. 23, 1999, pp.121-136.  
[https://lakshmiraut.netlify.app/publication/published/1999-01-01\\_aumann-shapley\\_random\\_order\\_va/](https://lakshmiraut.netlify.app/publication/published/1999-01-01_aumann-shapley_random_order_va/)
22. "Endogenous fertility and Growth Dynamics," (jointly with Kazuo Nishimura) in (eds.) G. Ranis and L.K. Raut, "Trade, Growth and Development: Essays in honor of Professor T.N. Srinivasan", Elsevier Science B.V., pp.39-53.  
[https://lakshmiraut.netlify.app/publication/published/1999-01-01\\_endogenous\\_fertility\\_and\\_growt/](https://lakshmiraut.netlify.app/publication/published/1999-01-01_endogenous_fertility_and_growt/)
23. "Introduction," (jointly with G. Ranis) in (eds.) G. Ranis and L.K. Raut, "Trade, Growth and Development: Essays in honor of Professor T.N. Srinivasan", Elsevier Science B.V., Amsterdam in 1999.

24. "Growth Models with Endogenous Population: A General Framework," (*jointly with Marc Nerlove*), in Mark Rosenzweig and Oded Stark (eds), *Handbook of Family and Population Economics*, North-Holland Elsevier, Amsterdam, 1997, pp.1117-1174.  
[http://dx.doi.org/10.1016/S1574-003X\(97\)80012-8](http://dx.doi.org/10.1016/S1574-003X(97)80012-8)
25. "Complementarities between Exports and Human Capital in Economic Growth: Evidence from the Semi-industrialized countries," (*jointly with Andrew Levin*), *Economic Development and Cultural Change*, vol. 46(1):155-174, October 1997.  
<http://www.jstor.org/stable/10.1086/452325>
26. "Construction of Haar measure on projective limit group and random order value of non-atomic games," *Journal of Mathematical Economics*, volume 27 issue 2, pp. 229-250, February 1997. [http://dx.doi.org/10.1016/S0304-4068\(96\)00753-7](http://dx.doi.org/10.1016/S0304-4068(96)00753-7)
27. "Old-age Security and Gender Preference Hypotheses: A Duration Analysis of Malaysian Family Life Survey Data," *Journal of Quantitative Economics*, Vol. 12(1):81-104, January 1996.
28. "R&D Spillover and Productivity Growth: Evidence from Indian Private Firms," *Journal of development Economics*, Vol.48:1-23, 1995.  
[http://dx.doi.org/10.1016/0304-3878\(95\)00028-3](http://dx.doi.org/10.1016/0304-3878(95)00028-3)
29. "Dynamics of Endogenous Growth," (*jointly with T.N. Srinivasan*), *Economic Theory*, vol.4: 777-790, 1994. <http://dx.doi.org/10.1007/bf01212030>
30. "Per Capita Income Growth, Social Expenditures and Living Standards: Evidence from Rural India," *Journal of Asian Economics*, vol.4(1):59-76, 1993.  
[http://dx.doi.org/10.1016/1049-0078\(93\)90006-X](http://dx.doi.org/10.1016/1049-0078(93)90006-X)
31. "Theories of Long-Run Growth: Old and New," (*Jointly with T.N. Srinivasan*), in (eds) Kausik Basu, Mukul Majumdar and Tapan Mitra (eds) "Capital, Investment and Development" Basil Blackwell, 1993. [Theories of Long-Run Growth: Old and New | Dr. Lakshmi K. Raut \(lakshmiraut.netlify.app\)](http://www.lakshmiraut.netlify.app/publication/published/1992-01-01-demographic-links-to-savings-i/)
32. Demographic Links to Savings in Life Cycle Models: Identification of Issues for LDCs," *The Indian Economic Journal*, vol.40, No. 1, 116-138, July 1992.  
<https://lakshmiraut.netlify.app/publication/published/1992-01-01-demographic-links-to-savings-i/>
33. "Effects of Social Security on Fertility and Saving: An Overlapping Generations Model," *Indian Economic Review*, vol.27 (1):25-43, 1992. <http://www.jstor.org/stable/42657366>
34. "Capital Accumulation, Income Distribution, and Endogenous Fertility in an Overlapping Generations General Equilibrium Model," *Journal of Development Economics*, vol. 34 No1/2, 1990. [http://dx.doi.org/10.1016/0304-3878\(90\)90079-Q](http://dx.doi.org/10.1016/0304-3878(90)90079-Q)

