The background of the slide features a soft-focus image of a mountain range in the distance and a willow tree branch with drooping catkins in the foreground on the right side. The overall color palette is muted, consisting of earthy greens, browns, and greys.

*Evaluation of Financial Systems
in Developing Economies*

Growth, Poverty, Inequality and the
Distribution of Gains and Losses

Robert M. Townsend

Federal Reserve Bank of Philadelphia
Policy Forum
December 1st, 2006

Overall Contribution, Applied General Equilibrium Analysis

- ❖ The whole may be greater than the sum of the parts
- ❖ There is relatively little work in development that combines micro economics and macro economics
- ❖ Relatively little work that combines both theory and data
- ❖ Provides an overall conceptual framework that allows us to integrate both macro and micro data.
- ❖ Various theories can be rejected in the data (fathering further rounds of iterative research agenda)
- ❖ Both the micro and macro data are put into a common framework for measurement
- ❖ Modified and new theories which link growth, inequality, poverty, and financial deepening.
- ❖ Research to assess and quantify the heterogeneous impact of financial policy change at the level of households and firms while being consistent with the facts of growth, inequality, and poverty.

Other Related Efforts

- ❖ There are relatively few contributions of this kind, and practically none in developing countries.
- ❖ **Banerjee and Duflo**: cross-country growth dynamics and TFP pioneered by **Lucas** among others are hard to reconcile with an aggregated production function, that is, as if the neoclassical framework were assumed to cover the micro data.
- ❖ Build toward a new micro-founded model with a small number of alternative technologies and varying fixed costs.
- ❖ They view their contribution as a preliminary attempt but of interest precisely because there are few other studies and almost none which combine micro estimates with endogenous growth and inequality dynamics.
- ❖ Clearly progress can be made:
 - **Heckman, Cameron, and Taber** study wage dynamics and inequality in dynamic general equilibrium models estimated with US data
 - **Cagetti and DeNardi** study entrepreneurial wealth in inequality in the U.S. with structural g.e. models.
 - Some of the asset pricing literature is solidly in this tradition (**Hansen, Cochrane, Singleton, Lucas**).
 - Real business cycle literature and some intn'l- Prescott, Kehoe
- ❖ .

The background features a soft-focus landscape with a mountain range under a pale sky. In the foreground on the right, a dark, thin tree branch with small, dark buds or leaves hangs down. The overall color palette is muted, consisting of various shades of beige, tan, and light brown.

Research Algorithm

The Thai Economy... Neoclassical Anomalies

If markets and institutions were perfect and there were no policy distortions, then certain benchmark standards would be implied. Relative to these benchmarks there are many anomalies in the Thai economy, even for those using formal credit and savings instruments. Initial wealth facilitates entry into business and facilitates investment for those in business.

Many households and businesses appear to be constrained in occupation choice, and estimated rates of return are high for constrained low wealth households and low for unconstrained high wealth households.

Poor households and SME enterprise are particularly vulnerable in consumption and investment to variation in income and cash flow.

Some apparently insurable shocks such as movement in international rubber prices are not covered.

Wealth

Wealth helps business starts

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Table 3A
Probit estimates of having started business in last 5 years

	Whole sample		Northeast		Central region	
	dF/dx*	Z-statistic	dF/dx*	Z-statistic	dF/dx*	Z-statistic
Age of head	-0.0105	-3.18	-0.0106	-3.01	-0.0111	-1.84
Age of head squared	0.0001	2.52	0.0001	2.68	0.0001	1.21
Years of schooling—head	0.0080	3.01	0.0102	3.74	0.0034	0.67
Number of adult females in household	0.0013	0.15	0.0089	0.96	-0.0131	-0.85
Number of adult males in household	0.0158	2.03	0.0013	0.16	0.0345	2.41
Number of children (< 18 years) in household	-0.0045	-0.79	-0.0115	-1.80	0.0103	0.99
Wealth 6 years ago [†]	0.0276	3.25	0.0861	2.15	0.0246	2.82
Wealth squared [†]	0.0000	-1.78	0.0000	-1.20	0.0000	-0.79
<i>Member/customer in organization/institution 6 years ago</i>						
Formal financial institution*	0.0199	1.10	0.0040	0.19	0.0314	1.03
Village institution/organization*	-0.0224	-1.05	-0.0400	-1.96	0.0239	0.55
Agricultural lender*	0.0278	1.39	0.0145	0.67	0.0511	1.40
BAAC group*	0.0397	1.72	0.0519	2.06	0.0084	0.20
Moneylender*	0.0014	0.04	0.0130	0.36	-0.0176	-0.31
Observed frequency	0.1407		0.0915		0.2070	
Predicted frequency at mean of X	0.1105		0.0699		0.1720	
Log likelihood	-860.30		-363.62		-488.65	
χ^2 for significance of fixed effects	152.96		28.83		85.69	
Prob> χ^2	0.00		0.19		0.00	
Pseudo R-squared (%)	14.14		10.87		15.59	
Number of observations	2467		1333		1135	

The sample excludes the top 1% of households by wealth.

* dF/dx is equal to the infinitesimal change in each continuous independent variable. For dummy variables, it is equal to the discrete change in probability when the dummy variable changes from 0 to 1. Dummy variables are marked by an asterisk.

[†] Wealth 6 years ago is made up of the value of household assets, agricultural assets and land. Number in table is estimated coefficient multiplied by 1,000,000.

Education + helps overall, NE

Demographics, # of adults

Wealth + reject overall, both regions
- village fund, be aware of selection, see below

Access + helps, BAAC, NE

Rates of Return Decline With Wealth for Constrained Business

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Table 2B

Median returns to business investment in business by wealth

	Wealth			
	Lowest quartile	Second quartile	Third quartile	Fourth quartile
<i>Whole sample</i>				
Business	56.7%	38.4%	20.7%	16.2%**
Constrained	96.9%	67.2%	13.8%	16.4%***
Unconstrained	10.5% ⁺⁺	31.2%	32.3%	16.1%
<i>Central</i>				
Business	80.8%	48.8%	39.1%	16.0%***
Constrained	98.2%	79.3%	28.2%	14.4%***
Unconstrained	48.0%	34.8%	56.6%	21.0%
<i>Northeast</i>				
Business	21.2%	12.7%	6.6%	10.0%
Constrained	57.9%	35.7%	23.2%	17.1%
Unconstrained	4.0% ⁺	8.9%	3.2% ⁺	0.0%
	Education			
	0–3 years	4 years	5–16 years	
<i>Whole sample</i>				
Business	5.80%	28.54%	22.77%	
Constrained	32.59%	30.44%	25.63%	
Unconstrained	2.90%	28.46%	19.37%	
<i>Central</i>				
Business	6.42%	38.99%	25.63%	
Constrained	21.84%	37.84%	25.63%	
Unconstrained	6.42%	43.89%	24.98%	
<i>Northeast</i>				
Business	4.10%	12.71%	21.40%	
Constrained	35.59%	18.69%	26.52%	
Unconstrained	–5.43% ⁺⁺	4.32% ⁺	4.53%	

*, **, *** indicate the significance of the difference in median returns to investment for businesses, constrained businesses or unconstrained businesses when the lowest wealth quartile is compared to the highest wealth quartile at the 10%, 5% and 1% levels, respectively. ^o, ^{oo}, ^{ooo} indicate the significance of the difference in median returns to investment for businesses, constrained businesses or unconstrained businesses when the lowest education category is compared to the highest education category at the 10%, 5% and 1% levels, respectively. ^o, ^{oo}, ^{ooo} indicate the significance of the difference in median returns to investment for businesses, constrained businesses or unconstrained businesses when the wealth quartile indicated in the column heading is compared to the next lowest wealth quartile at the 10%, 5% and 1% levels, respectively. ⁺, ⁺⁺, ⁺⁺⁺ indicate the significance of the difference in median returns to investment within the category indicated by the column heading, for constrained businesses and unconstrained businesses at the 10%, 5% and 1% levels, respectively.

Same Technology

Both Regions

Low rates for the unconstrained

The Risk Sharing Equation

$$\begin{aligned} \Delta c_{t,t+1}^j &= \beta_{t,t+1}^j D_{t,t+1}^j + \delta \Delta \bar{A}_{t,t+1}^j + \eta \Delta h s_{t,t+1}^j \\ &+ \mu X_{j96} + \xi \Delta Y_{t,t+1}^j + \nu \Delta Y_{t,t+1}^j X_{j96} + u_{t,t+1}^j \end{aligned}$$

(7.2.8)

Reject Neoclassical, By Category

Accept!

Reject →

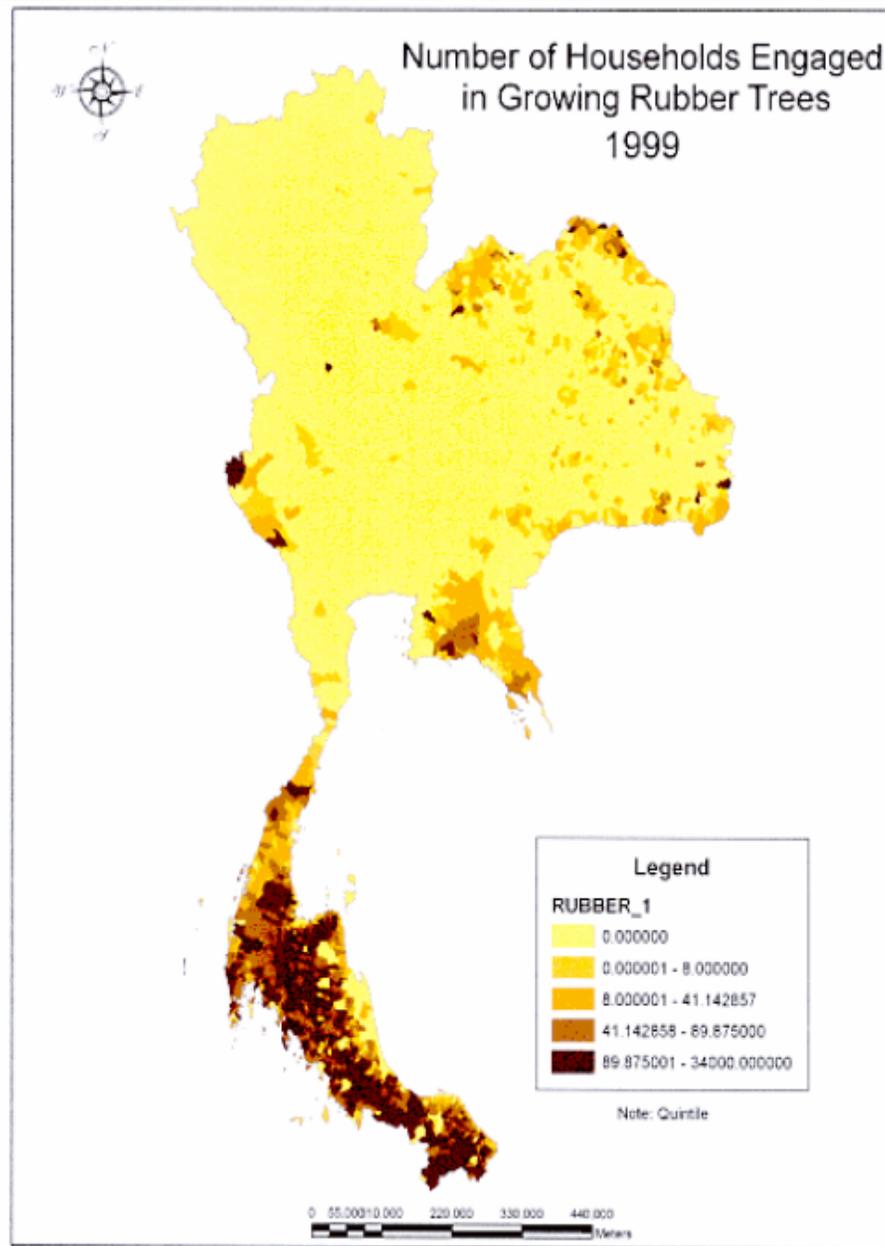
Especially →

bad for poor

Table 4: Change in Consumption onto Change in Income (Levels). Incremental Effect.

	Overall	Central	Northeast	Central Crisis	Recovery	Northeast Crisis	Recovery
Overall	.057*** (.000)	.109*** (.000)	.004 (.832)	.112*** (.000)	.082*** (.001)	.013 (.675)	.003 (.919)
Age	.047*** (.001)	.019 (.275)	.291*** (.000)	.019 (.499)	.012 (.620)	.254*** (.000)	.391*** (.000)
Female	.014 (.849)	-.065 (.468)	.315** (.031)	-.193 (.178)	.091 (.437)	.227 (.252)	.815*** (.001)
Educ	-.009 (.206)	-.001 (.894)	-.070*** (.000)	.007 (.663)	.011 (.452)	-.046*** (.017)	-.121*** (.000)
Wealth	-1.3e-12*** (.000)	-7.8e-07*** (.013)	-6.3e-06*** (.000)	-1.1e-06** (.021)	-7.3e-07 (.135)	-5.4e-06*** (.000)	-8.8e-06*** (.000)

Notes: The table reports the coefficient of income change interacted with household characteristics in Equation (4). Line 1, overall, reports the coefficients from OLS regression and lines 2-5 report the coefficient from Median regressions with age, female, education and wealth run jointly. Tambon-specific fixed effects are included in the regression equations. *** indicates 1% significant level, ** 5% and * 10%, respectively. P-values in parenthesis.



At best, remittances reduce size of income shock by 10 -11%(Paulson Miller - less remittance reduce rain fall 22%)

Estimation by least squares (first part of table) and median regression (second part of table). Robust standard errors. Regression also includes a constant and: (i) 8 dummies for the sex and education level of household head (ii) controls for number of children in 5 different sex-age categories (ii) dummies for changwat (province) location of household (iii) dummies for the year-quarter the household was surveyed (iv) 5 dummies for the amount of land held by the household and/or whether the household was a renter (v) 8 dummies for the socio-economic class of the household head (vi) 13 dummies for the type of enterprise the household head was primarily occupied with.

