

The Effects of Structural Adjustment Programs on Poverty and Income Distribution

Doris A. Oberdabernig

WIIW
Seminar in International Economics

4th March 2010

Structure of the presentation

Research question

Do Structural Adjustment Programs (SAPs) of the International Monetary Fund (IMF) have significant effects on poverty and income distribution?

Structure:

- Introduction to SAPs and literature review
- Treatment evaluation model
- Difference in differences model
- Conclusions

Structural Adjustment Programs (SAPs)

IMF loans to member countries to

- Combat deficits in the balance of payments / fiscal deficits
- Rebuild their international reserves
- Stabilize their currencies
- Restore conditions for economic growth

Types of SAPs:

- Stand-By Arrangements (SBAs)
- Extended Fund Facility (EFF)
- Structural Adjustment Facility (SAF)
- Enhanced Structural Adjustment Facility (ESAF)
- Poverty Reduction and Growth Facility (PRGF) since 1999

Conditionality

“[The lending countrys] government agrees to adjust its economic policies to overcome the problems that led it to seek financial aid in the first place” (International Monetary Fund, 2009)

- Reduce inflation
- Currency devaluation
- Fiscal adjustment (higher taxation / lower public expenditures)
- Trade liberalization
- Financial liberalization
- Privatization

Literature review

- **Johnson and Salop (1980)** - specific distributional effects
- **Pastor (1987)** - decline in labor share of income in program years
- **Heller (1988)** - benefit of the poor in the long run, adverse short run effects
- **Schadler et al (1993)** - positive results on poverty reduction in program years
- **Collier and Gunning (1999)** - country specific effects on social expenditure

- **Garuda (2000)** - effect on income shares depends on initial imbalances
- **Vreeland (2001)** - labor share of income declines during program years
- **Easterly (2003)** - lower cross elasticity of poverty
- **Martin and Segura-Ubiergo (2004)** - social spending rises
- **Nooruddin and Simmons (2006)** - no significant effect on social spending
- **Hajro and Joyce (2009)** - no significant effects on HDI or infant mortality

Data

Indicators of interest:

- **Poverty gap (1\$ and 2\$)**
339 observations from 1982-2004, 94 countries
- **Poverty headcount ratios (1\$ and 2\$)**
346 observations from 1982-2004, 94 countries
- **GINI**
241(WIID) and 353(WDI) observations from 1982-2004,
44(WIID) and 105(WDI) countries

Data Sources:

- WDI 2007
- WIID2b (Poverty Data)
- IMF Members' Financial Data
- Database of Political Institutions 2006

Descriptives

| Pgap1 | mean | median | sd | N |
|--------------|-------------|---------------|-----------|----------|
| never | 2.496909 | 0.5 | 4.12384 | 22 |
| before | 3.32629 | 0.7 | 5.226506 | 62 |
| during | 5.733099 | 2.005 | 8.047922 | 202 |
| between | 10.7621 | 4.328 | 13.05848 | 50 |
| after | 2.869608 | 0.5 | 6.231259 | 51 |

| GINI | mean | median | sd | N |
|-------------|-------------|---------------|-----------|----------|
| never | 28.74936 | 28.7 | 5.203118 | 265 |
| before | 29.04167 | 26.7 | 11.72965 | 36 |
| during | 41.04612 | 36.8 | 11.14374 | 116 |
| between | 46.96471 | 50.85 | 11.70061 | 34 |
| after | 36.21323 | 34.7 | 10.82365 | 65 |

Selection Bias

Average treatment effect on the treated
estimation of outcome that would have occurred without treatment

Bias

$$\begin{aligned}ATT &= E[Y_1 | X, D = 1] - E[Y_0 | X, D = 1] \\ E[Y_0 | X, D = 1] &\approx E[Y_0 | X, D = 0] \\ B(X) &= E[Y_0 | X, D = 1] - E[Y_0 | X, D = 0]\end{aligned}$$

Different macroeconomic preconditions of program countries lead to biased estimates of the effect of program participation on poverty

