The poverty-reducing potential of agricultural land reform: Evidence from Myanmar

Peter Warr

Australian National University

Outline

1. What is land reform? Three contradictory meanings

2. Michael Lipton on land reform

3. My question

4. Measuring poverty incidence

5. Myanmar data on poverty incidence

6. Methodology

7. Regression results

8. Projected changes in poverty incidence

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Land reform: an ambiguous term

3 contradictory meanings, reflecting 3 different objectives:

1. To reduce inequality of land ownership and thereby reduce poverty;

2. To improve security of tenure and thereby raise overall agricultural productivity;

3. To redress past injustices, not necessarily reducing poverty or raising productivity.

In this seminar, we will be looking only at meaning / objective 1. This is what Michael Lipton calls "classic land reform" and I will call *redistributive land reform*.

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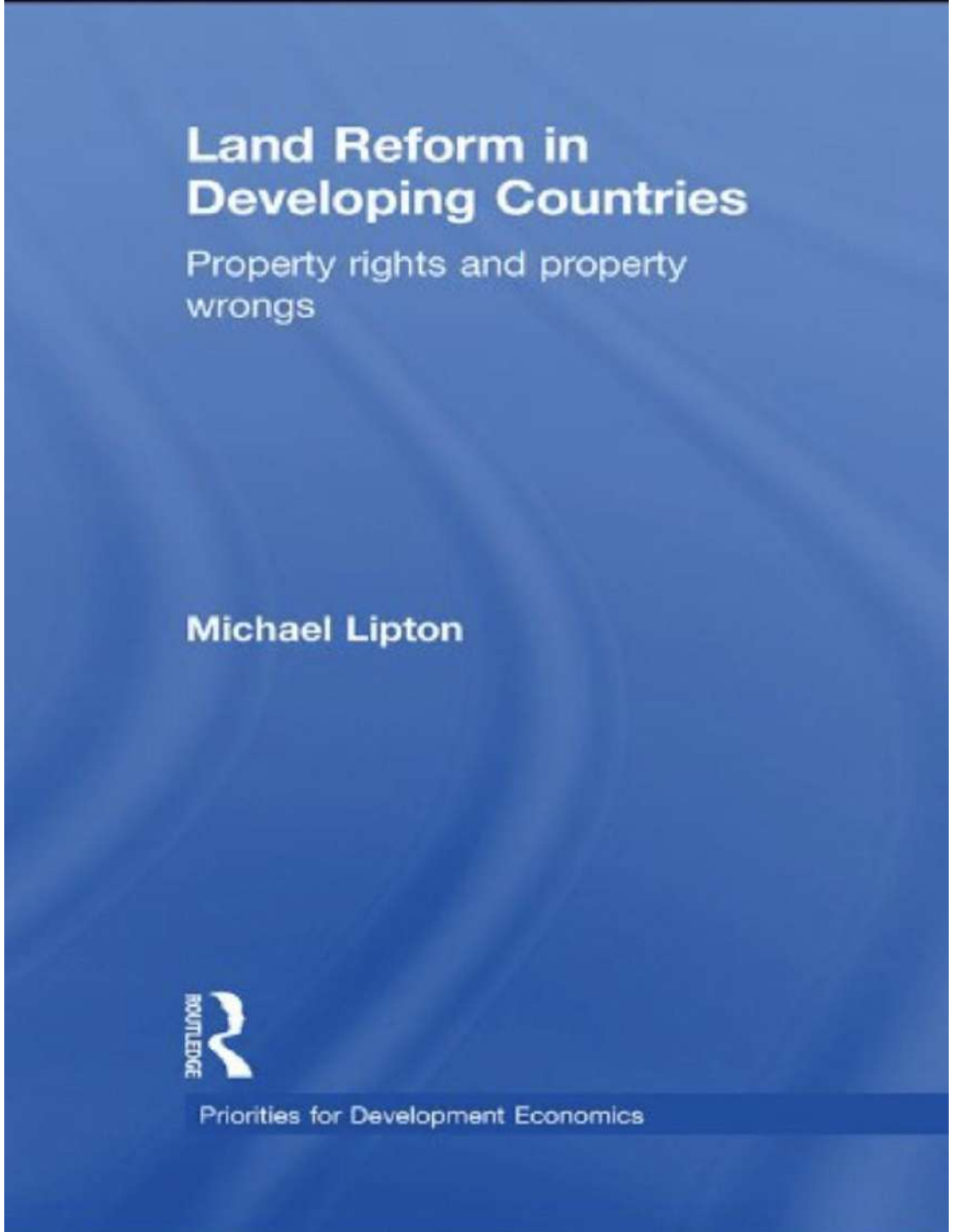
Land Reform in Developing Countries
Property rights and property wrongs
Michael Lipton
ROUTLEDGE
Priorities for Development Economics

Michael Lipton: “Land reforms are laws that are intended, and likely, to cut poverty by raising the poor’s share of land rights … the point is that land reform ‘matters’ mainly for its effect on poor people.”

Lipton’s book is endorsed by many distinguished economists, including Jeffrey Sachs, Amartya Sen, Joachim von Braun, Ricardo Hausmann, Sir Gordon Conway, Nancy Birdsall, Paul Collier and Lord Nicholas Stern.

Amartya Sen: “Land reform can make a huge contribution in removing poverty, but it has not been effectively tried in many areas of the world.”

Nancy Birdsall “Land reform is alive and well and delivering development around the world.”

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What is the upper bound on the poverty-reducing effect of a redistributive agricultural land reform?

We will study this in the context of Myanmar, a country in which the distribution of agricultural land is seemingly very unequal and poverty incidence is a huge problem.

The data used are from a UNDP survey of 11,172 households involved in agricultural production in 2010. The sample includes 9,025 households that either “own” or rent land and a further 2,147 who are landless.

From the World Bank's Myanmar Poverty Profile (2017):

	Cultivator owns land	Landless cultivator
Total	84%	16%
Non-poor	88%	12%
Poor	77%	23%

Among the non-poor who cultivate land, 88% "own" that land and 12% are landless.

Among the poor who cultivate land, 77% "own" that land and 23% are landless.

From the World Bank's Myanmar Poverty Profile (2017) cont'd:

	Household has title for land cultivated	Household has legal title for dwelling	Someone in household has a bank account
Total	64.8%	36.9%	15.7%
Non-poor	71.7%	40.8%	18.0%
Poor	51.5%	28.8%	10.8%

Not all who "own" land have legal title. The state owns all land. Legal title means a Land Use Certificate (LUC).

Among the non-poor who cultivate land, 71.7% have legal title to that land, compared with 88% who supposedly "own" the land.

Among the poor, 51.5% have legal title, compared with 77% who supposedly "own" the land.

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The possible endogeneity of these supposed ‘drivers’ of poverty is a serious problem.

