



REDISTRIBUTION, INEQUALITY, AND GROWTH

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*The views expressed in this presentation are those of the presenter and do not necessarily represent those of the IMF or IMF policy. This presentation draws on recent joint work with Andrew Berg and Charalambos Tsangarides.

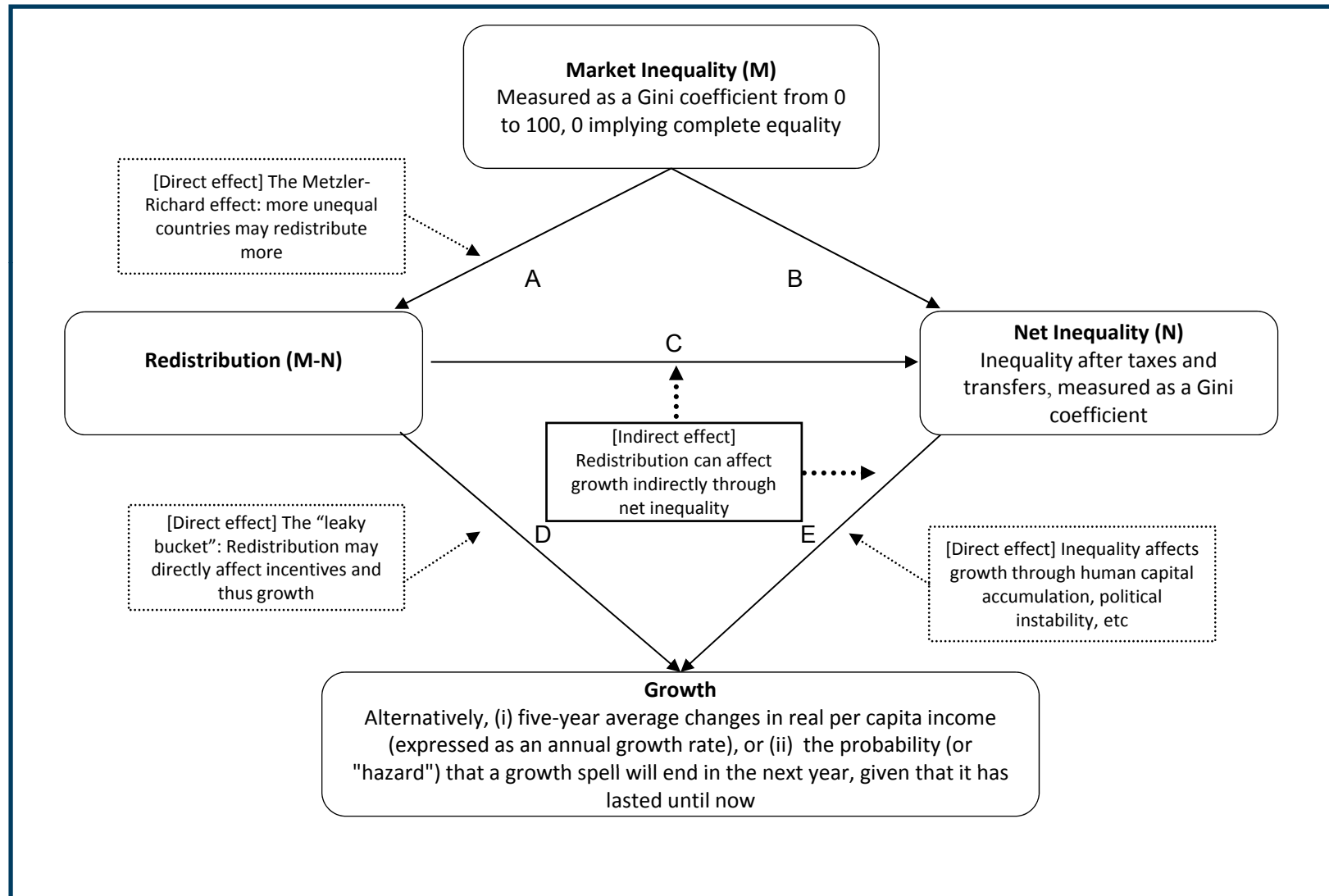
Motivation

- Renewed interest in the relationship between changes in income distribution and growth
 - Rajan (2010), Stiglitz (2012)
 - World Economic Forum Report 2015, Pew Survey 2014, “Occupy” Movements
- Tentative consensus that inequality hurts growth
- But does this make a case for redistribution?
 - Possible equality-efficiency “big tradeoff” (Okun (1975))
 - Efforts to redistribute may undermine growth (even as they reduce inequality)
- Simultaneously analyze effect of transfers and inequality on growth

Contribution and key findings

- Two approaches
 - ▣ Panel growth regressions (growth rate over five-year horizons)
 - ▣ Growth spell duration analysis
- Data on inequality and redistribution
 - ▣ Recently-compiled cross-country dataset (Solt (2009))
 - ▣ Distinguishes market and net income inequality
 - ▣ Direct calculation of redistribution (\equiv gini market income – gini of net income)
- Key findings
 - ▣ Lower net inequality drives faster/more durable growth, for a given level of redistribution
 - ▣ Redistribution appears generally benign in its impact on growth
 - Only in extreme cases, some evidence of direct negative effects on growth
 - ▣ The combined direct and indirect effects of redistribution are pro-growth

Possible channels



Evidence

Inequality can influence growth positively

- Provides incentives for innovation and entrepreneurship (Lazear and Rosen, 1981); raises saving and investment if rich people save a higher fraction of their income (Kaldor, 1957)
- Allows accumulation of the minimum needed to start businesses and get a good education (Barro, 2000)
- Empirical evidence to support this view (Forbes, 2000)