(A) Least squares

Dep. Variable:	h.h.income	h.h.saving	h.h.consumption
rubber_prop	-938.642 (465.414)**	-371.956 (440.771)	-566.686 (265.694)**
rubber_prop * time	73.314 (52.758)	16.958 (50.310)	56.356 (31.439)*
rubber_prop * rubber_price	521.445 (131.282)***	37.741 (149.130)	483.703 (124.259)***
Number of observations	44009	44009	44009
R ²	0.15	0.04	0.18

(B) Median regression

Dep. Variable:	h.h.income	h.h.saving	h.h.consumption
rubber_prop	-139.344 (163.798)	-254.458 (112.071)**	-219.973 (128.721)*
rubber_prop * time	28.714 (19.532)	40.280 (13.361)***	4.586 (15.353)
rubber_prop * rubber_price	243.363 (62.091)***	15.499 (42.473)	231.589 (48.823)***
Number of observations	44009	44009	44009

* significant at 10%; ** significant at 5%; *** significant at 1%

Vickery



Policy Impact

Research Algorithm

Likewise, government program innovations and plausibly exogenous variation in access to intermediation have had nontrivial impacts on households and businesses. The new one million baht village funds program seems to have increased consumption, agricultural investment, and total borrowing above and beyond village fund credit, while raising default rates and lowering assets/savings.

Running in reverse, a Bank for Agriculture debt moratorium program has a neutral if not negative impact.

Arguably, exogenous variation in villages funds by policy (emergency services training, monitoring, pledged saving) and by type (rice bank, buffalo bank, production credit group, women groups) implies variation in impact (asset accumulation, risk sharing, occupation choice, and reliance on money lenders).

Instrumented variation in access allows an assessment of particular financial institutions (commercial banks, BAAC, village funds, informal sector) providing a score card/rating system for the impact on consumption and investment smoothing.

$$\begin{aligned} VFCR_{n,t} = & \sum_{i=1}^I \delta_i X_{i,n,t} + \theta_t + \theta_n + \lambda_1 invHH_{t,n} \\ & + \lambda_2 invHH_{t,n} \chi_{t=2002} + \lambda_3 invHH_{t,n} \chi_{t=2003} + e_{n,t} \end{aligned}$$

(8.1.5)

$$y_{n,t} = \sum_{i=1}^I \alpha_i X_{i,n,t} + \beta VFCR_{n,t-1} + u_{n,t}$$

(8.1.3)

Impact Variable=> Technique	Total Expenditures	Total Consumption	Log Assets†	Net Income‡	Number of New Businesses	Number of Businesses	Avg. Short-Term Credit Interest Rate†	Amount of Short-Term Credit in Default†	Amount of All Credit in Default†	Fraction of Short-Term Credit in Default†	Fraction of All Credit in Default†
Normal Regression	2.3372 (1.5242)	2.1048** (0.6159)	-1.06-5** (5.19e-6)	1.8025 (1.2339)	1.47e-6 (1.84e-6)	8.71e-6** (4.13e-6)	2.47e-6** (1.16e-6)	0.3024 (0.4036)	0.0788 (0.4759)	2.83e-6 (2.55e-6)	-7.16e-8 (2.25e-6)
Regression w/out 1% Outliers	2.2913** (0.9445)	1.1396** (0.3662)	-9.95e-6** (4.91e-6)	-0.1413 (0.5495)	††	††	1.92e-6** (9.54e-7)	0.8017** (0.2898)	0.7340** (0.3458)	††	††
Regression w/out 5% Outliers	1.0596* (0.6282)	1.0305** (0.2487)	-7.42e-6 (4.63e-6)	0.0587 (0.3796)	††	††	9.95e-7 (6.78e-7)	0.4218** (0.1767)	0.4122* (0.2359)	††	††
DV for Positive Value and DV for Credit	‡	‡	‡	0.0389 (0.0315)	0.0542 (0.0563)	0.1142 (0.0903)	-0.1670 (0.1766)	0.1912** (0.0959)	0.2219** (0.1016)	0.1912** (0.0959)	0.2219** (0.1016)
Dummy Variable for Above Household Average and DV for Credit	0.3694** (0.1284)	0.4742** (0.1289)	-0.0388 (0.1312)	0.0983 (0.1343)	0.0516 (0.0540)	0.0616 (0.0944)	0.4575 (0.3063)	0.2083** (0.0931)	0.2293** (0.0993)	0.1461 (0.0939)	0.1076 (0.1006)

** Significant at 5% level * Significant at 10% level

The independent variables are year dummies, household fixed effect dummies, male head of household dummy, number of adult males, number of adult females, number of kids, age of head and age of head squared, years of schooling of head, gross assets and gross assets squared, income, and inverse number of households in village. The treatment variable is the level of short-term village fund credit. The additional instruments in the first-stage are the inverse village size interacted with a dummy variable for year=2002 and year=2003. The fertilizer credit regressions also contain the area of cultivated land as an explanatory variable. Standard errors for the binomial regressions are not corrected for heteroskedasticity. The “log assets” and “net income” regressions omitted assets and net income, respectively, as explanatory variables.

† Regressions are based on specification (3), where the treatment variable is the level of *lagged* village credit.

‡ Regression could not be run because all values were positive.

†† Outliers could not be eliminated because of large mass points (i.e., either >5% or >1%, respectively) at the boundaries of the empirical distribution.

[Table 8.1.7. Impact of Village Fund Credit on Outcome Measures – Levels Regressions. Source: Kaboski and Townsend (2005)]

Outcome variable			Reducing consumption or input use in bad year	Starting a business	Changing jobs	Becoming money-lender customer
Presence of institution with policy	Number of observations	Asset growth				
Baseline	2858	0.0296 (0.0521)	0.0914 (0.0227)	0.0161 (0.0153)	0.0050 (0.0186)	-0.0821 (0.0151)
Offer lending services	716	-0.1332 (0.1186)	-0.0041 (0.0550)	-0.0477 (0.0367)	0.0145 (0.0457)	0.0333 (0.0305)
Savings used to evaluate loan applicants	731	-0.0979 (0.0960)	-0.1792 (0.0468)	-0.0209 (0.0322)	-0.0351 (0.0359)	-0.0381 (0.0283)
Offer emergency services	672	-0.0604 (0.1690)	-0.2005 (0.0826)	-0.0996 (0.0447)	-0.0693 (0.0623)	0.0118 (0.0451)
Provide training or advice	674	0.2605 (0.1125)	-0.0993 (0.0555)	-0.0175 (0.0327)	-0.0094 (0.0459)	-0.0087 (0.0319)
Offer saving services	731	0.2546 (0.0996)	-0.1344 (0.0464)	0.0068 (0.0273)	-0.0063 (0.0371)	-0.0268 (0.0289)
Offer pledged savings accounts	688	0.3183 (0.1274)	-0.1155 (0.0672)	0.0670 (0.0427)	0.1305 (0.0539)	-0.0671 (0.0339)
Offer traditional savings accounts	731	-0.1433 (0.2533)	-0.2946 (0.1149)	-0.1058 (0.0890)	-0.2644 (0.1009)	0.0663 (0.0749)
Savings is optional to members	716	-0.0735 (0.1079)	-0.1201 (0.0515)	-0.0450 (0.0316)	-0.0373 (0.0412)	-0.0291 (0.0284)
Savings requires minimum deposit	688	0.1057 (0.1015)	-0.1496 (0.0499)	-0.0286 (0.0307)	-0.0424 (0.0389)	0.0162 (0.0296)

Impact variable			Reducing consumption or input use in bad year	Starting a business	Changing jobs	Becoming moneylender customer
Presence of institution with policy	Number of observations	Asset growth				
Baseline	2858	0.0296 (0.0521)	0.0194 (0.0227)	0.0161 (0.0153)	0.0050 (0.0186)	-0.0821 (0.0151)
Collateral required	552	0.1230 (0.1728)	0.0776 (0.0744)	-0.0182 (0.0496)	-0.0266 (0.0690)	-0.0348 (0.0487)
Guarantor required	582	0.0318 (0.1176)	0.0268 (0.0533)	0.0044 (0.0352)	0.0464 (0.0458)	-0.0054 (0.0367)
Frequent payments	537	-0.0279 (0.1909)	0.0233 (0.0834)	-0.0237 (0.0629)	0.0105 (0.0738)	0.0150 (0.0548)
Frequent monitoring	375	0.2253 (0.1850)	0.0018 (0.0758)	-0.0071 (0.0510)	-0.0149 (0.0613)	-0.0077 (0.0563)
Everyone monitored	360	-0.1971 (0.1643)	-0.1256 (0.0762)	-0.0024 (0.0465)	0.0103 (0.0570)	-0.0215 (0.0400)

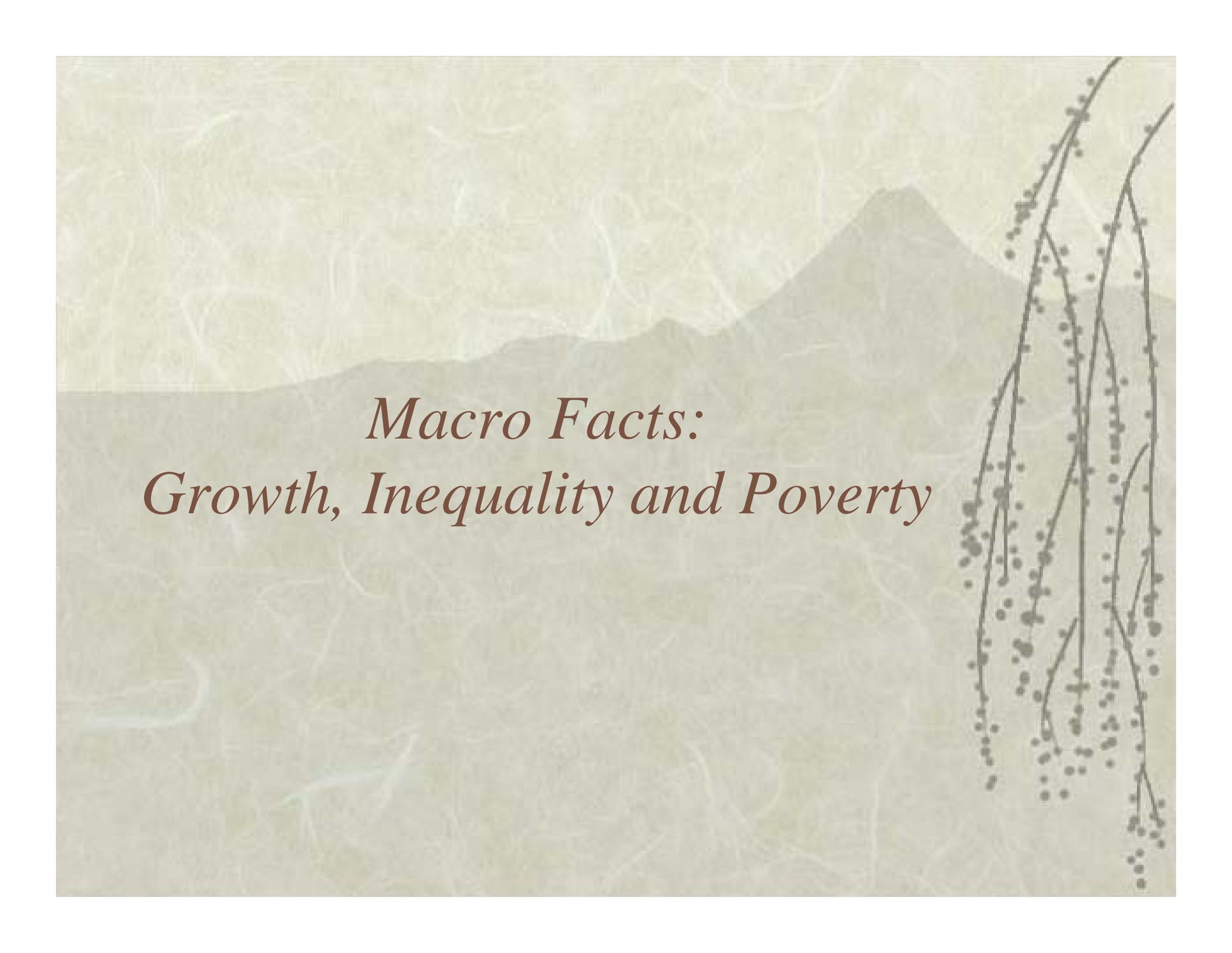
Light shading indicates significance at 5% level.

Dark shading indicates significance at the 10% level.