35. "Determinants of Consumption and Savings Behavior in Developing Countries," (jointly with Arvind Virmani), *World Bank Economic Review*, Vol.3, no.3, September 1989. <http://dx.doi.org/10.1093/wber/3.3.379>
36. "R & D Behavior of Indian Firms: A Stochastic Control Model," *Indian Economic Review*, Vol. XXIII, no.2, 207-229, July-December 1988. <http://www.jstor.org/stable/29793488>
37. "Myopic Topologies on General Commodity Spaces," *Journal of Economic Theory*, Vol.39, no.2, 358-367, August 1986. [http://dx.doi.org/10.1016/0022-0531\(86\)90050-5](http://dx.doi.org/10.1016/0022-0531(86)90050-5)

### ***Published Papers (arranged by research areas)***

## **Empirical**

1. "[Determinants and Predictions of Risks of Diseases in Mid Ages: Logistic Regression Models versus Deep Neural Network Models.](#)" Chapter 12 in (eds) Probal Ghosh et al. (2024), "Practical Economic Analysis and Computation: A Festschrift in Honor of Professor Kirit Parikh", Springer Nature. Final draft URL: [https://lakshmiraut.netlify.app/publication/workpaper/2024-10-23\\_early\\_childhood\\_factors\\_and\\_health/](https://lakshmiraut.netlify.app/publication/workpaper/2024-10-23_early_childhood_factors_and_health/)
2. "Intergenerational Long Term Effects of Preschool - Structural Estimates from a Discrete Dynamic Programming Model," (jointly with James J. Heckman), *Journal of Econometrics*, Volume 191, Issue 1, March 2016, Pages 164-175, doi: [10.1016/j.jeconom.2015.10.001](https://doi.org/10.1016/j.jeconom.2015.10.001); also NBER Discussion Paper: <http://www.nber.org/papers/w19077>.
3. "Long-term Effects of Preschool on School Performance, Earnings and Social Mobility," *Studies in Microeconomics*, SAGE Publications, 2018, 6, 24-49, DOI: <https://doi.org/10.1177/2321022218802023>.
4. Exits From Disability: Estimates From A Competing Risk Model," *Social Security Bulletin*, 2017, Vol. 77 No. 3, <https://www.ssa.gov/policy/docs/ssb/v77n3/v77n3p15.html>.
5. "Cost-effectiveness, Competitiveness and Export Performance of Indian Private Firms," *Studies in Microeconomics*, Vol. 5(1):1-21, 2017. url: [10.1177/2321022216670236](https://doi.org/10.1177/2321022216670236).
6. "Education and Economic Growth: A Comparative Study of China and India," (forthcoming, Chapter 9, in the conference proceedings, ed. Pradeep Agrawal, "Policies for Sustaining High Growth in India"), Cambridge University Press, New York. <https://doi.org/10.1017/9781316855584.014>