Equality can influence growth positively

- Helps the poor stay healthy and accumulate human capital (Perotti, 1996; Galor and Moav, 2004)
- Supports political and economic stability that helps investment (Alesina and Perotti, 1996)
- Helps create the social consensus required to adjust to shocks and sustain growth (Rodrik, 1999)
- Empirical evidence to support this view (Berg and Ostry, 2011)

Market inequality creates pressures for redistribution

- Majority of voters will have the power and incentive to vote for redistribution (Meltzer and Richard, 1981)
- Need not be the case if the rich have more political influence than the poor (Benabou, 2000; Stiglitz, 2012)

Redistribution may hurt or help growth

- Redistribution hurts growth—"leaky bucket" (Okun, 1975)
- Redistributive policies could increase growth (Benabou, 2000; Saint-Paul and Verdier, 1993, 1997)
- Key point: distinction between direct and total effect (this paper)

A Preliminary Look at the Data



Inequality data

- Difficulties for inequality-redistribution-growth literature
 - Mixing different definitions of inequality: at best simple attempts to address
 - Income/welfare definition: wage income, market income, disposable income, expenditure
 - Reference unit: person, household, tax unit
 - Mixing net and market inequality
 - How to directly measure redistribution
 - Difficult, so redistribution is omitted
 - Poorly proxied with e.g. size of government (Milanovic (2000) is an exception))
- Solt (2009) SWIID
 - Standardizes by type of income and reference unit, creating a comparable series on “net” and another on “market” income inequality
 - Starts with high-quality survey data: LIS, UN’s WIID, ...
 - Uses a regression-based method to impute standardized net and market inequality Ginis
 - Interpolation (and provides standard errors)

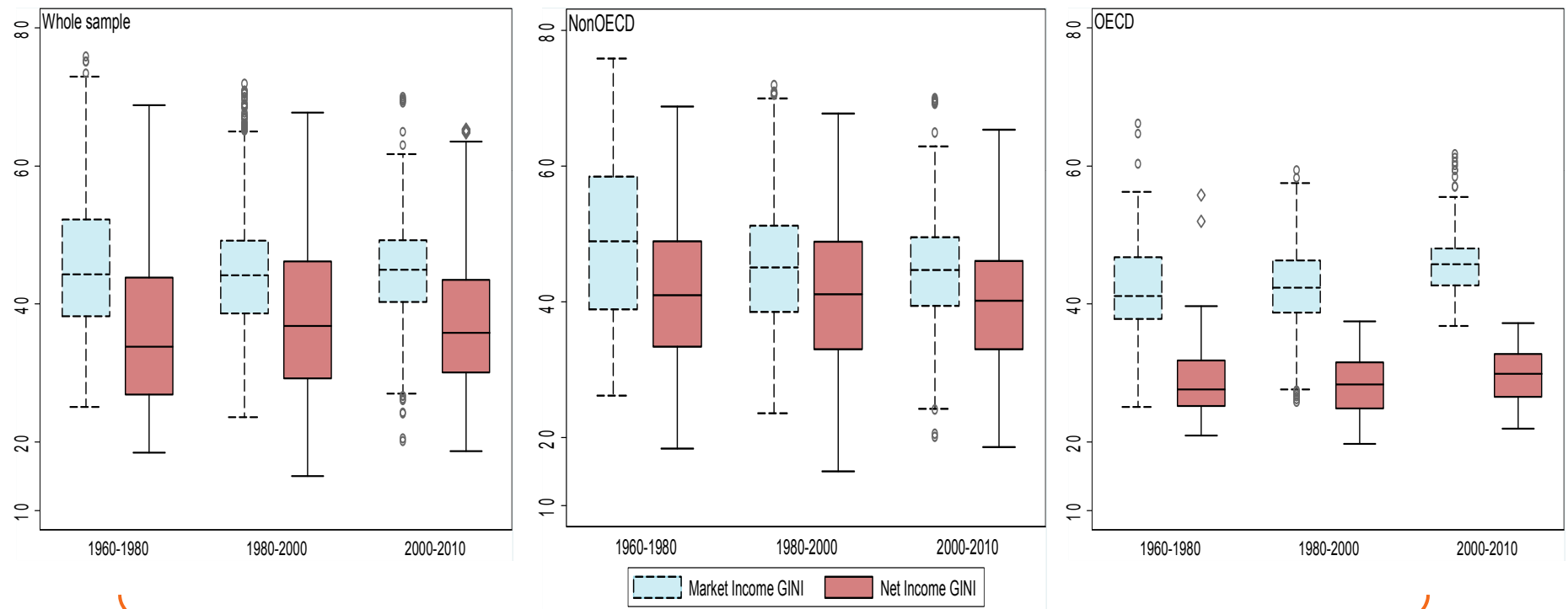


Only data set with redistribution measure for large number of countries/time periods

