

Development Policy

Financing Development: Private Saving

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Financing Development

Remember the Solow growth model? Investment is the engine of growth

$y = Ak^\alpha$ $\Rightarrow$ two ways to raise y : (1) raise k ; (2) raise A

$\Delta k = sy - (n + \delta)$ $\Rightarrow$ raise k by raising the saving rate (s)

$\Rightarrow$ raise k by lowering the population growth rate (n)

$\Delta A/A = \mu(\bar{y}/y)^\theta$ $\Rightarrow$ save and invest in imported technology (Lucas catch up)

Resources are made available for investment by saving: private, public and foreign.

No saving $\Rightarrow$ no investment $\Rightarrow$ no growth

Remember MRW (1992)? $\ln(y) = 7.8 + 0.7(s) - 1.5(n)$ $R^2 = 0.8$

Key questions:

- What determines rates of saving: private (S_P) , public (S_G) and foreign (S_F)?
- What are the relative merits of financing investment by each of these sources?

National Income Accounts and the Balance of Payments

Remember the National Income Accounts?

$$Y = C + I + G + X - M$$

$$S_P = Y - T - C \Rightarrow C = Y - T - S_P$$

$$Y = (Y - T - S_P) + I + G + (X - M)$$

$$I = S_P + (T - G) + (M - X) = S_P + S_G + S_F$$

Remember the Balance of Payments?

$$IF: X - M \approx CA = \Delta NFA + \Delta R > 0$$

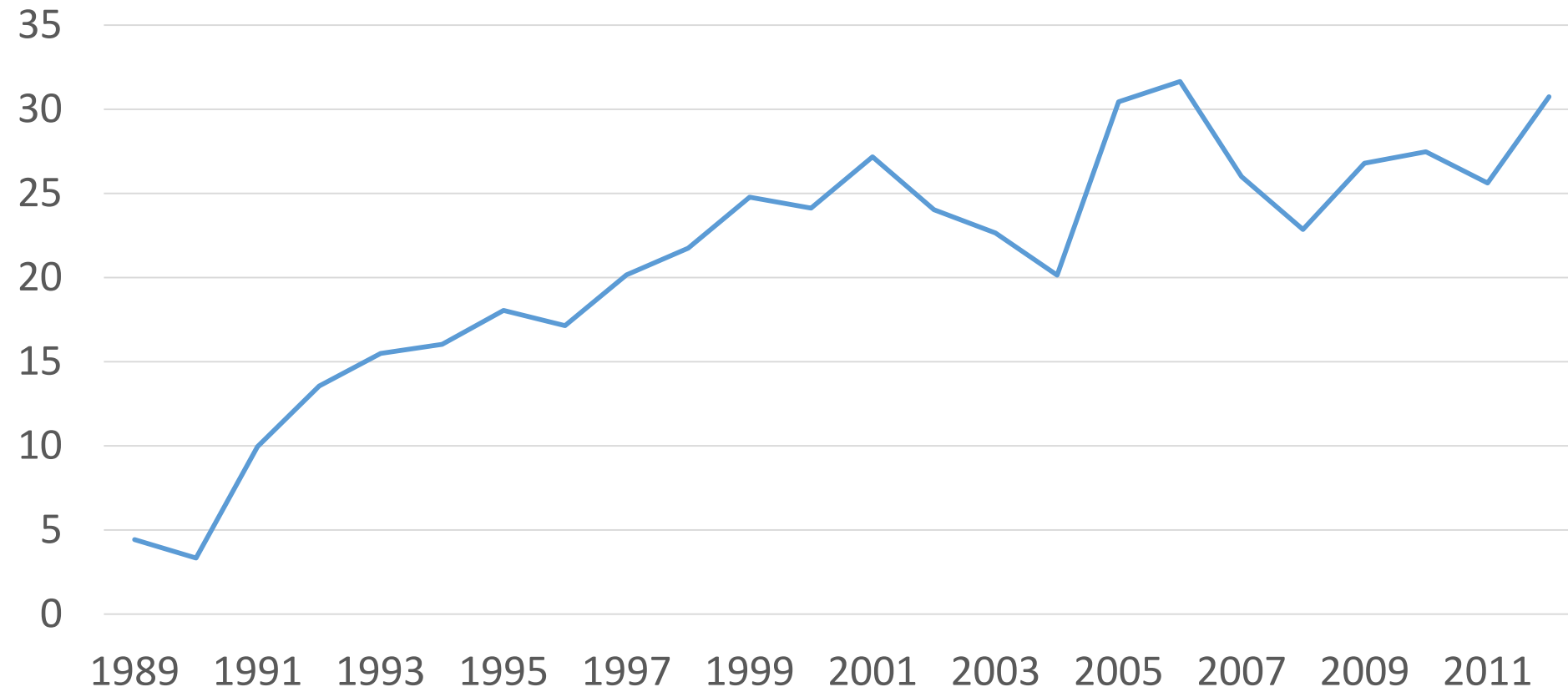
THEN $S_F < 0$ (net domestic saving outflow)

$$IF: X - M \approx CA = \Delta NFA + \Delta R < 0$$

THEN $S_F > 0$ (net foreign saving inflow)

