Industrial Development in Developing Economies: Cases in Sub-Sahara Africa

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Introduction

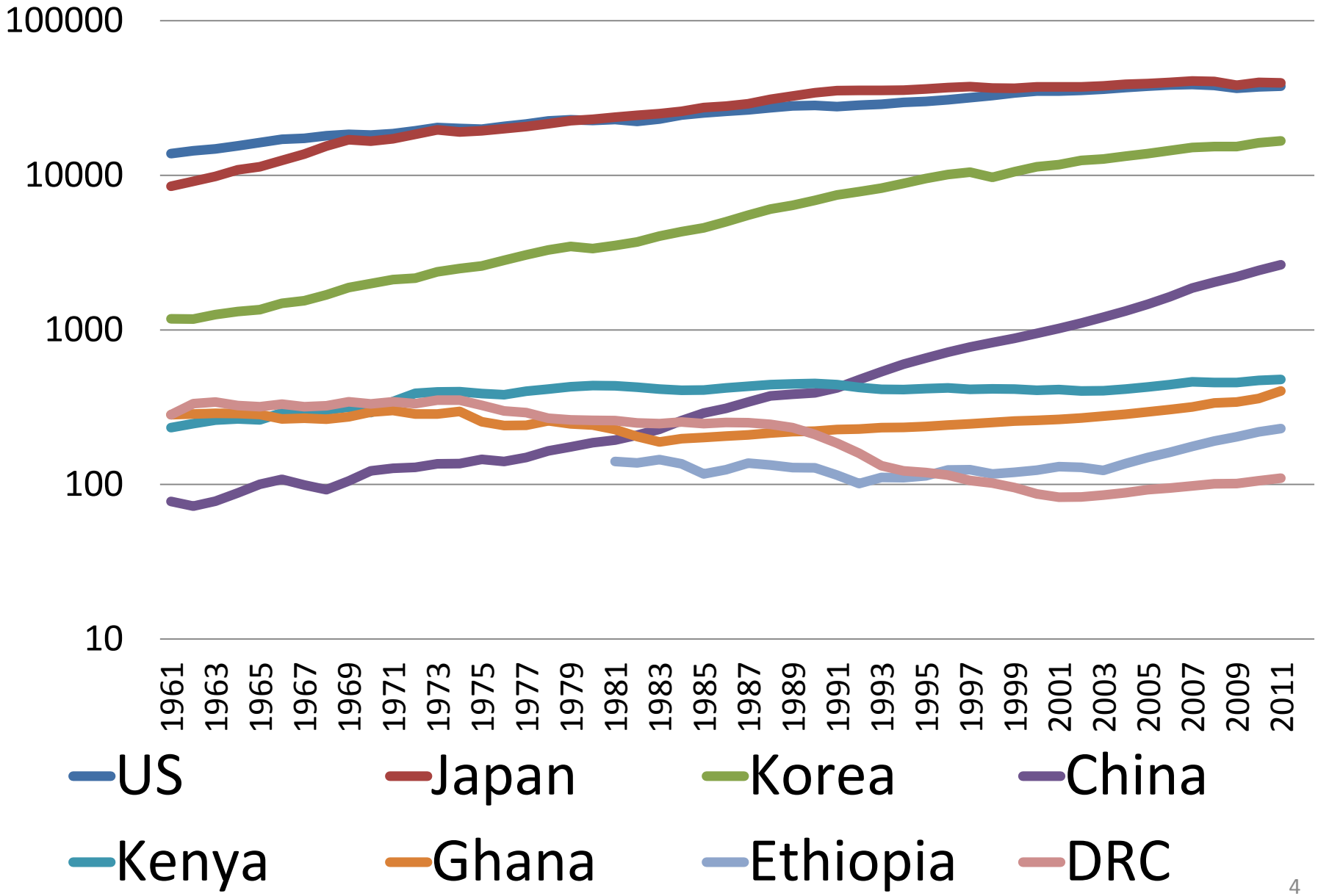
Escape from poverty

The world today is characterized by extremely large income inequality among countries.

Sub-Sahara Africa (SSA) is particularly stagnant.

The escape from poverty through economic development is a common goal of developing economies.