Stylized facts

Global median inequality varies over time across groups

Evolution of market and net inequality, 1960-2010

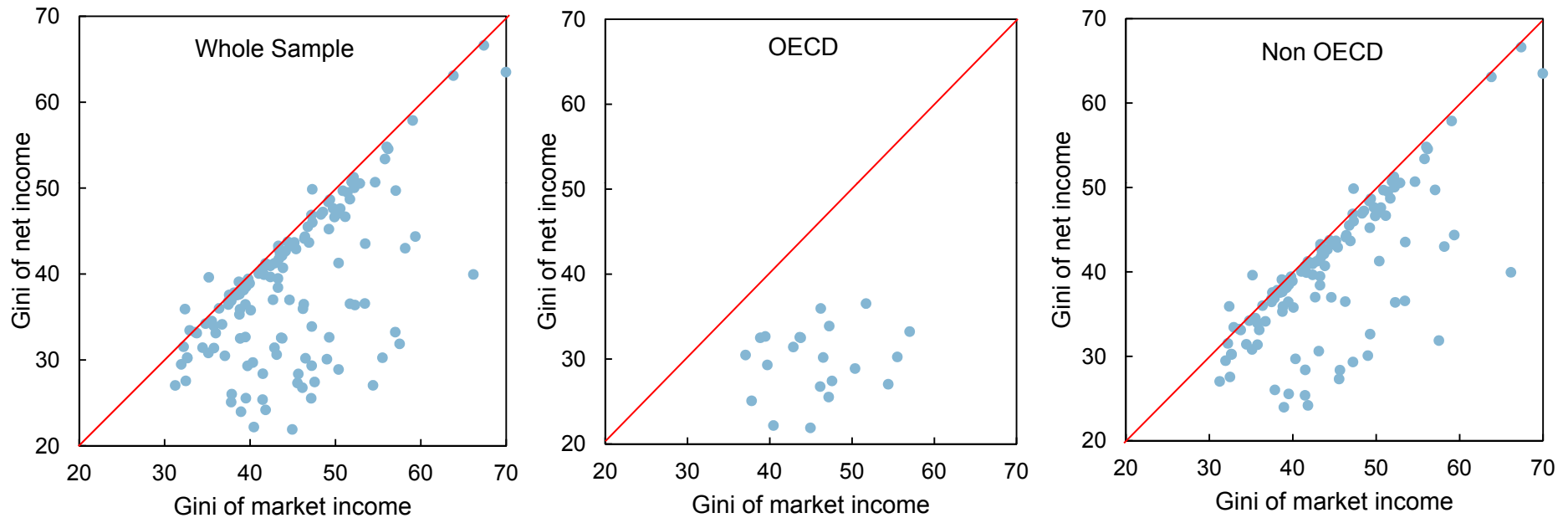


- *Global median inequality has been steady over the past half century*
- *Important differences across groups: market inequality has been rising in the OECD and falling in developing countries*
- *The gap between market and net inequality is much more pronounced in industrial countries*

Stylized facts

Unequal countries tend to redistribute more

Market and net inequality by country group



- *Most countries lie below the line, implying some degree of redistribution*
- *Relatively unequal countries tend to redistribute more*
- *OECD countries engage in a large amount of redistribution*

Stylized facts

More unequal societies redistribute more, controlling for income

Correlation between market inequality and redistribution

Dependent variable: Redistribution	Sample (1)	OECD (2)	Non-OECD (3)
Log(income)	1.469 (0.1197)	0.265 (0.9257)	1.666* (0.0982)
Market inequality	0.483*** (0.0000)	0.619*** (0.0000)	0.405*** (0.0000)
Constant	-25.288*** (0.0011)	-16.240 (0.5412)	-22.411*** (0.0042)
Observations	829	220	609
R-squared	0.8797	0.9083	0.8215

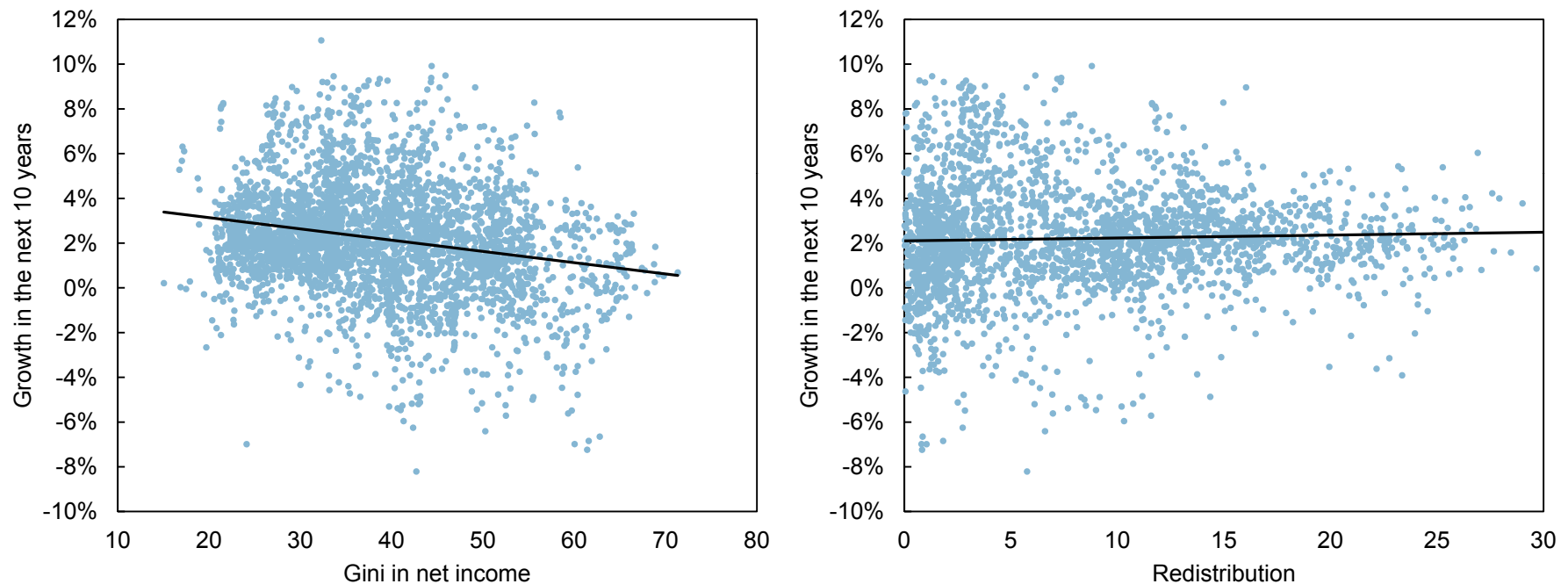
• An increase in market inequality from the 50th to the 75th percentile of the sample (45 to 51) is associated with an increase in redistribution by 3 Gini points