Notes:

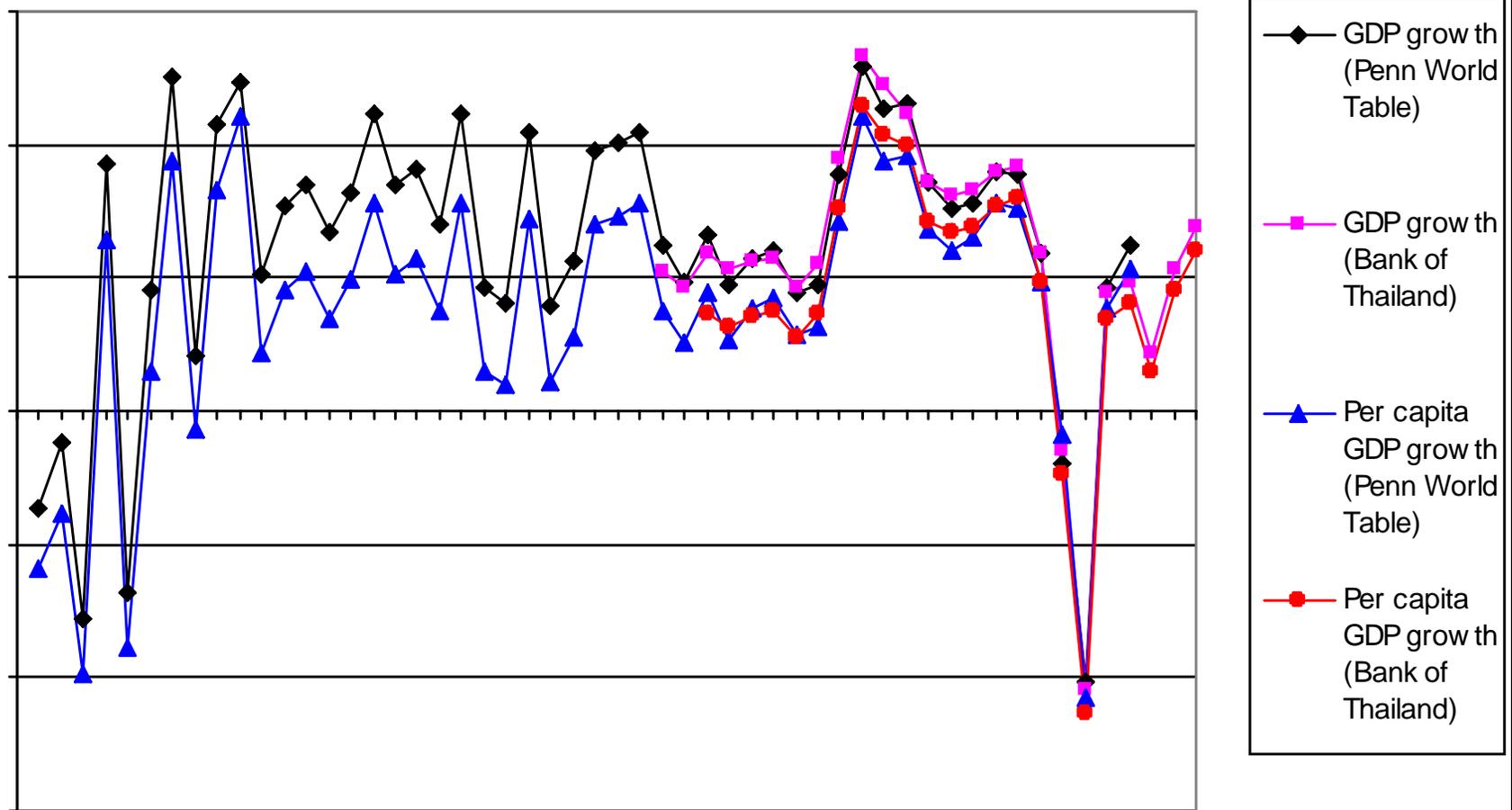
Impact estimates are the OLS estimate of the coefficient on the dummy variable for all institutions in the village in 1990 having/not having the relevant policy. "Outcome variables" are the dependent variables. The other independent variables are the list of controls variables contained in the notes to Table 8.

[Table 8.4.2. Impact estimates by policies of institution, growth/failure related policies (top) and tradition microfinance policies (bottom). Source: Kaboski and Townsend (2005)]

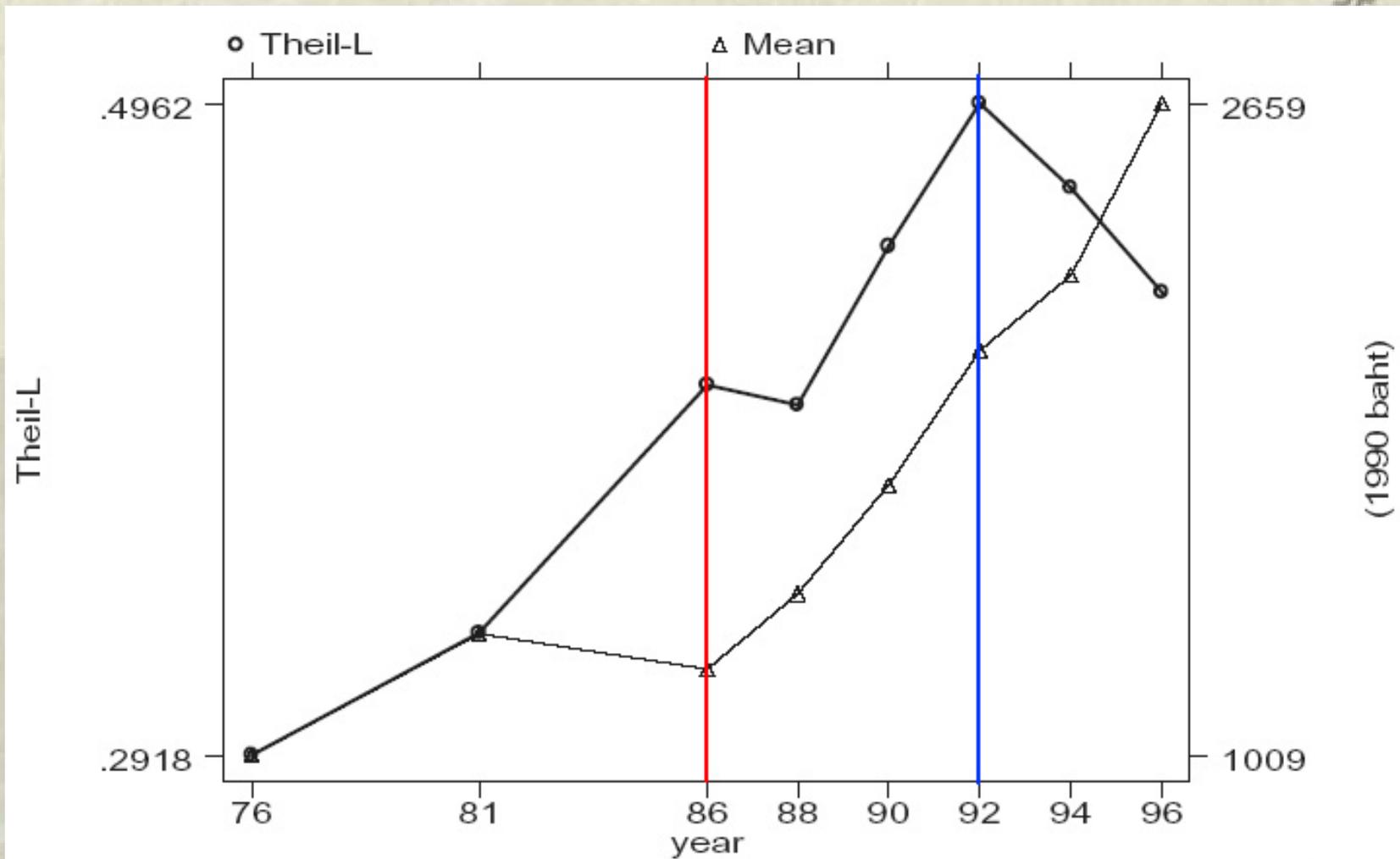
The background of the slide features a muted, sepia-toned landscape. In the upper half, a range of mountains is visible, with a prominent, rounded peak on the right side. The lower half of the image is dominated by the dark, slender branches of a willow tree, which are heavily laden with small, dark, round buds or leaves, hanging down from the right edge. The overall aesthetic is that of a textured, aged paper or parchment.

*Macro Facts:
Growth, Inequality and Poverty*

Growth has been relatively high for the past 50 years, but with a sharp drop in 1997 and the recession in the years of following the financial crisis. But the trend of long term industrialization dominates the data. Thailand has gone through a demographic transition with lower family size, increased longevity, increase in the number of inactive workers, and an increase in the number of female headed households. Inequality by almost all measures has been increasing since at least 1976, along with income, but unlike the growth of income, inequality peaks in 1992, with some backtracking for the crisis. There has been a steady decrease in the fraction of poor and distance of the poor from the poverty line, with only a slight wobble in the crisis. However, in panel data poverty is shown to be a transient rather than chronic phenomenon, especially if income data are used. Consumption, or especially wealth, move more slowly in the panel data. Apart from HIV/AIDS, health and other measures of wellbeing have steadily improved. Financial deepening displays astounding trends relative to the US. Part of that starting in 1986 can be attributable to a financial liberalization. Foreign capital inflows increased at the same time so this needs to be sorted out. By the 1990's commercial bank regulation appears deficient and government transfers masked the distortion. Post crisis, the government involvement in the financial sector has increased.



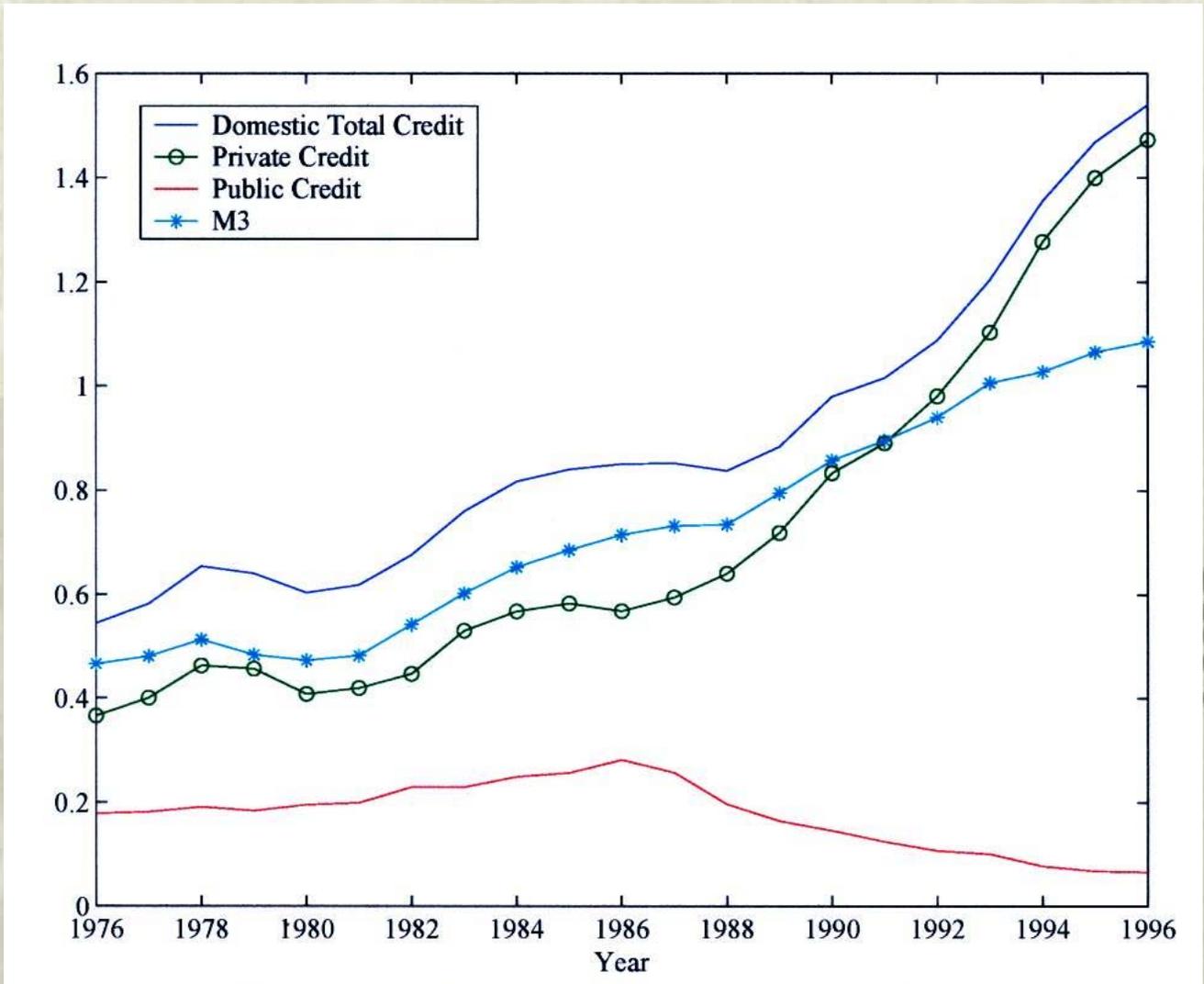
[Figure 1.1.1. Compiled from Penn World Trade, and Bank of Thailand]



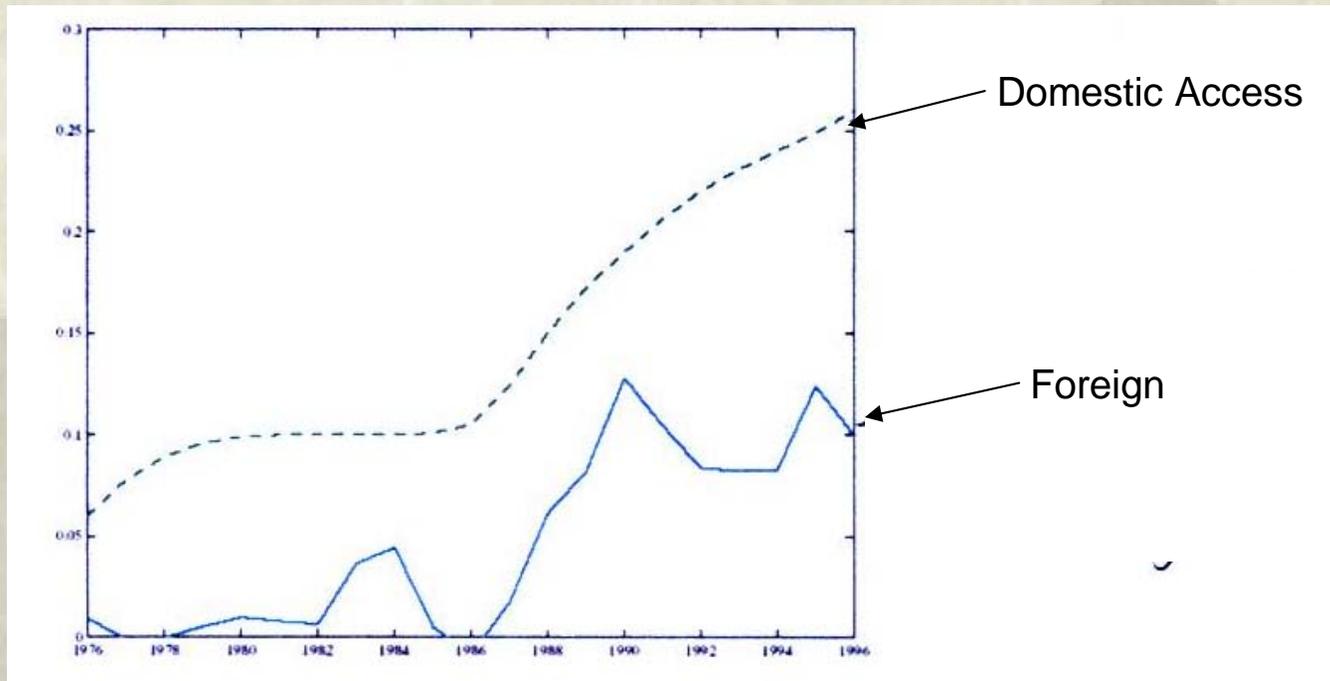
[Figure 1.2.1. Average Income and Income Inequality in Thailand. Kuznets Curve: see stages marked (red and blue lines). Source: Jeong (2000)]