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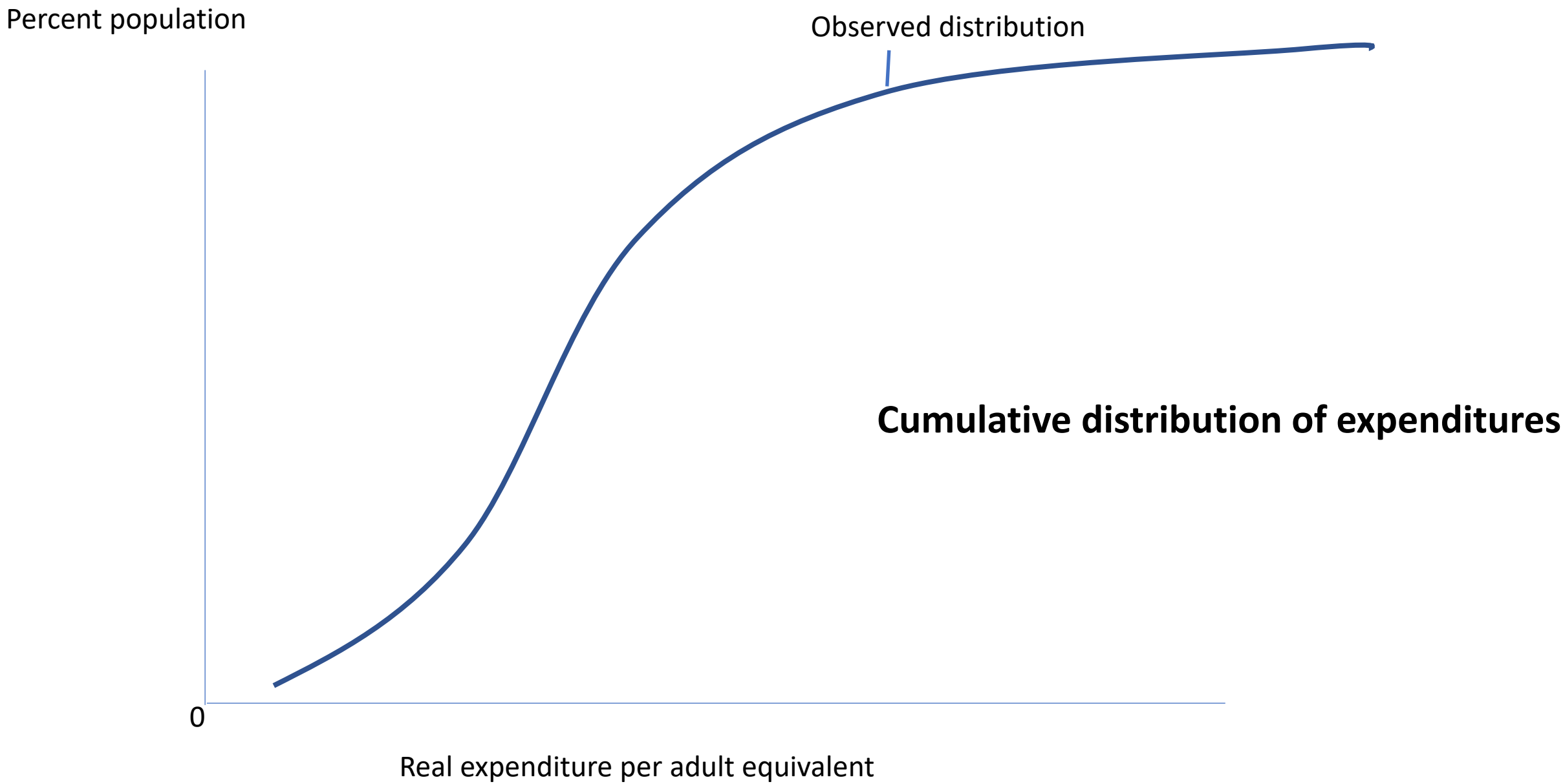
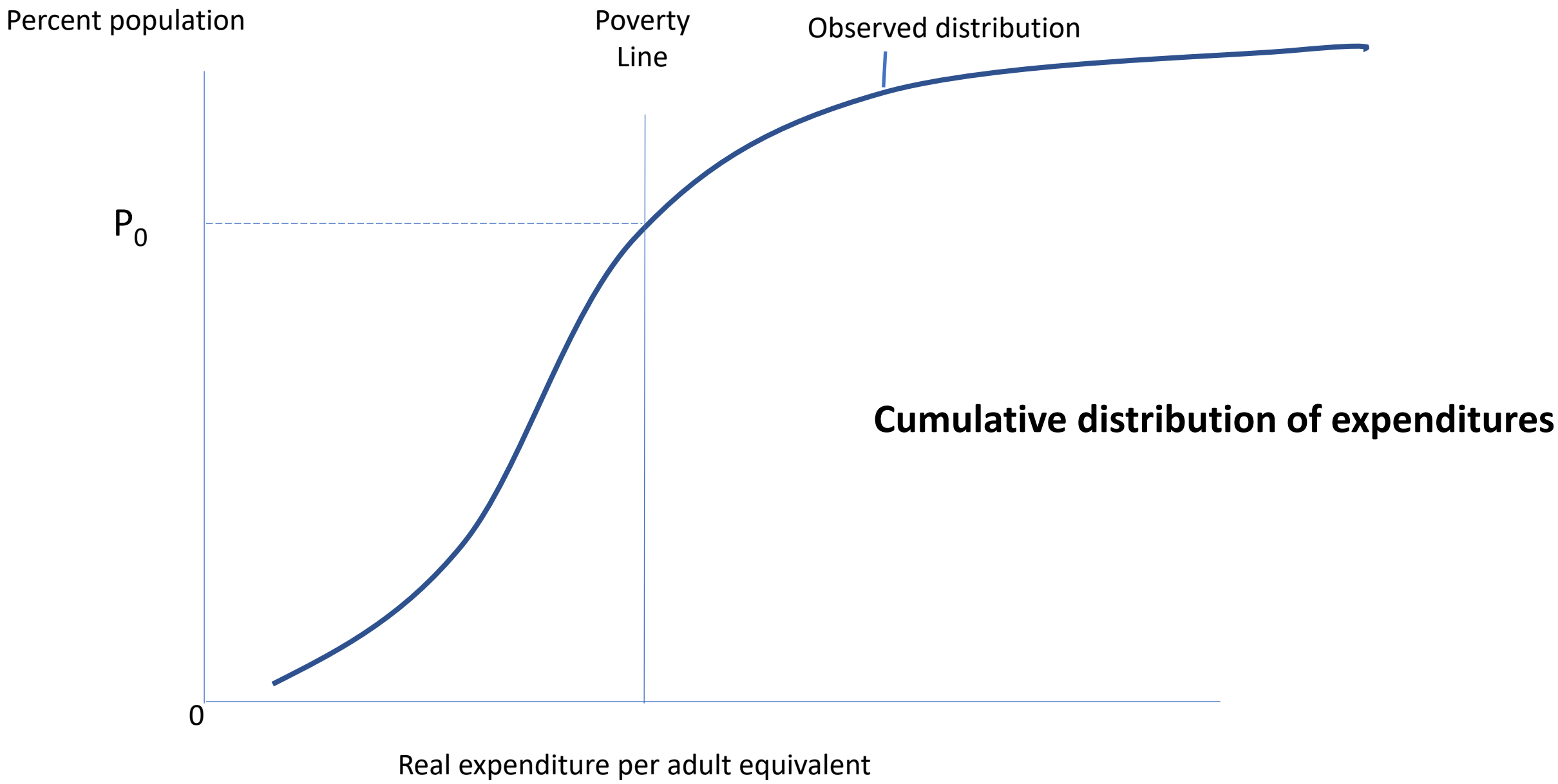