• The relationship is weaker in the non-OECD sample than in the OECD, but still significant

Stylized facts

More inequality is associated with lower growth; weak relationship between redistribution and growth

Growth, inequality, and redistribution

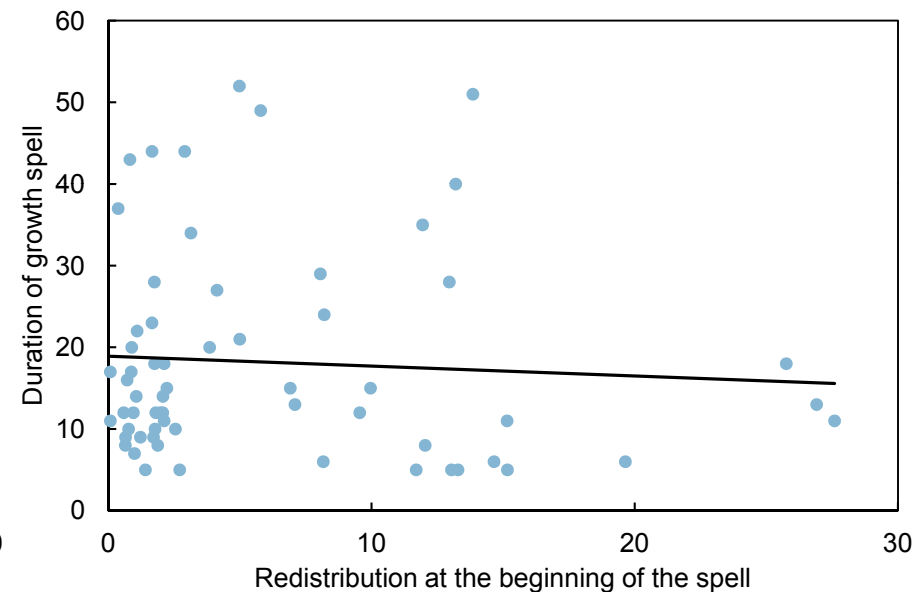
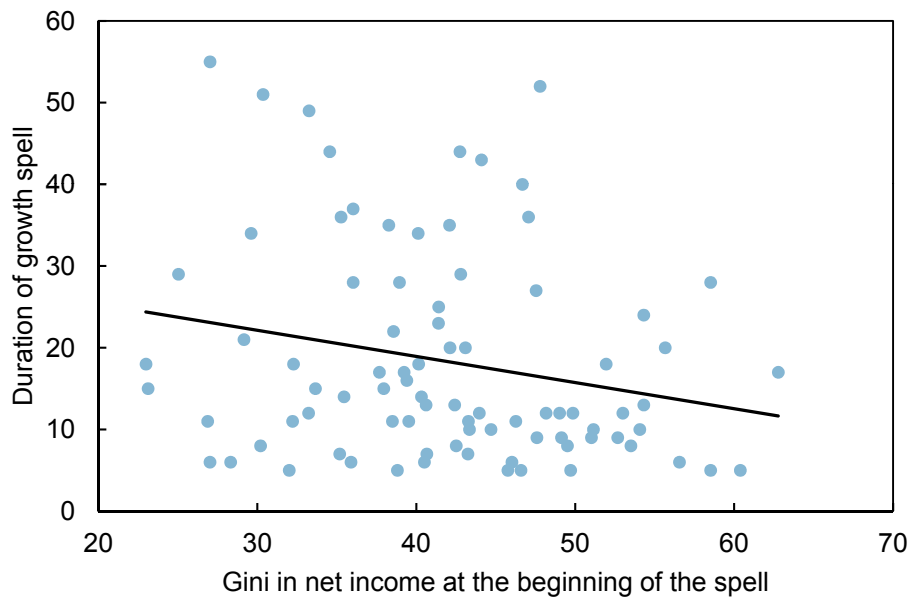


- **Strong negative relation between the level of net inequality and growth in income per capita over the subsequent period**
- **Weak (positive) relationship between redistribution and subsequent growth**

Stylized facts

More inequality lowers growth spell length; weak relationship between redistribution and spell duration

Duration of growth spells, inequality, and redistribution



- **Strong negative relationship between the level of net inequality and the duration of growth spells**
- **Weak (negative) relationship between redistribution and the duration of growth**

Empirical analysis



Approach I: growth regressions

Standard growth regression setup

- Initial income, net inequality, redistribution + controls \mathbf{Z}

$$(1) \quad y_{i,t} = \gamma_0 y_{i,t-\tau} + \gamma_1' Z_{i,t-\tau} + u_i + v_t + \varepsilon_{i,t}$$

$$(2) \quad y_{i,t} - y_{i,t-\tau} = \gamma_0 (y_{i,t-\tau} - y_{i,t-2\tau}) + \gamma_1' (Z_{i,t-\tau} - Z_{i,t-2\tau}) + (v_t - v_{t-\tau}) + (\varepsilon_{i,t} - \varepsilon_{i,t-\tau}).$$