7. "Home Ownership and School Outcomes of Children: Evidence from PSID Child Development Supplement," (jointly with Lisa Mohanty), American Journal of Economics and Sociology, Vol. 68, No 2 (April, 2009). <http://dx.doi.org/10.1111/j.1536-7150.2009.00635.x>
8. "Parental Human Capital Investment and Old-age transfers from Children: Is it a loan contract or reciprocity for Indonesian Families?," (jointly with Lien H. Tran) Journal of Development Economics, Volume 77: 389-414, August 2005. <http://dx.doi.org/10.1016/j.jdeveco.2004.04.003>
9. "Effects of R&D and Competitiveness on Exports of Indian Private Firms," Indian Economic Journal, Vol.50 No. 3&4.
10. "Competitiveness, Productivity and Export Performance of Indian Private Firms", Applied Econometrics and Economic Development, vol. 3(3), 2003, pp. 25-48. [https://lakshmiraut.netlify.app/publication/published/2003-01-01\\_competitiveness\\_productivity/](https://lakshmiraut.netlify.app/publication/published/2003-01-01_competitiveness_productivity/)
11. "An analysis of Thailand's capital flows" (jointly with W. Paitoon et al.), in (eds) J. Behrmann, M. Dutta, S. L. Husted, P. Sumalee, C. Suthiphand "Restructuring Asian Economies for the New Millennium : Volume 9B", November 2001.
12. "Reciprocity with two-sided altruism in intergenerational transfers: evidence from Indonesian Family Life survey Data", (jointly with Lien H. Tran) in the Proceedings of International Conference on "*Economics of Reciprocity, Gift-giving and Altruism*", Macmillan, 2000. [https://link.springer.com/chapter/10.1007%2F978-1-349-62745-5\\_17](https://link.springer.com/chapter/10.1007%2F978-1-349-62745-5_17)
13. "Complementarities between Exports and Human Capital in Economic Growth: Evidence from the Semi-industrialized countries", (jointly with Andrew Levin), Economic Development and Cultural Change, vol.46 (1):155-175, October 1997. <http://dx.doi.org/10.1086/452325>
14. "Old-age Security and Gender Preference Hypotheses: A Duration Analysis of Malaysian Family Life Survey Data", Journal of Quantitative Economics, vol.12 (1):81-104, 1996. [https://lakshmiraut.netlify.app/publication/published/1996-01-01\\_old-age\\_security\\_and\\_gender\\_pr/](https://lakshmiraut.netlify.app/publication/published/1996-01-01_old-age_security_and_gender_pr/)
15. "R&D Spillover and Productivity Growth: Evidence from Indian Private Firms," Journal of Development Economics, Vol.48:1-23, 1995. <https://doi.org/10.1016/0304-3878%2895%2900028-3>
16. "Per Capita Income Growth, Social Expenditures and Living Standards: Evidence from Rural India", Journal of Asian Economics, vol.4 (1):59-76., 1993. [https://lakshmiraut.netlify.app/publication/published/1993-01-01\\_per\\_capita\\_income\\_growth\\_soci/](https://lakshmiraut.netlify.app/publication/published/1993-01-01_per_capita_income_growth_soci/)



17. "Determinants of Consumption and Savings Behavior in Developing Countries", (*jointly with Arvind Virmani*), World Bank Economic Review, Vol.3, no.3, September 1989. <http://wber.oxfordjournals.org/content/3/3/379>
18. "R & D Behavior of Indian Firms: A Stochastic Control Model", Indian Economic Review, Vol. XXIII, no.2, July-December 1988, 207-229. [https://lakshmiraut.netlify.app/publication/published/1988-01-01\\_r\\_d\\_behavior\\_of\\_indian\\_firms/](https://lakshmiraut.netlify.app/publication/published/1988-01-01_r_d_behavior_of_indian_firms/)