Percent population
Observed distribution
Cumulative distribution of expenditures
0
Real expenditure per adult equivalent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Poverty Line
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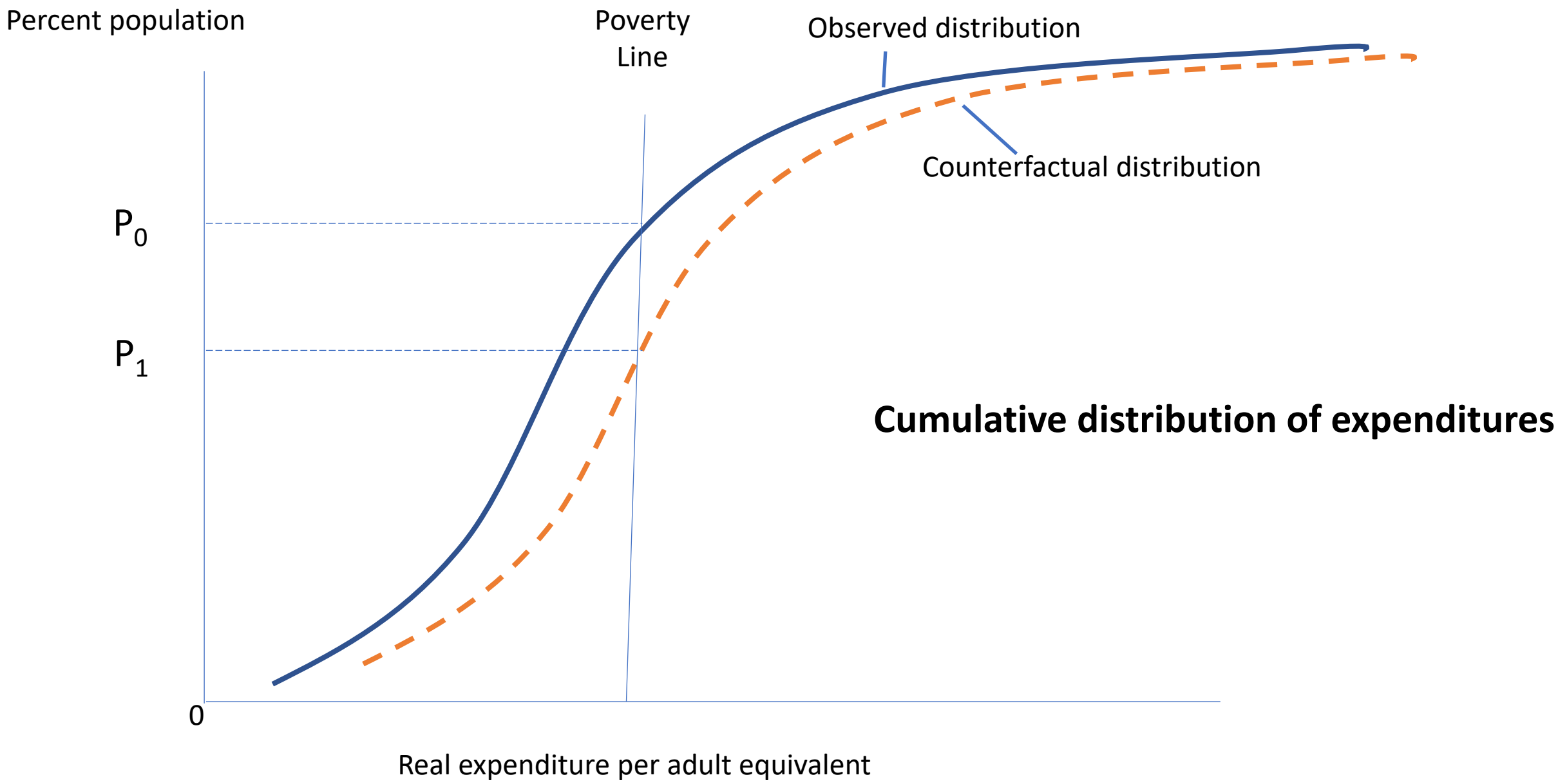

Cumulative distribution of expenditures

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Myanmar: Survey-based estimates of consumption, poverty and inequality, 2005 to 2015

Variable	2005	2010	2015	Average annual change 2005 to 2015
Mean real consumption per AE[a]				
National	1,950	1,977	2,243	1.78%
Urban	2,205	2,144	2,625	1.95%
Rural	1,875	1,944	2,175	1.54%
Gini coefficient of inequality[b]				
National	0.256	0.220	0.317	0.006
Urban	0.315	0.262	0.366	0.005
Rural	0.212	0.188	0.280	0.007
Poverty incidence (%)[c]				
National	32.1	25.6	19.4	-1.27
Urban	21.5	15.7	9.0	-1.25
Rural	35.8	29.2	23.3	-1.25

Notes: Average annual changes calculated as: [a] mean consumption, annual percentage change; [b] Gini coefficient, average annual change; [c] poverty incidence, average annual percentage point change.
Source: Author's calculations from World Bank (2017a) *Myanmar Poverty Trends, Part 1.*