- Sys-GMM combines the levels equation (1) and the difference equation (2)
 - Accounts for reverse causality
 - Exploits both cross-section and time-series variation in the data
 - Internal instruments, i.e. lags of various variables, to instrument for both the lagged dependent variable and for inequality and redistribution
 - Diagnostic tests for instrument validity
 - Test robustness to instrument choice

Approach II: growth spells

- Unit of analysis is a “growth spell”
 - Growth takeoffs fizzle after a few years: critical to sustain growth rather than just to ignite it
 - Periods of at least five years with growth above 2 percent and higher than during preceding years
 - Approach of Berg, Ostry, Zettelmeyer (2012), Pritchett et al. (2013)
- Estimate proportional hazard models with time-varying covariates
 - Relate the probability that spell will end to the variables of interest
 - Model the time it takes for events to occur—the end of the growth spell

Baseline results: growth

Growth, inequality and redistribution

	Dependent Variable: growth rate of per capita GDP			
	Baseline	Baseline + controls		
	(1)	(2)	(3)	(4)
Log(initial income)	-0.0069** (0.0034)	-0.0081** (0.0035)	-0.0140*** (0.0037)	-0.0135*** (0.0046)
Net inequality	-0.1435*** (0.0444)	-0.0914*** (0.0336)	-0.0739*** (0.0266)	-0.1057** (0.0492)
Redistribution	0.0046 (0.0492)	0.0258 (0.0516)	0.0109 (0.0428)	0.0530 (0.0494)
Log(investment)		0.0241*** (0.0077)	0.0250*** (0.0084)	0.0076 (0.0125)
Log(population growth)		-0.0159 (0.0182)	-0.0215 (0.0174)	-0.0084 (0.0160)
Log(total education)			0.0206*** (0.0073)	0.0164* (0.0099)
Large negative terms of trade shock				-0.0424*** (0.0158)
Political institutions				-0.0011 (0.0008)
Openness				0.0001 (0.0001)
Debt liabilities				-0.0002*** (0.0001)
Constant	0.1262*** (0.0389)	0.0718 (0.0456)	0.0965** (0.0389)	0.1687*** (0.0573)
Number of observations	828	828	751	558

• *Basic specification: a stripped-down standard model in which growth depends on initial income, net inequality, and redistribution*

• *Additional controls: physical and human capital, then a number of additional standard growth determinants*



Baseline results: growth

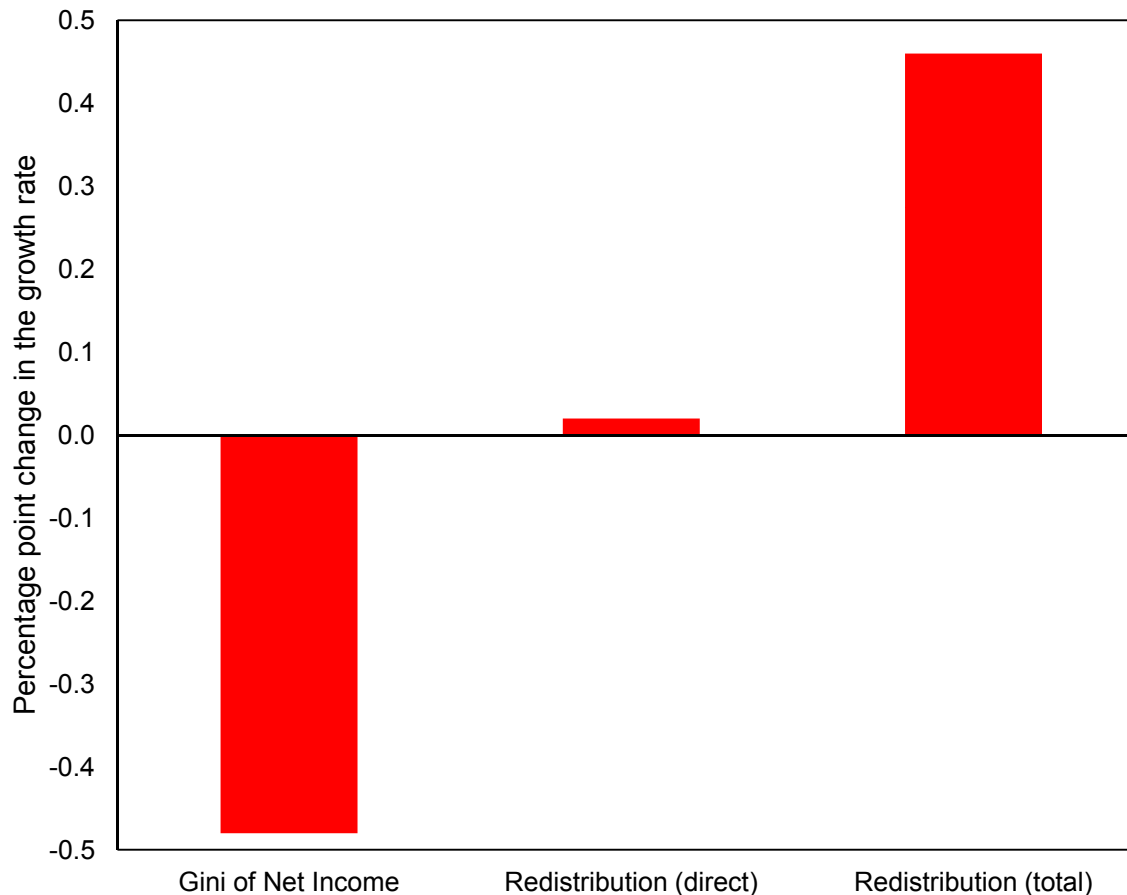
Findings from the growth model

- Higher inequality associated with lower growth
 - Redistribution has a statistically insignificant (slightly positive) effect
 - Inclusion of additional determinants
 - ▣ No change in our conclusions about inequality and redistribution
 - No evidence for “non-linearities” in the inequality-growth relationship
 - No trade-off of growth and inequality reduction through redistribution
 - ▣ If trade-off the coefficient on redistribution should be negative and more negative than that on inequality: not the case
 - ▣ Rather than a trade-off; the average result is a win-win situation
- ➔ *Redistribution has an overall pro-growth effect, counting both potential negative direct effects and potential positive effects of the resulting lower inequality*
- ➔ *Reject the Okun assumption that there is in general a trade-off between redistribution and growth*