Domestic Saving Rate in Vietnam

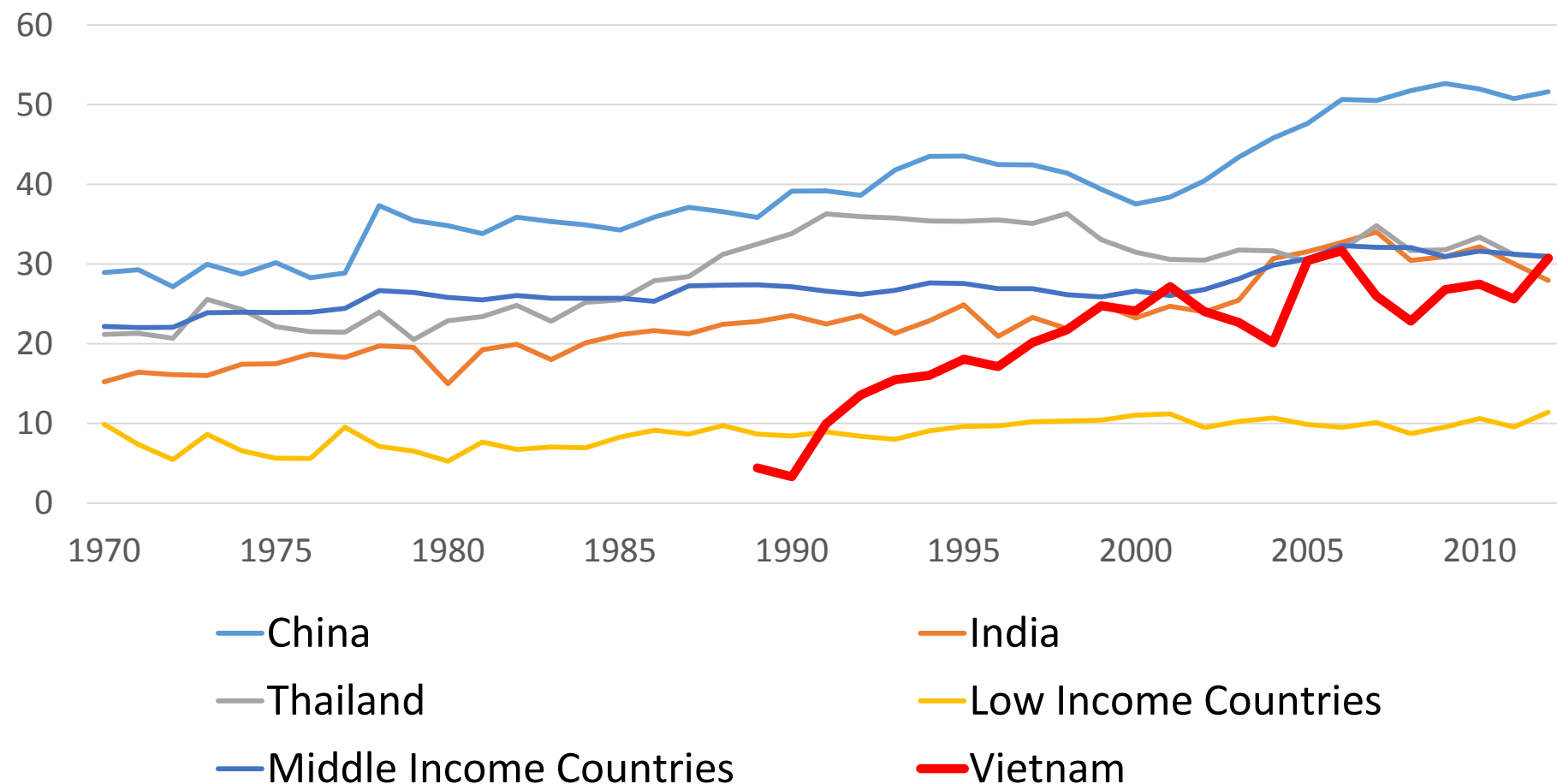
Gross National Saving as % of GDP: Vietnam, 1989-2012



Source: World Bank Indicators

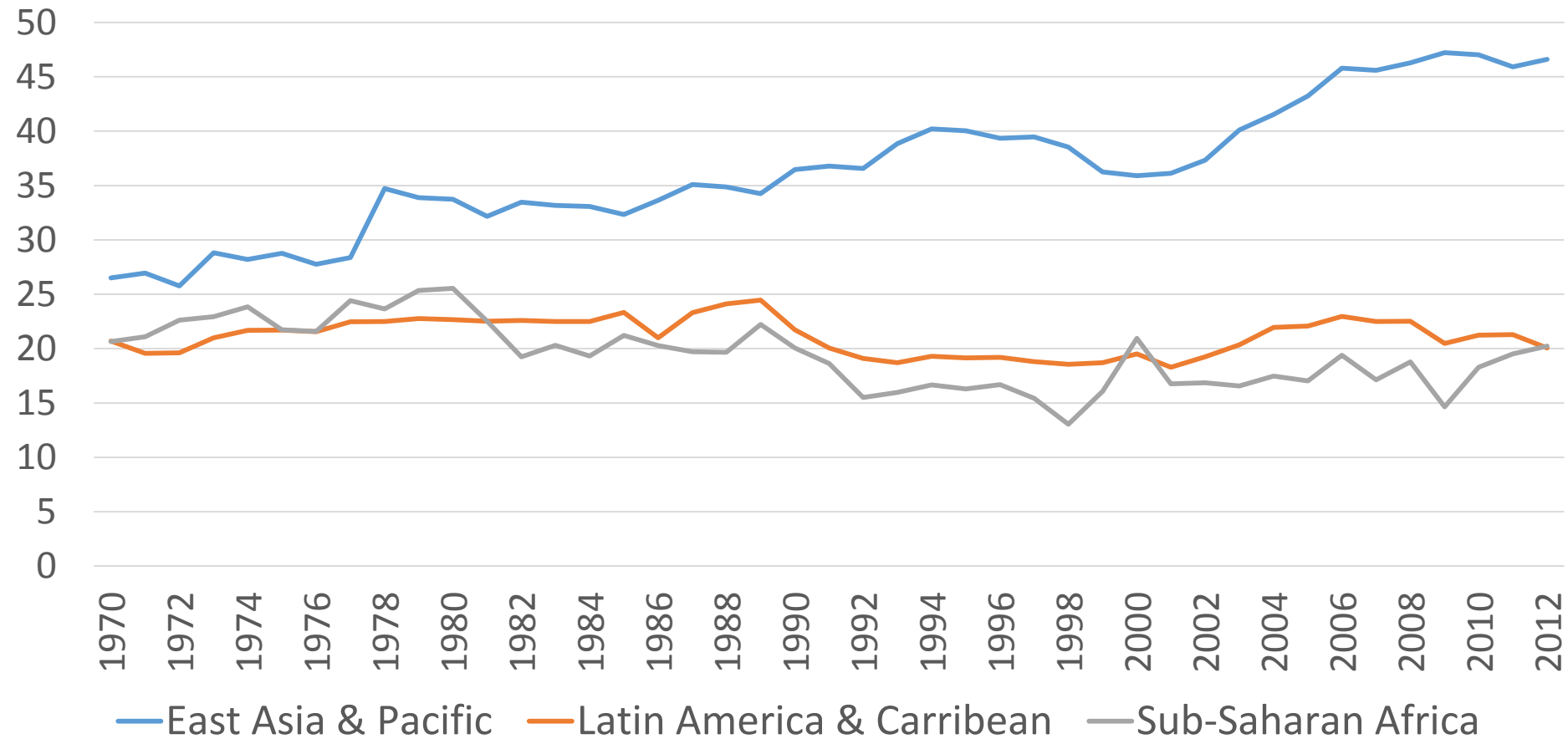
Domestic Saving Rates: Selected countries