GDP per Capita, 1961-2011 (2000 USD)

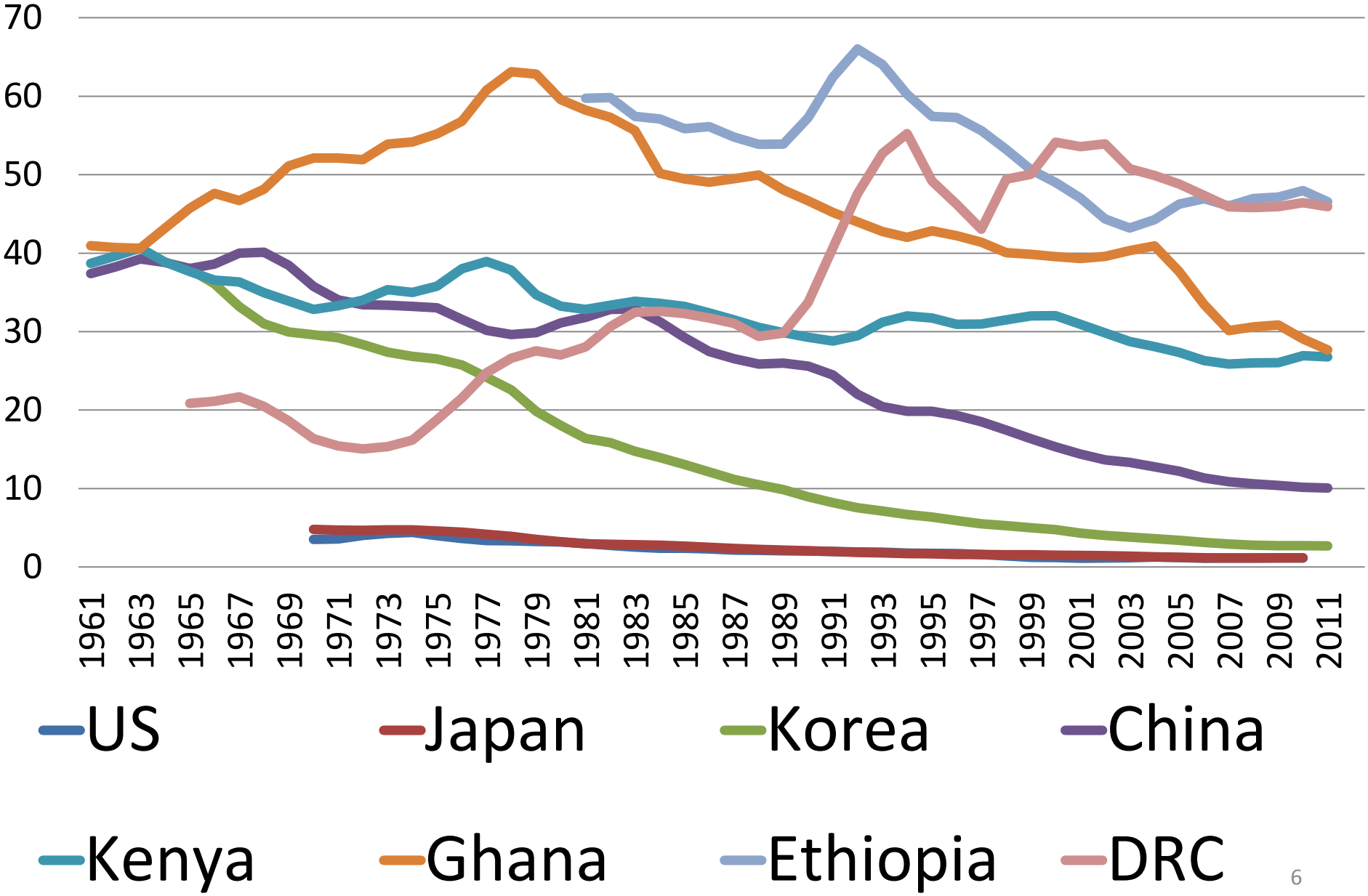


Why Poor?

