

# **STAGES OF DEVELOPMENT, ECONOMIC POLICIES AND NEW WORLD ECONOMIC ORDER**

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and  
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# INITIAL CONDITIONS AND ECONOMIC POLICIES

Initial conditions	Level of technological development (GDP per capita)	
Quality of institutions (CPI index)	LOW	HIGH
LOW	<ul style="list-style-type: none"> <li>• Accumulation of FOREX</li> <li>• Increase in gov.rev/GDP ratio</li> <li>• Decrease in tariff protection</li> </ul>	No such countries
HIGH	<ul style="list-style-type: none"> <li>• Accumulation of FOREX</li> <li>• Increase in gov.rev/GDP ratio</li> <li>• Increase in tariff protection</li> </ul>	<ul style="list-style-type: none"> <li>• Decrease in FOREX</li> <li>• Increase/decrease in gov.rev/GDP ratio</li> <li>• Decrease in tariff protection</li> </ul>

# Introduction

- Two recent papers by Acemoglu, Aghion, Zilibotti (2002a,b) offer a model to demonstrate the dependence of economic policies on the distance to the technological frontier.

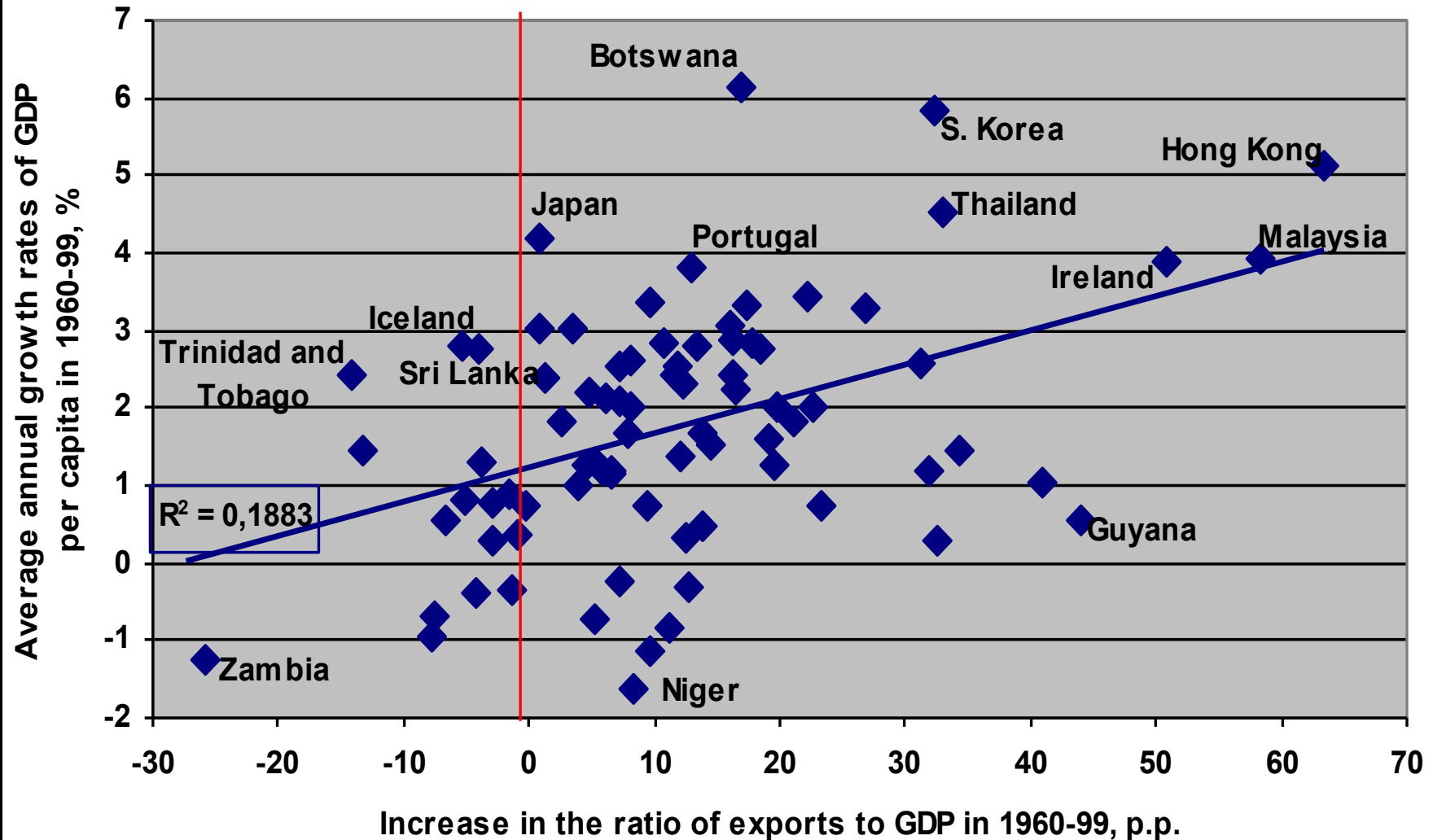
A general idea is to run regressions of the following type:

■  $GR = \text{Control variables} + bX(a - Y)$ ,  
where

- $GR$  is rate of growth (or another outcome indicator);
- $X$  is a policy variable (level of tariffs, speed of foreign exchange reserves accumulation, etc.);
- $b, a$  are regression coefficients;
- $Y$  is a characteristics of stage of development of a country (GDP per capita,

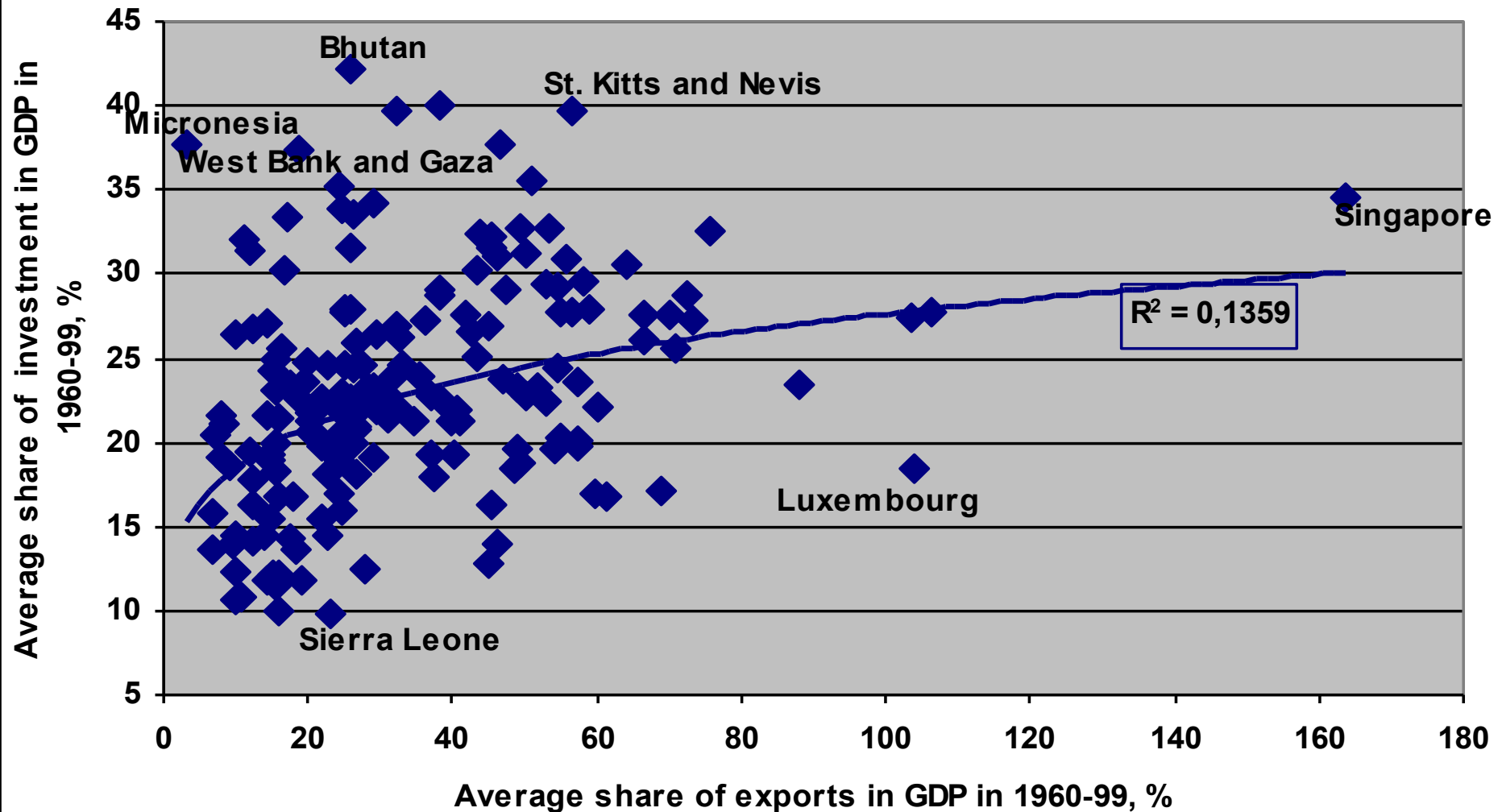
# TARIFFS

Fig. 1. Increase in the ratio of exports to GDP and average annual growth rates of GDP per capita in 1960-99, %