Controlling for selection bias is necessary

Treatment Effects Model

1st Stage

$$pov_{it} = x'_{it}\beta + \delta D_{it} + \epsilon_{it}$$

$$D_{it}^* = w'_{it}\gamma + u_{it}$$

$$D_{it} = 1 \text{ if } D_{it}^* > 0, 0 \text{ otherwise}$$

2nd Stage

$$E[pov_{it} | D_{it} = 1, x_{it}, D_{it}^*] = x'_{it}\beta + \delta + \rho\sigma_{\epsilon} \left[\frac{\phi(w'_{it}\gamma)}{1 - \Phi(w'_{it}\gamma)} \right]$$

$$E[pov_{it} | D_{it} = 0, x_{it}, D_{it}^*] = x'_{it}\beta + \rho\sigma_{\epsilon} \left[\frac{-\phi(w'_{it}\gamma)}{\Phi(w'_{it}\gamma)} \right]$$

Difference in Poverty Levels

$$E[pov_{it} | D_{it} = 1, x_{it}, D_{it}^*] - E[pov_{it} | D_{it} = 0, x_{it}, D_{it}^*] = \delta + \rho\sigma_{\epsilon} \left[\frac{\phi_{it}}{\Phi_{it}(1 - \Phi_{it})} \right]$$

1st stage

Program participation probit model:

$$\text{prog}_{it} = \beta_1 \text{gdppc}_{it-1} + \beta_2 \text{num}_t + \beta_3 \text{years}_{it} + \beta_4 \text{exch}_{it-1} + \beta_5 \text{invest}_{it-1} + \epsilon_{it}$$

Participation prediction

| | <i>Program</i> | <i>Not-Program</i> |
|------------------------------|----------------------------|--------------------|
| <i>Predicted Program</i> | 815 | 500 |
| <i>Predicted Not-Program</i> | 259 | 1253 |
| <i>Total</i> | 1074 | 1753 |
| | <i>Correctly Predicted</i> | |
| <i>Program</i> | 75.88% | |
| <i>Not-Program</i> | 71.48% | |
| <i>Total</i> | 73.15% | |

2nd stage

Poverty / Income Distribution model:

Dependent variables:

pgap_1, pgap_2, phcr_1, phcr_2,
phcr_urban, phcr_rural,
GINI, income deciles

Further explanatory variables:

- GDP pc growth
- Inflation
- Net current transfers
- Gross domestic savings
- Labor force participation rate
- Education
- GINI

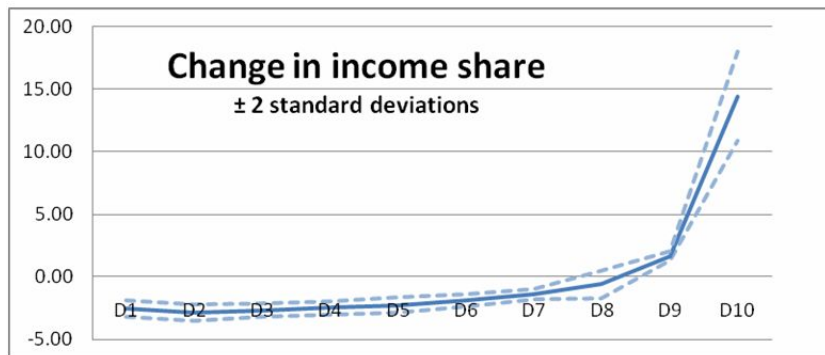
Results

| EQUATION | COEFFICIENT | (1) Pgap_1 | (2) Pgap_2 | (3) Phcr_1 | (4) Phcr_2 |
|-----------------------|--------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| Poverty model | prog | 12.50*** (1.509) | 28.48*** (3.304) | 29.30*** (3.322) | 59.94*** (5.868) |
| | Constant | -1.009 (0.689) | 0.395 (1.830) | 0.145 (1.714) | 4.335 (3.737) |
| Program participation | lgdp_pc | -0.000207*** (0.0000346) | -0.000252*** (0.0000327) | -0.000240*** (0.0000340) | -0.000227*** (0.0000412) |
| | num | 0.000129 (0.00491) | -0.00424 (0.00443) | -0.00411 (0.00453) | -0.00550** (0.00274) |
| | years | 0.0540*** (0.0108) | 0.0486*** (0.00969) | 0.0525*** (0.00999) | 0.0381*** (0.00525) |
| | lexch | 0.0000688 (0.0000635) | 0.0000892** (0.0000440) | 0.0000804 (0.0000535) | 0.0000887*** (0.0000258) |
| | linvest | -0.0145 (0.00885) | -0.0117 (0.00810) | -0.0138* (0.00788) | -0.00713** (0.00316) |
| | Constant | 0.243 (0.286) | 0.588** (0.271) | 0.538* (0.280) | 0.624*** (0.167) |
| | athrho | Constant | -1.191*** (0.153) | -1.636*** (0.210) | -1.392*** (0.147) |
| Insigma | Constant | 2.375*** (0.0868) | 3.032*** (0.0673) | 3.139*** (0.0674) | 3.659*** (0.0606) |
| | Observations | 339 | 339 | 346 | 346 |
| | R-squared | . | . | . | . |