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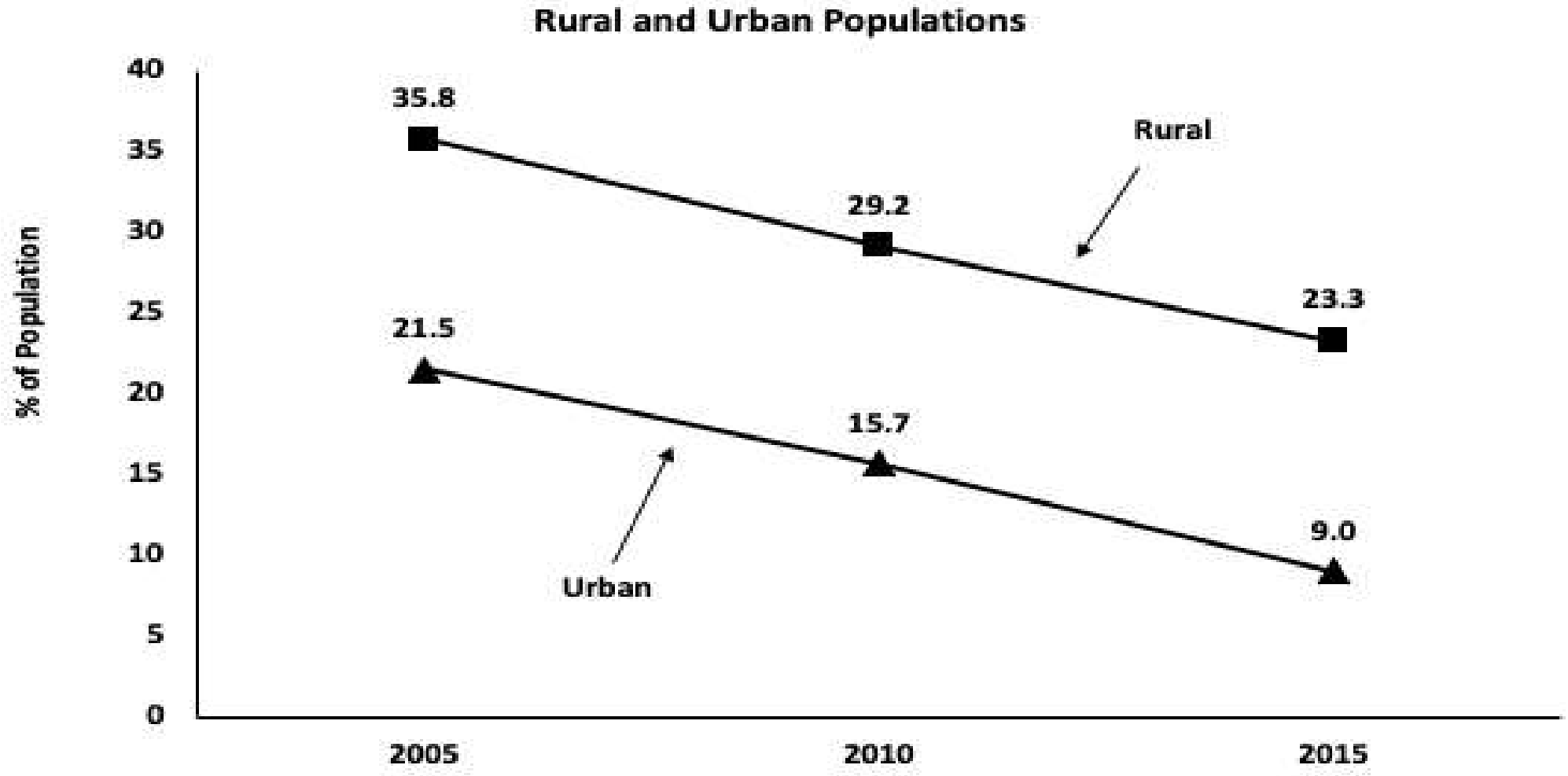
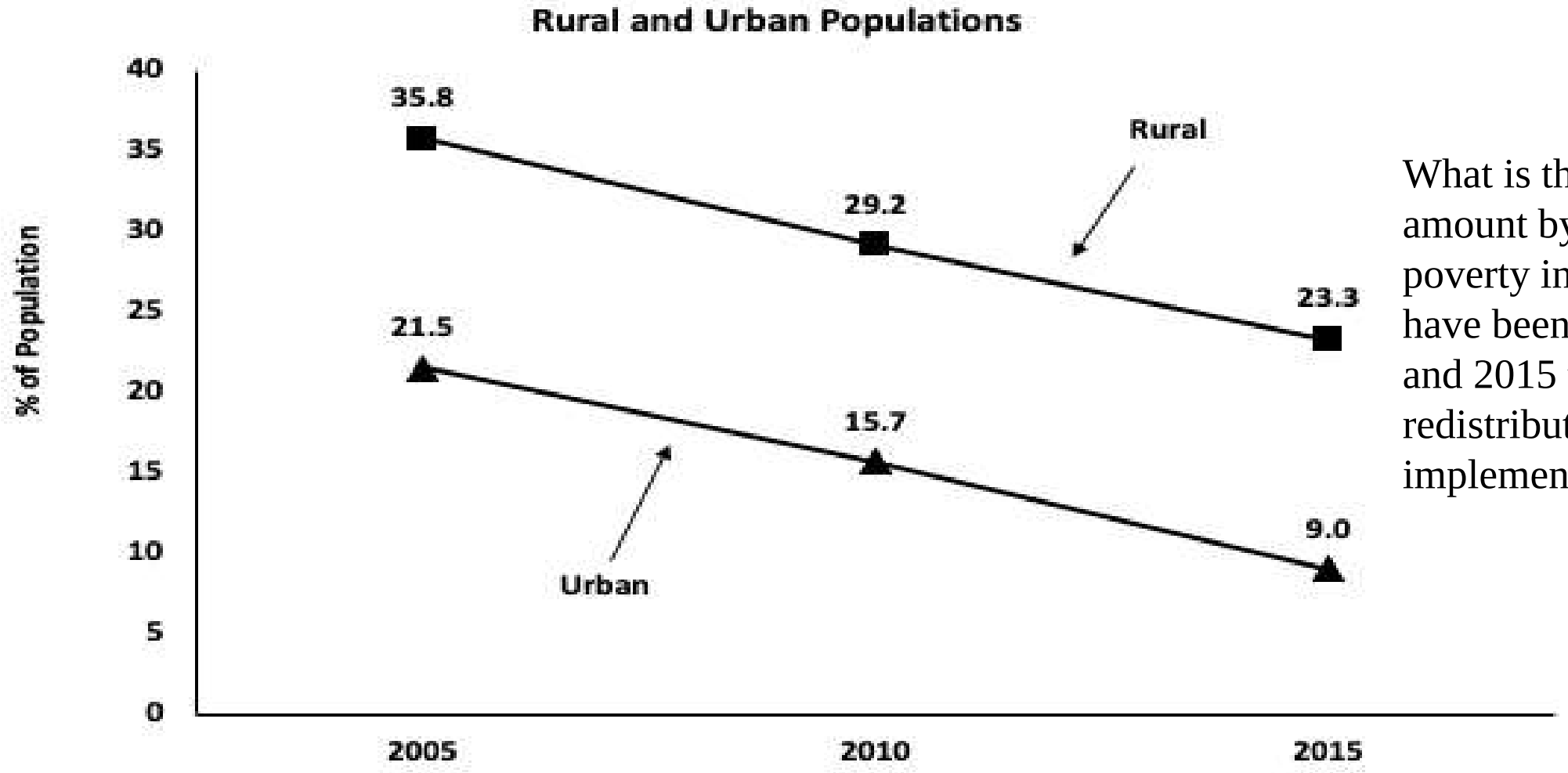
Poverty incidence, Myanmar, 2005 to 2010



Poverty incidence, Myanmar, 2005 to 2015



What is the maximum amount by which rural poverty incidence could have been reduced in 2010 and 2015 through a redistributive land reform implemented before 2010?

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Simulating the impacts that a hypothetical land reform has on the distribution of expenditures:

4 kinds of agricultural land: owned / rented; and irrigated / unirrigated (i = 1, 2, 3, 4)

$$lnE_h = \alpha + \sum_{i=1}^{4} \beta_i L_{hi} + \sum_{j=1}^{3} \gamma_j R_{hj} + \sum_{k=1}^{58} \delta_k X_{hk} + \varepsilon_h \qquad (1)$$

We do this twice: OLS and IV, meaning first without (OLS) and then with (IV) use of instrumental variable treatment for possibly endogenous irrigated and unirrigated owned land.

$$L_{hi}^{*} = L_{hi} + \theta(\overline{L_i} - L_{hi}) = \theta\overline{L_i} + (1-\theta)L_{hi}, \qquad i = 1, 2 \qquad (2)$$