Poverty	1976	1981	1986	1988	1990	1992	1994	1996	1998	2000	2002
Head-count Ratio	0.483	0.359	0.446	0.365	0.307	0.256	0.205	0.130	0.125	0.149	0.089
Poverty Gap	0.175	0.119	0.170	0.127	0.100	0.079	0.061	0.034			
FGT P_2	0.083	0.054	0.085	0.060	0.044	0.034	0.026	0.013			
Sample Size	11356	11880	10895	11044	13174	13458	25208	25110			

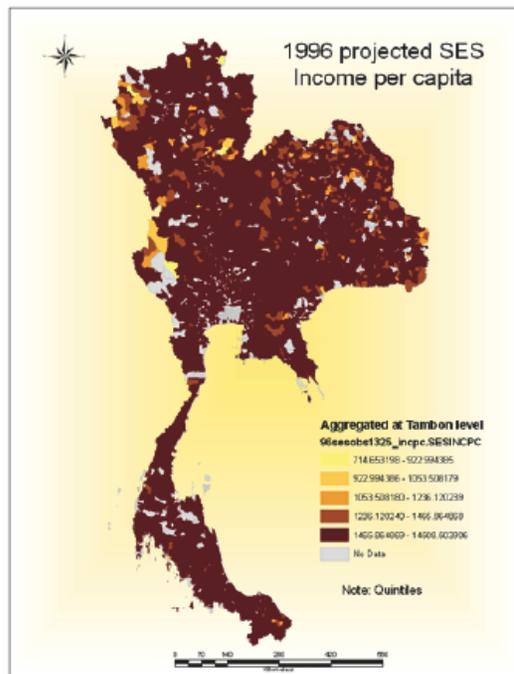
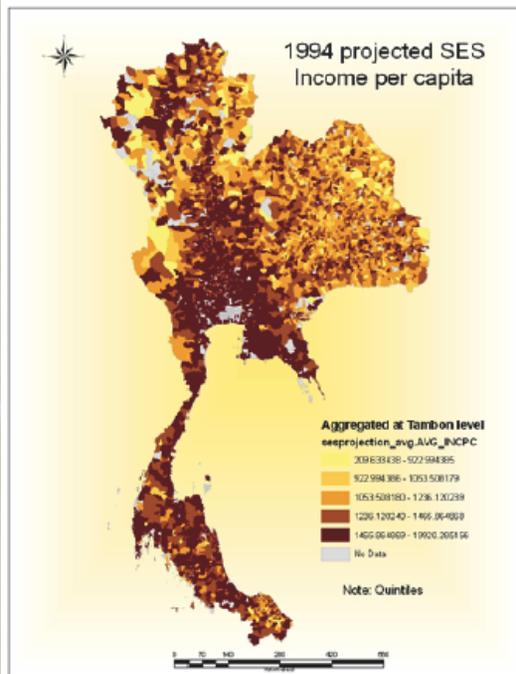
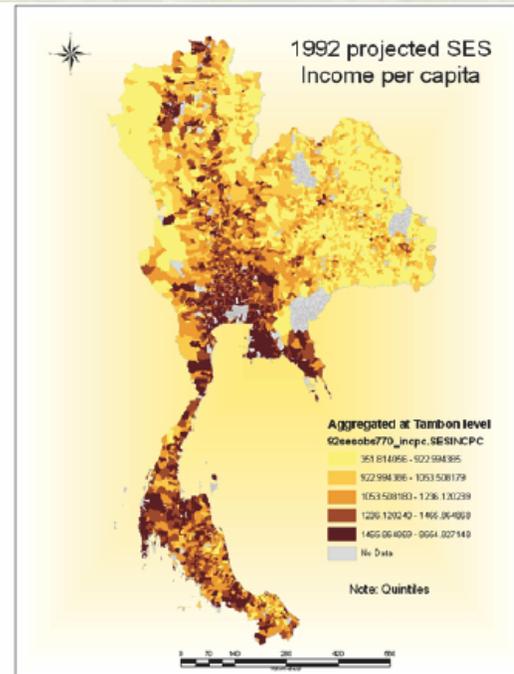
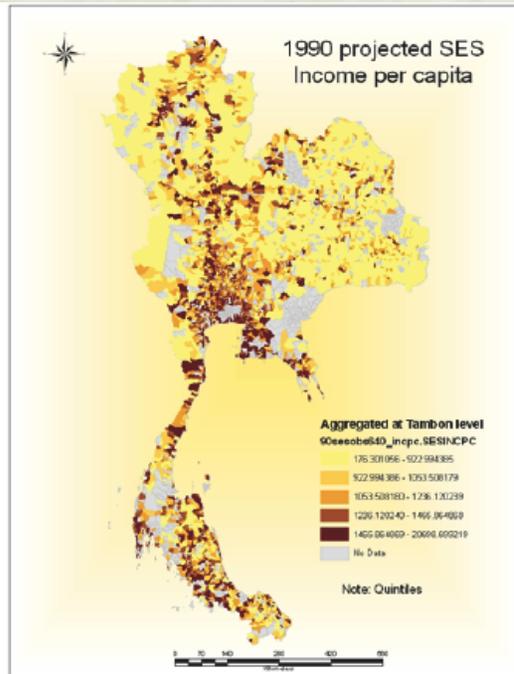
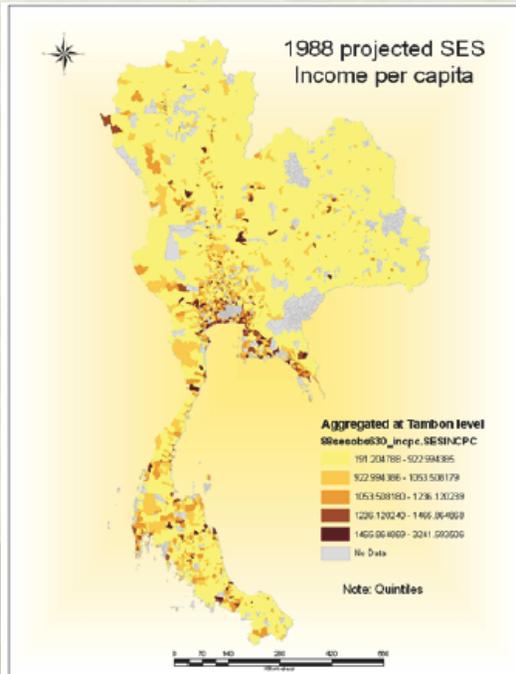
[Table 1.3.1. Summary Statistics of Income in Thai SES. Source: Jeong (2000)]



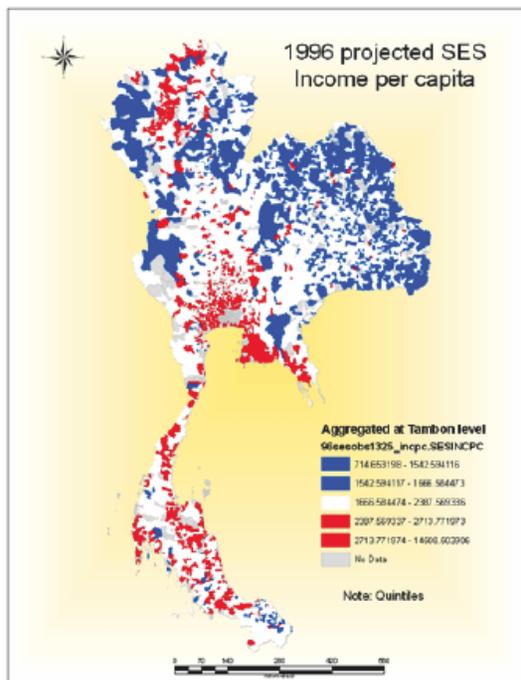
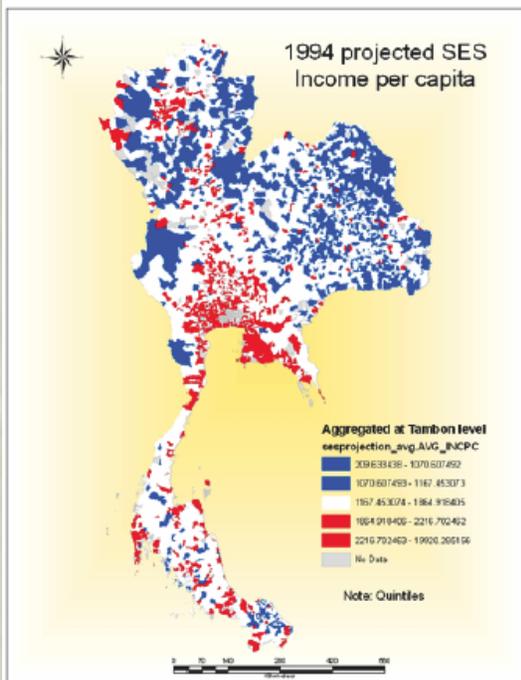
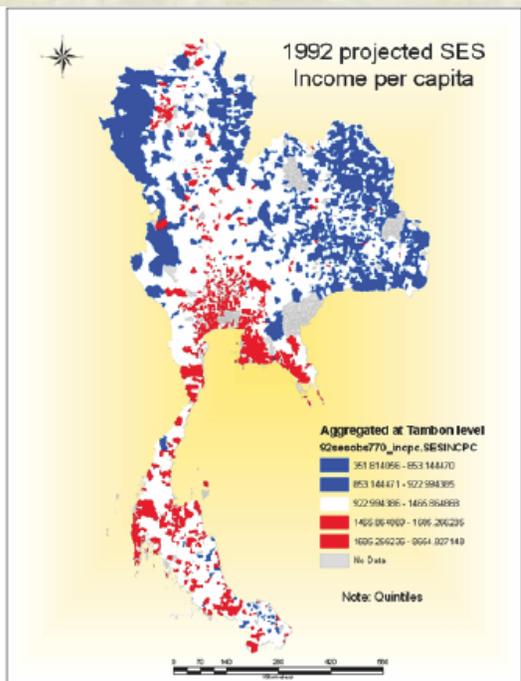
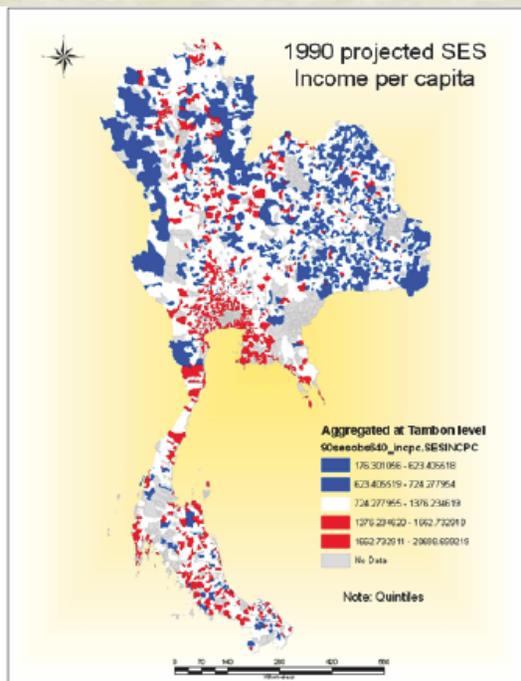
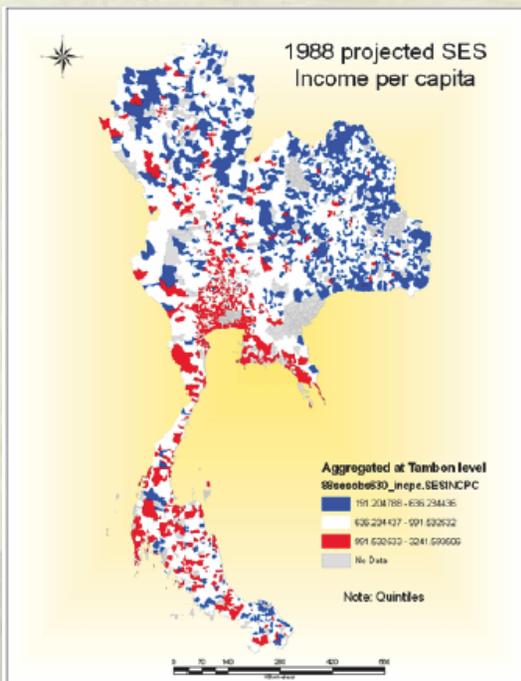
[Figure 1.4.2. Macro Indicators of Financial Deepening in Thailand. Source: Townsend and Jeong (2005)]



[Figure 1.4.3. Foreign Capital Inflows and Financial Liberalization. Foreign capital inflows are indicated by solid line, Fraction of population with access to intermediation by dotted line. Source Townsend and Jeong (2005)]