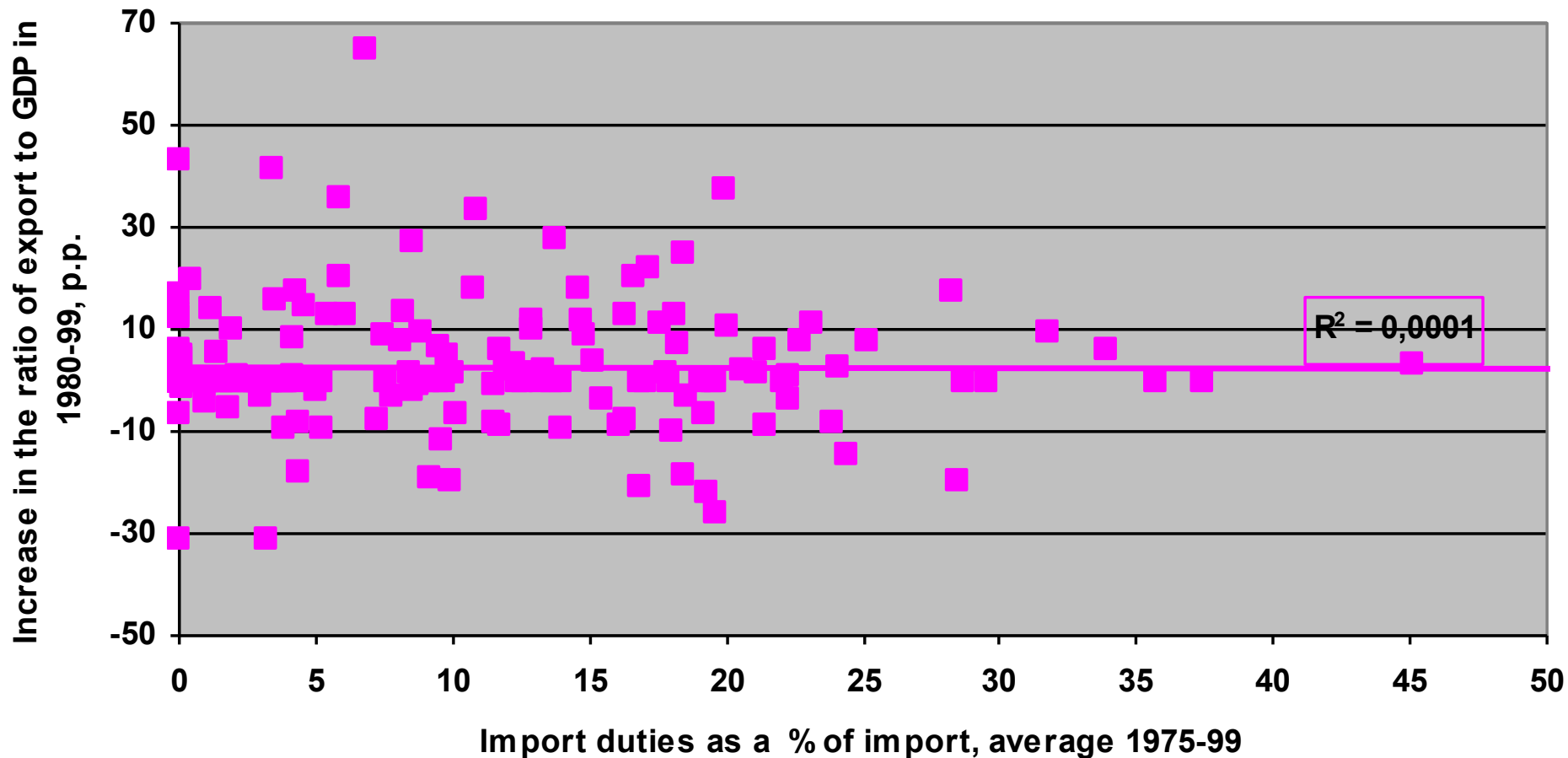
# TARIFFS

Fig. 2. Average share of exports and investment in GDP in 1960-99, %



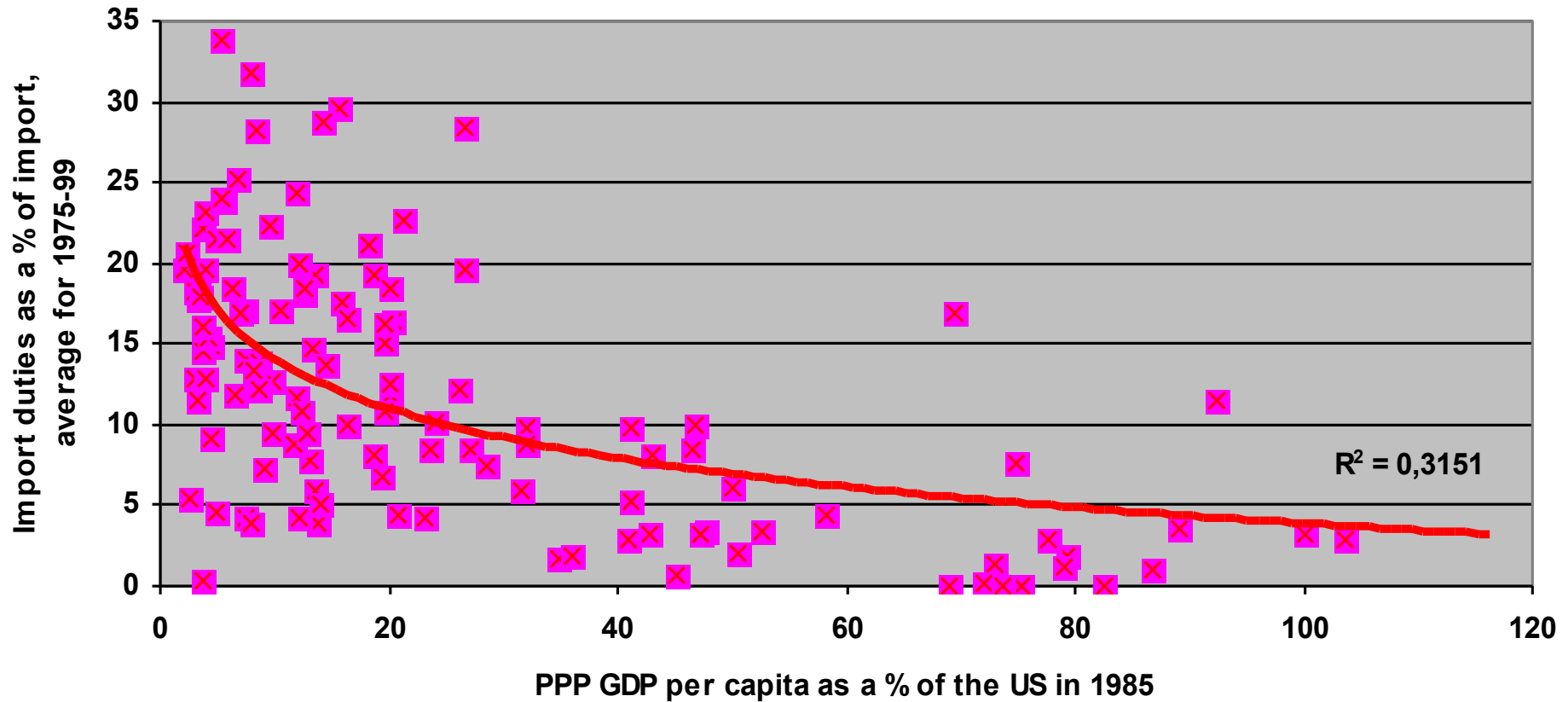
# TARIFFS

Fig. 3. Import duties as a % of import in 1975-99 and the increase in export as a % of GDP in 1980-99, p.p.