Gross National Saving as % of GDP: Selected Countries: 1970-2012



Domestic Saving: Selected regions

Gross National Saving as % of GDP: Selected Regions, 1970-2012



Domestic Saving: Some data on selected regions

	Sub-Saharan Africa			High-performing Asian Countries		
	S/GDP	I/GDP	(S-I)/GDP	S/GDP	I/GDP	(S-I)/GDP
1970-79	11.7	21.4	-9.7	29.2	26.3	2.7
1980-89	6.7	18.8	-12.0	33.2	29.8	3.4
1990-95	6.2	17.2	-11.0	35.7	36.5	-0.8

Source: Ibrahim A. Elbadawi and Francis M. Mwega, "Can Africa's Saving Collapse be Reversed?" World Bank Economic Review, 14(1): 415-43

Determinants of the Rate of Private Domestic Saving: Income

J.M. Keynes' Absolute Income Hypothesis (AIH):

$$C = \alpha + \beta \cdot (Y - T)$$

α = subsistence income level

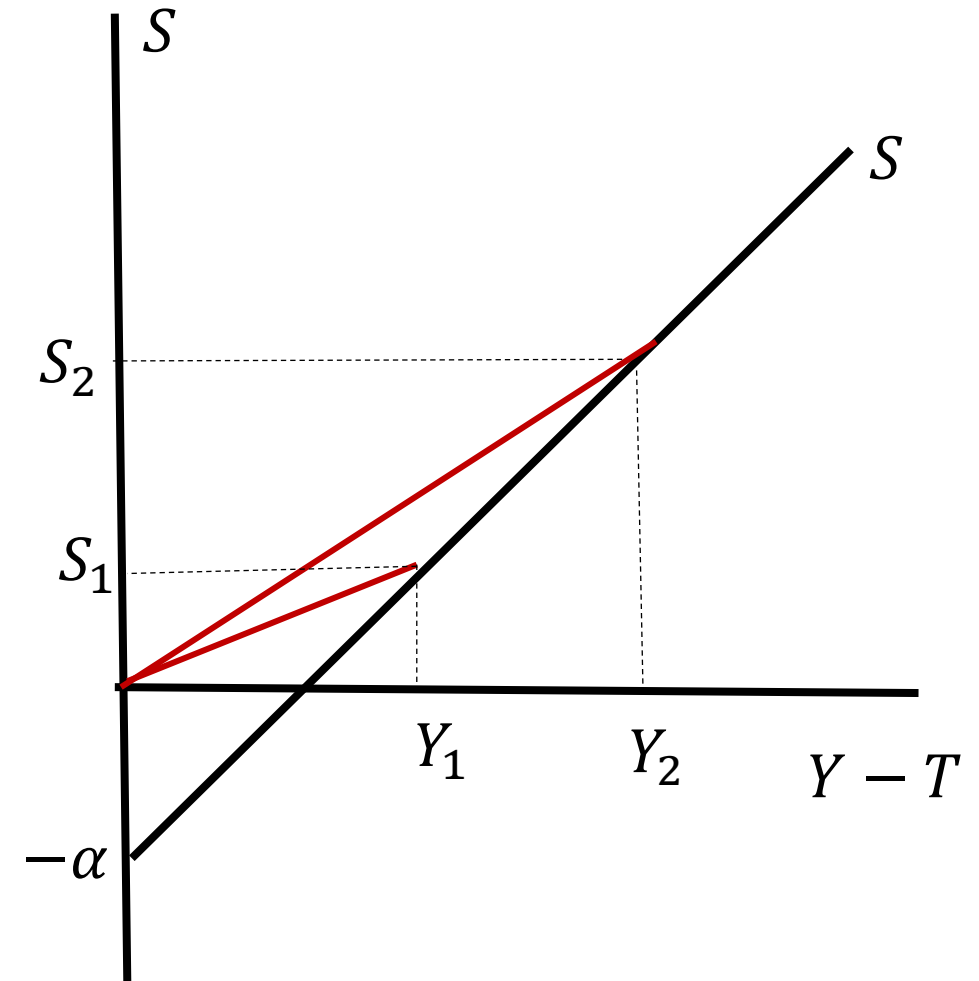
β = marginal propensity to consume (MPC)

$$S = (Y - T) - C \Rightarrow S = -\alpha + (1 - \beta) \cdot (Y - T)$$

$$S/Y = -\alpha/(Y - T) + (1 - \beta)$$

Accordingly, the saving rate (s) rises with income.