Baseline results: growth

The effect graphically

**The effect of inequality and redistribution on growth
(10 percentile increase from median)**



• An increase in *net Gini* from 37 (such as in the United States in 2005) to 40 (such as in Morocco in 2005) decreases growth on average by 0.5 percentage points, that is, from 5 percent to 4.5 percent per year (holding redistribution and initial income constant)

• An increase in *redistribution* from the 50th to the 60th percentile (also roughly a 3-Gini-point change) increases the growth rate slightly (controlling for inequality and initial income)

• The *total* effect of a 10-percentile change in redistribution is to increase the annual growth rate by 0.5 percentage points

Baseline results: growth spells

Spells, inequality, and redistribution

	Dependent Variable: Risk that the growth spell will end			
	Baseline	Baseline + controls		
	(1)	(2)	(3)	(4)
Net inequality	1.060** (0.0266)	1.050* (0.0266)	1.060** (0.0291)	1.074** (0.0314)
Redistribution x Top 25th percentile	1.098*** (0.0322)	1.099*** (0.0329)	1.055 (0.0378)	0.990 (0.0567)
Redistribution x Bottom 75th percentile	0.987 (0.0690)	0.961 (0.0735)	0.971 (0.0695)	0.938 (0.0734)
Log(initial income)	1.024 (0.0318)	1.026 (0.0318)	1.077* (0.0413)	1.216*** (0.0844)
Log(investment)		3.050** (1.7293)		
Log(population growth)		1.201 (1.7085)		
Log(total education)			0.694 (0.2705)	0.845 (0.4260)
Large negative global interest rate shock			1.391 (0.6620)	1.153 (0.5945)
Large negative terms of trade shock			2.719** (1.1700)	3.198** (1.4887)
Political institutions				0.924* (0.0398)
Openness				0.990 (0.0066)
Debt liabilities				1.001 (0.0027)
Number of observations	640	640	609	549
Number of total spells/number of complete spells	62/28	62/28	55/23	49/20

- Specification relates the hazard to initial income at the start of the spell, and inequality and redistribution during the spell
- No evidence of a nonlinear relationship between inequality and spell duration
- For redistribution, evidence for a nonlinear relationship
- Baseline divides sample into observations where the degree of redistribution is very large (the top 25th percentile) and those where it is moderate (the rest of the distribution)