# TARIFFS

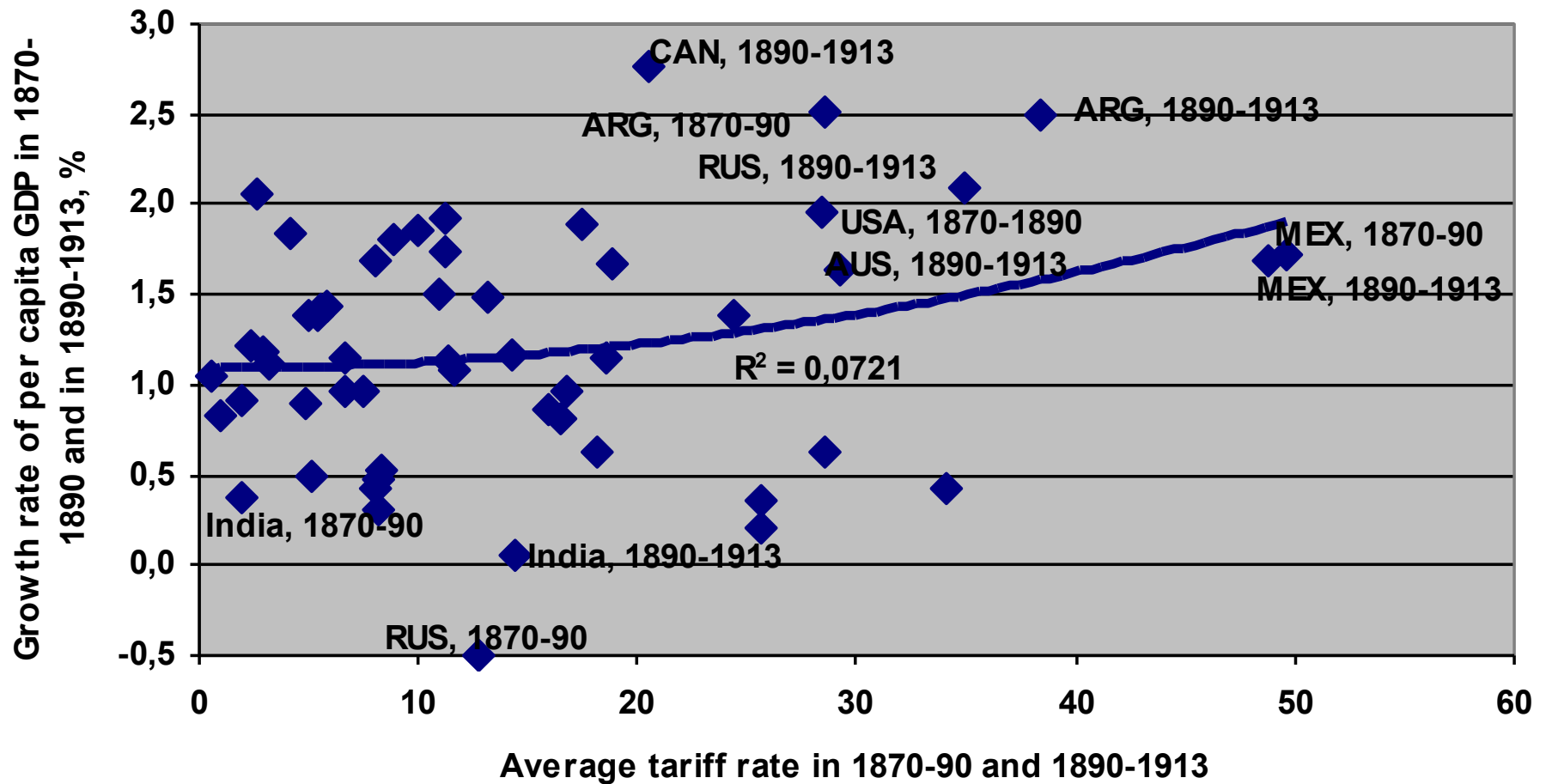
Import duties as a % of import, average for 1975-99, and PPP GDP per capita as a % of the US in 1985





# TARIFFS

Average tariff rate (% of import) and growth rate of per capita GDP (%) in 1870-90 and 1890-1913



# TARIFFS

- We tried to find a GDP per capita threshold for the 19th century using data from (Irwin, 2002), but failed. The best equation linking growth rates in 1870-1913 to GDP per capita and tariff rates (27 countries, two periods – 1870-90 and 1890-1913 – 54 observations overall) is:
- Regression for 1870-1913
- $$\text{GROWTH} = 0.24 + 0.04*Y - 0.0004*Y^2 - 0.05*T + 0.001*T^2 + 0.0006*Y*T,$$
- Where Y – GDP per capita in 1870 nor 1890 respectively, T – average tariff rates
- ( $R^2_{\text{adj.}} = 33\%$ , all coefficients significant at 11% level or less).

## DATA - CPI

- Corruption perception index (CPI) for 1980-85 – these estimates are available from Transparency International for over 50 countries
- $CPI = 2.3 + 0.07 * Ycap75us$ ,
- $N=45$ ,  $R^2 = 59\%$ , T-statistics for  $Ycap75$  coefficient is 9.68.
- $CORR_{res} = 10 - [CPI - (2.3 + 0.07 * Ycap75us)] = 12.3 - CPI + 0.07 * Ycap75us$

## DATA: RISK

- RISK84-90 – average investment risk index for 1984-90, varies from 0 to 100, the higher, the better investment climate
- $RISK = 62.1 + 0.19Ycap75us$ ,  $N = 88$ ,  $R^2 = 36\%$ , T-statistics for  $Ycap75us$  coefficient is 3.95.
- $RISK_{res} = RISK84-90 - (62.1 + 0.19Ycap75us) + 100$

# TARIFFS

- **$GROWTH = CONST. + CONTR.VAR. + T_{incr} \cdot (0.06 - 0.004Y_{cap75us} - 0.004CORR_{pos} - 0.005T)$**
- **GROWTH**, is the annual average growth rate of GDP per capita in 1975-99,
- the control variables are population growth rates during the period and net fuel imports (to control for “resource curse”),
- **T** – average import tariff as a % of import in 1975-99,
- **T<sub>incr.</sub>** – increase in the level of this tariff (average tariff in 1980-99 as a % of average tariff in 1971-80),
- **Y<sub>cap75us</sub>** – PPP GDP per capita in 1975 as a % of the US level,
- **CORR pos** – positive residual corruption in 1975, calculated as explained earlier.
- **R<sup>2</sup>=40%, N=39**, all coefficients are significant at 5% level, except the last one (33%), but exclusion of the last variable (a multiple of T by T<sub>incr.</sub>) does not ruin the regression and the coefficients do not change much.

# TARIFFS

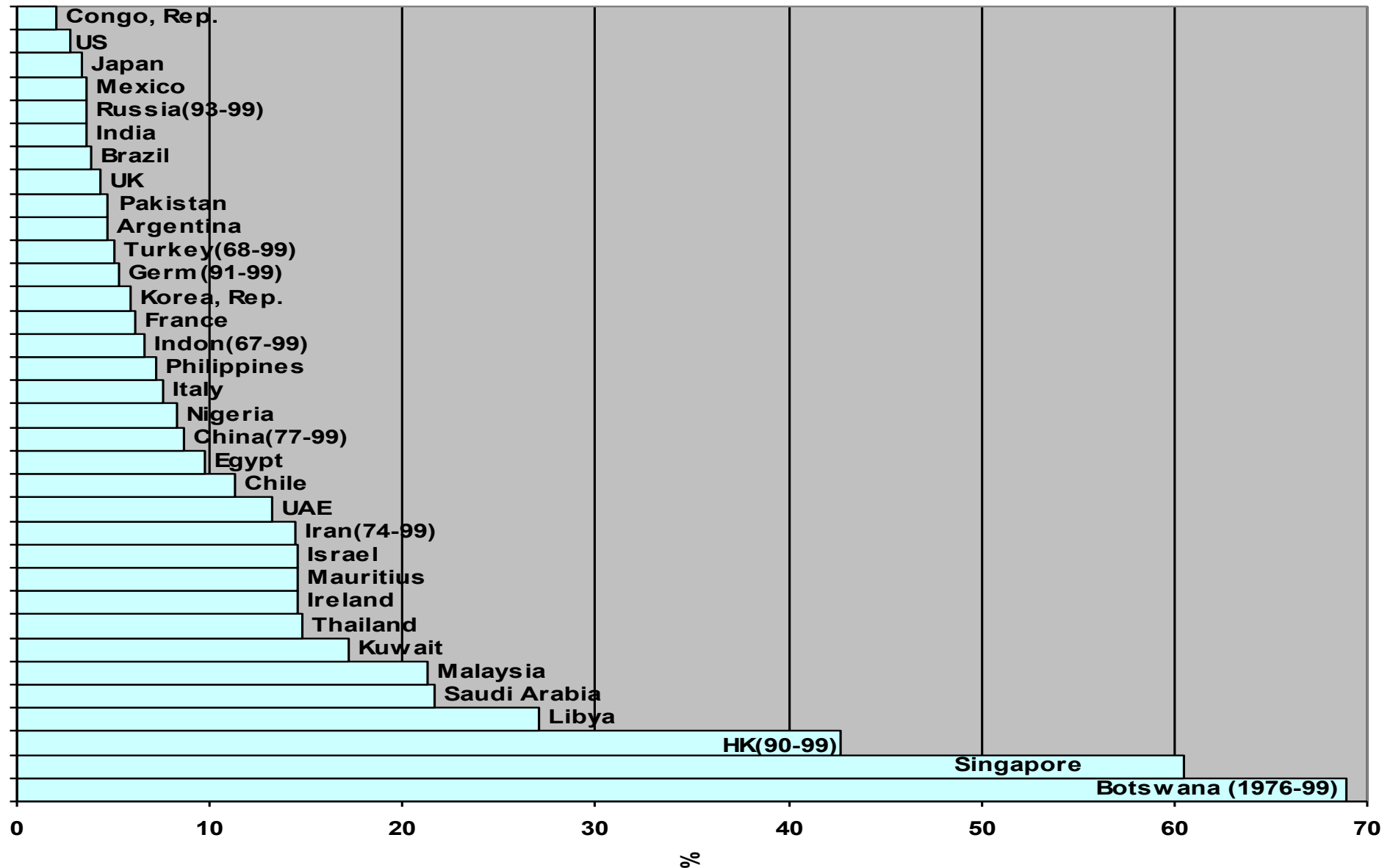
- If import duties are included into growth regressions without the interaction terms with GDP per capita and/or a measure of institutional strength (corruption), the coefficient on import duties is not significant:
- But when interaction terms are included, all coefficients become statistically significant. Here is an additional equation that give similar thresholds on GDP per capita and corruption:
- $GROWTH = CONST + CONTR.VAR + T(0.05 - 0.005Y_{cap75us} - 0.007R_{pol})$
- where  $R_{pol}$  is the indicator of the accumulation of foreign exchange reserves computed as explained later, in the third section,  $N=40$ ,  $R^2=40$ , all coefficients significant at 8% level or less, control variables – positive residual corruption and population growth rates.