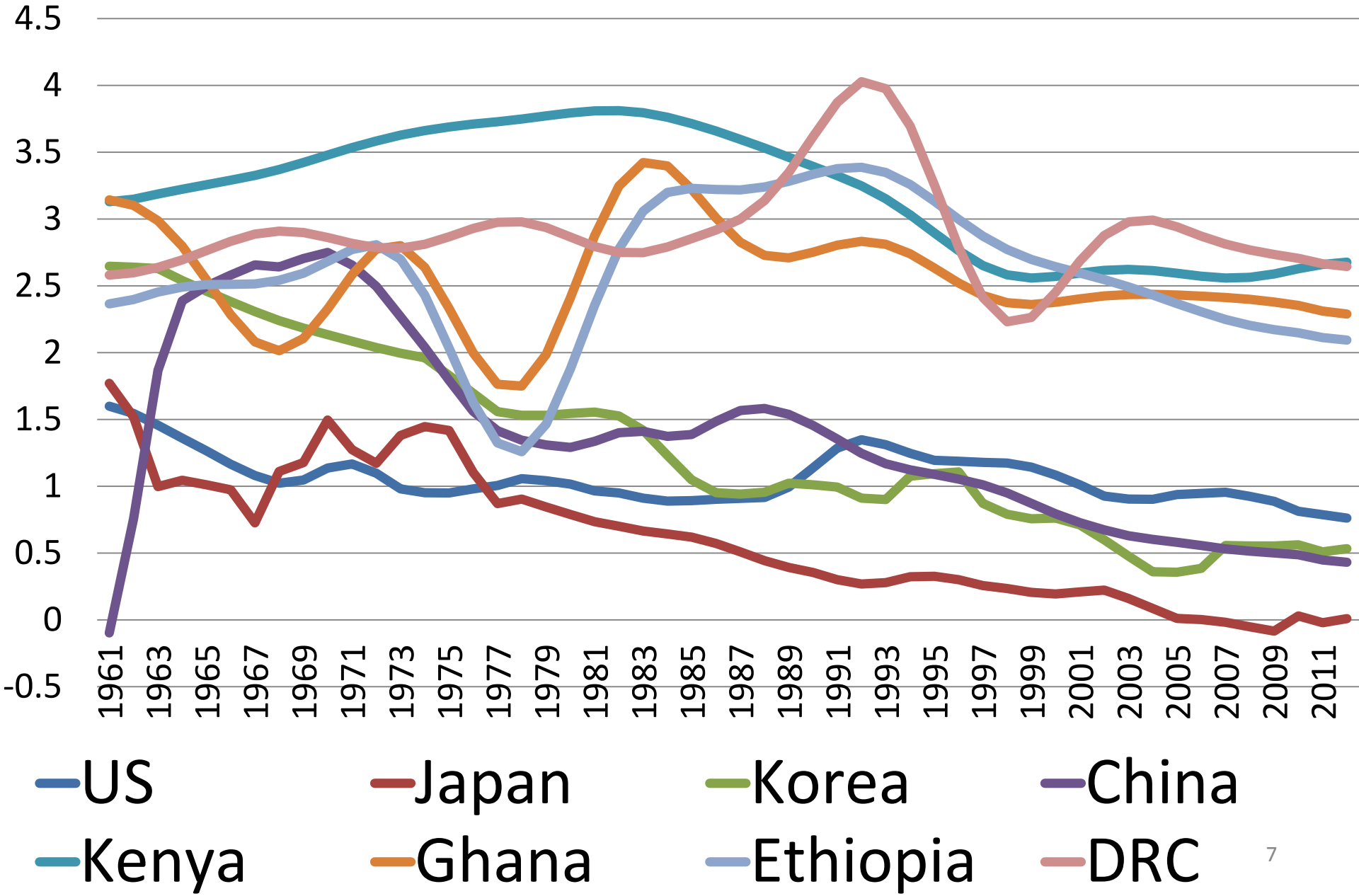
High dependence on production and export of primary products.

Increasing scarcity of land and other natural resources because of population pressure (Hayami and Godo, 2005).

Agriculture share, 1961-2011 (% of GDP)



Population growth, 1961-2011 (annual %)



Development strategies under population pressure

Induced innovation: Changes in technologies and institutions are induced towards saving resources and using more labor (Hicks, 1932; Hayami and Godo, 2005)

Agricultural development: Shift from resource-based to science-based agriculture (Boserup, 1965; Hayami & Kikuchi, 2000; Yamano *et al*., 2011).

Although Green Revolution alleviates poverty, it has only limited impact on employment (David and Otsuka, 1994). Development of non-farm sector is increasingly important (Otsuka *et al*., 2009).

Industrial development: Promote labor-intensive industries (Lewis, 1954; Fei & Ranis, 1964; Sonobe & Otsuka, 2006; 2011).