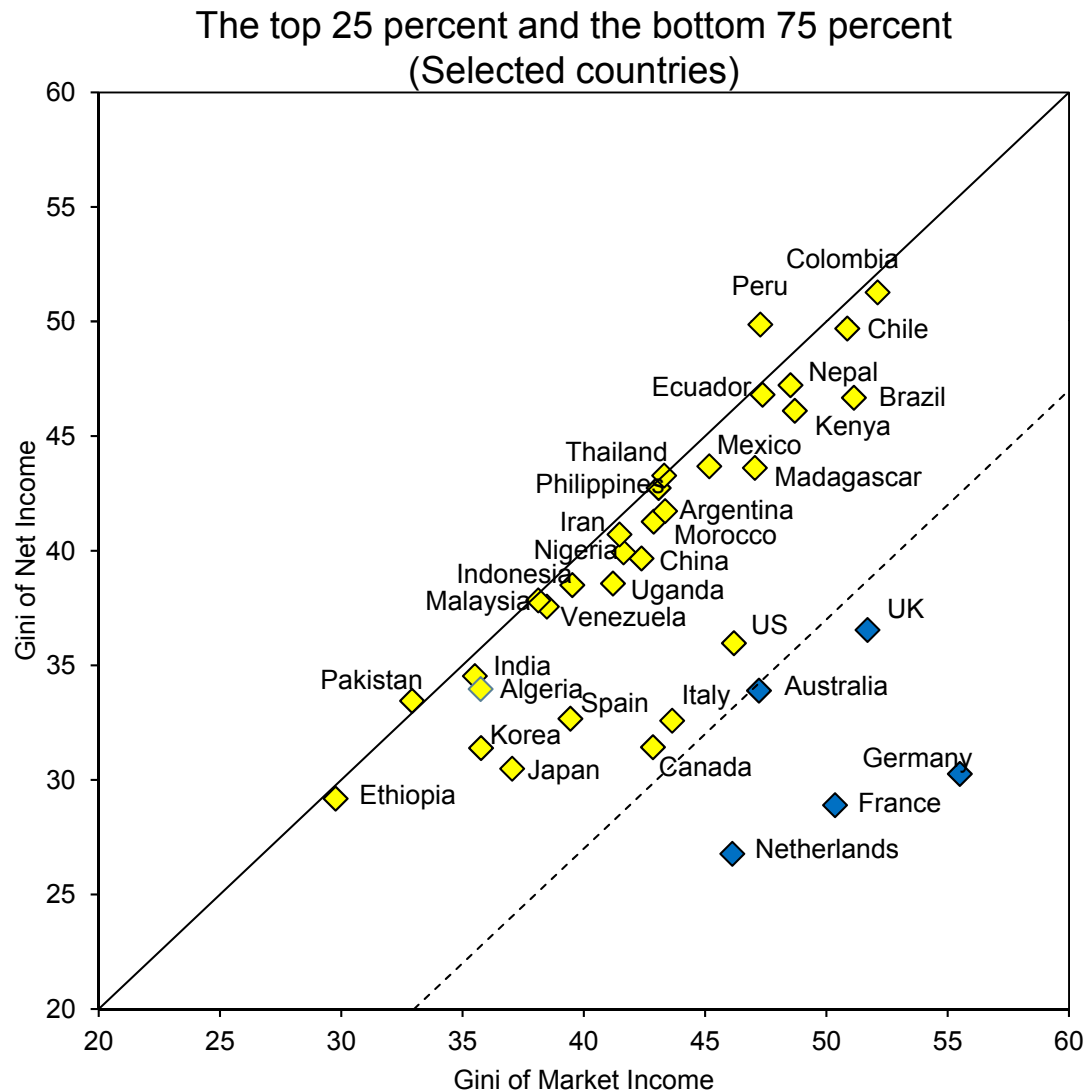
Baseline results: growth spells

Findings from the hazard model

- Inequality is negatively related to the duration of growth spells
 - ▣ A one-Gini-point increase in inequality → 6 % higher risk the spell will end
 - When redistribution is high (> 75th percentile)
 - ▣ Evidence that redistribution is directly harmful to growth
 - When redistribution is below 75th percentile
 - ▣ No evidence that further redistribution has any effect on growth
 - When controlling for additional determinants
 - ▣ Results robust on inequality, more fragile for redistribution
- ➔ *Overall effect of redistribution appears to be protective of growth, with the possible exception of extremely large redistributions*
- ➔ *There is no significant negative direct effect, and the resulting lower inequality seems to be associated with longer growth spells*

Baseline results: growth spells

When is redistribution harmful?



- Sample includes top 20 percent of countries by population (most recent observation)

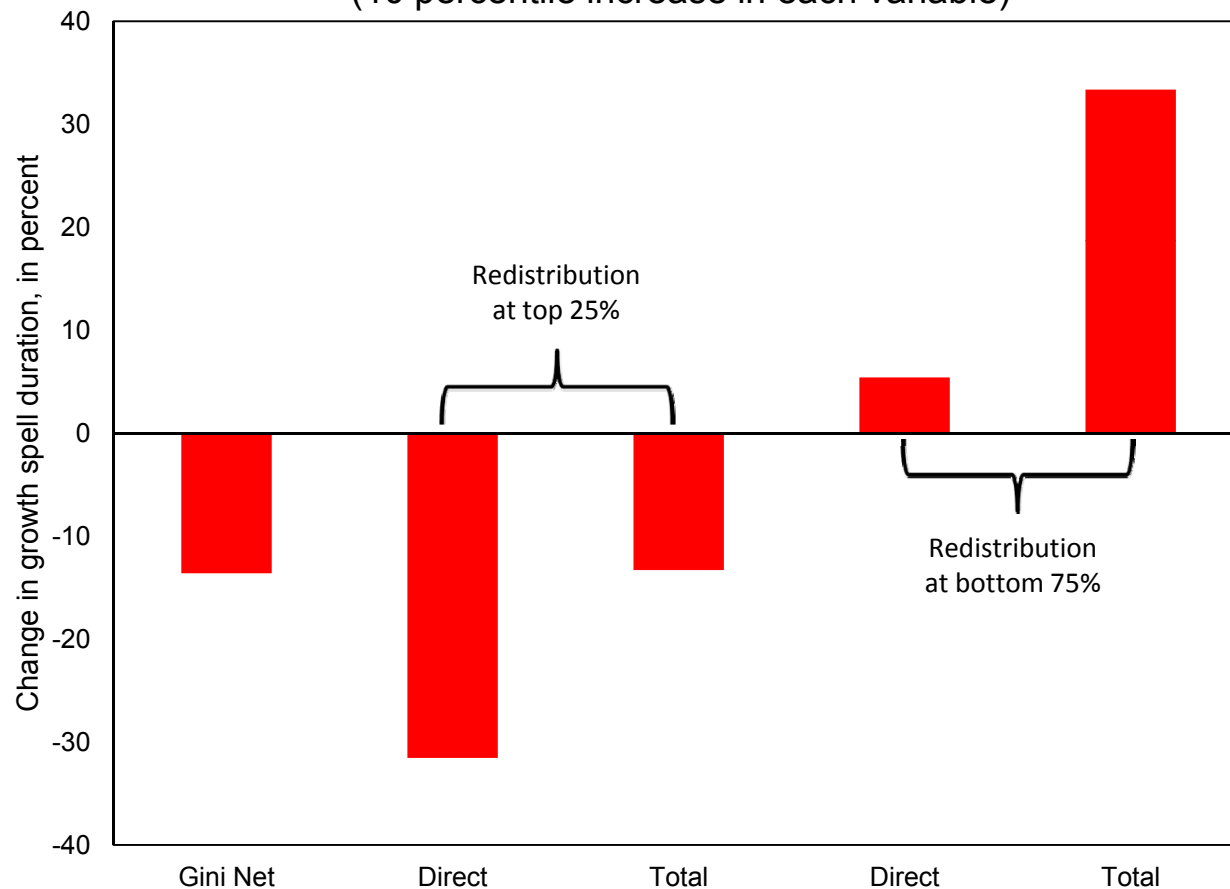
- The distance below the solid diagonal line represents the amount of redistribution