# TARIFFS

- $GROWTH = CONST + CONTR.VAR. + T(0.005RISK - 0.002Y_{cap75us} - 0.3)$
- (N= 87,  $R^2 = 42$ , all coefficients significant at 10% level or less, control variables are population growth rates, population density and total population).
- The equation implies that for a poor country (say, with the PPP GDP per capita of 20% of the US level or less) import duties stimulate growth only when investment climate is not very bad ( $RISK > 50\%$ ) – the expression in brackets in this case becomes positive.

# Foreign exchange reserves accumulation

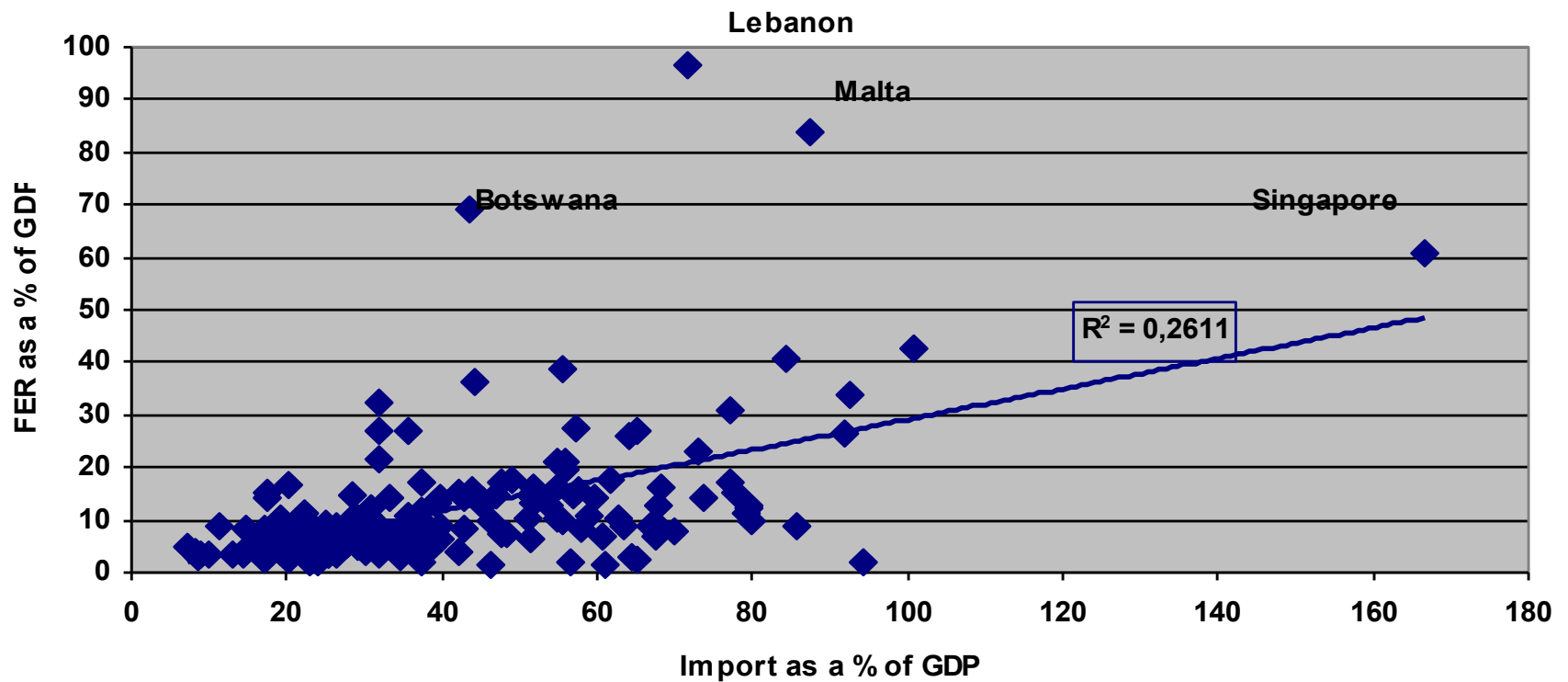
Fig. 3.1. Foreign exchange reserves as a % of GDP, average ratios for 1960-99





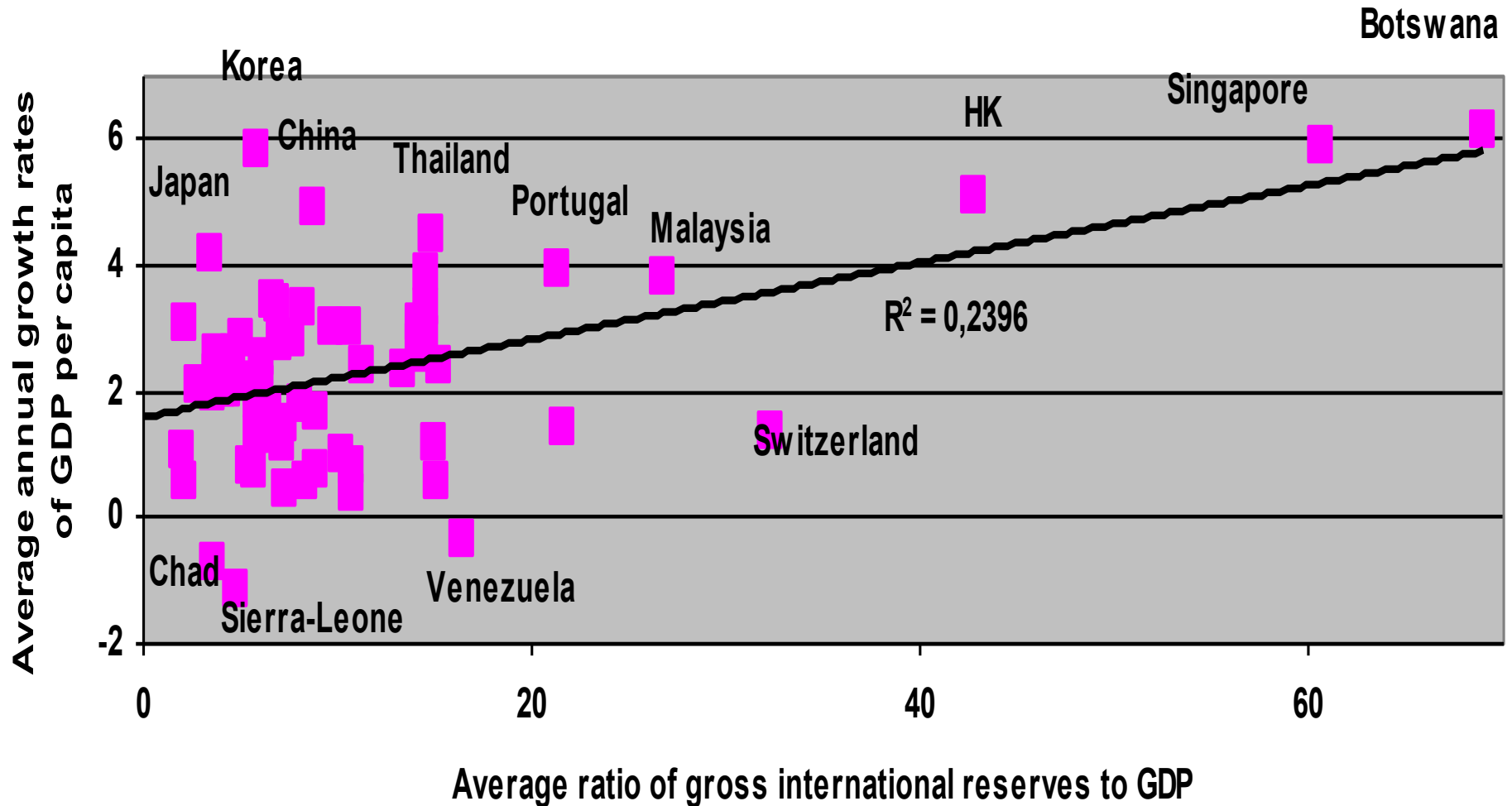
# Foreign exchange reserves accumulation

Fig. 3.2A. Average ratio of imports to GDP and average ratio of reserves to GDP in 1960-99, %