Green Revolution is possible in SSA (Njagi, Mano and Otsuka, 2013)

Case of Mwea Irrigation Scheme in Kenya

General beliefs on SSA.

- Large scale irrigation projects are not successful.
- Markets do not function.
- Farmers apply little fertilizer.

The above is not true in Mwea.

- Irrigation scheme is fairly well managed.
- Markets are functioning and responsive, with the existence of a large number of rice traders and millers.
- Farmers achieve high productivity due to high utilization of fertilizer.

Yields of rice production in SSA and Asia

	SSA				Asia			
	Mwea, Kenya		Doho, Uganda	Chokwe, Mozambique	Bangladesh	Pakistan	Philippines	Thailand
	2011		2007	2007	2010	2010	2010	2010
Rice variety	Basmati	Bw196	MV1&2	MV 1				
Yield (ton/ha)	**5.0**	**7.4**	2.9	2.1	4.2	3.1	3.6	2.9

Promote labor-intensive industries (Mano *et al*., 2012)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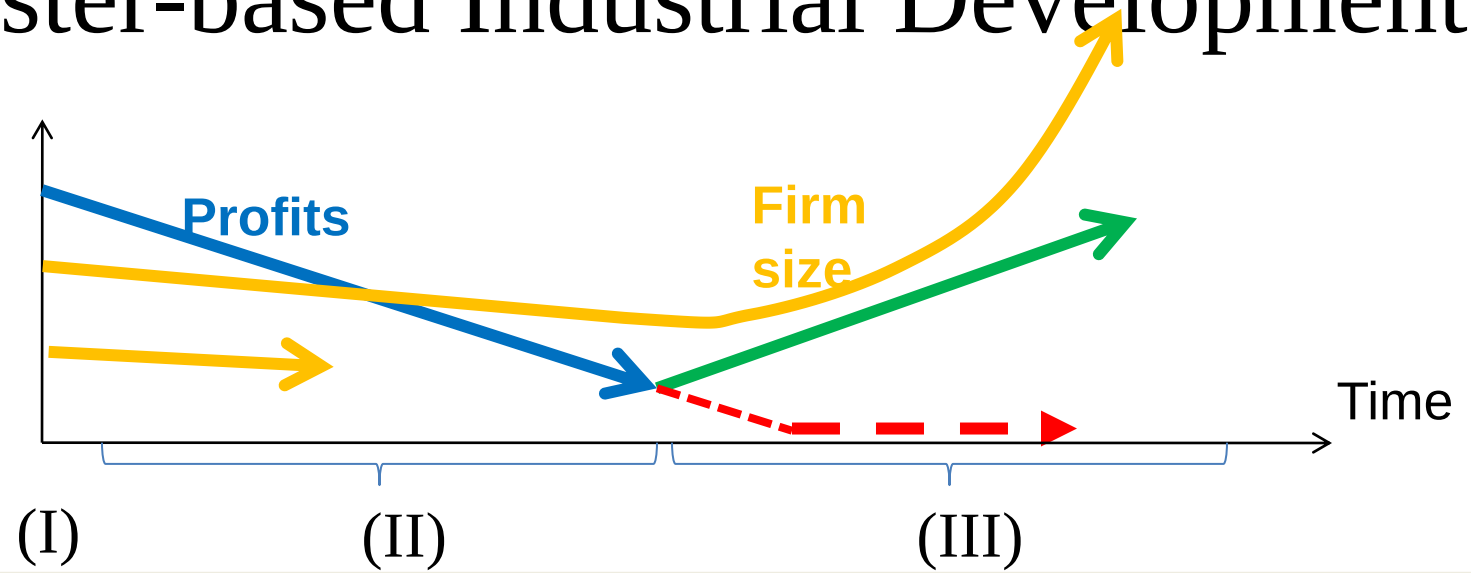
Improve management skills to revive stagnant industries

Micro and small enterprises are a major source of employment and income in developing countries, but they are often stagnant (Mead & Lieadholm,1998; Tybout,2000).

Recent empirical studies have identified problems within firms, especially those regarding management (Bloom *et al*., 2010; Bruhn *et al*., 2010).

Management is increasingly recognized as a major determinant of productivity (Syverson, 2011; Bloom and Van Reenen, 2007, 2010; Ichinowski *et al*., 1997).