## Applied Economic Theory

19. "Family Expansion and Capital Accumulation of a Dynasty," (jointly with Kazuo Nishimura), Journal of Microeconomics, Vol 1(1):107-124. <http://dx.doi.org/10.1177/2321022213501260>
20. "School Choice and Intergenerational Poverty Trap" (jointly with Kazuo Nishimura) forthcoming, Review of Development Economics, 2006. <http://dx.doi.org/10.1111/j.1467-9361.2007.00411.x>
21. "Firm's R&D under Rational Expectations," Indian Economic Review, 2005, vol. 40(2): 127-144, <http://www.jstor.org/stable/29793840>
22. "R&D Investment in Evolving Market Conditions," Investment Management and Financial Innovations, vol.1:119-133, 2004. [http://www.businessperspectives.org/journals\\_free/imfi/2004/imfi\\_en\\_2004\\_01\\_Raut.pdf](http://www.businessperspectives.org/journals_free/imfi/2004/imfi_en_2004_01_Raut.pdf)
23. "Ageing and Elderly Care in an Open Economy," (jointly with Koichi Hamada) in (eds.) Koichi Hamada and Hiromi Kato, "*Ageing and the Labor Market in Japan*", Edward Elgar Publishing, 2007, 75-90, <http://dx.doi.org/10.4337/9781847204240.00011>
24. "Immigration or Foreign Investment to Cope with Aging Crises of an Aging Open Economy," in (eds.) Koichi Hamada and Hiromi Kato, "*Ageing and the Labor Market in Japan*," Edward Elgar Publishing, 2007, 91-120, <http://dx.doi.org/10.4337/9781847204240.00012>
25. "Complementarities between exports and human capital in economic growth: evidence from the semi-industrialized countries" (jointly with Andrew Levin) reprinted in (eds) Sir Hans Singer, Neelambar Hatti and Rameshwar Tandon, "Trade and Growth : Models and Methods : Vol. 20, Chapter 26", Delhi, B.R. Publishing Corporation, 2002, xxxv, 1727 p., tables, figs., ISBN 81-7646-228-4.
26. "Endogenous fertility and Growth Dynamics," (jointly with Kazuo Nishimura) in (eds) G. Ranis and L.K. Raut, "Trade, Growth and Development: Essays in honor of Professor T.N. Srinivasan", Elsevier Science B.V., North-Holland, Amsterdam, 1999. [https://lakshmiraut.netlify.app/publication/published/1999-01-01\\_endogenous\\_fertility\\_and\\_growt/](https://lakshmiraut.netlify.app/publication/published/1999-01-01_endogenous_fertility_and_growt/)

27. "Introduction" (jointly with G. Ranis) in (eds.) G. Ranis and L.K. Raut, "Trade, Growth and Development: Essays in honor of Professor T.N. Srinivasan", Elsevier Science B.V., Amsterdam in 1999.
28. "Growth Models with Endogenous Population: A General Framework", (*jointly with Marc Nerlove*), in Mark Rosenzweig and Oded Stark (eds), Handbook of Family and Population Economics, North-Holland, Amsterdam, 1997, pp.1117-1174.  
[https://lakshmiraut.netlify.app/publication/published/1999-01-01\\_endogenous\\_fertility\\_and\\_growt/](https://lakshmiraut.netlify.app/publication/published/1999-01-01_endogenous_fertility_and_growt/)
29. "Theories of Long-Run Growth: Old and New" (*Jointly with T.N. Srinivasan*), in (eds) Kausik Basu, Mukul Majumdar and Tapan Mitra (eds) "Capital, Investment and Development" Basil Blackwell, 1993. [https://lakshmiraut.netlify.app/publication/published/1993-01-01\\_theories\\_of\\_long-run\\_growth\\_ol/](https://lakshmiraut.netlify.app/publication/published/1993-01-01_theories_of_long-run_growth_ol/)
30. "Capital Accumulation, Income Distribution, and Endogenous Fertility in an Overlapping Generations General Equilibrium Model", Journal of Development Economics, vol. 34 No1/2, 1990. [https://doi.org/10.1016/0304-3878\(90\)90079-q](https://doi.org/10.1016/0304-3878(90)90079-q)
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33. "Two sided Altruism, Lindahl Equilibrium and Pareto Efficiency in Overlapping Generations Models," Economic Theory, Volume 27, Number 3, 729 - 736, April 2006.  
<http://dx.doi.org/10.1007/s00199-004-0562-9>
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35. "Construction of Haar measure on projective limit group and random order value of non-atomic games," Journal of Mathematical Economics, volume 27 issue 2, pp. 229-250, February 1997.  
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36. "Dynamics of Endogenous Growth," (*jointly with T.N. Srinivasan*) Economic Theory, vol.4: 777-790, 1994. <http://dx.doi.org/10.1007/BF01212030>
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## Work-in-Progress