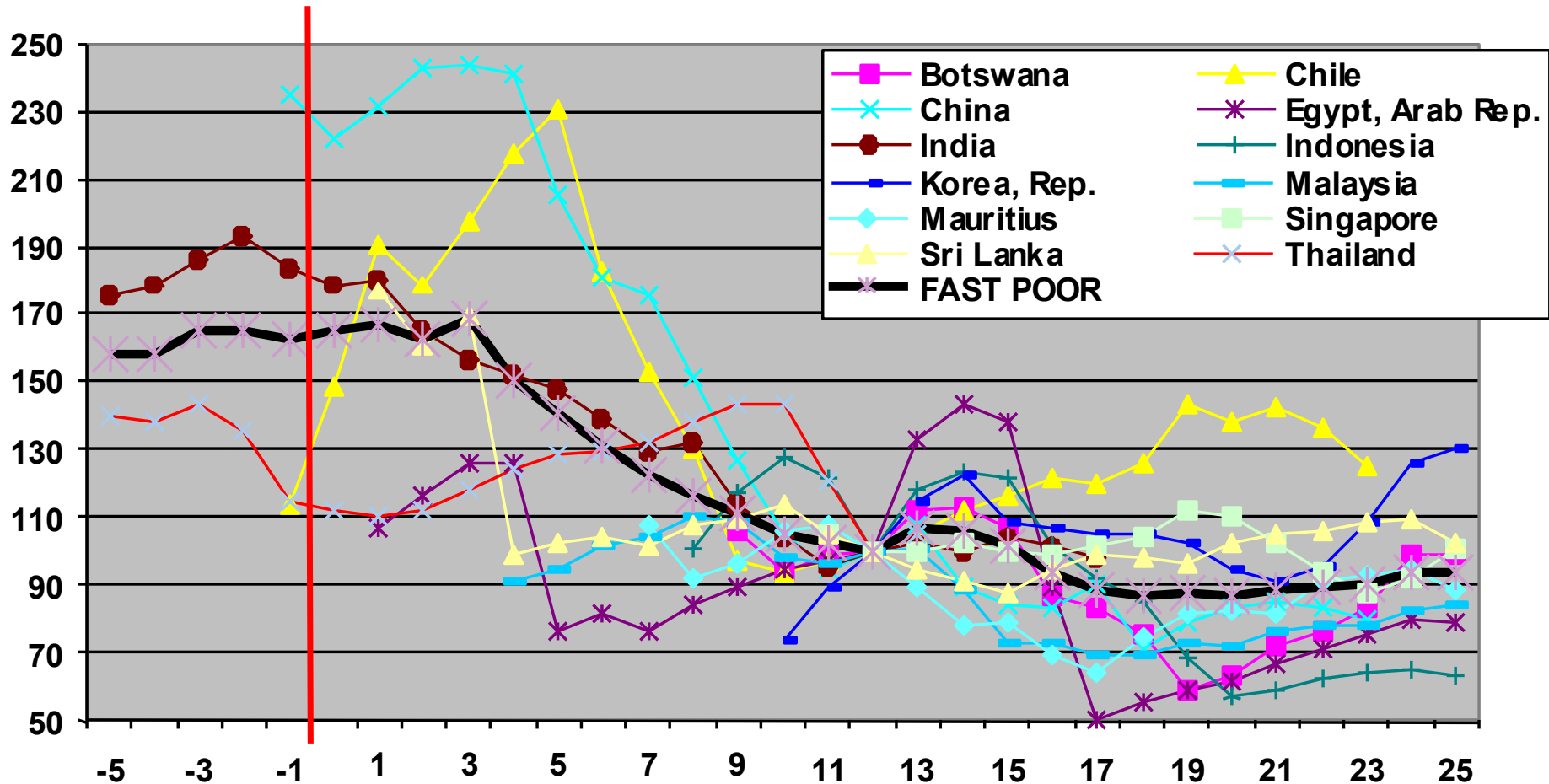
# Foreign exchange reserves accumulation

Fig. 3.3. Average ratio of gross international reserves to GDP and average annual growth rates of GDP per capita in 1960-99, %



# Foreign exchange reserves accumulation

Fig.6. Average real exchange rate versus the US \$ (Year 12 = 100%) in fast growing developing economies, year "0" denotes the point of take-off



# Foreign exchange reserves accumulation

- $\Delta R = 38 - 11.4 \log Y_{cap75} + 0.1(T/Y) + 0.24(\Delta T/Y)$

( $R^2=34\%$ ,  $N=82$ , all coefficients significant at 0.1% level).

- Then we considered the residual as the policy-induced change in reserves.
- Afterwards we used the *policy induced change in foreign exchange reserves* as one of the explanatory variables in growth regressions together with import taxes and change in government revenues/GDP ratio

# Foreign exchange reserves accumulation

- $GROWTH = CONST. + CONTR.VAR. + T(0.06 - 0.0027Y_{cap75us}) + R_{pol}(0.07 - 0.006T)$
- The control variables are the rule of law index for 2001, the size of the economy in 1975, and the population growth rates in 1975-99.
- $N=74$ ,  $R^2=44\%$ , all coefficients are significant at less than 10% level, except for coefficients of  $R_{pol}$  (11%) and the PPP GDP in 1975 (16%).

# Foreign exchange reserves accumulation

- $GROWTH = CONST. + CONTR.VAR. + G(0.05 - 0.0003Y_{cap75us} - 0.003CORR_{pos}) + R_{pol}(0.12 - 0.002Y_{cap75us})$
- This equation implies that the growth of government revenues/GDP ratio is good for most countries, excluding the richest ones and the most corrupt ones (if  $Y_{cap75us}$  is higher than 100%, whereas  $CORR_{pos} > 7$ , the impact of the increase of government revenues/spending on growth becomes negative).
- It also allows to determine the threshold level of GDP per capita for the impact on growth of reserve accumulation: for countries with GDP per capita higher than 60% of the US level, the accumulation of reserves has a positive impact on growth; for richer countries the impact is negative.

# Foreign exchange reserves accumulation

- We also experimented with another definition of *policy induced change in foreign exchange reserves*, as a residual from regression linking the increase in reserves to GDP ratio to the following ratios: trade/GDP, increase in trade/GDP, external debt/GDP( $ED/Y$ ) and debt service/GDP( $DS/Y$ ):

$$\Delta R = 3.3 - 0.6(DS / Y) + 0.06(ED / Y) + 0.2(T / Y) + 0.28(\Delta T / Y)$$

- $N=59$ ,  $R^2=36\%$ , all coefficients significant at less than 70%

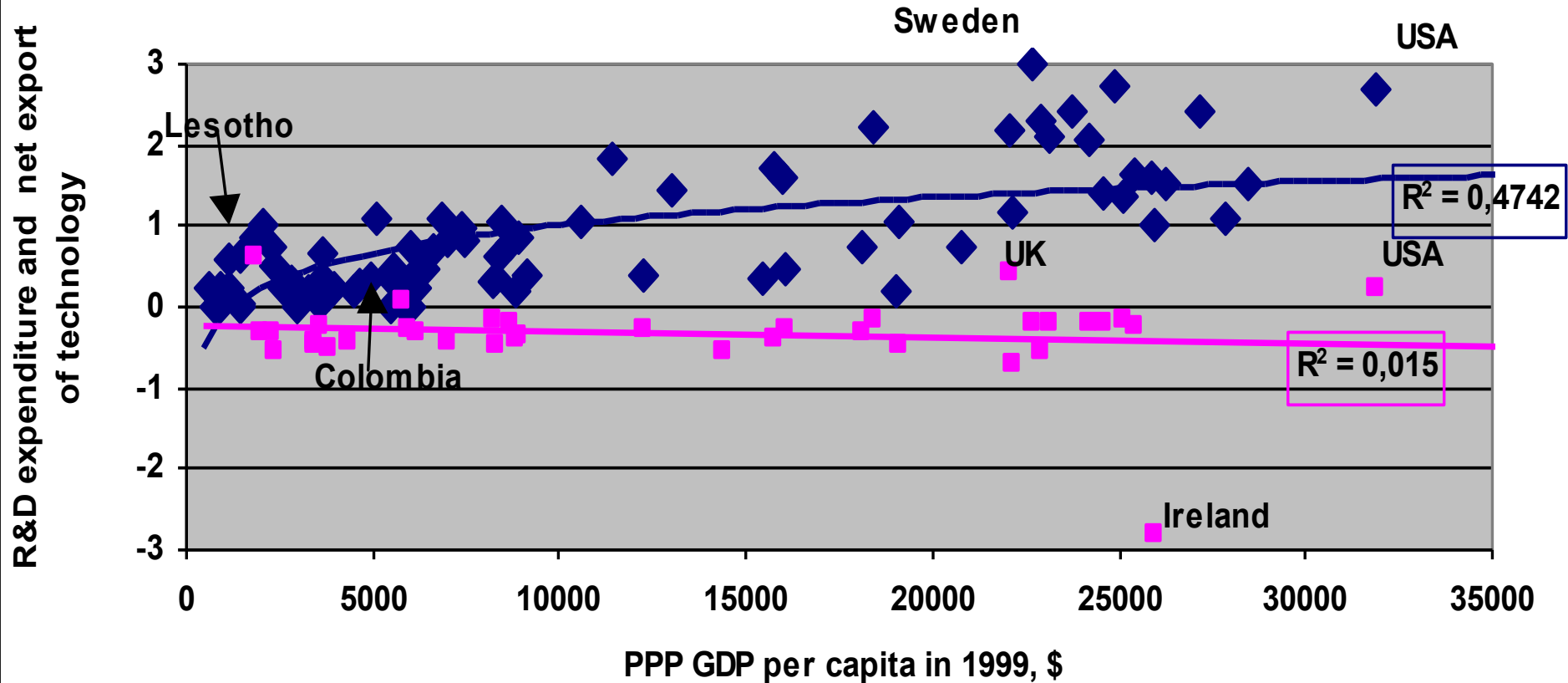
# Foreign exchange reserves accumulation

- $GROWTH = CONST. + CONTR.VAR. + T(0.001RISK - 0.0038Ycap75us) + Rpol(0.23 - 0.014T),$
- $N=48, R^2 = 46,$  all coefficients significant at 7% or less, control variables – PPP GDP in 1975 and population growth rate.
- $GROWTH = CONST. + CONTR.VAR. + Gpol(0.096RISK - 6.3) + Rpol(0.31 - 0.017T),$
- $N=28, R^2 = 61,$  all coefficients significant at 10% or less, control variables – PPP GDP in 1975, average ratio of government revenues to GDP in 1973-75.