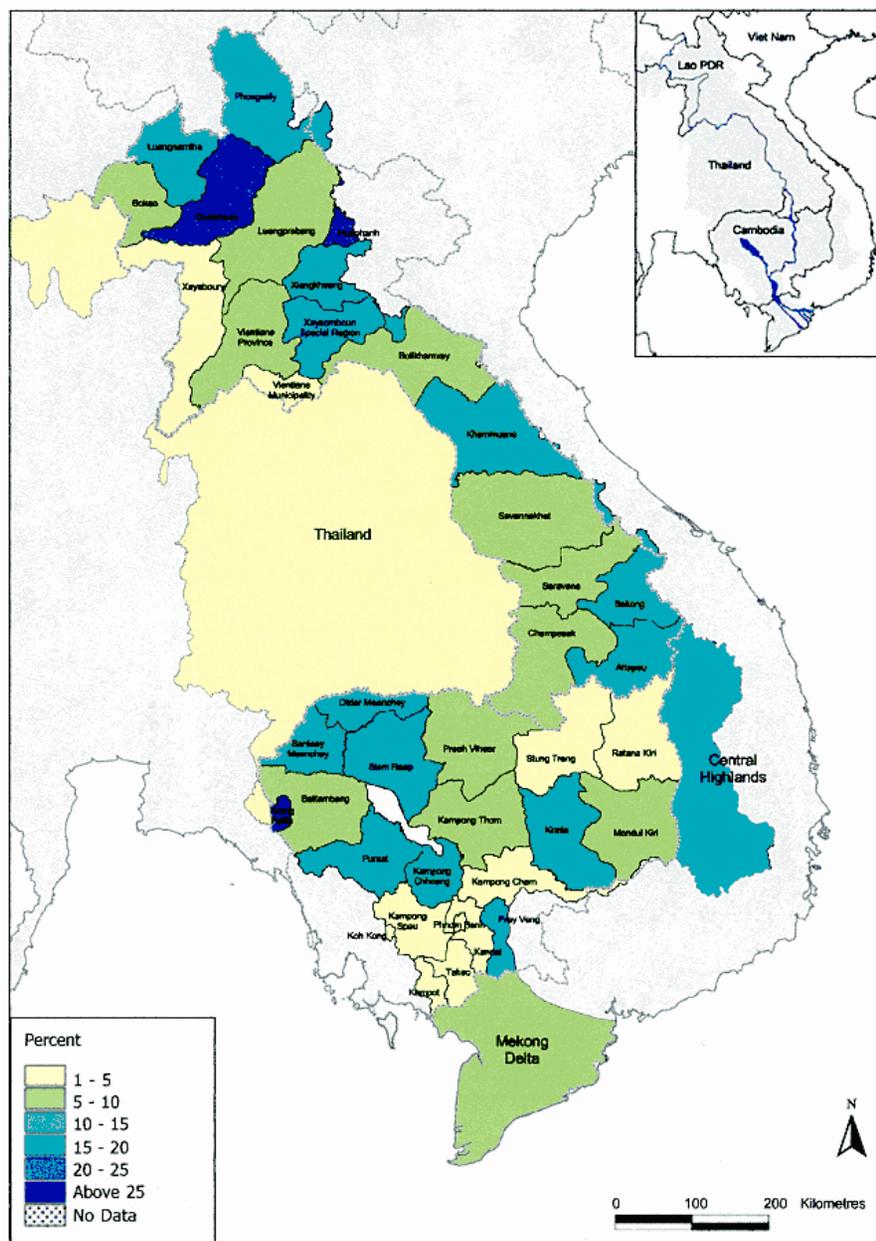
SES projected
Income per capita
(Quintiles: 1992 level)



Lowest and Highest 20%

Map 28: Poverty Gap

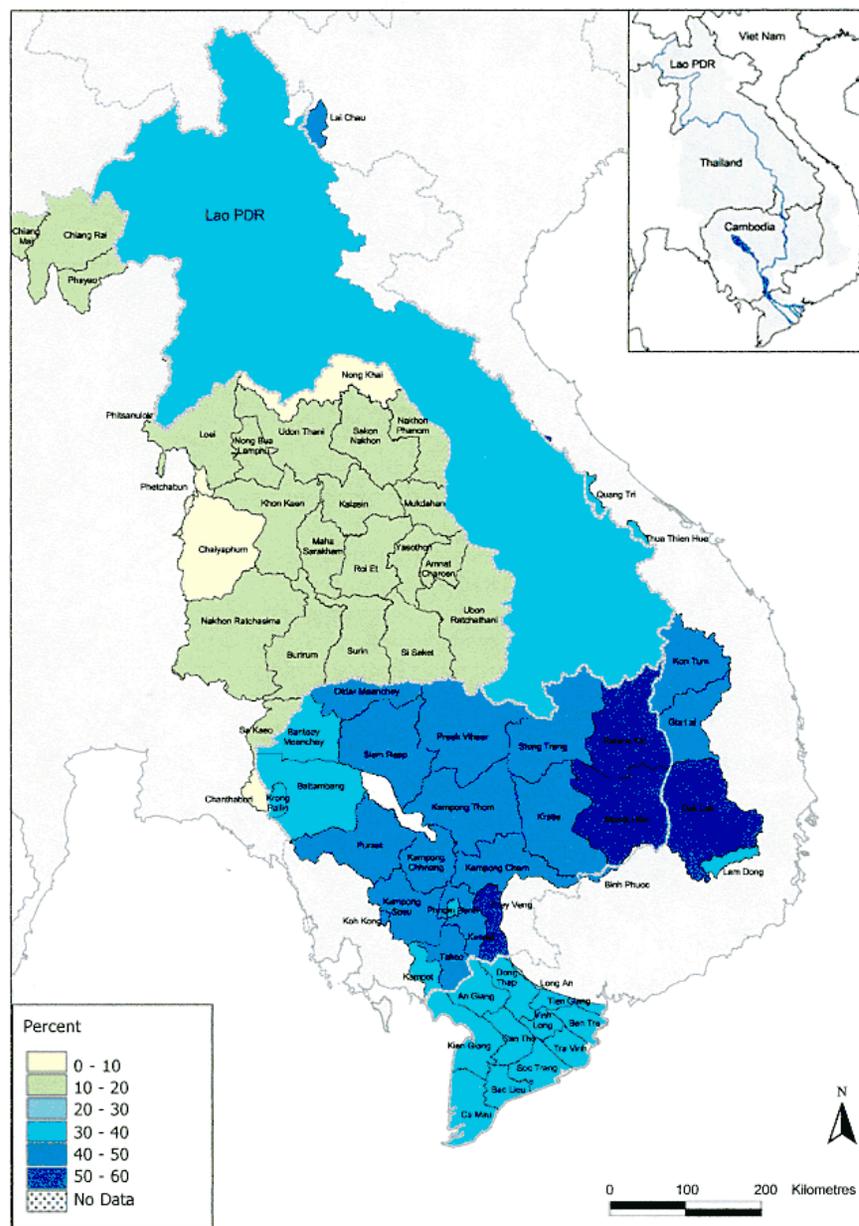
Average distance below the poverty line, as a percentage of the poverty line



Note: Province names and boundaries are not shown where national or regional data are used

Map 33: Child Malnutrition

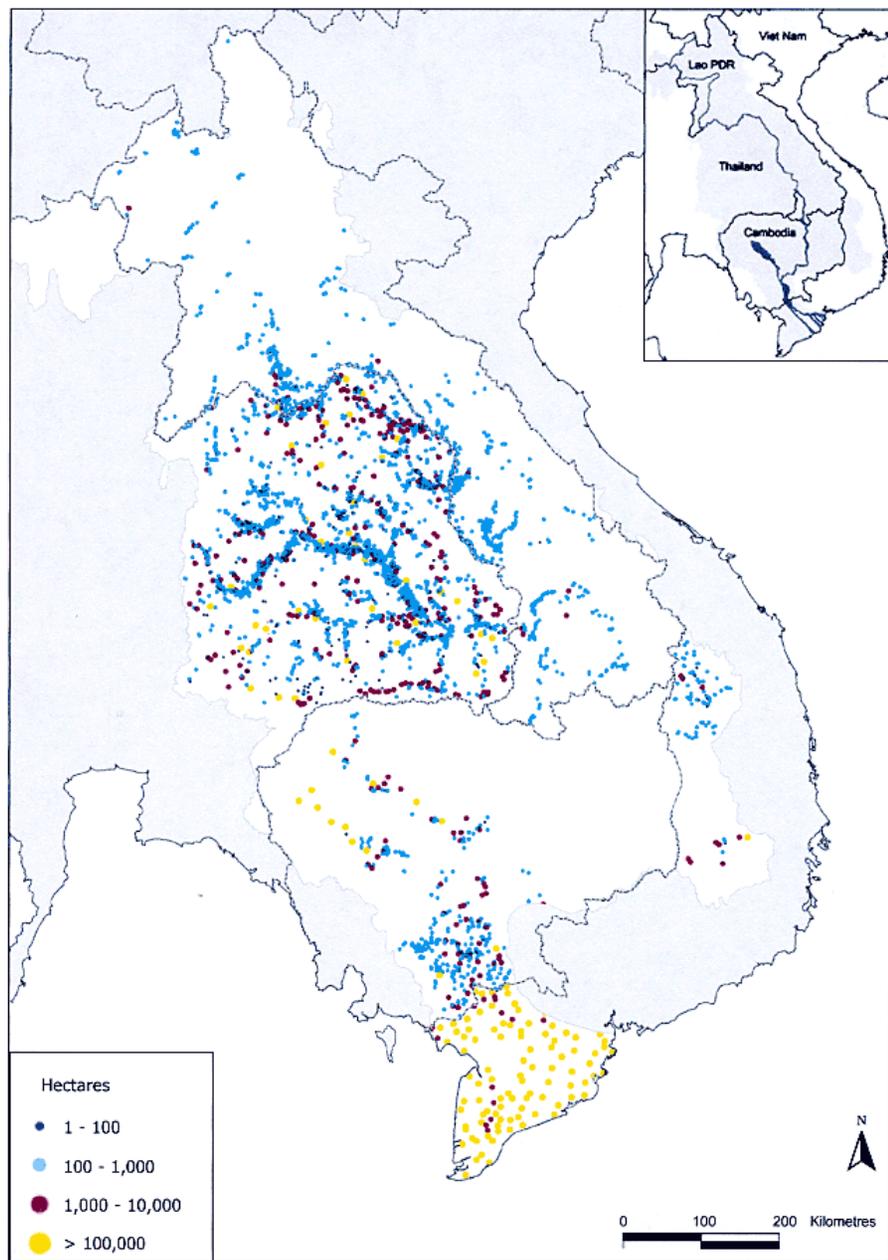
Proportion of children underweight for age



Note: Province names and boundaries are not shown where national or regional data are used