1. "[Early childhood factors and health pathways to disability and death in mid-ages — a multi-state time-to-event model](https://lakshmiraut.netlify.app/publication/workpaper/2024-10-23_early_childhood_factors_and_health/)," Working Paper, 2024, URL: [https://lakshmiraut.netlify.app/publication/workpaper/2024-10-23\\_early\\_childhood\\_factors\\_and\\_health/](https://lakshmiraut.netlify.app/publication/workpaper/2024-10-23_early_childhood_factors_and_health/)
2. “[Deep Neural Network Machine Learning Models for Prediction of Risks of Various Diseases in Mid-Ages.](https://lakshmiraut.netlify.app/publication/workpaper/2024-10-17-mlogit-vs-deep-learning-full-sample/)” Working Paper, 2024, URL: <https://lakshmiraut.netlify.app/publication/workpaper/2024-10-17-mlogit-vs-deep-learning-full-sample/>
3. [Machine learning imputation of race in statistical estimates of disability and mortality risks using Social Security administrative data.](https://lakshmiraut.netlify.app/publication/workpaper/2024-10-17-race-imputation/) Working Paper, Social Security Administration, 2024. URL: <https://lakshmiraut.netlify.app/publication/workpaper/2024-10-17-race-imputation/>
4. [Pathways to Disability and Death in Middle Ages: Estimates from the Health and Retirement Study Data.](https://lakshmiraut.netlify.app/publication/workpaper/2024-9-26-pathways_to_disability_version3/) Working Paper, Social Security Administration, 2024. URL: [https://lakshmiraut.netlify.app/publication/workpaper/2024-9-26-pathways\\_to\\_disability\\_version3/](https://lakshmiraut.netlify.app/publication/workpaper/2024-9-26-pathways_to_disability_version3/)
5. [Early childhood factors and health and Human capital.](https://lakshmiraut.netlify.app/publication/workpaper/2023-10-26-early-childhood-factors-health-and-human-capital/) Working Paper. Working Paper, 2023. URL: <https://lakshmiraut.netlify.app/publication/workpaper/2023-10-26-early-childhood-factors-health-and-human-capital/>
6. [Health Outcomes in Mid-Ages: Multistate time to event Statistical Models versus Long Short Term Memory \(LSTM\) Recurrent Neural Network \(RNN\) Models](https://lakshmiraut.netlify.app/publication/workpaper/2020-01-01_health_outcomes_in_mid-ages_mu_unpublished/), 2023. URL: [https://lakshmiraut.netlify.app/publication/workpaper/2020-01-01\\_health\\_outcomes\\_in\\_mid-ages\\_mu\\_unpublished/](https://lakshmiraut.netlify.app/publication/workpaper/2020-01-01_health_outcomes_in_mid-ages_mu_unpublished/) Earlier Draft presented at the 2020 ASSA Meetings, San Diego, January 3 - 5, 2020, URL: <https://www.aeaweb.org/conference/2020/preliminary/paper/KKRTYQrK>.
7. [A Reformulation of the Aumann-Shapley Random Order Values of Non-Atomic Games Using Invariant Measures](https://lakshmiraut.netlify.app/A_Reformulation_of_the_Aumann-Shapley_Random_Order_Values_of_Non-Atomic_Games_Using_Invariant_Measures), 2003. URL: [A Reformulation of the Aumann-Shapley Random Order Values of Non-Atomic Games Using Invariant Measures | Dr. Lakshmi K. Raut \(lakshmiraut.netlify.app\)](https://lakshmiraut.netlify.app/A_Reformulation_of_the_Aumann-Shapley_Random_Order_Values_of_Non-Atomic_Games_Using_Invariant_Measures)