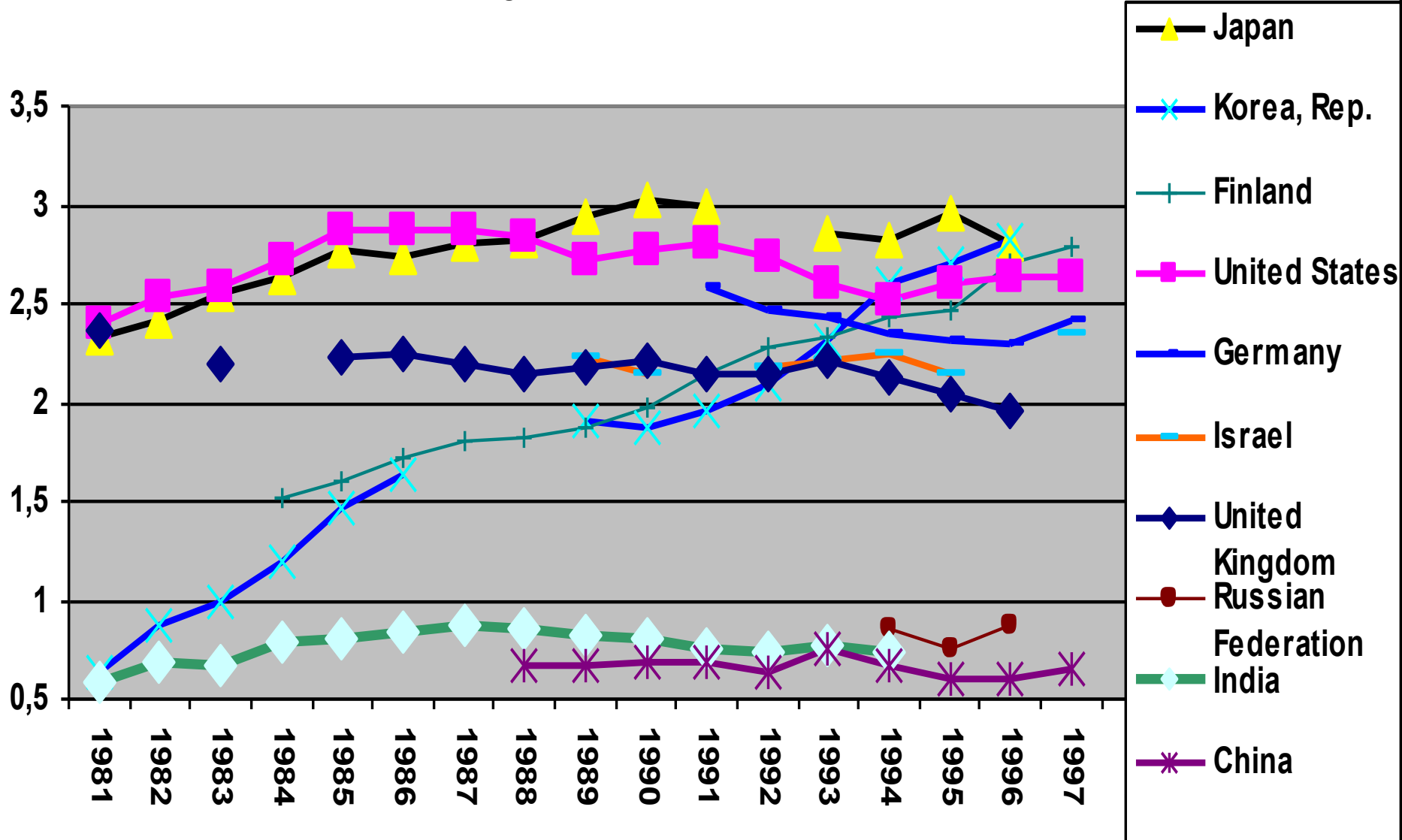
# IMITATION vs. INNOVATION

Fig. 5. R&D expenditure and net export of technology (receipts of licence fees and royalties minus payments of licence fees and royalties) in 1980-99, % of GDP, and PPP GDP per capita in 1999, \$



# IMITATION vs. INNOVATION

Fig. R&D expenditure, % of GDP



# IMITATION vs. INNOVATION

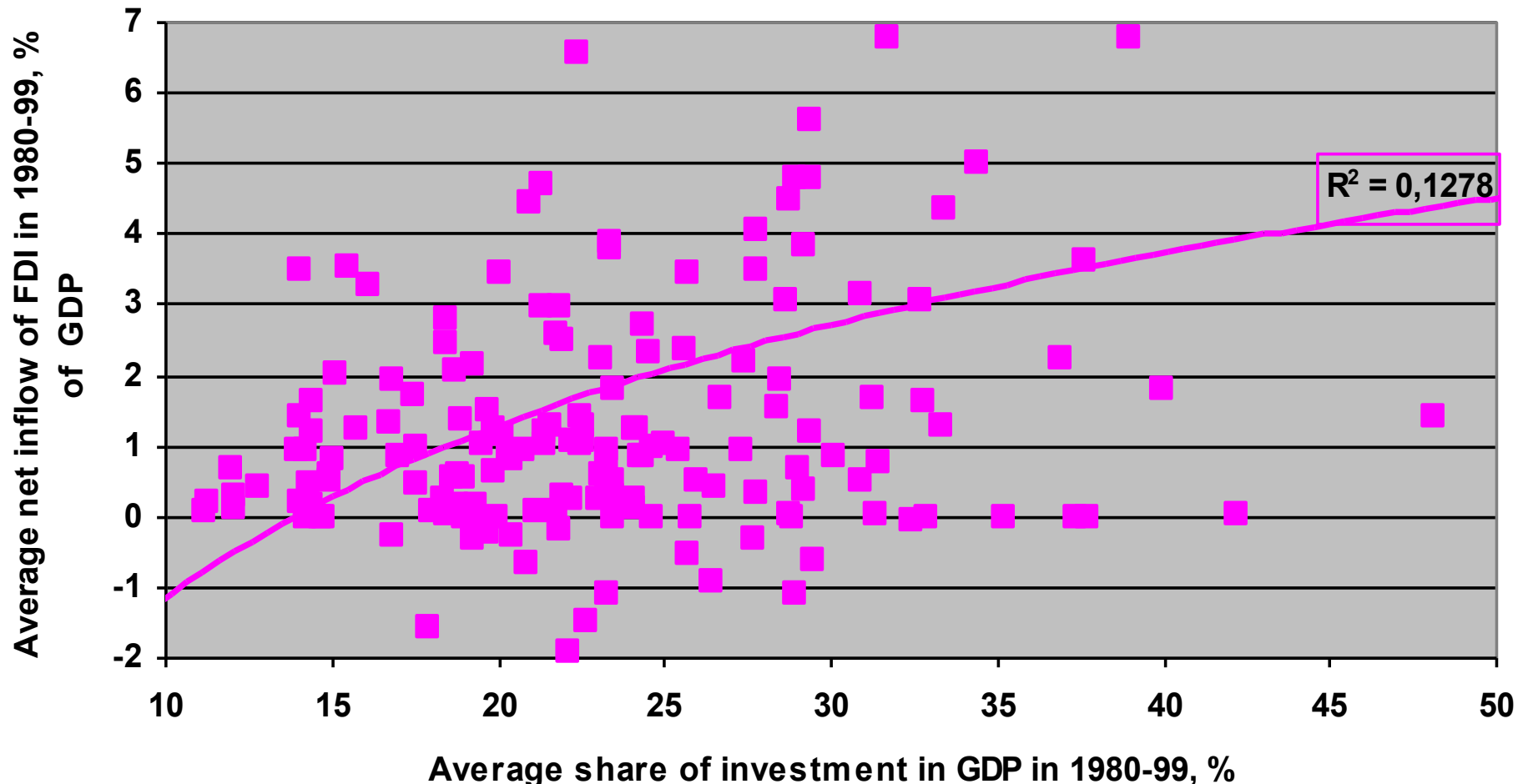
- $GR = CONST. + CONTR.VAR. + 0.11TT$   
(24.8 –  $Y_{cap75us}$  + 24.9R&D),
- where TT - net technology transfer in 1980-99 as a % of GDP,
- R&D - expenditure for research and development as a % of GDP in 1980-99
- Control variables - investment climate index in 1984-90 and share of investment in GDP in 1975-99
- All coefficients significant at 5% level,  $R^2=58\%$