Cluster-based Industrial Development



3 phases: (I) initiation (II) quantity expansion (III) quality improvement

Phase (III) requires infusion of a lot of new knowledge. The general human capital of the entrepreneur assumes importance here.

Because of rampant imitation, private benefits of improvement is smaller than social benefit.

Small entrepreneurs' managerial skills are good to run only a small enterprise. They have difficulty even at the very beginning of (III).

By providing a managerial training program as a pilot project, we can learn

- what they know and what they do not know.
- who are more willing to learn.
- who learn more.
- who put the knowledge into practice.
- how soon the full effect of knowledge transfer is felt.
- whether one can teach entrepreneurs entrepreneurship.
- how useful this kind of knowledge transfer is.

Suame Magazine, Kumasi, Ghana

Table. Number of enterprises

	Garages	Metal work	Others	Total
2000	4,958	807	2,204	7,969
2002	6,222	990	2,618	9,830
2003	7,847	1,139	2,844	11,830

Source: The Suame branch of the Ghana National Association of Garages (GNAG), which collects tax from entrepreneurs.

Timeline

Early 2005:

Survey on 167 randomly-selected metalwork entrepreneurs.

Nov. 2007:

Training program on 53 randomly-selected entrepreneurs.

Nov. 2008:

Survey on 139 entrepreneurs.

Characteristics of sample entrepreneurs

The average sample entrepreneur is a 45-year-old male from the local area.

10 years of schooling and 3 years of apprentice training.

Operating the business of metalworking for 13 years.

Training

Module 1: business planning and marking, 3 hours x 3 days

Module 2: production and quality management, 3h x 5 days

Module 3: bookkeeping and costing, 3h x 5 days

3 Ghanaian instructors. 2 got MBA in UK, and the other was trained in Japan.

Empirical strategy

Use “randomized invitation to the training program,” *Z*, as IV for “actual participation,” *D*.

Analysis of Covariance (ANCOVA) regression (Frison and Pocock, 1992; McKenzie, 2011):

$$Y_{iA} = \alpha + \beta D_i + \theta Y_{iB} + X_{iB}\gamma + \varepsilon_i. \qquad (※)$$

where Y_A is the post-training outcome, Y_B the average outcomes in the pre-training period, *X* a vector of entrepreneur’s characteristics in baseline.

Estimated training effect on the survival probability (IV-LPM)

	(i)	(ii)	(iii)
Instrumented D	0.095***	0.086**	0.091**
	(0.03)	(0.03)	(0.03)

Model (i) controls for characteristics of the firm.

Model (ii) additionally controls for whether the firm is implementing the management techniques recommended in the training program.

Model (iii) additionally controls for the sales revenue in baseline.

Estimated training effects on business practices and performances (ANCOVA)

	Business practices			Business performances		
	Visiting customers	Record keeping	Record analysis	Sales revenue	Value added	Gross profit
Instrumented D	0.24**	0.35***	0.42***	11.34	8.96	4.23
	(0.06)	(0.07)	(0.06)	(13.60)	(8.19)	(7.83)

Findings from training experiment

Entrepreneurs in a survival cluster are unfamiliar with the business practices which are standard in developed countries and other developing countries.

Participation in a rudimentary management training program improves the survival of the enterprise and the business practices.

Training effects on accounting-based business performances considerably vary across participants.

Introduce new labor-intensive industries (Mano *et al*., 2011)

Export of Ethiopia and Cut Flower Export of Top Exporters (million USD)

	Total	Coffee		**Cut Flower**			
Year	Ethiopia	Ethiopia		**Ethiopia**	Kenya	Columbia	Ecuador
2000	482	255		**0**	91	583	155
2002	415	160		**0**	100	672	290
2004	615	237		**2**	232	703	342
2006	1043	426		**25**	275	967	435
2008	1601	562		**104**	446	1094	557
2010	2580	774		**159**	396	1240	607

Growth of Ethiopia's cut flower export

Abundant labor: 90% of farm workers work at 1USD per day.

Favorable environment: high daily temperature & cool nights, wide underdeveloped highlands near the airport, and good access to EU.

Strong initiative of the government.

Shift of production from Kenya, to avoid environmental issues and post election violence in 2007, as well as other countries.

Grand conclusion: Induce development path consistent with changing comparative advantages

Insightful and competent entrepreneurs can identify the appropriate industries with comparative advantages.