Results

| EQUATION | COEFFICIENT | (1) Gini_1 | (2) Gini_rep | (3) Gini |
|-----------------------|--------------|------------------------------|----------------------------|----------------------------|
| GINI model | prog | 4.596* (2.664) | 18.69*** (2.064) | 19.45*** (2.141) |
| | Constant | 41.13*** (1.599) | 30.76*** (1.164) | 30.36*** (1.205) |
| Program participation | lgdp_pc | -0.0000544* (0.0000312) | -0.0000518* (0.0000307) | -0.0000600* (0.0000344) |
| | num | 0.00174 (0.00779) | -0.00193 (0.00482) | -0.00193 (0.00475) |
| | years | 0.0702*** (0.0115) | 0.117*** (0.0111) | 0.117*** (0.0112) |
| | lexch | 0.00000328** (0.00000160) | 0.0000826** (0.0000388) | 0.0000767* (0.0000425) |
| | linvest | -0.0162 (0.0100) | -0.0661*** (0.0130) | -0.0648*** (0.0134) |
| | Constant | -0.252 (0.412) | 0.475 (0.343) | 0.472 (0.345) |
| | athrho | Constant | -0.531*** (0.171) | -1.740*** (0.241) |
| Insigma | Constant | 2.335*** (0.0519) | 2.627*** (0.0497) | 2.654*** (0.0500) |
| | Observations | 353 | 241 | 241 |
| | R-squared | . | . | . |

Results



Graph 1: Changes in income shares of income deciles

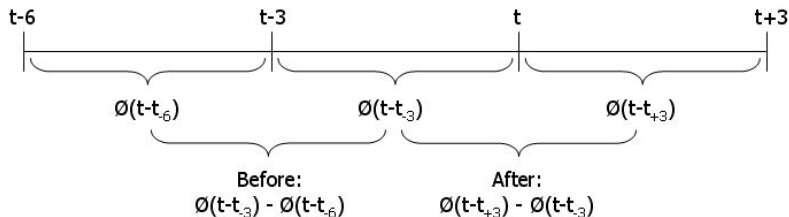
Robustness

- Control for additional explanatory variables in the 2nd stage
- Restriction of the control group (“never”, “before”)
- The main effects are stable over all specifications.
- Region subsamples

| | poverty | GINI_WDI | GINI_WIID |
|------------------------------|----------------|-----------------|------------------|
| East Asia and Pacific | ± | | |
| Europe and Central Asia | + | + | + |
| Latin America and Carribbean | - | - | + |
| Middle East and North Africa | ± | | |
| North America | | | |
| South America | | | |
| Sub-Saharan Africa | + | - | |

- PS-matching - no significant results

Difference in Differences



- 1 Take a specific year as treshold year
- 2 Calculate three years averages of GINIs before and after the treatment
- 3 Calculate change in averages
- 4 Vary treshold year
- 5 Collapse the dataset
- 6 Perform t-tests on treatment and control group

Difference in Differences

Mean-comparison tests of GINIs:

| | $\Pr(\text{Diff} < 0)$ | $\Pr(\text{Diff} \neq 0)$ | $\Pr(\text{Diff} > 0)$ |
|--|------------------------|---------------------------|------------------------|
| Program vs. controls: before treatment | 0.2466 | 0.4932 | 0.7534 |
| Program vs. controls: after treatment | 0.0122 | 0.0245 | 0.9878 |
| Program: before vs. after treatment | 0.0192 | 0.0386 | 0.9807 |

Long-run: Change in GINI is lower again afterwards

Robustness:

- Selection of program observations
- Changes in GINI vs. growth rates

Conclusions

- Participation in IMF SAPs leads to rising poverty after controlling for selection bias
(exception: Latin America & The Caribbean)
- Income distribution tends to worsen in program participation years
(exception: Sub-Saharan Africa)

Further research:

- Estimate effects by program types
- Does the situation change in the long run?
- Does regime type have a significant effect on the outcome?

Conclusions

Thank you for your attention.

Links

Descriptives:

Descriptive statistics of GINI.

Descriptive statistics of poverty by country.

Descriptive statistics of poverty by year.