# FDI:

**High growth without FDI: Japan, S. Korea, HK, Norway**

**High FDI without growth:  
Bolivia, Papua-New Guinea, Swaziland**

Fig. 7. Average share of investment and average net inflow of FDI in GDP in 1980-99, %

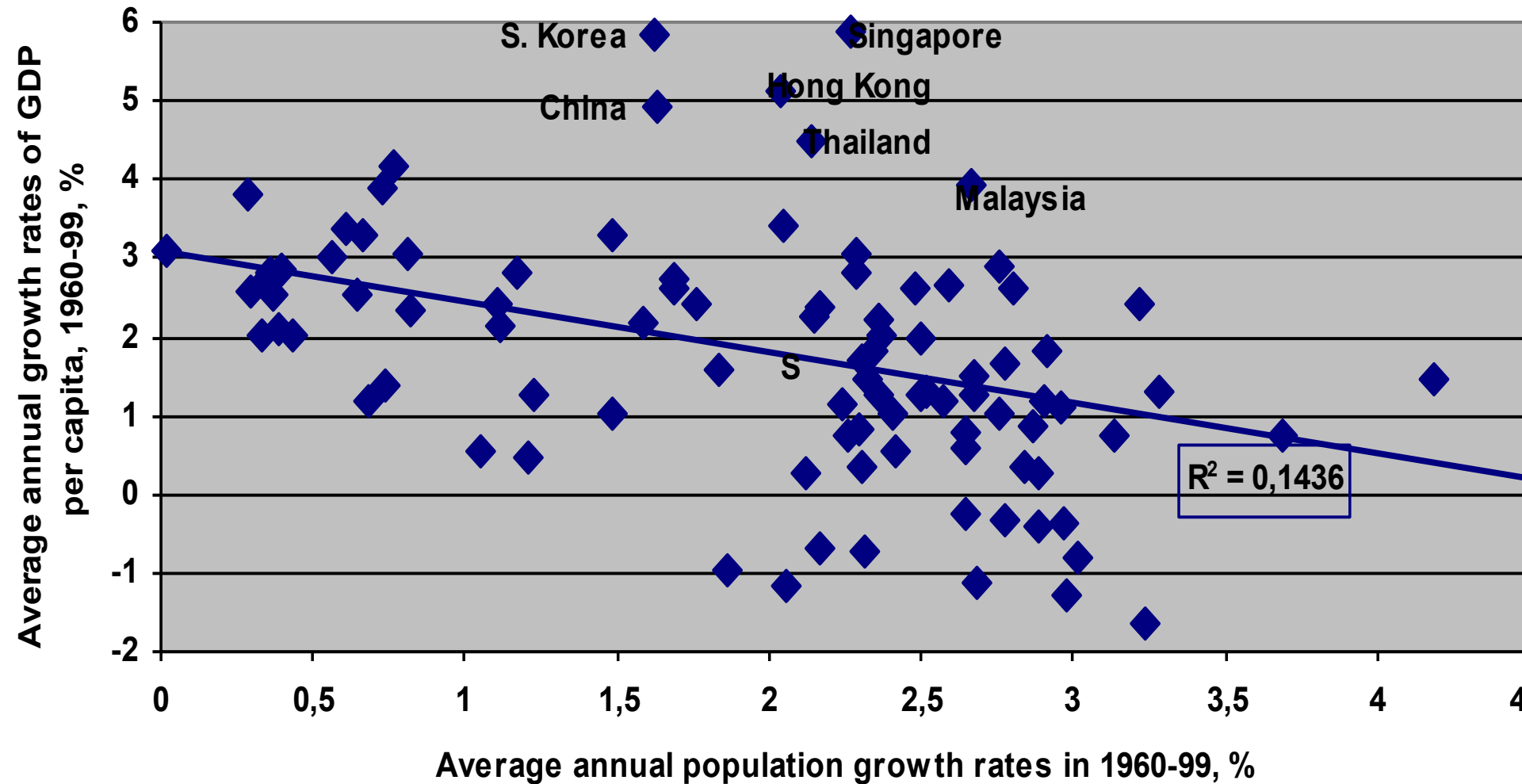


# FDI

- $GR = CONST. + CONTR. VAR. + 0.027 * FDI (ICI - 58.5),$
- where ICI – investment climate index in 1984-90, FDI – average foreign direct investment inflow as a % of GDP in 1980-99.
- Control variable - population growth rates in 1975-99.
- All coefficients are significant at 5% level,  $R^2 = 23\%$
- 58.5 – level of Colombia, Costa-Rica,

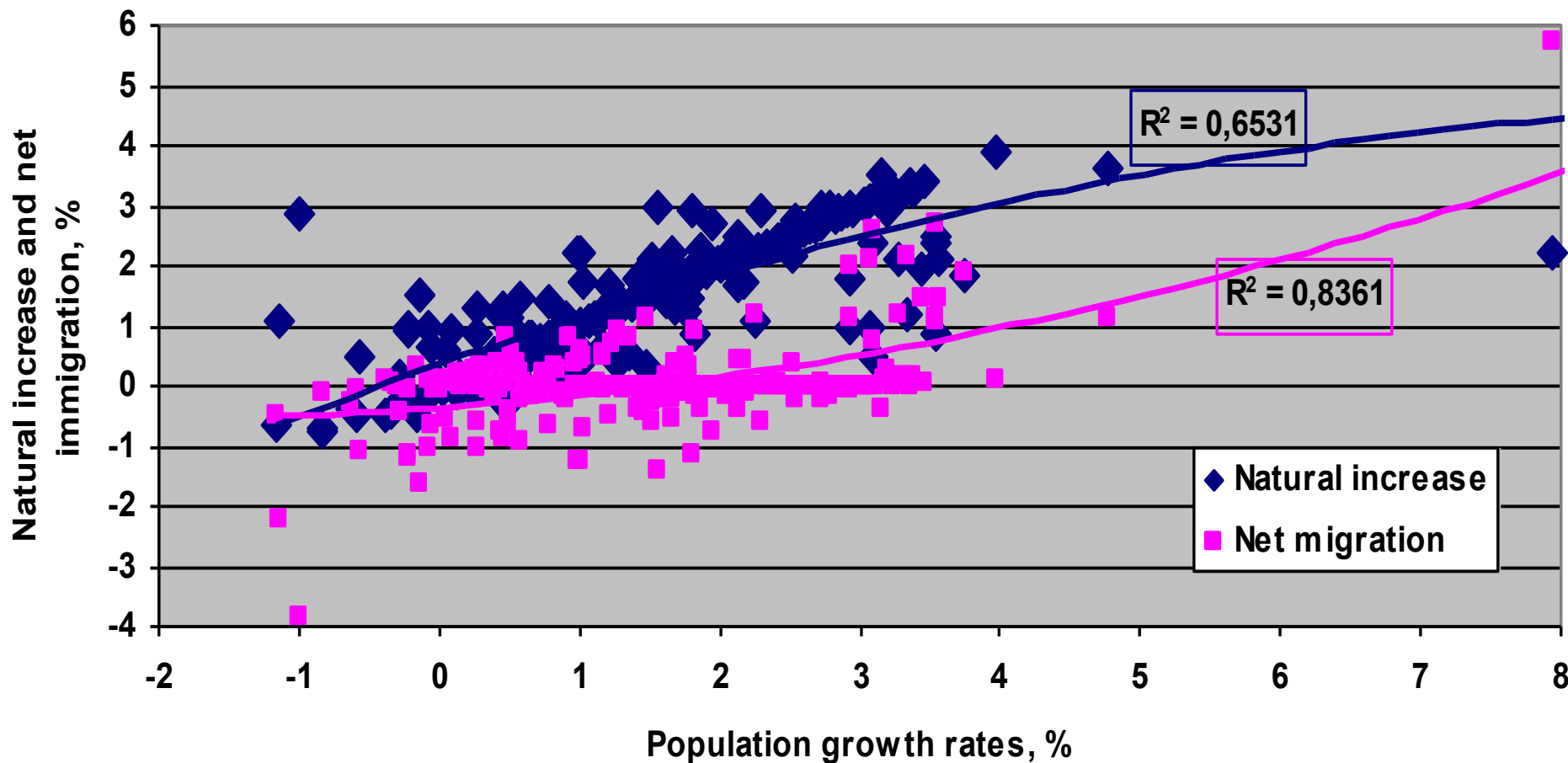
# MIGRATION

Fig. 8. Annual average growth rates of population and GDP per capita in 1960-99, %