$$0 \leq \theta \leq 1 \qquad (3)$$

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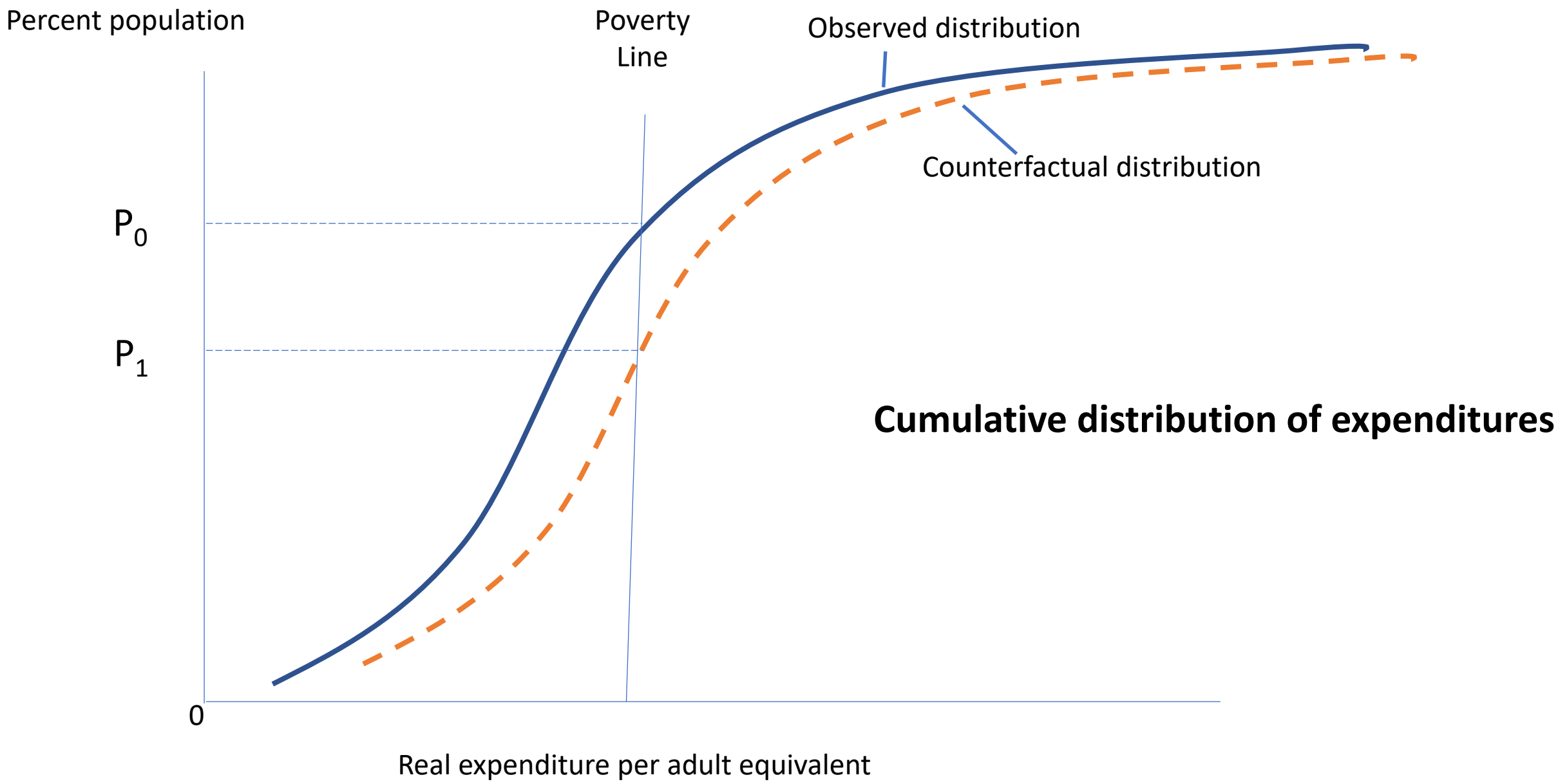
$$lnE_h - lnE_h^{*} = \sum_{i=1}^{4} \beta_i (L_{hi} - L_{hi}^{*}) \qquad (5)$$



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Regression results

Dependent Variable: Log of household expenditure per adult equivalent

	OLS			*IV*		
Independent variables	Coefficient	St. error	*p*-value	Coefficient	St. error	*p*-value
Owned irrigated land area per AE	0.0283	0.0041	0.0000	0.0376	0.0055	0.0000
Owned unirrigated land area per AE	0.0295	0.0029	0.0000	0.0306	0.0037	0.0000
Rented irrigated land area per AE	-0.0053	0.0128	0.6780	-0.0033	0.0129	0.7980
Rented unirrigated land area per AE	0.0215	0.0110	0.0520	0.0237	0.0111	0.0330

Plus 62 household, village and regional control variables plus intercept term

Number of obs.: 11,172
F(65, 8959): 66.39
Prob. > F: 0.0000
R-squared: 0.3131
Root MSE: 0.2818

Second-stage equation:
Number of obs.: 11,172
Wald chi-sq: 4200.52
Prob. > chi-sq.: 0.0000
R-squared: 0.3112
Root MSE: 0.2814

First-stage equation:
Number of obs.: 11,172
F-test of excluded instruments:
own. irrig.: F(1, 11106) = 515.59 (p = 0.0000)
own. unirrig.: F(1, 11106) = 279.81 (p = 0.0000)

Sanderson-Windmejer multivariate F-test of excluded instruments:
own. irrig.: F(1, 11106) = 553.41 (p = 0.0000)
own. unirrig.: F(1, 11106) = 436.35 (p = 0.0000)

Cragg-McDonald-Wald F-statistic: 1628.37
Stock-Yogo 5% critical value for two endogenous variables: 12.31

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Gini Coefficients of Land Sizes Before and After Redistribution

	Land per AE		Land per household	
	Households included in redistribution:			
	All (11,172)	Landed (9,025)	All (11,172)	Landed (9,025)
No redistribution ($\theta = 0$)				
Irrigated land	0.833	0.833	0.831	0.831
Unirrigated land	0.741	0.741	0.744	0.744
Effective land	0.641	0.641	0.642	0.642
Redistributed ($\theta = 0.25$)				
Irrigated land	0.625	0.673	0.640	0.679
Unirrigated land	0.555	0.603	0.572	0.613
Effective land	0.480	0.528	0.492	0.537
Redistributed ($\theta = 0.5$)				
Irrigated land	0.417	0.513	0.458	0.538
Unirrigated land	0.370	0.496	0.410	0.517
Effective land	0.320	0.426	0.358	0.454
Redistributed ($\theta = 0.75$)				
Irrigated land	0.208	0.352	0.295	0.416
Unirrigated land	0.185	0.329	0.271	0.395
Effective land	0.160	0.304	0.249	0.378
Redistributed ($\theta = 1$)				
Irrigated land	0.000	0.192	0.196	0.350
Unirrigated land	0.000	0.192	0.196	0.350
Effective land	0.000	0.192	0.196	0.350
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Simulated impacts on consumption, poverty and inequality:

A. Redistribution among all agricultural households, including landless (N = 11,172)

	Base mean	Base standard deviation	Simulation mean	Simulation standard deviation	Simulated change	*z*-statistic	*p*-value
Assumed distributional parameter$(\theta) = 1$							
Consumption							
OLS	506,159	6,290	502,607	6,048	-3,552	-3.093	0.002
IV	506,159	6,290	502,276	6,009	-3,884	-2.875	0.004
Gini							
OLS	0.1909	0.0047	0.1809	0.0046	-0.010	-11.565	0.000
IV	0.1909	0.0047	0.1801	0.0045	-0.011	-10.597	0.000
Poverty							
OLS	27.17	1.91	25.83	1.54	-1.3	-2.774	0.006
IV	27.17	1.91	25.49	1.61	-1.7	-3.507	0.000
Assumed distributional parameter$(\theta) = 0.5$							
Consumption							
OLS	506,159	6,290	504,031	6,152	-2128	-3.457	0.001
IV	506,159	6,290	503,742	6,125	-2418	-3.328	0.001
Gini							
OLS	0.1909	0.0047	0.1847	0.0047	-0.006	-13.498	0.000
IV	0.1909	0.0047	0.1840	0.0046	-0.007	-12.697	0.000
Poverty							
OLS	27.17	1.91	26.32	1.59	-0.8	-2.350	0.019
IV	27.17	1.91	26.38	1.56	-0.8	-1.981	0.048