Plot of GINI by year.

Plot of poverty indicators by year.

Robustness of treatreg:

Additional explanatory variables.

Different specification of the control group.

Region subsamples.

Robustness of difference in differences:

Changes of GINI vs. growth rates.

Long-run estimations.

Matching

| COEFFICIENT | Pgap_1 | Pgap_2 | Phcr_1 | Phcr_2 |
|----------------|---------|---------|---------|---------|
| Difference ATT | -2.391 | -2.409 | -4.971 | -0.818 |
| | (1.559) | (3.034) | (3.521) | (4.848) |
| Observations | 339 | 339 | 346 | 346 |
| R-squared | . | . | . | . |

| COEFFICIENT | Phcr_national | Phcr_rural | Phcr_urban | Gini_1 |
|----------------|---------------|------------|------------|----------|
| Difference ATT | 4.796 | -0.0727 | 7.338** | -3.068** |
| | (3.796) | (5.511) | (3.408) | (1.404) |
| Observations | 143 | 117 | 116 | 353 |
| R-squared | . | . | . | . |

| COEFFICIENT | Gini | Gini_rep |
|----------------|----------|----------|
| Difference ATT | -4.882** | -4.623** |
| | (2.25) | (2.293) |
| Observations | 241 | 241 |
| R-squared | . | . |

Additional Descriptives

| Pgap_1 | mean | median | sd | N |
|---------|----------|--------|----------|-----|
| never | 2.496909 | 0.5 | 4.12384 | 22 |
| before | 3.32629 | 0.7 | 5.226506 | 62 |
| during | 5.733099 | 2.005 | 8.047922 | 202 |
| between | 10.7621 | 4.328 | 13.05848 | 50 |
| after | 2.869608 | 0.5 | 6.231259 | 51 |

| Pgap_2 | mean | median | sd | N |
|---------|----------|--------|----------|-----|
| never | 8.516364 | 3.485 | 10.00497 | 22 |
| before | 10.24339 | 5.245 | 12.49448 | 62 |
| during | 16.4997 | 10.76 | 15.34943 | 202 |
| between | 24.47396 | 14.91 | 20.44056 | 50 |
| after | 7.716333 | 3.14 | 11.72425 | 51 |

| Phcr_1 | mean | median | sd | N |
|---------|----------|--------|----------|-----|
| never | 8.17895 | 2 | 10.78997 | 22 |
| before | 11.41145 | 3.33 | 14.81099 | 64 |
| during | 16.03797 | 7.51 | 17.57128 | 203 |
| between | 25.71103 | 13.615 | 24.34444 | 50 |
| after | 8.90598 | 2 | 13.35774 | 56 |

| Phcr_2 | mean | median | sd | N |
|---------|----------|--------|----------|-----|
| never | 22.2945 | 13.945 | 19.51912 | 22 |
| before | 26.38778 | 17.905 | 27.41192 | 64 |
| during | 38.38691 | 31.59 | 27.24014 | 203 |
| between | 48.70265 | 42.59 | 31.11538 | 50 |
| after | 22.71526 | 13.33 | 22.88446 | 56 |

Additional Descriptives

| GINI | mean | median | sd | N |
|---------|----------|--------|----------|-----|
| never | 28.74936 | 28.7 | 5.203118 | 265 |
| before | 29.04167 | 26.7 | 11.72965 | 36 |
| during | 41.04612 | 36.8 | 11.14374 | 116 |
| between | 46.96471 | 50.85 | 11.70061 | 34 |
| after | 36.21323 | 34.7 | 10.82365 | 65 |

| GINI_1 | mean | median | sd | N |
|---------|----------|----------|----------|-----|
| never | 39.89917 | 36.17203 | 11.51351 | 49 |
| before | 38.56968 | 36.06 | 13.68796 | 63 |
| during | 42.03577 | 41.485 | 9.450691 | 206 |
| between | 46.07442 | 46.17 | 9.790434 | 52 |
| after | 41.97398 | 41.844 | 9.456745 | 54 |

| GINI_rep | mean | median | sd | N |
|----------|----------|--------|----------|-----|
| never | 28.80389 | 28.58 | 5.194115 | 265 |
| before | 29.22944 | 27.31 | 11.76392 | 36 |
| during | 41.05552 | 37.55 | 10.79339 | 116 |
| between | 46.62765 | 49.79 | 11.32216 | 34 |
| after | 36.44985 | 35.3 | 10.5924 | 65 |