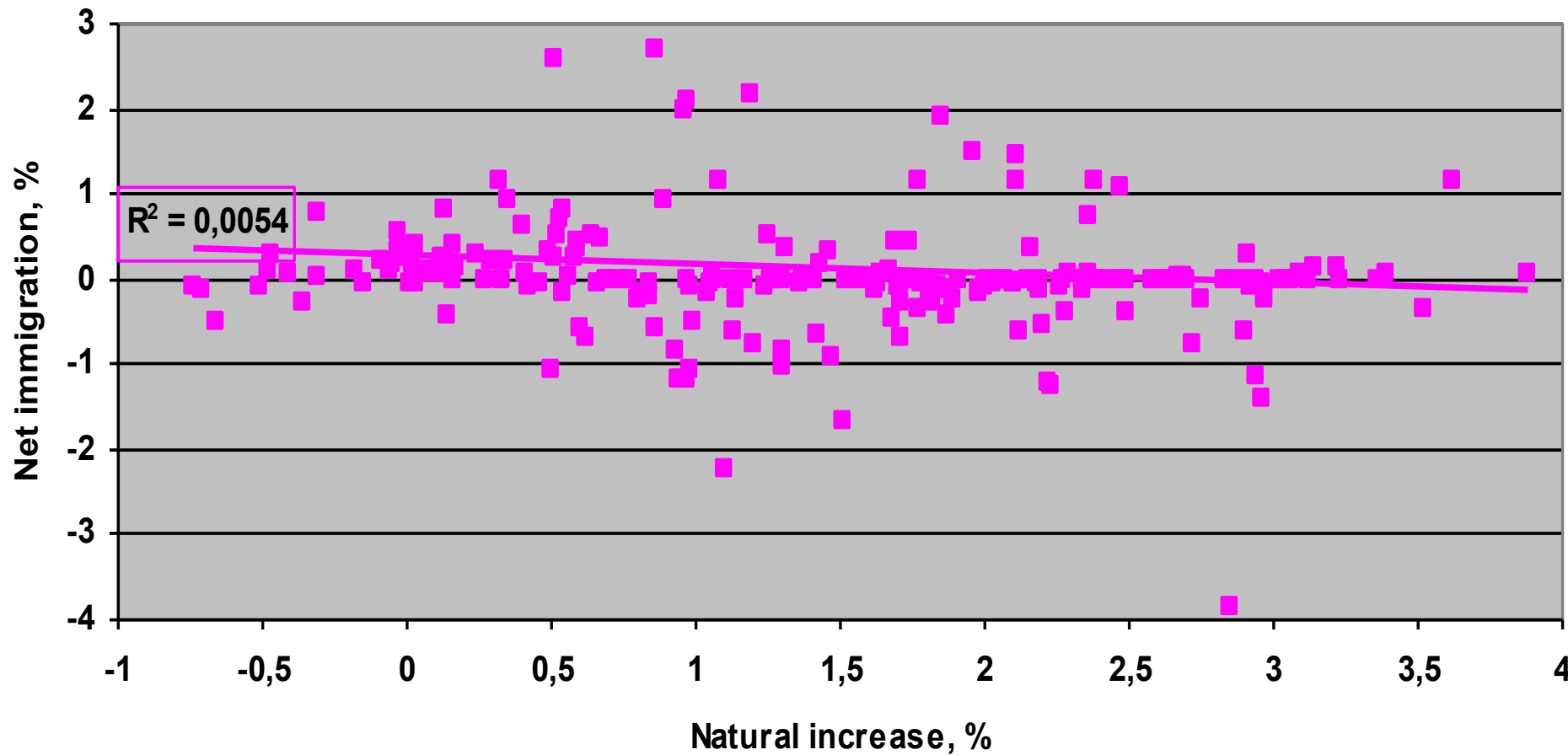
# MIGRATION

Fig. 9. Growth rates of population in 2000 - natural increase and net immigration, % of total population



# MIGRATION

Fig. 10. Growth rates of population in 2000 - natural increase and net immigration, % of total population





# MIGRATION

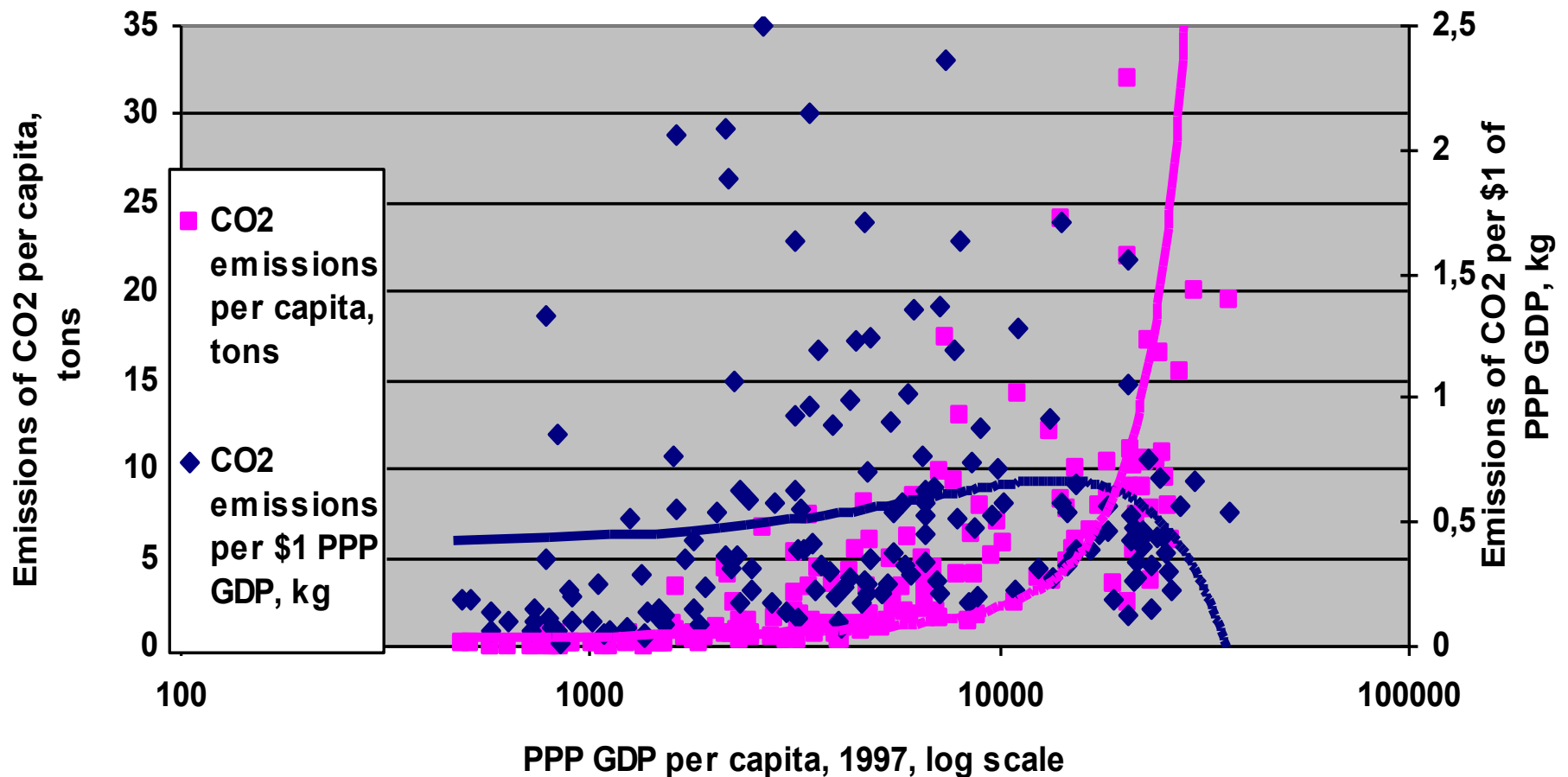
- Net migration flows are measured as the net inflow of migrants in 2000  
$$GR = CONST. + CONTR. VAR. + M(3.08 \lg Y - 9.08)$$
- where Y is PPP GDP per capita in 1975, M – net inflow of migrants in 2000 as a % of total population of receiving country (U.S. Bureau of the Census, 2002)
- Control variable - population growth rates in 1975-99.
- All coefficients are significant at 10%

# MIGRATION

- Equation (6) implies that for countries with PPP GDP of less than 10% of US level of 1975 (level of Bolivia and Cote d'Ivoire,  $\lg Y = 2.95$ ), the impact of the immigration on growth was negative.
- To put it differently, migrants coming to poor countries were probably less educated than the rest of the population, so the inflow of migrants lowered rather than increased the level of human capital.
- On the contrary, immigration to rich countries provided them with a “brain gain” that outweighed the negative impact on growth

# KYOTO PROTOCOL: FREEZE THE LEVELS OF EMISSIONS

Fig. 11. Emissions of CO<sub>2</sub> per capita (left scale, tons) and per \$1 of PPP GDP (right scale, kg) in 1997



# Conclusions

- What is good for the West, is not necessarily good for the South
- In our interdependent world “good policies” for developing countries, whether its trade protectionism or control over short-term capital flows, in most instances cannot be pursued unilaterally, without the co-operation of the West or at least without some kind of understanding on the part of the rich countries.

# Conclusions

- Protectionism
- Accumulation of FOREX
- Free import of technology
- Control over capital flows
- Control over “brain drain”
- Control over pollution
- Different priorities (child labor, democracy, reproductive rights, animal rights, etc.)

# Conclusions

- It is not reasonable to apply the modern Western patterns of tradeoffs between different development goals (wealth, education, life expectancy, equality, environmental standards, human rights, etc.) to less developed countries. Policies that prohibit child labor, for instance, may be an unaffordable luxury for developing countries, where the choice is not between putting a child to school or into a factory shop, but between allowing the child to work or to die.