8. [A non-standard analysis of random order values of non-atomic games](https://lakshmiraut.netlify.app/publication/workpaper/2022-01-01_a_non-standard_analysis_of_ran_unpublished/), 1995. URL: [https://lakshmiraut.netlify.app/publication/workpaper/2022-01-01\\_a\\_non-standard\\_analysis\\_of\\_ran\\_unpublished/](https://lakshmiraut.netlify.app/publication/workpaper/2022-01-01_a_non-standard_analysis_of_ran_unpublished/)
9. [The Economic Burden of Disability in India: Estimates from the NSS Data, \(jointly with Manoranjan Pal, Premananda Bharati\)](#), 2018. [Cite](#) [html-preprint](#)
10. [Identification of Structural Parameters in Stochastic Dynamic Programming Models](#), 2018. [PDF](#) [Cite](#)
11. [Altruism, Gaussian curvature and Pareto Optimality: An Implication for Sen's Meta Ranking Ethical Principle](#), 2018. [Cite](#) [HTML](#) [PDF](#)
12. [Signaling Equilibrium, Intergenerational Social Mobility and Long Run Growth](#), 1995. [Cite](#) [HTML](#) [PDF](#)
13. [Early Childhood Development, Earnings Inequality and Social Mobility in an Education Signaling Model](#), 2017. [Cite](#) [PDF](#) [HTML](#)
14. [Learning to Perfect Manipulation: Implications for Fertility, Savings, and Old-Age Social Security](#), 1998. [PDF](#) [Cite](#) [html-preprint](#)
15. [Learned Convention and Subgame Perfect Equilibrium in an Overlapping Generations Model with Two-Sided Altruism](#), 2004. [PDF](#) [Cite](#) [html-preprint](#)
16. [Economic Epidemiology of Malaria and Income Growth](#), 2004. [PDF](#) [Cite](#) [html-preprint](#)
17. [Economic Incentives and Social Security Disability Entitlements in a Counting Process Model](#), 2010. [PDF](#) [Cite](#)
18. [Mortality and Disability Risk Sharing under the OASDI Program in a Stochastic Overlapping Generations Framework](#), 2007. [Cite](#)
19. [Symmetry Axiom and Haar Measure for Random Order Shapley Value of Games](#), 2003. [PDF](#) [Cite](#)

### ***Books and Software Packages in Progress***

1. "An Introduction to Differential Geometry with Applications in Economics and Optimizations" (2015).

2. "**A Treatise on Development Economics**", (Based on graduate and undergraduate lectures at various universities), © Lakshmi K. Raut, January 2005.
3. "**RautSoft Economics and Business Numerics**", an Application package using Java (software and manual), (Approximations, Interpolations, Calculus, Optimization, Basic Econometrics, Dynamic Macroeconomic Models), © Lakshmi K. Raut, January 2005.

### ***Unpublished Papers and Lecture Notes***

1. "A Duration Analysis of Fertility Behavior of Malaysian Women: Partial Likelihood and Non-parametric Maximum Likelihood Estimates", University of California-San Diego, Discussion Paper # 89-10, 1989.
2. "Random Order Approach to Semi-Values of Non-Atomic Games," Indian Statistical Institute Discussion Paper # 8105, New Delhi, India, June 1981.
3. "Values of Non-atomic Games," ISI Lecture Notes, Indian Statistical Institute, New Delhi, India, June 1980.
4. "Convex Analysis," ISI Lecture Notes, Indian Statistical Institute, New Delhi, India, June 1980.

### ***COMPUTER SKILLS***

- Programming Languages: Java, C++, Python
- Statistical and Econometric software: SAS, R, Stata
- Machine Learning and Big Data using Python (Keras and scikit-learn) and Java (DL4j)
- General purpose Symbolic Software: Maple , Python (SymPy)
- Web programming: html5, JavaScript, and ASP
- Database Programming: SQL

### ***RESEATCH GRANT PROPOSALS (Outside the Social Security Administration)***

- "Economic Epidemiology of Malaria and Economic Growth" the World Bank, Washington, DC, 2004
- Economic Benefits of Early Childhood Interventions (jointly with Flavio Cunha, James J. Heckman, University of Chicago) *June 2004*
- Structural Choices in Rapidly Ageing Society", (Jointly with Koichi Hamada, Junichi Goto, and Masaya Sukuragawa), Economic Planning Agency, Ministry of Japan, 2000.
- "Export Promotion and Economic Growth in Pacific Rim Developing Countries", (jointly with Andrew Levin), Grant awarded by Office of the President, University of California, Berkeley, 1990-1991.