The government should set the correct market signals for them, and provide general managerial knowledge and basic infrastructures. The social infrastructures include roads, electricity, water, and communication systems, without which no modern industries can develop.

References

- Bloom, N., Mahajan, A., McKenzie, D., and Roberts, J. (2010) "Why do firms in developing countries have low productivity?" *American Economic Review*: Papers & Proceedings, 100(2): pp. 619–623.
- Bloom, N., and Van Reenen, J. (2007). "Measuring and explaining management practices across firms and countries." *Quarterly Journal of Economics*, 122(4): pp. 1351–1408.
- Bloom, N., and Van Reenen, J. (2010). "Why do management practices differ across firms and countries?" *Journal of Economic Perspectives*, 24(1): pp. 203–224.
- Boserup, E. (1965) *The Conditions for Agricultural Growth*, Chicago: Aldine.
- Bruhn, M., Karlan, D., and Schoar, A. (2010) "What capital is missing in developing countries?" *American Economic Review*: Papers & Proceedings, 100(2): pp. 629–633.
- David, C.C. and Otsuka, K. (1994) *Modern Rice Technology and Income Distribution in Asia*, Boulder, CO: Lynne Rienner.
- Fei, J. C. H., and Ranis, G. (1964) *Development of the Labor Surplus Economy*, Homewood, III.: Irwin.
- Frison, L., and Pocock, S. J. (1992) "Repeated measures in clinical trials: Analysis using mean summary statistics and its implications for design," *Statistics in Medicine*, 11(13): pp. 1685–1704.
- Hayami, Y. and Godo, Y. (2005) *Development Economics: From the Poverty to the Wealth of Nations*, Third Edition, Oxford: Oxford University Press.
- Hayami, Y. and Kikuchi, M. (2000) *A Rice Village Saga: Three Decades of Green Revolution in the Philippines*, London: MacMillan Press.
- Hicks, J. R. (1932) *The Theory of Wages*, London: Macmillan.
- Ichinowski, C., Shaw, K., and Prennushi, G. (1997) "The effects of human resource management practices on productivity: A study of steel finishing lines," *American Economic Review*, 87(3): pp. 291–313.
- Lewis, W. A. (1954) "Economic Development with Unlimited Supplies of Labor," *Manchester School of Economic and Social Studies*, ii: pp. 1541-99.
- Mano, Y., Yamano, T., Suzuki, A. and Matsumoto, T. (2011) "Local and Personal Networks in Employment and the Development of Labor Markets: Evidence from the Cut Flower Industry in Ethiopia," *World Development*, 39 (10): pp. 1760-1770.
- Mano, Y., Iddrisu, A., Yoshino, Y. and Sonobe, T. (2012) "How Can Micro and Small Enterprises in Sub-Saharan Africa Become More Productive? The Impacts of Experimental Basic Managerial Training," *World Development*, 40(3): pp. 458-468.
- McKenzie, D. (2011) "Beyond baseline and follow-up: The case for more t in experiments," *Policy Research Working Paper Series*, 5639, The World Bank.
- Mead, D. D. and Lieadholm, C. (1998) "The dynamics of micro and small enterprises in developing countries," *World Development*, 24(3): pp. 481–487.
- Njagi, N.T., Mano, Y. and Otsuka, K. (2013) "The Role of Access to Credit on Rice Green Revolution in Sub Saharan Africa: The Case of Mwea Irrigation Scheme," submitted.
- Otsuka, K., Estudillo, J.P. and Sawada, Y. (2009) *Rural Poverty and Income Dynamics in Asia and Africa*, OX: Routledge.
- Sonobe, T. and Otsuka, K. (2006) *Cluster-based Industrial Development: An East Asian Model*, NY: Palgrave MacMillan.
- Sonobe, T. and Otsuka, K. (2011) *Cluster-based Industrial Development: A Comparative Study of Asia and Africa*, NY: Palgrave MacMillan.
- Syverson, C. (2011) "What determines productivity?" *Journal of Economic Literature*, 49(2): pp. 326–365.
- Tybout, J. R. (2000) "Manufacturing firms in developing countries: How well do they do, and why?" *Journal of Economic Literature*, 38(1): pp.11–44.
- Yamano, T., Otsuka, K. and Place, F. (2011) *Emerging Development of Agriculture in East Africa: Markets, Soil, and Innovations*, New York: Springer.