- $MPS = 1 - MPC \Rightarrow$ slope of black line
- S/Y (saving rate) $\Rightarrow$ slope of the red line



Determinants of the Rate of Private Domestic Saving: Income

M. Friedman's Permanent Income

Hypothesis (PIH):

Households consume permanent income and save temporary income

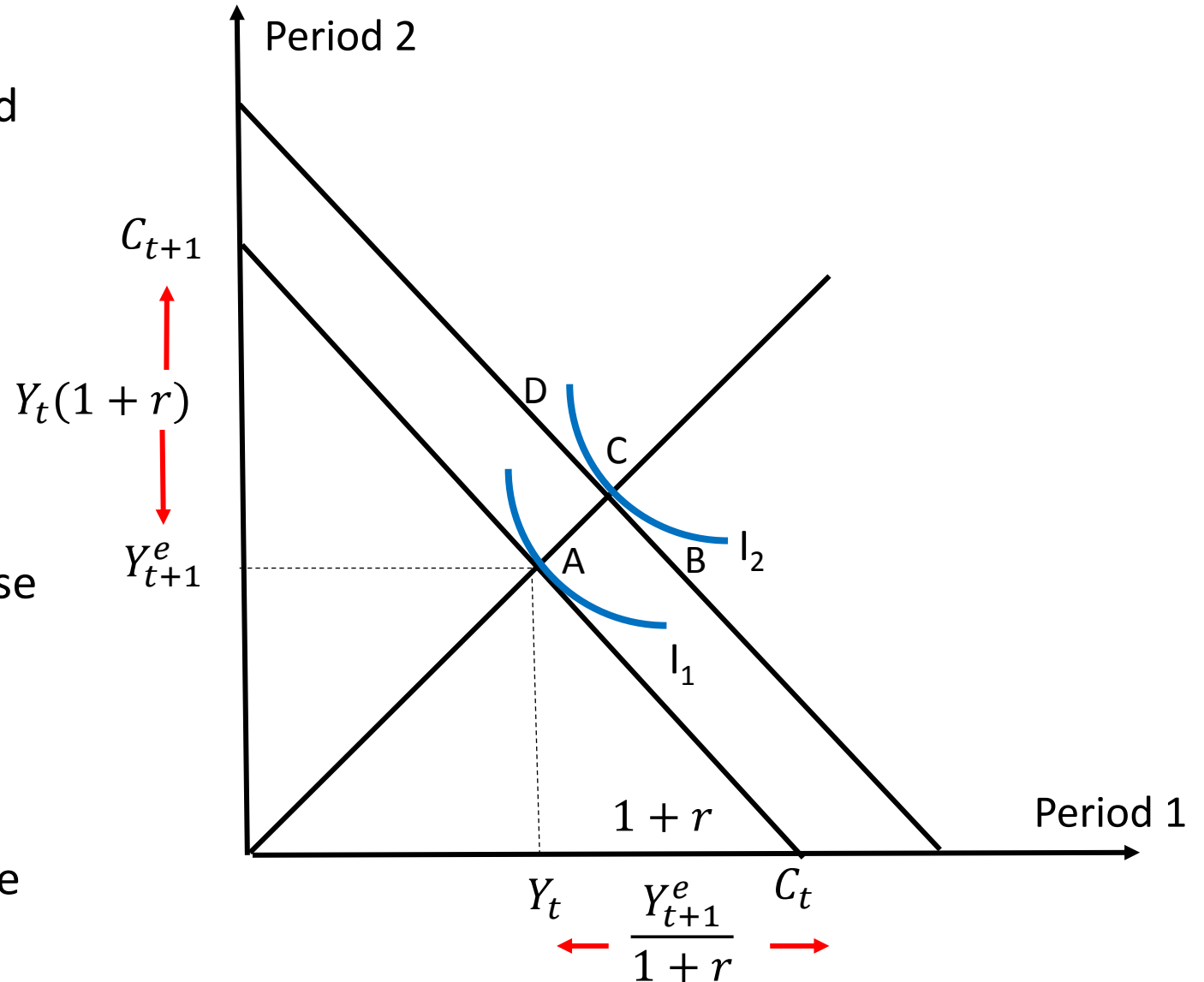
Initial current income is Y_t and expected future income is Y_{t+1}^e . By borrowing and lending at interest rate (r) HHs can consume anywhere on the line $C_{t+1}C_t$. The optimum choice is A.

What happens if there is a temporary increase in income? $A \rightarrow B \Rightarrow S/Y \uparrow$

What happens if expected future income increases? $A \rightarrow D \Rightarrow S/Y \downarrow$

What happens if present and expected future income increase proportionally?

$A \rightarrow C \Rightarrow S/Y \text{ constant}$



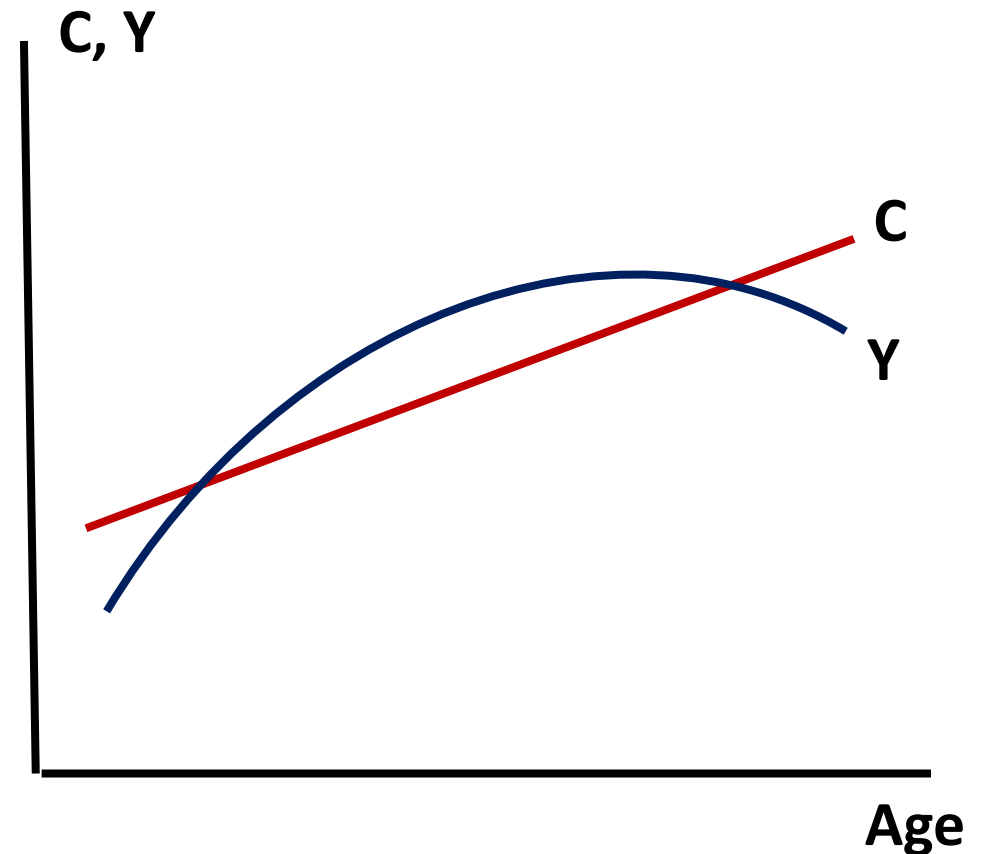
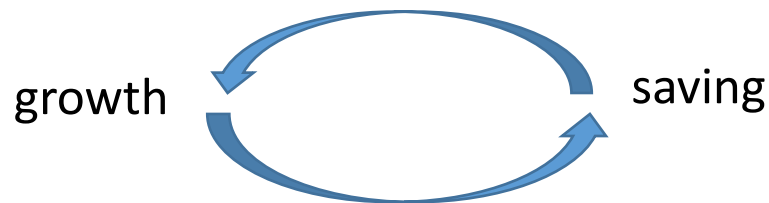
Determinants of the Rate of Private Domestic Saving: Income