- “Foreign Capital Flows in East Asia”, *(jointly with Bangorn Tubtimtong, and Paitoon Weiboonchutikula, Chulalongkorn University, Thailand.*

#### ***PAPERS PRESENTED AT CONFERENCES***

(All papers are presented by LK Raut unless otherwise stated, only a selected few presentations are included here)

- [1] "Capital Accumulation, Income inequality, and Endogenous Fertility in an Overlapping Generations General Equilibrium Model", Presented at Northeast Universities Development Consortium Conference, April 29-30, 1983, Yale University, New Haven, Connecticut.
- [2] "Capital Accumulation, Income Distribution and Endogenous Fertility in an Overlapping Generations General Equilibrium Model", Presented at the Far Eastern Econometric Society Meeting, June 10-11, 1989, Kyoto, Japan.
- [3] “Limited Two-sided Altruism, Lindahl Equilibrium and Pareto Efficiency in Overlapping Generations Models”, presented at the the Sixth World Congress, Barcelona, Spain, 1990.
- [4] Limited Two-sided Altruism, Lindahl Equilibrium and Pareto Efficiency in Overlapping Generations Models", presented at the American Economic Association Meetings, Washington, DC, December 1990.
- [5] “Old-Age Security and Son Preference Hypotheses: Evidence from Duration Analysis of Malaysian Women," Presented at the Annual Conference of European Society for Population Economics, Pisa, Italy, June 5-6, 1991.
- [6] “Endogenous Fertility, Technical Change and Growth in a Model of Overlapping Generations," (jointly with T.N. Srinivasan), presented at the Annual Conference of European Society for Population Economics, Pisa, Italy, June 5-6, 1991.
- [7] “Old-Age Security and Son Preference Hypotheses: Evidence from Duration Analysis of Malaysian Women," Far Eastern Econometric Society Meeting, Soul National University, Korea, June 29-30
- [8] “Two-sided Altruism, Lindahl Equilibrium and Pareto Efficiency in Overlapping Generations Models," presented at the post theory conference of the third FE of the econometric society, July 2-3, 1991, Seoul, Korea.
- [9] “Two-sided altruism, Operative Gifts, Bequests, Fertility and Social Security,” Sixth Annual Meeting of European Society for Population Economics, Gmunden, Austria, June 10-13, 1992.
- [10] “Growth Models with Endogenous Population,” *(jointly with Marc Nerlove),* presented at the sixth annual Meeting of European Society for Population Economics, Gmunden, Austria, June 10-13, 1992.

- [11] "Construction of Haar Measure on Projective Limit Group and Random Order Values of Non-atomic Games," presented at the Second International Meeting of the Society for Social Choice and Welfare, Rochester, July 8-11, 1994.
- [12] "Signaling Equilibrium, Intergenerational mobility and long-run growth," Presented at the Seventh World Congress of the Econometric Society, Tokyo, August 22-29, 1995.
- [13] "Random Order Approach to Aumann-Shapley Value and Haar Measure," presented at the conference on, "New Directions in the Theory of Markets and Games: in honor of Robert Aumann", Toronto, Canada, October 19-23, 1995.
- [14] "Social Mobility and Long-run Growth," Presented at Econometric Society's ASSA meetings, San Francisco, January 5-7, 1996.
- [15] "The nature and impact of foreign capital flows into Thailand," (jointly with Paitoon Weiboonthutikula, and Bangorn Tubtimtong, and paper presented by Paitoon Weiboonthutikula) at the East Asian Economic Association Meeting, Bangkok, Thailand, October, 1996.
- [16] "Motives for investment in human capital of children and their consequences: evidence from Indonesian Family Life Survey Data," (*jointly with Lien H. Tran*), presented at the International Economic Association Conference on, "Economics of Reciprocity, Gift-Giving and Altruism", Ecole des Hautes Etudes en Sciences Sociales, Marseille, France.
- [17] "Endogenous fertility and Growth Dynamics," (jointly with Kazuo Nishimura) presented by L.K. Raut at the "Conference in honor of T.N. Srinivasan, Yale University, New Haven, March 27-28, 1998.
- [18] "The Structural Choices Facing a Rapidly Aging Economy," (jointly with Junichi Go to, Koichi Hamada, Masaya Sukuragawa, and Roberta de Santis", presented at the International Forum on the Collaboration Projects in Autumn 2000", Osaka, September 22-24, 2000.
- [19] "The Structural Choices Facing a Rapidly Aging Economy," (jointly with Junichi Go to, Koichi Hamada, and Masaya Sukuragawa," Second International Forum of the Collaboration Projects in Spring 2001", March 16 – March 22, 2001.
- [20] "The Structural Choices Facing a Rapidly Aging Economy," (jointly with Junichi Go to, Koichi Hamada, and Masaya Sukuragawa," Second International Forum of the Collaboration Projects in Spring 2001", March 16 – March 22, 2001.
- [21] "Economic Epidemiology of Malaria: Dynamics and Control," Presented at the 2001 Far Eastern Econometric Society Meeting, Kobe, July 2001.