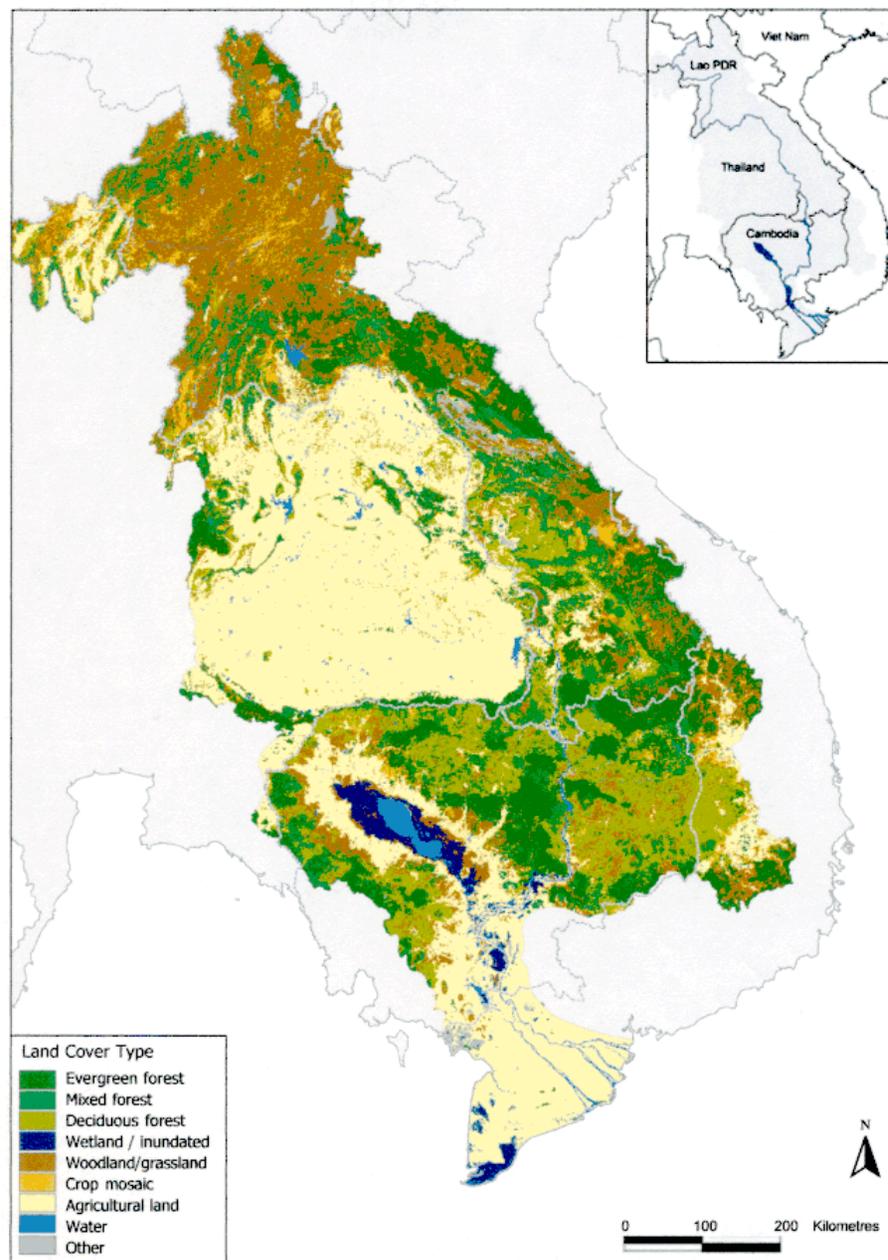
Map 48: Irrigation

Size of irrigation areas



Map 50: Land Cover

Major land cover categories



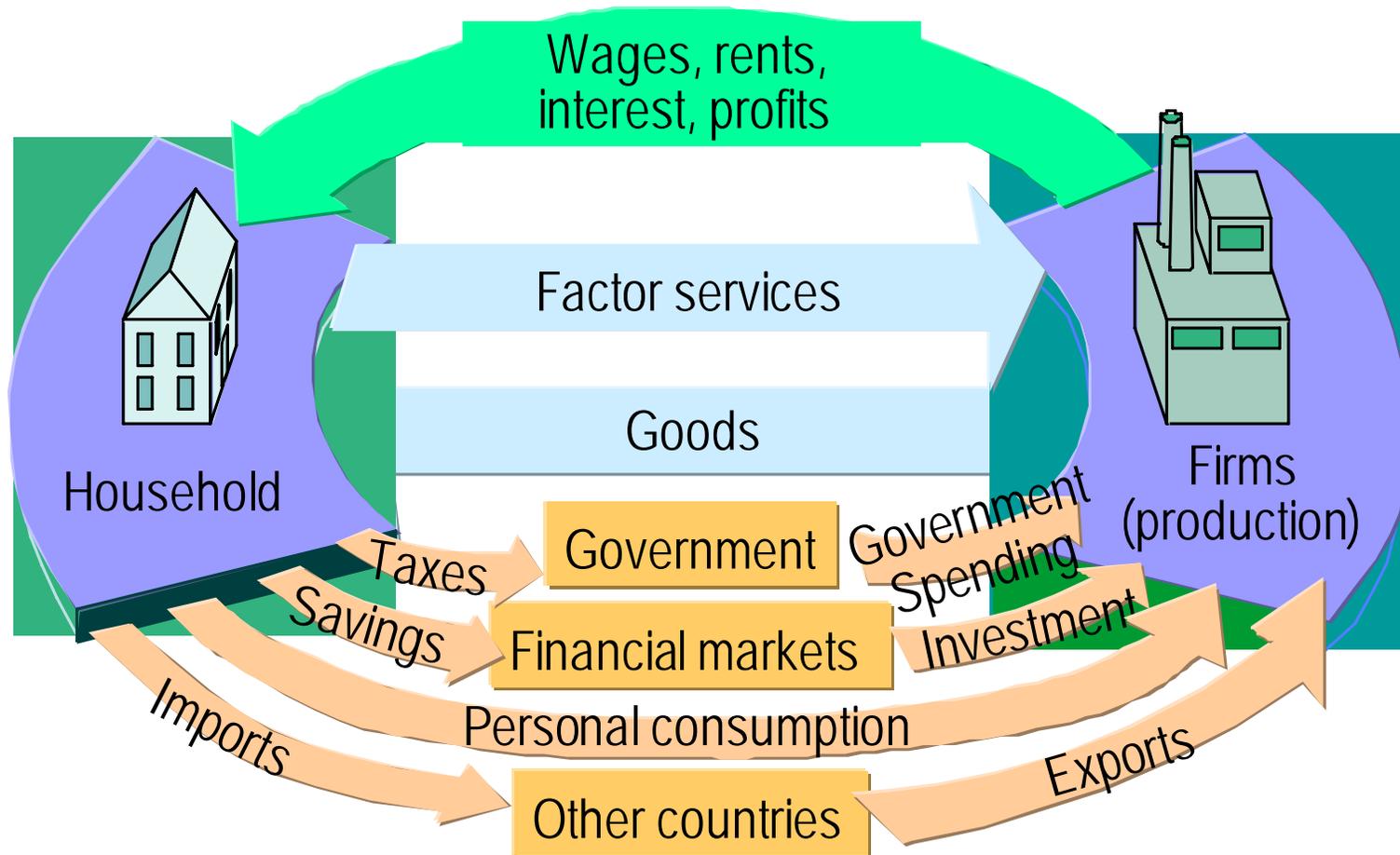


Measurement

The Thai Economy... Research Algorithm

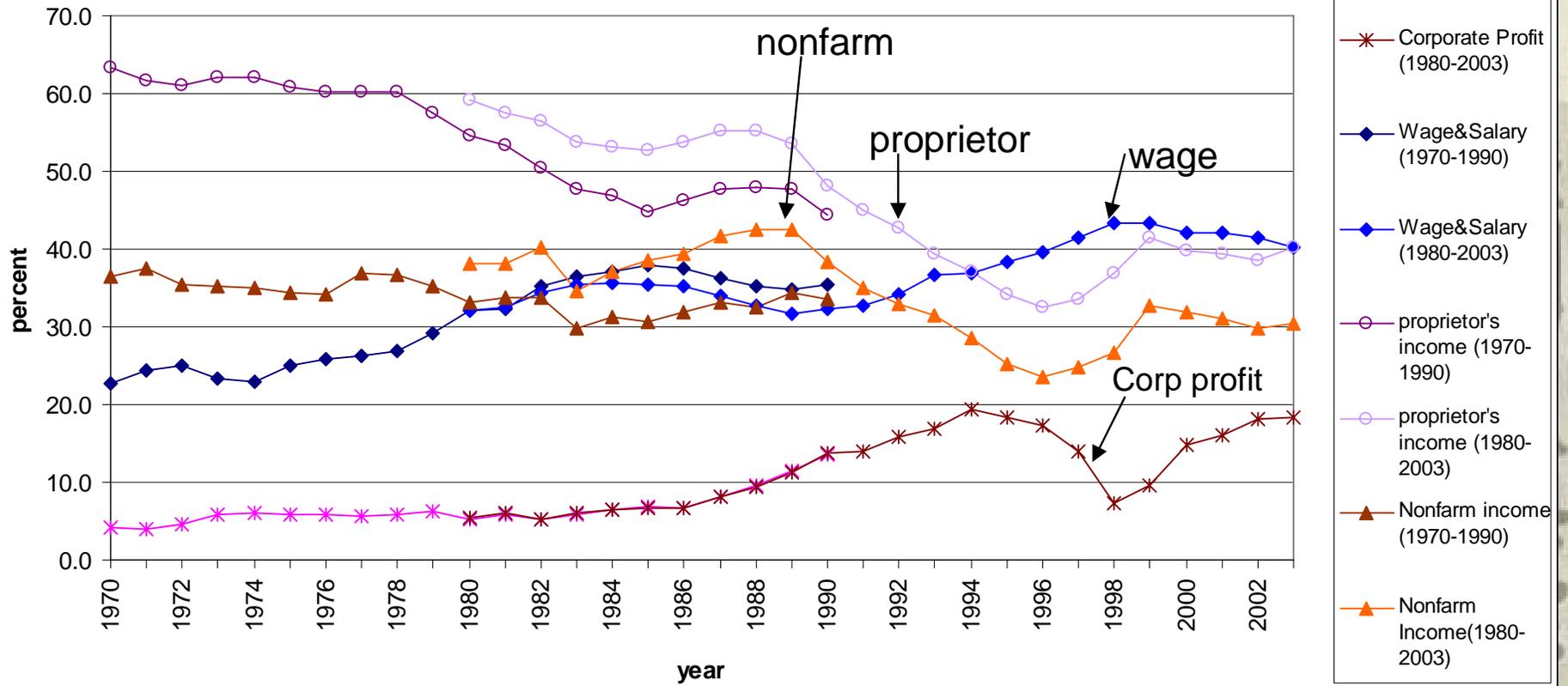
The national income accounts are based on corporate financial accounts. These distinguish stocks in the balance sheets from cash flow, which is distinguished in turn from (accrued) income. Yet the national income accounts and the associated "circular flow" diagram envision little production in the household sector. Still, even as constructed, non farm proprietary income has been large relative to other factor payments in the data. Nonfarm proprietary income still dominates corporate profits, for example. Emphasizing the importance of domestic growth, private investment has the largest share of GDP and commoves strongly with it. Foreign capital investment is a relatively recent phenomenon. Data from an ongoing household survey and constructed balance sheet, income and cash flow accounts show there is much production in the household sector. More generally, households in a developing economy need to be thought of as firms as in corporate finance. Otherwise, as in the most existing secondary data, there are discrepancies between the income and savings numbers of household surveys from those of the national accounts. There are as well non standard levels of aggregation, e.g. kinships networks, villages, and family related industrial conglomerates.

The Circular Flow



[Figure 2.1.1. The Circular Flow. Source: *Colander's Economics, Microeconomics, and Macroeconomics*, 5th Edition by David C. Colander, ©2004 McGraw Hill/Irwin

Thailand: Distribution of National Income (1970-2003p)



Source: NESDB data series

Table A1 Balance Sheet of Household A

Month	5	6	7	8	9	10	11	12	13	14	15	16
Cash in Hand	1,966,139	1,862,121	1,701,863	1,663,257	1,593,938	1,504,906	1,531,443	1,484,738	1,448,589	1,407,044	1,362,112	1,311,011
Account Receivables	688,971	805,259	952,359	1,059,382	1,126,773	1,207,075	1,269,435	1,320,273	1,373,029	1,422,880	1,473,025	1,524,025
Deposits at Financial Institutions	167,271	167,969	168,094	156,799	157,474	157,469	189,549	201,194	240,759	240,304	240,249	240,194
ROSCA (Net Position)	33,000	37,000	41,000	11,500	16,050	20,600	25,150	28,450	7,750	10,750	16,750	23,750
Other Lending	153,136	153,136	153,136	153,136	153,136	153,136	153,136	153,136	153,136	153,136	153,136	153,136
Inventories	1,346,939	1,440,729	1,576,481	1,697,413	1,842,527	1,986,251	2,111,673	2,238,242	2,356,958	2,486,177	2,609,586	2,744,157
Livestock	326,280	323,018	319,787	316,590	313,424	310,289	313,186	310,055	336,954	333,585	330,249	326,946
Fixed Assets	967,342	973,759	970,949	968,151	965,365	962,591	959,828	957,076	954,336	951,608	948,890	946,185
Household Assets	598,758	596,261	593,775	591,299	588,833	586,378	583,933	581,498	579,073	576,658	574,253	571,859
Agricultural Assets	66,104	65,829	65,554	65,281	65,009	64,737	64,468	64,199	63,931	63,664	63,399	63,135
Business Assets	2,479	11,669	11,620	11,572	11,523	11,475	11,428	11,380	11,332	11,285	11,238	11,191
Land and Other Fixed Assets	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000
Total Assets	5,649,079	5,762,991	5,883,669	6,026,228	6,168,687	6,302,317	6,553,400	6,693,163	6,871,511	7,005,483	7,133,997	7,269,404
Total Liabilities	1,132,310	1,280,270	1,425,465	1,570,660	1,715,855	1,861,050	2,116,245	2,260,056	2,403,867	2,547,678	2,679,744	2,827,946
Account Payables	1,078,505	1,228,465	1,375,660	1,522,855	1,670,050	1,817,245	1,964,440	2,111,635	2,258,830	2,406,025	2,541,475	2,693,525
Other Borrowing	53,805	51,805	49,805	47,805	45,805	43,805	151,805	148,421	145,037	141,653	138,269	134,421
Total Wealth	4,516,769	4,482,721	4,458,204	4,455,568	4,452,832	4,441,267	4,437,155	4,433,107	4,467,644	4,457,806	4,454,253	4,441,459
Initial Wealth (Contributed Capital)	3,439,250	3,439,250	3,439,250	3,439,250	3,439,250	3,439,250	3,439,250	3,439,250	3,439,250	3,439,250	3,439,250	3,439,250
Cumulative Net Gifts Received	-6,664	-6,046	-6,357	-6,319	-7,576	-6,635	-7,233	-7,181	-6,774	-7,000	-6,335	-4,198
Cumulative Savings (Retained Earnings)	1,084,182	1,049,517	1,025,311	1,022,637	1,021,158	1,008,652	1,005,139	1,001,038	1,035,168	1,025,555	1,021,338	1,006,406
Total Liabilities and Wealth	5,649,079	5,762,991	5,883,669	6,026,228	6,168,687	6,302,317	6,553,400	6,693,163	6,871,511	7,005,484	7,133,997	7,269,405

[Source: Samphantharak and Townsend (2006)]

Table A2 Income Statement of Household A

Month	5	6	7	8	9	10	11	12	13	14	15	16
Cultivation							3,200	11,676	11,676	11,676	11,700	
Livestock	30,485	27,753	26,180	21,780	26,730	28,050	39,000	39,600	79,600	39,600	33,000	31,900
Livestock Produce	28,985	27,753	26,180	21,780	26,730	28,050	33,000	39,600	39,600	39,600	33,000	31,900
Capital Gains	1,500						6,000		40,000			
Fish and Shrimp												
Business	184,360	145,360	183,875	152,890	160,455	167,295	249,440	169,460	175,855	166,170	167,150	170,000
Labor	11,440	11,440	11,440	11,440	11,440	11,440	11,440	10,056	11,440	10,096	10,100	10,000
Others	6,000	3,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
Total Revenues	232,285	187,553	227,495	192,110	204,625	212,785	309,080	236,792	284,571	233,542	227,950	217,900
Cultivation								1,468	1,468	1,468	1,468	
Livestock	31,944	30,281	27,642	22,813	21,715	19,225	20,371	25,573	27,787	30,064	28,059	27,048
Capital Losses												
Depreciation (Aging)	3,281	3,263	3,230	3,198	3,166	3,134	3,103	3,132	3,101	3,370	3,336	3,302
Other Expenses	28,663	27,018	24,412	19,615	18,549	16,090	17,268	22,441	24,687	26,694	24,723	23,745
Fish and Shrimp												
Business	220,176	167,323	199,933	150,300	159,472	173,440	262,931	182,317	186,649	173,751	174,006	177,608
Labor											150	100
Others												
Total Cost of Production	252,120	197,604	227,575	173,112	181,187	192,665	283,302	209,358	215,905	205,283	203,684	204,756
Interest Revenue												
Interest Expense	55	55	55	75	55	55	55	55	35	55	55	55
Other Expenses	2,794	2,783	2,810	2,798	2,786	2,775	2,763	2,751	2,740	2,729	2,717	2,706
Depreciation of Fixed Assets	2,794	2,783	2,810	2,798	2,786	2,775	2,763	2,751	2,740	2,729	2,717	2,706
Insurance Premium												
Extraordinary Items												
Capital Gains												
Capital Losses												
Net Income	(22,684)	(12,889)	(2,945)	16,125	20,597	17,290	22,960	24,627	65,891	25,475	21,494	10,383
Consumption	9,035	9,362	8,145	10,849	8,566	16,186	9,663	1,472	3,005	6,332	(2,399)	9,105
Savings	(31,719)	(22,251)	(11,090)	5,276	12,031	1,104	13,296	23,155	62,886	19,143	23,892	1,278

[Table 2.3.3. Source: Samphantharak and Townsend (2006)]