F. Modigliani's Life Cycle Hypothesis (LCH)

The life cycle hypothesis (like the permanent income hypothesis) argues that consumption is determined by expected future income as well as current income.

One's saving rate depends on one's stage in the life cycle. National saving rates change as demographics change and as growth rates change.

The LCH predicts a strong positive correlation with growth rates and implies virtuous and vicious growth-saving cycles.



Determinants of the Rate of Private Domestic Saving: Other

2. Other Income Hypotheses: It has been hypothesized that consumption is a matter of habit, implying that consumption lags behind income and that increases in income will be saved. Others hypothesize that consumer utility is a positive function of the difference between subsistence and actual consumption, implying that saving rises with wealth or income growth. If wealth is valued for its own sake, then growth will prompt higher savings
3. Demographics: The LCH suggests that demographics are important for saving. According to the hypothesis, the saving rate is composed of the saving rate of different age groups weighted by their share in the population. Countries with aging populations, increasing life expectancy, and increasing fertility can be expected to experience declining rates of saving
4. Social Security: The more generous a social security system, the less a household must save during its working period. However, if households recognize that their retirement will be paid for by taxes levied on their children, they may save more to leave a large bequest to their children.

Determinants of the Rate of Private Domestic Saving: Other

5. Interest Rate: The impact of the interest rate on the rate of saving is ambiguous. On the one hand, a higher interest rate implies a higher return on saving, and hence encourages saving. On the other hand, a higher interest rate raises permanent income and hence encourages consumption.
6. Uncertainty. The general presumption is that greater uncertainty leads to greater saving by risk-averse consumers. If consumers face the possibility of fluctuations in income, unemployment, higher taxes and inflation, they will set aside income to protect against those events
7. Borrowing constraints. Borrowing constraints result from well-known capital market imperfections, including interest rate ceiling, credit rationing and lack of financial alternatives. When consumers face borrowing constraints they are prevented from financing current consumption against their future wealth. Consequently risk-averse, forward-looking consumers raise their saving rate in anticipation of borrowing constraints, or so it is hypothesized.
8. Borrowing Constraints in World Capital Markets. It is suggested by some that foreign capital flows finance consumption and discourage domestic savings, especially in developing countries. We consider this hypothesis in greater detail in a subsequent lecture.

Determinants of the Rate of Private Domestic Saving: Other

9. Financial Liberalization. The impact of financial liberalization is ambiguous. On the one hand, by relaxing borrowing constraints, it may discourage savings. On the other hand, by increasing financial depth and broadening the diversity of available saving instruments, it may encourage savings. This issue is also examined in more depth below.
10. Fiscal Policy. There is some theoretical ambiguity about the impact of fiscal policy on saving, but the existing empirical evidence points overwhelmingly to a negative relation between public saving and private saving. Ambiguity arises from the *Rational Expectation (Ricardian equivalence) Hypothesis*, which argues that consumers adjust to government spending, regardless of how it is financed in the short-run (taxes, debt, inflation or default). As a practical matter, however, it seems quite clear that public saving crowds out private saving. This matter too is explored in greater detail in a subsequent lecture.

Private saving behavior: Empirical Evidence

Hypotheses:

1. Income level (+)
2. Growth rate (+)
3. Dependency rate (-)
4. Social security (-)
5. Interest rate (?)
6. Uncertainty (+)
7. Borrowing constraints (+)
8. Financial liberalization (?)
9. Government spending (generally negative, but Ricardian equivalence)
10. Foreign aid and borrowing (-)

Econometrics: Lagged Dependent Variables

(1) Shows the long-run relationship

$$(1) \quad Y_t^* = \alpha_0 + \alpha_1 X_t$$

(2) Illustrates a partial adjustment model

$$(2) \quad Y_t - Y_{t-1} = \lambda(Y_t^* - Y_{t-1}) \quad 0 < \lambda < 1$$

(3) Substitute (1) into (2)

$$(3) \quad Y_t = \lambda\alpha_0 + \lambda\alpha_1 X_1 + (1 - \lambda)Y_{t-1}$$

(4) Regression with partial adjustment

$$(4) \quad Y_t = \beta_0 + \beta_1 X_1 + \beta_2 Y_{t-1} + \varepsilon_t$$

- Regression coefficients in (4) are short-run coefficients.
- Long-run coefficients (the alphas) are computed by dividing the betas by lambda
- The proportion of long-run adjustment that occurs in the short-run (λ) is simply $(1 - \beta_2)$