- [22] "Parental Human Capital Investment and Old-age transfers from Children: Is it a loan contract or reciprocity for Indonesian Families?," (*jointly with Lien H. Tran*), Presented at the 2001 Far Eastern Econometric Society Meeteeing, Kobe, July 20-22, 2001.
- [23] "Economic Epidemiology of Malaria: Dynamics and Control," Presented at the Indian Institute of Technology, Kharagpur, India, August 3, 2001.
- [24] "Immigration vs. Foreign Investment in an Aging Open Economy," (the paper was presented by Professor Junichi Goto, my flight was cancelled due national Tragedy on September 11, 2001) Third International Forum of the Collaboration Projects in Fall 2001", September 17-19, Tokyo, Japan.
- [25] "Immigration or Foreign Investment to Cope with Aging Crises of an Aging Open Economy," Fourth International Forum of the Collaboration Projects", February 17-21, 2002, Tokyo, Japan.
- [26] "Economic Epidemiology of Malaria and Economic Growth," Presented at the Western Economic Association Meeting, Seattle, June 30-July 2, 2002, Seattle.
- [27] "The Effects of Housing Stability on Child Achievement," (jointly with Lisa Mohanty), Paper presented by Lisa Mohanty at MEA Annual Meetings, St. Louis, MO. Session 6A: Child Support/Child Outcomes. (2003).
- [28] "Long-Term Effects of Preschool," Western Economic Association Meeting, Denver, 2003.
- [29] "Immigration or Foreign Investment to Cope with Aging Crises of an Aging Open Economy," presented at Improving Social Insurance Programs September 13 - 14, 2003 University of Maryland.
- [30] "Disability and Mortality Risk Sharing within the OASDI Program," Presented at the Western Economic Association Meeting Seattle, 2007.
- [31] "A Duration Model of Social Security Disability Program Entitlement," Presented at the Western Economic Association Meeting , Portland, 2010.
- [32] "Globalization, Education and Economic Growth - Lessons from China to India," presented during 2014-2015 at "Policies for Sustaining High Growth in India," 19-20 August 2014, Institute of Economic Growth, Delhi. This paper was also presented at the Indian Institute of Management - Ahmedabad, Indian Statistical Institute - Kolkata, Indira Gandhi Institute of Development Research - Mumbai.
- [33] "Intergenerational Long Term Effects of Preschool -Estimates from a Structural Dynamic Programming Model," (joint paper with Professor James Heckman) presented at the American Economic Association Meetings, San Francisco, Jan 3, 2016.

- [34] "Early Childhood Development, Earnings Inequality and Social Mobility in an Education Signaling Model," Draft Presented at the 2017 ASSA Meetings, 2017, Chicago.
- [35] "Pathways to disability and mortality in mid-ages: Estimates from the Health and Retirement Study Data," Annual Conference of the Society of Government Economists, April, 5, 2019, Washington, DC.
- [36] "Health Outcomes in Mid-Ages: Multistate Time to Event Statistical Models Versus Long Short Term Memory (LSTM) Recurrent Neural Network (RNN) Models," presented at the American Economic Association Meetings, San Diego, January 4, 2020.

## ***REFERENCES***

1. Professor James Heckman, Nobel Laureate in Economics and Henry Schultz Distinguished Service Professor of Economics, Department of Economics, University of Chicago, 1126 E 59th Street, Chicago, IL 60637. Phone: (773)702-0634, fax: (773)702-8490, e-mail: (please send email to his assistant, <[jjh.assistant@gmail.com](mailto:jjh.assistant@gmail.com) > or [jjh.info@uchicago.edu](mailto:jjh.info@uchicago.edu) Executive Assistant to James Heckman)
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