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Simulated impacts on consumption, poverty and inequality:

B. Redistribution among all agricultural households excluding landless (N = 9,025)

	Base mean	Base standard deviation	Assumed distributional parameter	Simulation mean	Simulation standard deviation	Simulated change	*z*-statistic	*p*-value
Assumed distributional parameter (θ) = 1								
Consumption								
OLS	506,159	6,290	1.00	502764	6143	-3395	-3.270	0.001
IV	506,159	6,290	1.00	502436	6117	-3724	-3.097	0.002
Gini								
OLS	0.1909	0.0047	1.00	0.1832	0.0046	-0.008	-10.158	0.000
IV	0.1909	0.0047	1.00	0.1826	0.0045	-0.008	-9.306	0.000
Poverty								
OLS	27.17	1.91	1.00	26.20	1.51	-1.0	-1.623	0.105
IV	27.17	1.91	1.00	26.06	1.56	-1.1	-2.233	0.026
Assumed distributional parameter (θ) = 0.5								
Consumption								
OLS	506,159	6,290	0.50	502764	6179	-3395	-5.744	0.000
IV	506,159	6,290	0.50	502438	6159	-3722	-5.331	0.000
Gini								
OLS	0.1909	0.0047	0.50	0.1858	0.0047	-0.005	-11.480	0.000
IV	0.1909	0.0047	0.50	0.1852	0.0046	-0.006	-10.671	0.000
Poverty								
OLS	27.17	1.91	0.50	26.78	1.59	-0.4	-1.090	0.276
IV	27.17	1.91	0.50	26.93	1.56	-0.2	-0.588	0.556

Simulated impacts on consumption, poverty and inequality:

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Poverty								
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IV	27.17	1.91	1.00	26.06	1.56	-1.1	-2.233	0.026
Assumed distributional parameter (θ) = 0.5								
Consumption								
OLS	506,159	6,290	0.50	502764	6179	-3395	-5.744	0.000
IV	506,159	6,290	0.50	502438	6159	-3722	-5.331	0.000
Gini								
OLS	0.1909	0.0047	0.50	0.1858	0.0047	-0.005	-11.480	0.000
IV	0.1909	0.0047	0.50	0.1852	0.0046	-0.006	-10.671	0.000
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Gini								
OLS	0.1909	0.0047	0.50	0.1858	0.0047	-0.005	-11.480	0.000
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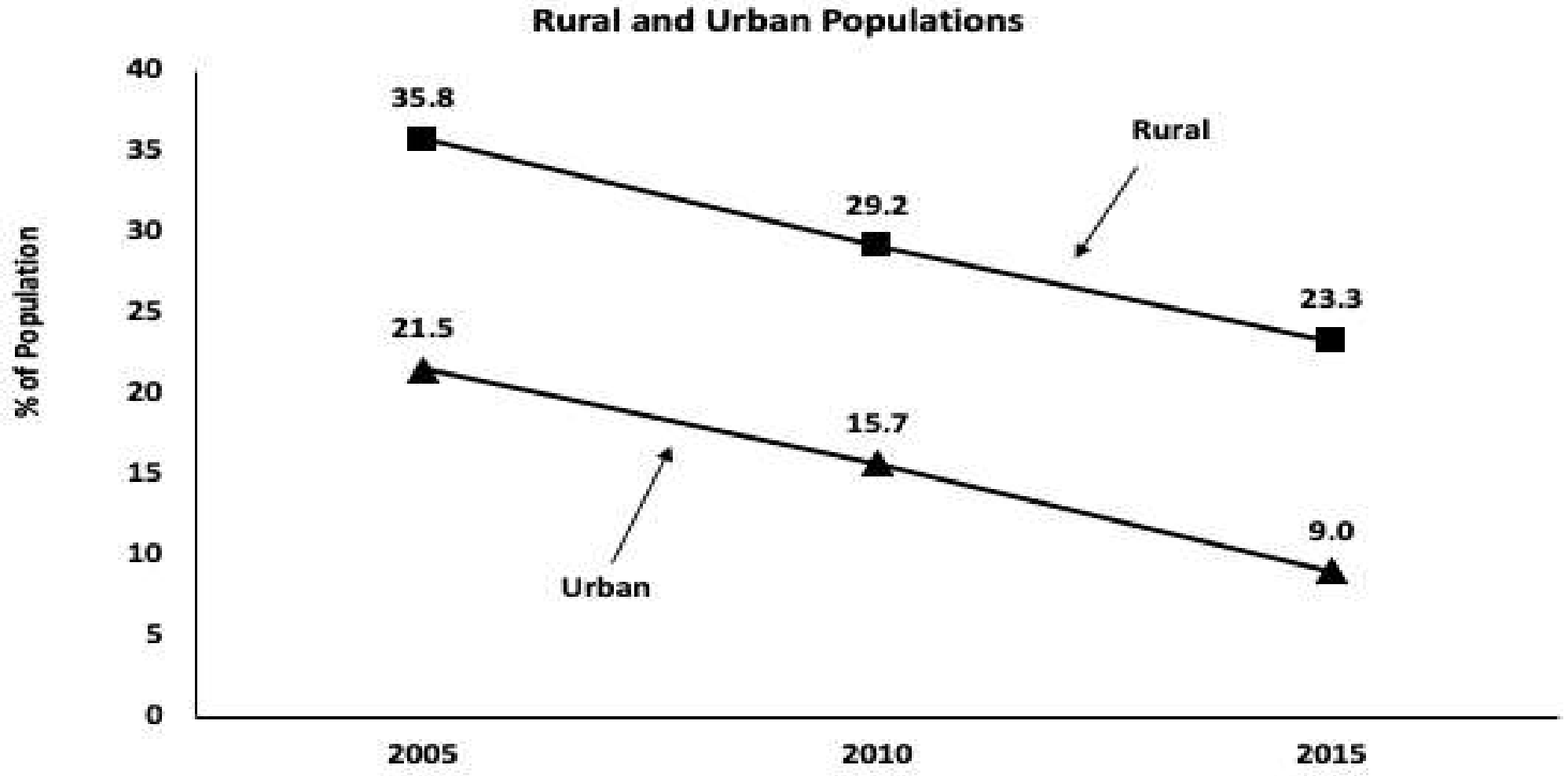
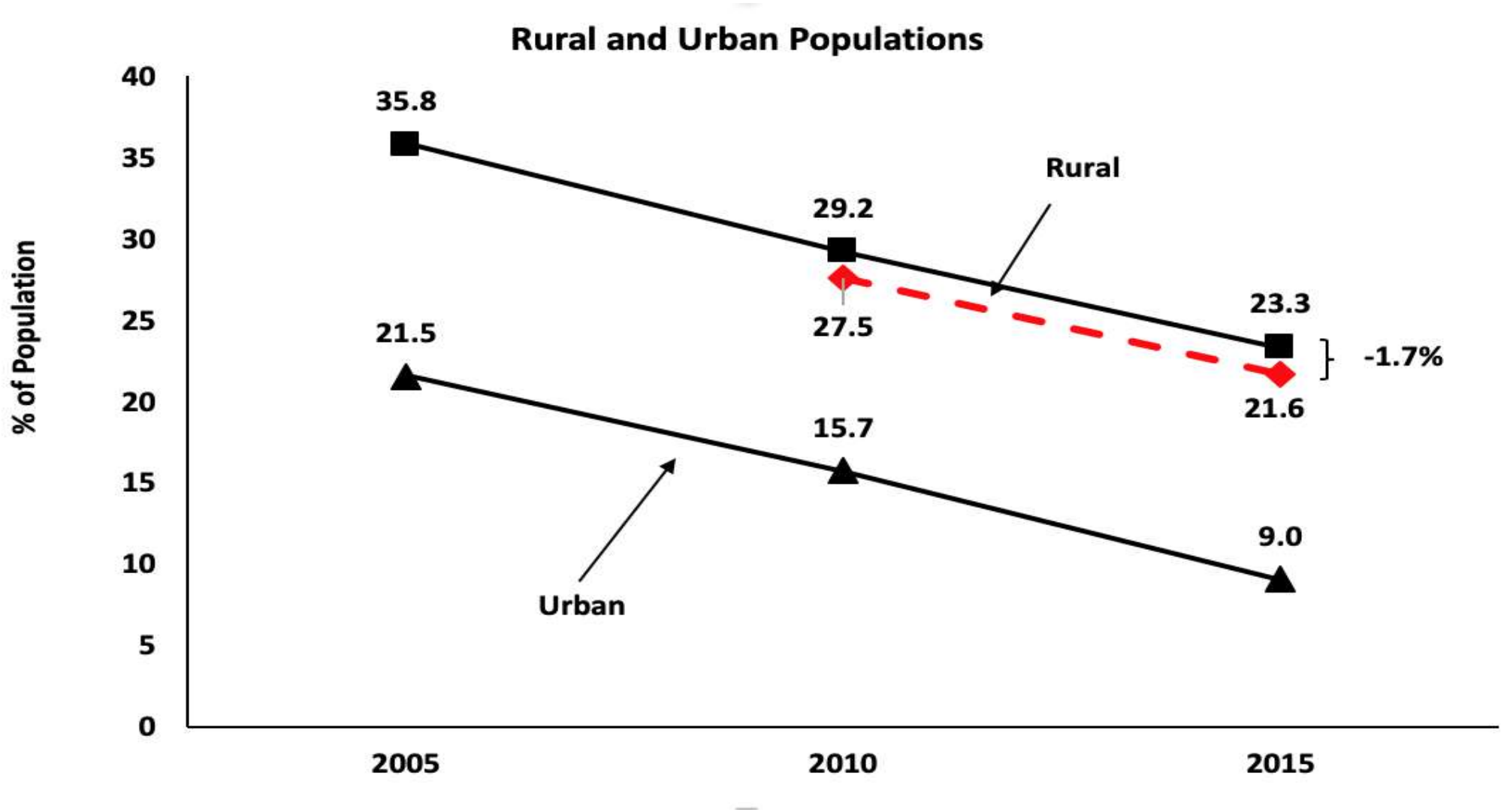
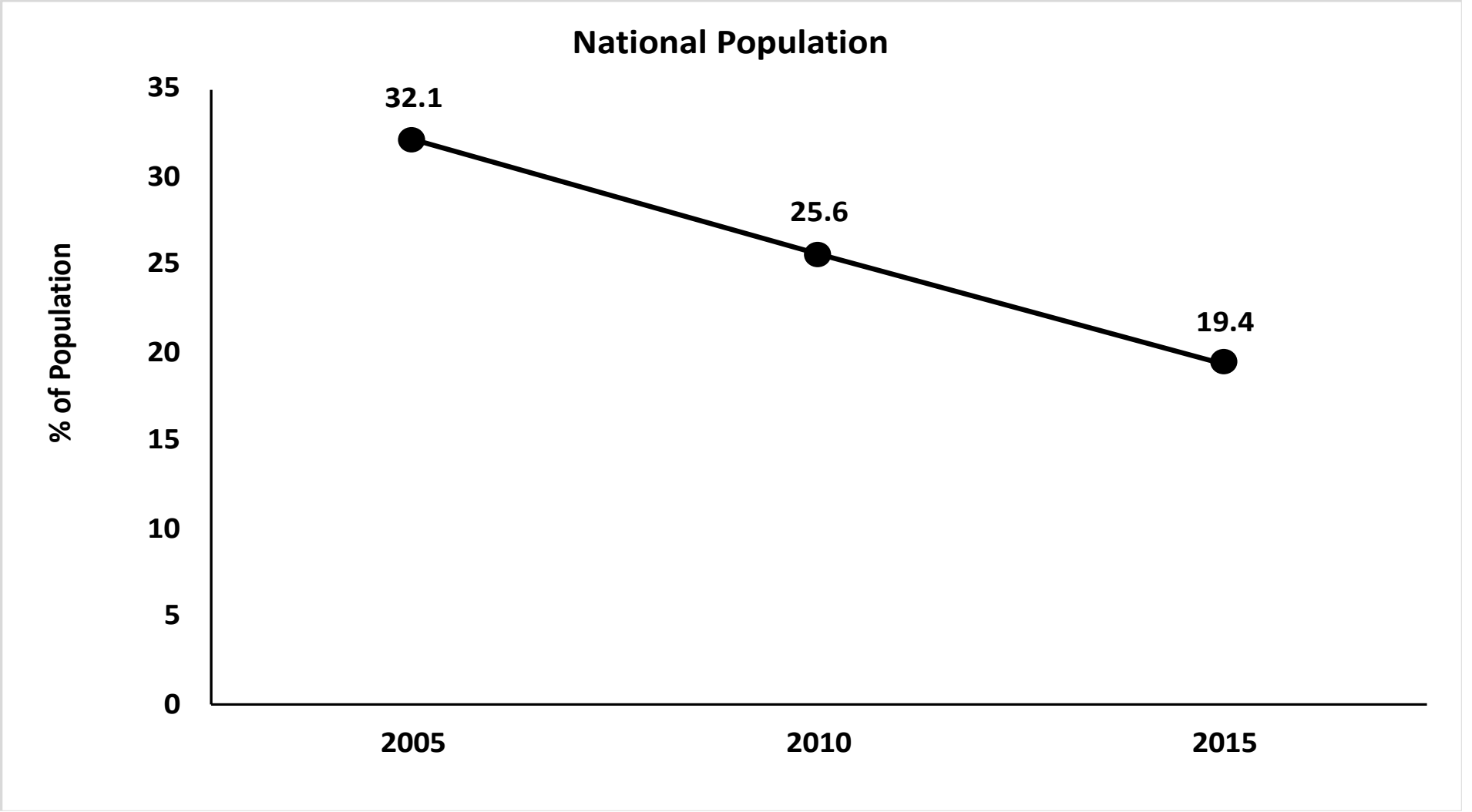
Poverty incidence, Myanmar, 2005 to 2010