Where:

$$\beta_0 = \lambda\alpha_0 \quad \Rightarrow \quad \alpha_0 = \beta_0/\lambda$$

$$\beta_1 = \lambda\alpha_1 \quad \Rightarrow \quad \alpha_1 = \beta_1/\lambda$$

$$\beta_2 = 1 - \lambda \quad \Rightarrow \quad \lambda = 1 - \beta_2$$

Private saving: Alternative samples, system estimator
(Dependent variable: Gross private saving/GPDI)

Sample	1 Full	2 Bounded*	3 LDC	4 OECD
Lagged private saving rate	0.587 (9.254)	0.494 (10.330)	0.476 (17.820)	0.674 (12.704)
Real per-capita GPDI ^a	0.049 (2.458)	0.035 (2.408)	0.071 (7.473)	0.013 (0.382)
Real growth rate of per-capita GPDI ^b	0.450 (5.828)	0.379 (6.103)	0.425 (13.282)	0.285 (2.036)
Real interest rate ^{a, c}	-0.253 (-5.011)	-0.162 (-3.408)	0.002 (.084)	0.020 (0.313)
M2/GNP	-0.020 (-0.562)	-0.007 (-0.262)	0.024 (1.001)	0.028 (1.989)
Terms of trade ^a	0.078 (5.096)	0.060 (5.921)	0.044 (4.875)	0.068 (3.641)
Urbanization ratio	-0.382 (-3.538)	-0.241 (-3.452)	-0.240 (-5.101)	-0.080 (-1.751)
Old dependency ratio	-0.655 (-3.069)	-0.555 (-4.531)	-1.370 (-4.321)	-0.218 (-1.42)
Young dependency ratio	-0.299 (-4.017)	-0.275 (-5.607)	-0.279 (-5.816)	-0.068 (-0.639)
Government saving/GPDI	-0.285 (-5.097)	-0.172 (-3.782)	-0.238 (-8.333)	-0.112 (-2.782)
Private credit flow/GPDI	-0.318 (-3.989)	-0.316 (-5.791)	-0.508 (-9.955)	-0.085 (-2.427)
Inflation rate ^{a, c}	0.143 (2.034)	0.127 (3.325)	0.177 (4.181)	0.157 (2.963)
Wald test of joint significance (p-value)	0.000	0.000	0.000	0.000
Sargan test (p-value)	0.400	0.174	0.292	0.942
Test for 1st-order serial correlation (p-value)	0.001	0.001	0.000	0.013
Test for 2nd-order serial correlation (p-value)	0.121	0.362	0.690	0.157
Test for 3rd-order serial correlation (p-value)	0.221	0.404	0.353	0.889
Number of observations (Number of countries)	872 (69)	845 (73)	475 (49)	397 (20)

Notes: T-statistics (in brackets) computed with heteroskedasticity-consistent standard errors.

* Observations more than 4 Standard Deviations away from mean of variables are dropped.

^a Expressed in logs (log of [1+x] for the real interest rate and the inflation rate).

^b Measured by the first difference of the log.

^c Both the real interest rate and the inflation rate are bounded between -50 percent and percent.

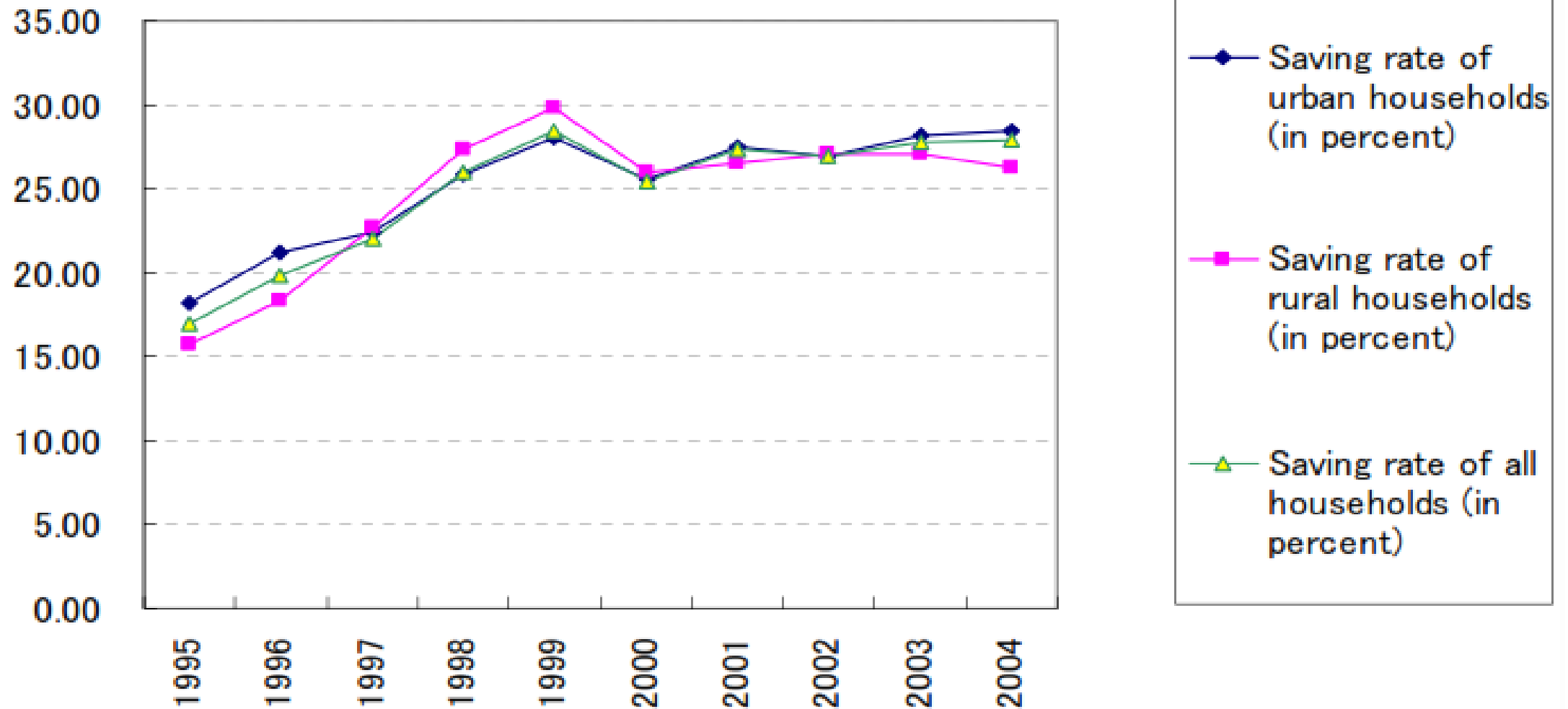
Private saving behavior: Policy Implications