Table A3 Statement of Cash Flows of Household A

Month	5	6	7	8	9	10	11	12	13	14	15	16
Net Income (+)	-22,684	-12,889	-2,945	16,125	20,597	17,290	22,960	24,627	65,891	25,475	21,494	10,383
Adjustments:												
Depreciation (+)	6,075	6,046	6,040	5,996	5,952	5,909	5,866	5,883	5,841	6,098	6,053	6,008
Change in Account Receivable (-)	-147,488	-116,288	-147,100	-107,023	-67,391	-80,302	-62,360	-50,838	-52,757	-49,851	-50,145	-51,000
Change in Account Payable (+)	149,960	149,960	147,195	147,195	147,195	147,195	147,195	147,195	147,195	147,195	135,450	152,050
Change in Inventory (-)	-126,465	-106,205	-148,866	-128,883	-158,624	-157,334	-142,232	-153,825	-147,472	-157,975	-151,519	-150,782
Change in Other Current Assets (-)	1,781	3,263	3,230	3,198	3,166	3,134	-2,897	3,132	-26,899	3,370	3,336	3,303
Consumption of Owned-Produced Outputs (-)	-350	-314	-383	-373	-440	-590	-323	-396	-336	-348	-373	-205
Cash Flows from Production	-139,171	-76,427	-142,830	-63,765	-49,545	-64,697	-31,792	-24,221	-8,537	-26,036	-35,704	-30,243
Consumption Expenditure (-)	-8,685	-9,048	-7,762	-10,476	-8,126	-15,596	-9,340	-1,076	-2,669	-5,984	2,772	-8,900
Capital Expenditure (-)	-3,281	-12,463	-3,230	-3,198	-3,166	-3,134	-3,103	-3,132	-3,101	-3,370	-3,336	-3,302
Cash Flows from Consumption and Investment	-11,966	-21,511	-10,992	-13,674	-11,292	-18,730	-12,443	-4,208	-5,770	-9,354	-564	-12,202
Change in Deposit at Financial Institution (-)	-8,895	-698	-125	11,295	-675	5	-32,080	-11,645	-39,565	455	55	55
Change in ROSCA Position (-)	-4,000	-4,000	-4,000	29,500	-4,550	-4,550	-4,550	-3,300	20,700	-3,000	-6,000	-7,000
Lending (-)	0	0	0	0	0	0	0	0	0	0	0	0
Borrowing (+)	-2,000	-2,000	-2,000	-2,000	-2,000	-2,000	108,000	-3,384	-3,384	-3,384	-3,384	-3,848
Net Gifts Received (+)	-710	618	-311	38	-1,257	940	-598	53	406	-226	665	2,137
Cash Flows from Financing	-15,605	-6,080	-6,436	38,833	-8,482	-5,605	70,772	-18,276	-21,843	-6,155	-8,664	-8,656
Change in Cash Holding (from Statement of Cash Flows)	-166,742	-104,019	-160,258	-38,606	-69,319	-89,032	26,537	-46,705	-36,149	-41,545	-44,932	-51,101
Change in Cash Holding (from Balance Sheet)	-166,742	-104,019	-160,258	-38,606	-69,319	-89,032	26,537	-46,705	-36,149	-41,545	-44,932	-51,101

[Source: Samphantharak and Townsend (2006)]

Decompositions- Micro and Macro

More generally, enhanced finance is established to be correlated with and causally related to growth of GDP and poverty reduction, though with mixed consequences for the distribution of income.

Macro, total factor productivity is largely explained, and the TFP numbers make more sense, when an access-no access dichotomy is used.

Micro Kuznets decompositions establish that increasing access/use of the formal sector along with high and increasing income differentials account for a nontrivial part of growth of per capita income and increasing inequality, albeit with other factors.

Characteristics	Overall	Stage 1	Stage 2	Stage 3
Age	0	3	0	0
Gender	2	5	1	4
Community Type	7	17	2	12
<u>Production Sector</u>	<u>18</u>	<u>33</u>	<u>13</u>	<u>21</u>
<u>Occupation</u>	<u>21</u>	<u>39</u>	<u>17</u>	<u>30</u>
<u>Financial Participation</u>	<u>20</u>	<u>23</u>	<u>27</u>	<u>18</u>
<u>Education</u>	<u>25</u>	<u>45</u>	<u>20</u>	<u>24</u>
<u>Joint Three</u>	<u>39</u>	<u>66</u>	<u>38</u>	<u>38</u>
Total Growth	4.96	1.98	8.78	6.94

Big but falling



population shifts



rises again



peak



[Table 4.2.1. Composition Effects on Average Income Growth.

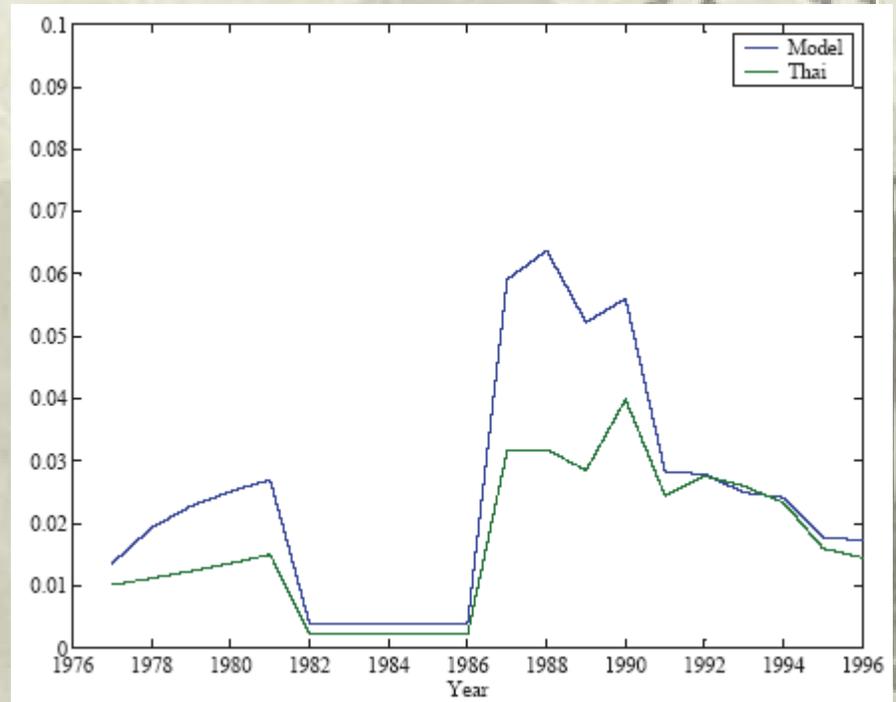
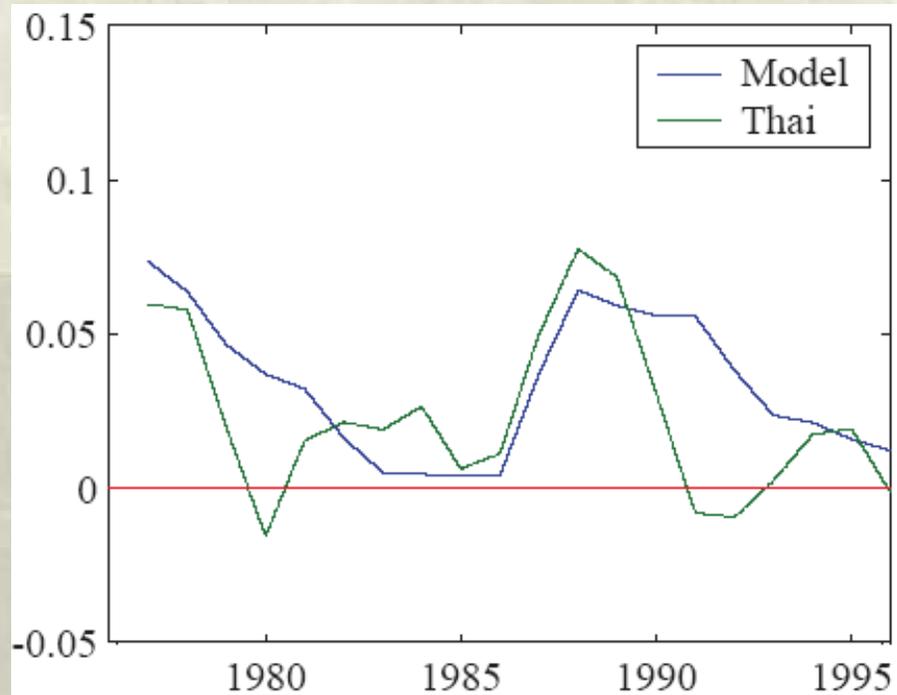
Note: the numbers indicate percentage shares of income growth due to compositional changes out of total income growth. Source: Jeong (2001)]

Characteristics	Within-group Inequality		Across-group Inequality	
	Intra-group	Composition	Income-Gap	Composition
Age	101	-2	1	0
Gender	97	0	2	1
Community Type	67	-1	24	10
<u>Production Sector</u>	<u>58</u>	<u>9</u>	<u>25</u>	<u>8</u>
<u>Occupation</u>	<u>59</u>	<u>2</u>	<u>32</u>	<u>7</u>
<u>Financial Participation</u>	<u>59</u>	<u>12</u>	<u>2</u>	<u>27</u>
<u>Education</u>	<u>54</u>	<u>-7</u>	<u>5</u>	<u>47</u>
<u>Joint Three</u>	<u>28</u>	<u>2</u>	<u>19</u>	<u>51</u>

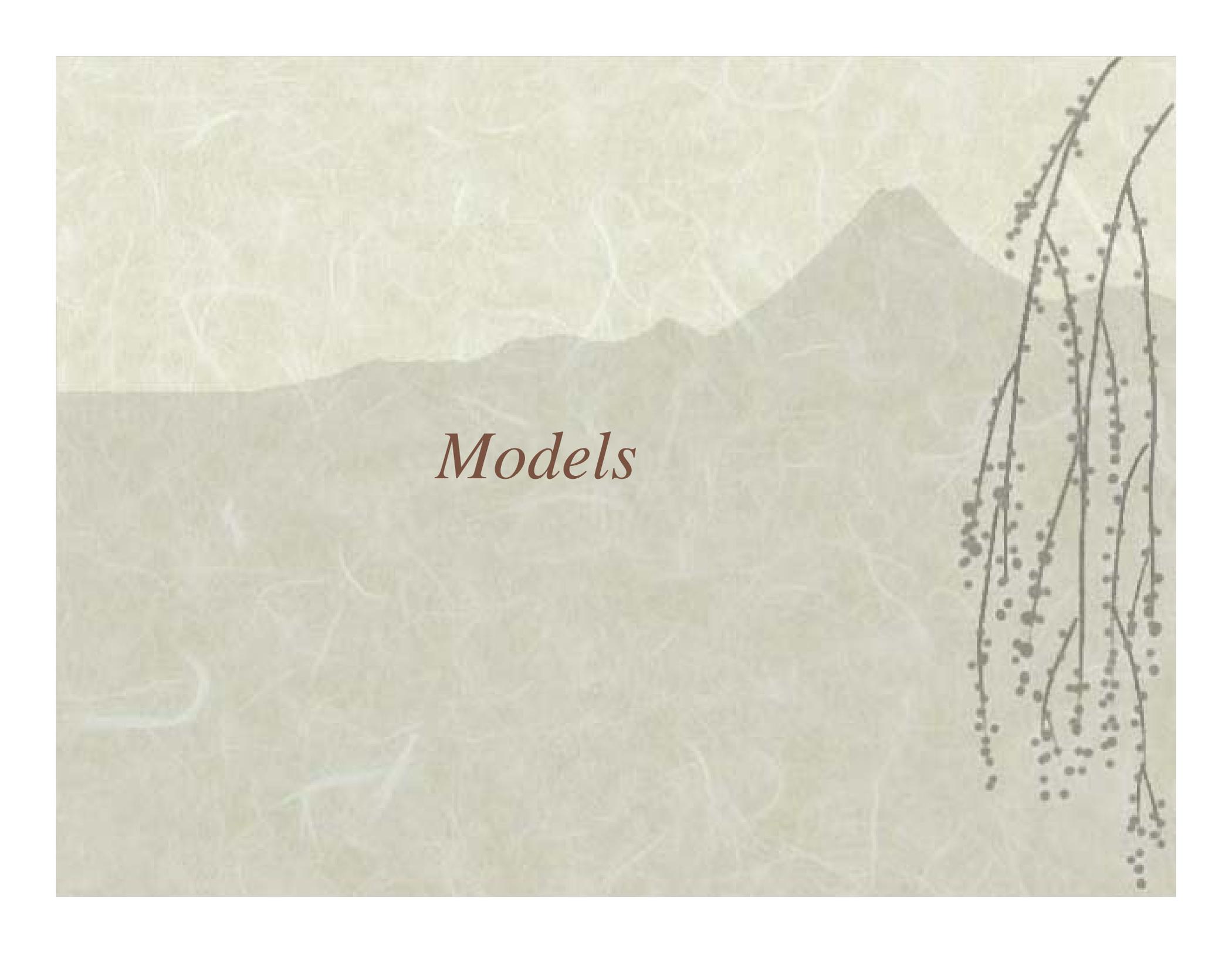
Education
then finance
composition
effect

Work more of income gaps

[Table 4.2.2. Decomposition of Inequality Change. Source: Jeong (2001)]



[Figure 4.1.2. TFP Aggregate Growth Dynamics (top) and TFP Growth from Financial Deepening (bottom).
Source: Jeong and Townsend (2005)]



Models

The Thai Economy... Research Algorithm

A model of occupation choice with an exogenous financial driver explains well the upturn in the Thai economy at the time of a financial liberalization, and a model with endogenous financial access delivers observed long term trends but not that upturn. Regional and village analysis with these same models reveals the impact of the government operated BAAC expansion targeting credit and gaps in private commercial bank services. These indicate the potential political economy impact of market segmentation. The impact of the financial crisis, which restricted intermediation and the subsequent increased in government participation in the financial sector, with its current impact, is again part of the analysis.