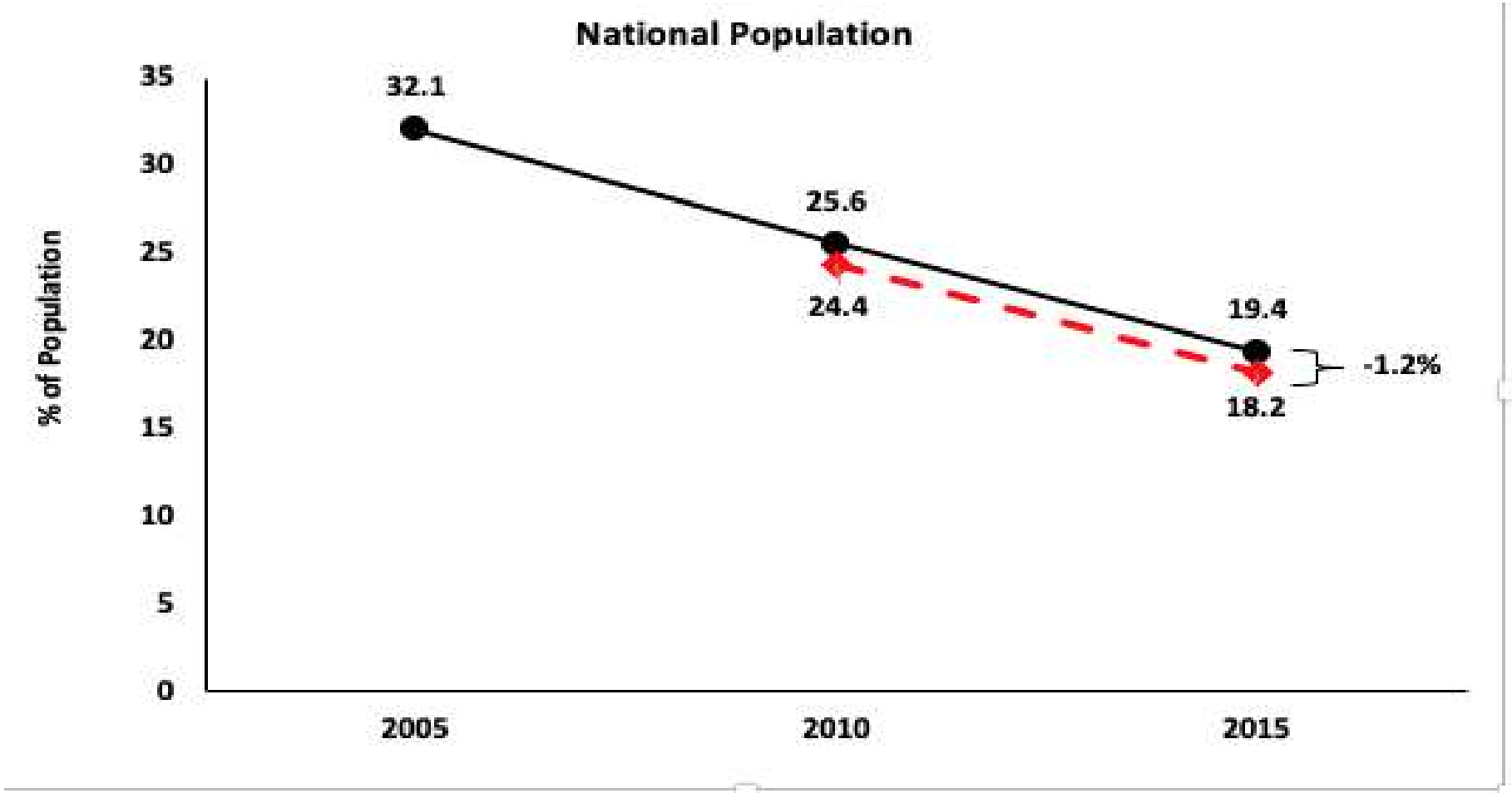
Poverty incidence, Myanmar, 2005 to 2010



Poverty incidence, Myanmar, 2005 to 2010



Poverty incidence, Myanmar, 2005 to 2010



Myanmar: Survey-based estimates of consumption, poverty and inequality, 2005 to 2015

Variable	2005	2010	2015	Average annual change 2005 to 2015
Mean real consumption per AE[a]				
National	1,950	1,977	2,243	1.78%
Urban	2,205	2,144	2,625	1.95%
Rural	1,875	1,944	2,175	1.54%
Gini coefficient of inequality[b]				
National	0.256	0.220	0.317	0.006
Urban	0.315	0.262	0.366	0.005
Rural	0.212	0.188	0.280	0.007
Poverty incidence (%)[c]				
National	32.1	25.6	19.4	-1.27
Urban	21.5	15.7	9.0	-1.25
Rural	35.8	29.2	23.3	-1.25

Notes: Average annual changes calculated as: [a] mean consumption, annual percentage change; [b] Gini coefficient, average annual change; [c] poverty incidence, average annual percentage point change.
Source: Author's calculations from World Bank (2017a) *Myanmar Poverty Trends, Part 1.*

Salamat po

Thanks for listening

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Land operated by farming households ("owners" and renters)

Areas of irrigated and unirrigated land per household

	Number of households	Mean irrigated land (acres)	Mean unirrigated land (acres)	Gini coefficient of total land area	Gini coefficient of adjusted land area	Household expenditure per adult equivalent	
						Mean	Gini coefficient
Both irrigated and unirrigated land	1,403	4.53	4.83	0.47	0.46	153,326	0.32
Irrigated land only	2,815	6.60	0*	0.54	0.54	171,105	0.35
Unirrigated land only	4,807	0*	7.18	0.51	0.51	161,763	0.33
Either accessed irrigated or unirrigated or both	9,025	2.76	4.58	0.51	0.54	163,365	0.33

Note: Row 1 means accessed irrigated and unirrigated land are both strictly positive; row 2 means that accessed irrigated land is strictly positive but accessed unirrigated land is zero; row 3 means the reverse; row 4 refers to the full data set and means that some agricultural land is accessed, whether irrigated or unirrigated.
In rows 2 and 3, 0* means zero by construction. In column 4 'total land area' means the sum of irrigated and unirrigated land areas. In column 5 'adjusted land area' household' means 2.282*(irrigated area in acres) + (unirrigated area in acres), where 2.282 is average rice yield on irrigated land relative to unirrigated land.

Tenure of irrigated and unirrigated land

Households accessing land category:	Own and do not rent	Own and rent	Rent and do not own	All tenure categories
Both irrigated and unirrigated land				
No. households with positive output	1,307	76	20	1,403
Total irrigated area occupied (acres)	6,021	264	66	6,351
Total unirrigated area occupied (acres)	6,442	274	55	6,771
Mean area per household (acres)	9.54	7.08	6.02	9.35
Mean adjusted area per household[a]	15.44	11.52	10.21	15.15
Irrigated land only				
No. households with positive output	2,646	38	131	2,815
Total area occupied (acres)	17,765	392	428	18,584
Mean area per household (acres)	6.71	10.33	3.26	6.60
Mean adjusted area per household[a]	15.32	23.56	7.45	15.07
Unirrigated land only				
No. households with positive output	4,577	65	165	4,807
Total area occupied (acres)	33,325	493	703	34,521
Mean area per household (acres)	7.28	7.59	4.26	7.18
Mean adjusted area per household[a]	7.28	7.59	4.26	7.18
Either irrigated or unirrigated land or				
No. households with positive output	8,530	179	316	9,025
Total irrigated area occupied (acres)	23,786	656	493	24,935
Total unirrigated area occupied (acres)	39,766	767	758	41,291
Mean area per household (acres)	7.45	7.95	3.96	7.34
Mean adjusted area per household[a]	11.03	12.65	5.96	10.88

Notes: [a] 'Mean adjusted area per household' means 2.282*(irrigated area in acres) + (unirrigated area in acres), where 2.282 is average rice yield on irrigated land relative to unirrigated land.

Education of household head