- Fiscal policy. Fiscal policy has a negative effect on private saving, but a net positive effect on national savings (contrary to the Ricardian equivalence hypothesis). The offset coefficients vary from less than 30% in India to 80% in Mexico. Evidence shows that cutting expenditure is more effective way to increase national saving than raising taxes. (Note, public capital spending may raise the return to private investment and generate growth and raise savings. The evidence on tax incentives to savers is mixed and not promising.
- Pension reform. The effect (presumed positive) of replacing pay-as-you-go systems with fully funded schemes depends on the way the transition deficit is financed. If financed by debt, then little effect. If financed by reducing the non-pension deficit, then it will have a negative effect on savings of the current generation, but presumably a positive effect on the saving rate of future generations. Pension reform can have a positive effect through mandatory retirement programs. In Chile one study shows that 3.8% out of a 12.2% increase in saving rate since 1986 is attributable to pension reform.

Private saving behavior: Policy Implications

- Financial liberalization. There is a direct effect, which is short-term and generally negative, and an indirect effect, which is long-term and strongly positive. The direct effect is presumed to be negative because households will rely less on self finance (i.e., saving) and more on debt to smooth consumption and finance big expenditures (like home buying, etc.). The indirect effect works through the positive effect of financial liberalization on intermediation and the efficiency of investment.
- External aid and foreign borrowing. Generally it is found that a 2% increase in foreign savings adds only 1% increase in domestic savings (i.e., 1% loss to crowding out of domestic savings). In Africa the negative relation between aid and domestic savings is especially strong.

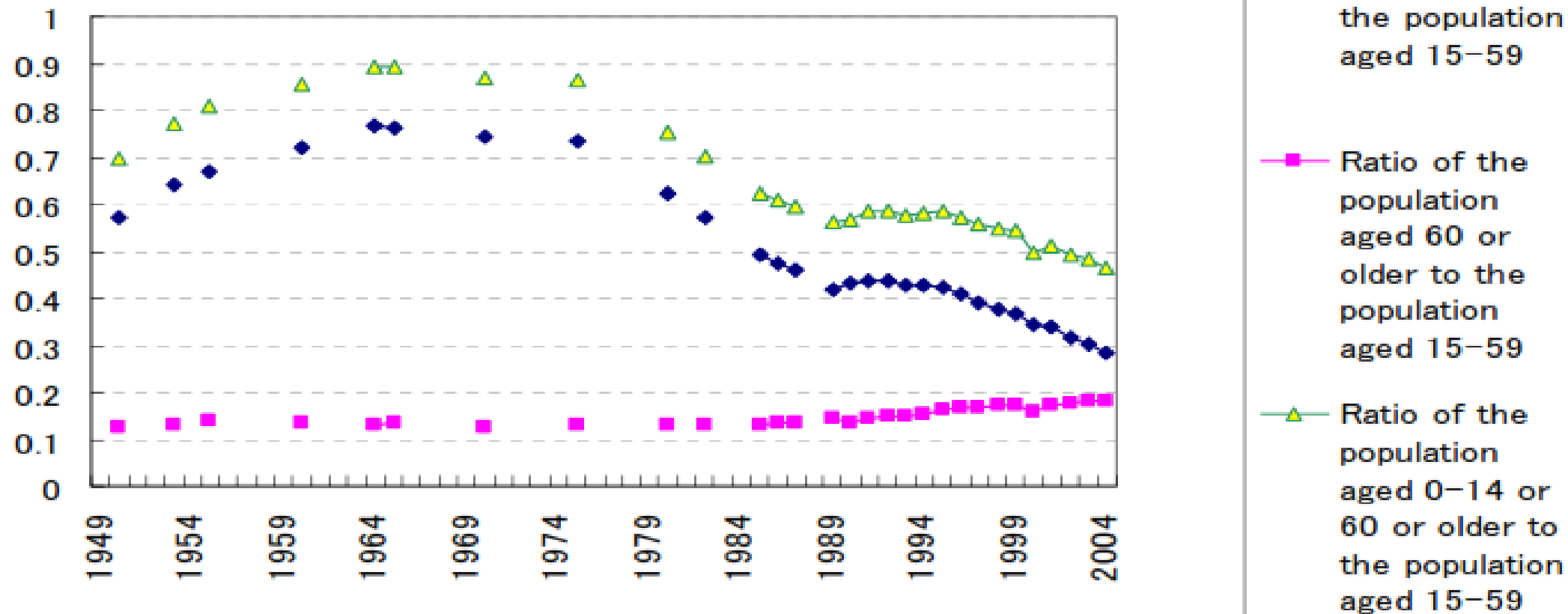
Household Saving Rates In China



Charles Horioka and Junmin Wan, "The Determinant of Household Saving in China: Dynamic Panel Annalysis of Provincial data," *Journal of Money, Credit and Banking*, 2008.

Demographic Change in China

Figure 1: Age Structure of the Population in China, 1949–2004



Sources: China Population Statistics Yearbook, 1988–2005 editions, and World Population Prospects: The 2002 Revision (United Nations)

Charles Horioka and Junmin Wan, “The Determinant of Household Saving in China: Dynamic Panel Analysis of Provincial data,” *Journal of Money, Credit and Banking*, 2008.

Determinants of Household Saving in China

The table present the panel regression results using Chinese provincial data.

Note the LCH is supported by the significance of the income growth rate, but undermined by the weak significance of the dependency ratio.