INTERMEDIATION IMPACTS GROWTH , INTERMEDIATION, INEQUALITY, POVERTY, # FIRMS

Macro simulation:
Credit Matters

Eventual diminishing
Returns, BUT WE GET
TFP

Investment will move
too

Dynamics due to
improved
intermediation

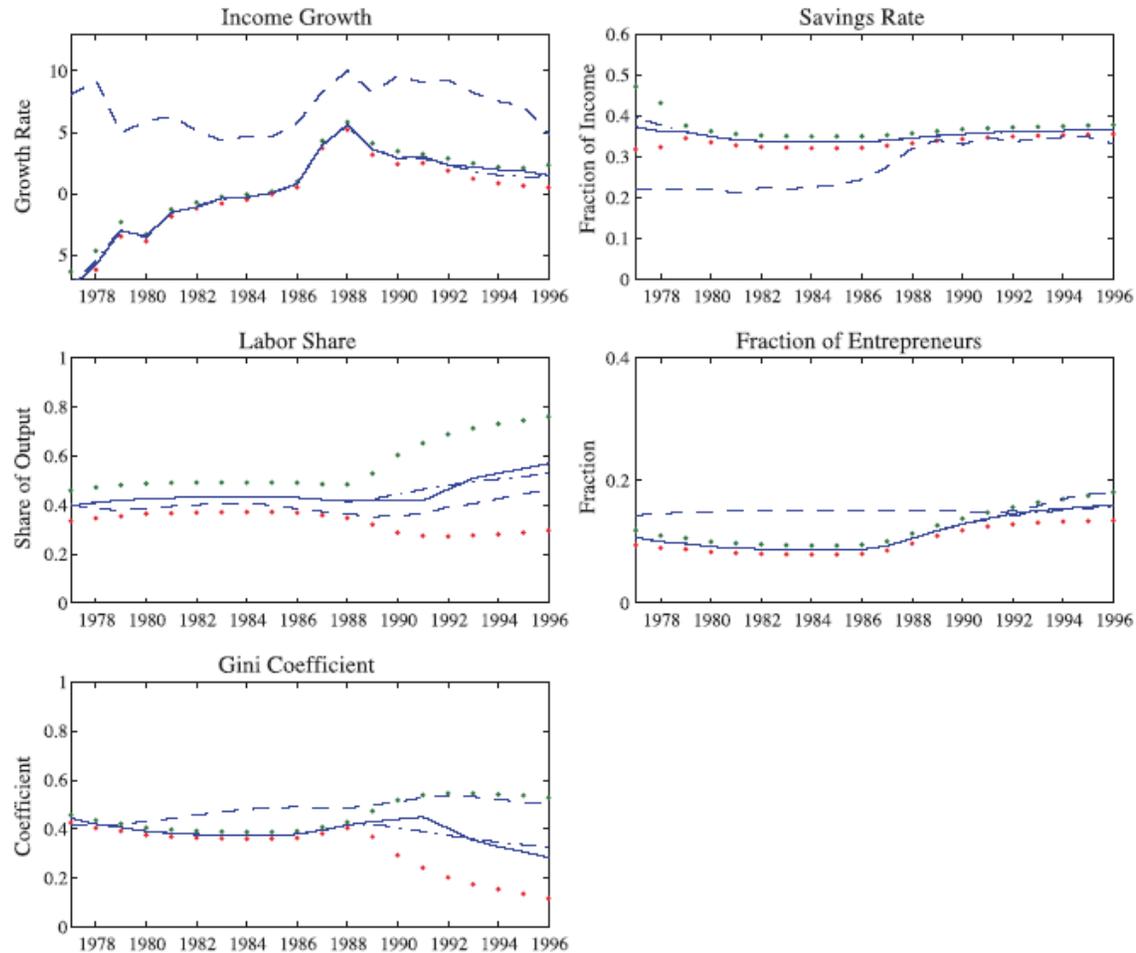
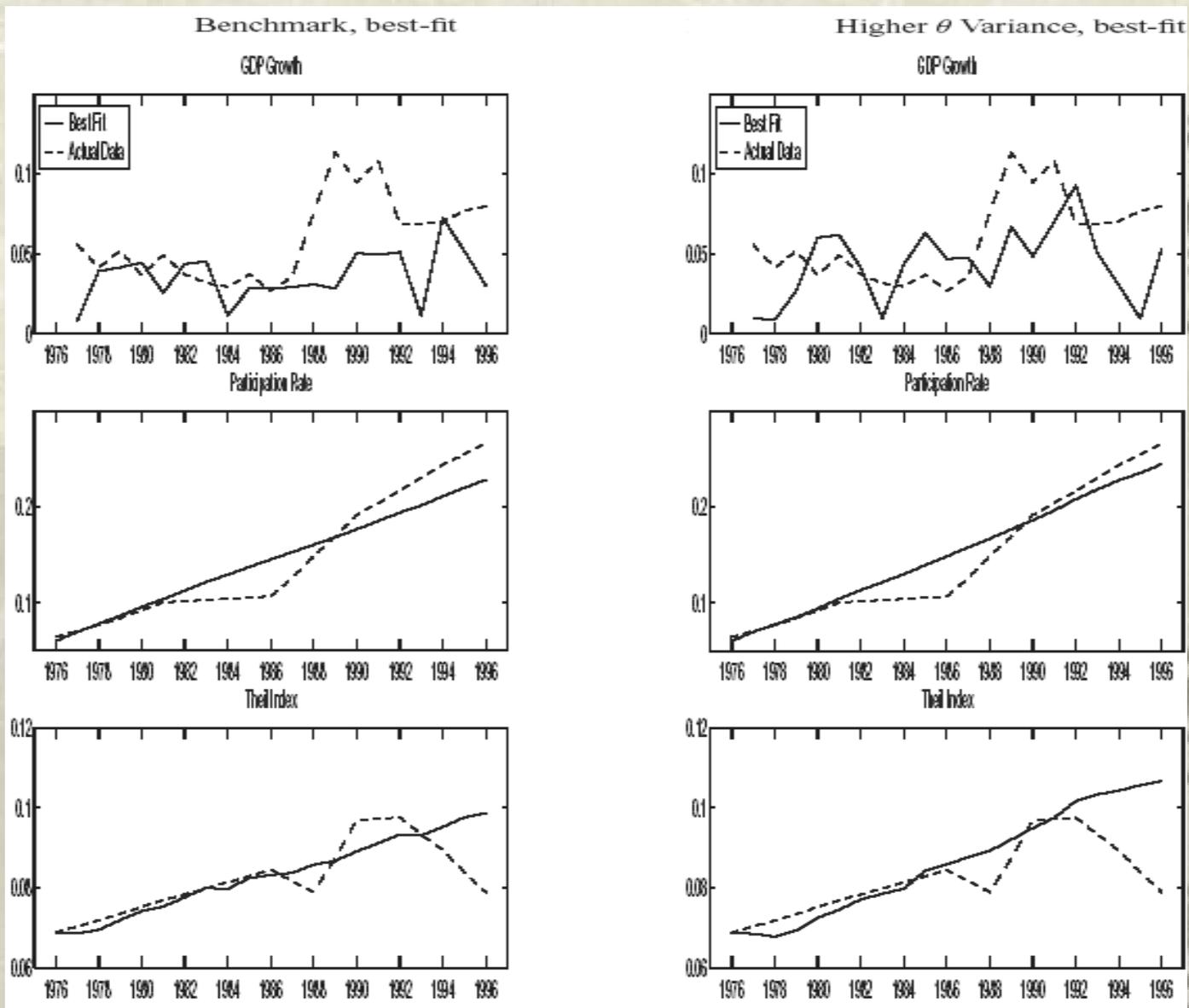
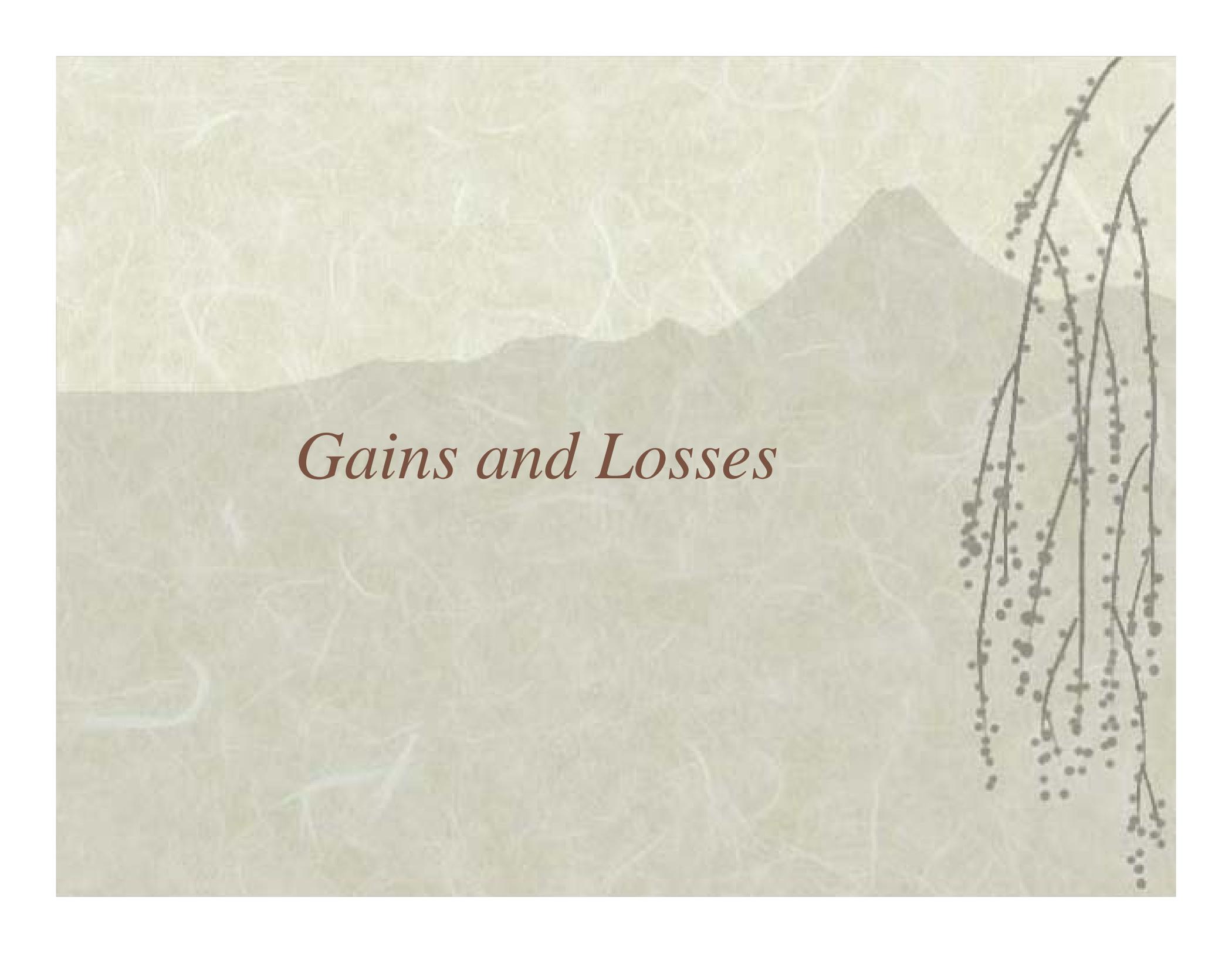


Fig. 3. Intermediated model (SES Data). Legend: - - (dash-dash) Thai economy, — (solid) simulation at estimated parameters, -·- (dash-dot). Mean simulation,···(dot-dot) confidence intervals.

[Figure 6.1.2.3. Intermediated Model (SES Data). Notes: $\eta = .026$, $\omega = .321$, $\gamma_{gr} = 0$. Source: Giné and Townsend (2004)]



[Figure 6.2.2.3. Benchmark, best-fit (left-hand graphs) and Higher θ Variance, best-fit (right-hand graphs). Source: Townsend and Ueda (2005)]



Gains and Losses

The Thai Economy... *Research Algorithm*

A repeated theme is the description of the Thai economy as an integrated micro macro system, with the choices of diverse individual agents aggregated up to explain macro variables. Choices are shown to be constrained by real obstacles to trade. There seems to be moral hazard in entrepreneurial effort and project choice. A further example is monitoring by joint liability borrowers. There seems to be adverse selection, the exclusion of safer customers from the loan market. There seem to be limited commitment problems, with loan size limited by collateral or wealth, and a tendency for strategic default limited by unofficial sanctions. Apparently, there are transactions costs, varying with household and village characteristics, such as distance to a bank office. But tests distinguishing the models indicate that the mix of obstacles varies by region. Further, some of the transactions costs may pick up the policy distortion of deliberately segmented markets. Finally, as noted earlier, contracts may be incomplete even beyond the associated, revised benchmark standards that take these obstacles into account.

The Thai Economy... Research Algorithm

There are thus nontrivial gains and losses to financial policy variation and, again, consequences for growth, inequality and poverty. Financial liberalization facilitating access to intermediaries and weakening wealth constraints is shown under a variety of the models to have a distribution of gains which is particularly high for the talented poor. An evaluation of specific policy options shows that impact is a function of estimated impediments to trade. With transactions costs and limited commitment, enhanced collateral is more effective than is placement of the formal sector into villages or interest rate subsidies. When savings, hence wealth, is endogenous, enhanced collateral and more generous credit limits speed up life cycle mobility. But the impact of wealth redistribution via subsidies and lowered interest rates can be large when moral hazard is a concern. Dominating, however, is movement on the extensive margin, the order of magnitude of gains for the poor who move from no access to limited access of some kind. The general equilibrium effect of price changes from financial liberalization can cause losses for existing firms that use unskilled labor.

Domestic liberalization is the cause of a surge in growth, thus rising wages (associated with the fall in inequality). Augmented capital availability via foreign capital inflows could in principal be expansionary, and welfare improving, but at estimated parameter values the effect is small and, in any event much of this seems to have been squandered. New roads and easier access to agglomeration synergies lower business entry cost. This can even dominate the credit effect: new roads alter substantially the path of regional development. But if credit markets are distorted by implicit government policy, there are gains to their removal, shown in Thailand to be particularly high for the educated, rising middle class near main roads and towns. Wealth redistribution from the middle class to the relatively poor can slow down growth. In short, the incompleteness of financial regimes, their evolution, and government policy can alter not only growth rates but also business formation, investment, inequality, and poverty.

DISTRIBUTION OF GAINS

Gains depend on wealth and talent-need disb of each-

Rich hh sensitive to Interest rate, occupation choice

Not talented rich give up firms and save

Change in talent will change impact

Poverty Reduction: Laudable Goal

Here it is Linked to macro growth