The PIH is supported by the real interest rate and inflation rate.

Savings rates in China exhibit inertia and persistence, which means they will remain high.

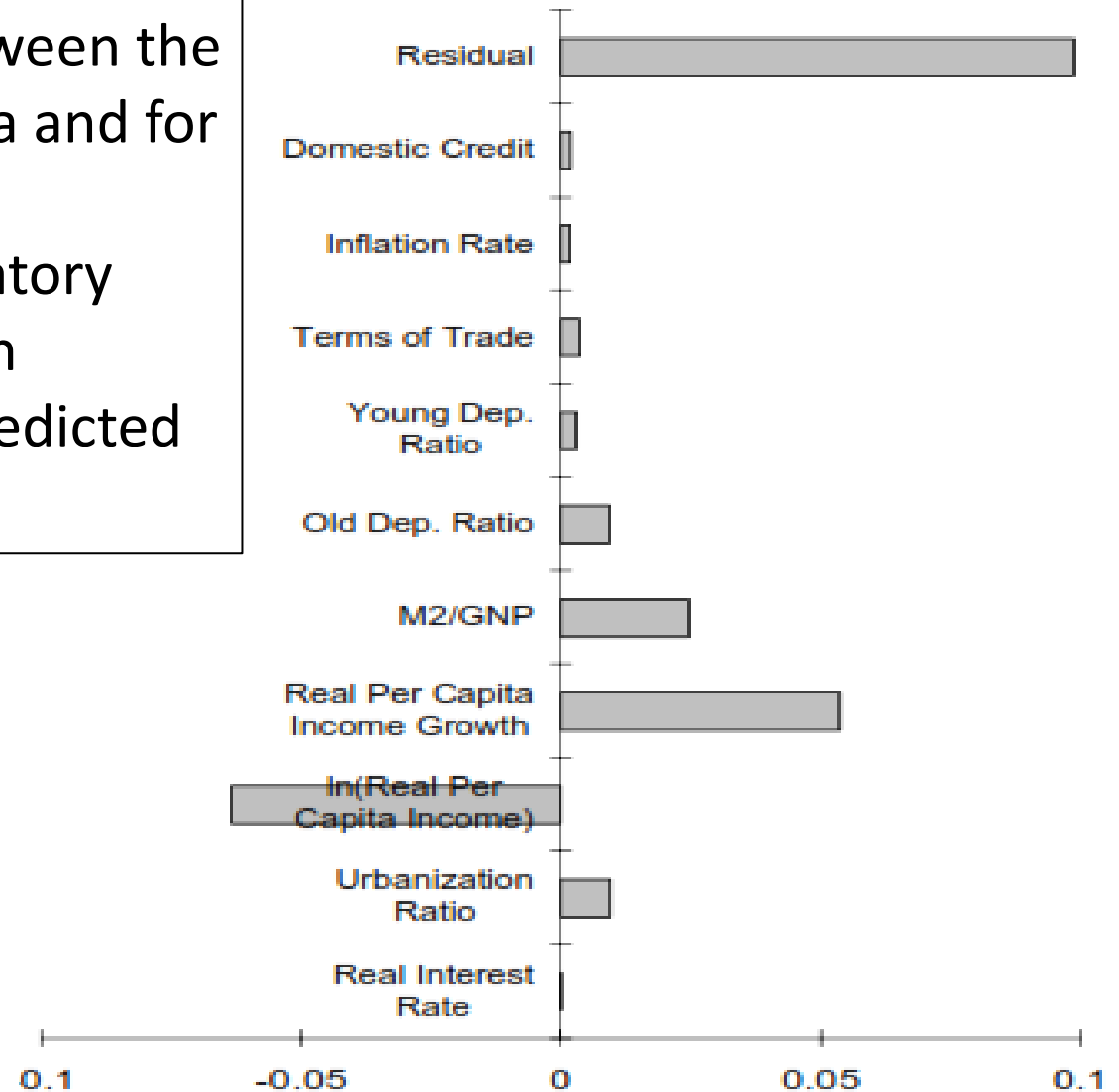
Dependent Variable S/Y		
Explanatory Variables	Estimated coefficient	(Standard error)
S/Y lagged	0.87	(0.53)***
Growth rate	0.28	(0.09)***
Real interest rate	0.004	(0.002)**
Dependency ratio	0.05	(0.026)*
Inflation rate	-0.26	(0.07)***
Constant	-0.004	(0.018)
* Significant at 10% level, ** 5% level, *** 1% level		

Accounting for China's Saving Rate

Kraay (2000) computes the differential between the value of each explanatory variable for China and for the average across a large cross-section of countries. The differential for each explanatory variable is then multiplied by the regression coefficient for that variable to yield the “predicted S/Y differential for China.”

Cross-country Determinants of S/Y

	Coefficient	Standard Error
Constant	-0.050	0.071
Real Interest Rate	0.012	0.102
Urbanization Ratio	-0.041	0.038
Log(Real per capita GNDI)	0.039***	0.009
Growth in Real per capita GNDI)	0.991***	0.260
M2/GNP	0.098***	0.031
Old Dependency Ratio	-0.600***	0.159
Young Dependency Ratio	-0.028	0.048
Terms of Trade	-0.035	0.029
Inflation Rate	-0.032	0.134
Domestic Credit Flow/GNDI	0.076	0.292



Contribution to Predicted S/Y Differential For China

Accounting for China's Saving Rate

The results present in the previous slide indicate to what extent the difference in China's high saving rate from those of the typical developing country can be attributed to differences in the known determinants of the saving rate.

- China's saving rate is unusually high given its low per capita income, as indicated by the negative contribution to the saving differential of per capita income.
- By contrast, China's high growth rate and level of financial depth, as well as its relatively low old-age dependency rate contributed positively to China's saving differential.
- More importantly, even after controlling for these differences in saving rate determinants, China remains a large outlier in the regression, with the regression under predicting China's saving rate by almost 10 percentage points (i.e. the residual).

SUGGESTION: Replicating this analysis for Vietnam might make an interesting thesis topic.

SAVE
INVEST