- Further redistribution seems to start being growth-negative after 13 Gini points

Baseline results: growth spells

The effect graphically

The effect of inequality and redistribution on growth spell duration
(10 percentile increase in each variable)



- For large redistributions, the estimated negative effect of redistribution on growth duration is somewhat larger than the estimated positive effect of the resulting reduction in inequality
- For smaller redistribution (less than 13 Gini points) the overall effect is growth-positive: roughly neutral direct effects of redistribution, and a protective effect of the resulting reduction in inequality

Robustness Analysis

We conduct a series of robustness tests to ensure our results hold

- Sample composition
 - ▣ Analyze restricted, and very restricted samples
 - ▣ Investigate OECD using SWIID and LIS data
- Account for potential measurement error associated with imputation
- Estimation specification (GMM)
 - ▣ Alternative instruments in the GMM estimation
 - ▣ Weak instrument robust confidence intervals

Our results remain unchanged:

- *Controlling for redistribution, lower inequality drives faster/more durable growth*
- *There is no significant negative direct effect of redistribution*

Robustness example: growth results

To the sample specification

Alternative Samples: The Effect of Inequality and Redistributive Transfers on Growth

	Baseline			Restricted				Very restricted				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log(initial income)	-0.0069** (0.0034)	-0.0081** (0.0035)	-0.0140*** (0.0037)	-0.0135*** (0.0046)	-0.0211** (0.0098)	-0.0226*** (0.0073)	-0.0260*** (0.0072)	-0.0245*** (0.0072)	-0.0144** (0.0062)	-0.0184** (0.0078)	-0.0251*** (0.0068)	-0.0272*** (0.0069)
Net inequality	-0.1435*** (0.0444)	-0.0914*** (0.0336)	-0.0739*** (0.0266)	-0.1057** (0.0492)	0.3083*** (0.0600)	-0.2440** (0.0970)	-0.1350** (0.0663)	-0.1269* (0.0648)	0.2102*** (0.0717)	-0.2082** (0.0969)	-0.1709* (0.0970)	-0.1425** (0.0668)
Redistribution	0.0046 (0.0492)	0.0258 (0.0516)	0.0109 (0.0428)	0.0530 (0.0494)	-0.0103 (0.1404)	0.0264 (0.1073)	0.0194 (0.0640)	0.0047 (0.0602)	-0.0384 (0.0927)	-0.0359 (0.1042)	-0.0171 (0.0732)	-0.0022 (0.0832)
Log(investments)		0.0241*** (0.0078)	0.0250*** (0.0084)	0.0076 (0.0125)		0.0249 (0.0168)	0.0343* (0.0189)	-0.0071 (0.0206)		0.0603*** (0.0226)	0.0680*** (0.0105)	0.0387* (0.0207)
Log(population growth + 5)		-0.0159 (0.0182)	-0.0215 (0.0174)	-0.0084 (0.0160)		-0.0549 (0.0378)	0.0086 (0.0288)	-0.0338 (0.0576)		-0.0742** (0.0326)	-0.0634*** (0.0241)	-0.0923** (0.0365)
Log(total education)			0.0206*** (0.0073)	0.0164* (0.0099)			0.0433*** (0.0146)	0.0357 (0.0249)			0.0181 (0.0165)	0.0116 (0.0201)
Large negative TOT shock				-0.0424*** (0.0158)				-0.0505** (0.0213)				-0.0255 (0.0161)
Political institutions				-0.0011 (0.0008)				0.0002 (0.0013)				0.0000 (0.0009)
Openness				0.0091 (0.0082)				0.0206* (0.0106)				0.0269*** (0.0095)
Debt liabilities				-0.0198*** (0.0059)				-0.0100 (0.0063)				-0.0091 (0.0073)
Constant	0.1262*** (0.0389)	0.0718 (0.0457)	0.0965** (0.0389)	0.1687*** (0.0573)	0.3167*** (0.0921)	0.3270*** (0.0856)	0.0955 (0.0803)	0.3173** (0.1372)	0.2432*** (0.0662)	0.2154*** (0.0707)	0.1827** (0.0905)	0.3470*** (0.1246)

Robustness example: growth results

To the sample composition (OECD)

Alternative Samples: The Effect of Inequality and Redistributive Transfers on Growth

	OECD using SWIID data				OECD using LIS data			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(initial income)	-0.0833*** (0.0271)	-0.1110*** (0.0228)	-0.1226*** (0.0190)	-0.1253*** (0.0261)	-0.0719*** (0.0163)	-0.0421 (0.0589)	0.0001 (0.0443)	-0.0109 (0.0330)
Net inequality	-0.3138** (0.1560)	-0.2817** (0.1423)	-0.2839* (0.1712)	-0.2142 (0.1466)	-0.2698*** (0.0948)	-0.3443** (0.1438)	-0.4040* (0.2319)	-0.1357 (0.3546)
Redistribution	0.0074 (0.0994)	-0.0274 (0.0906)	0.0371 (0.1053)	0.1267 (0.2333)	-0.0512 (0.0996)	-0.1273 (0.0783)	-0.1746 (0.1126)	-0.0879 (0.0751)
Log(investments)		0.0239 (0.0331)	0.0248 (0.0193)	0.0142 (0.0369)		0.0548* (0.0288)	0.1560*** (0.0509)	-0.0177 (0.1115)
Log(population growth + 5)		-0.0202 (0.0441)	0.0141 (0.0493)	0.0278 (0.0780)		0.0505 (0.1012)	-0.1838 (0.1504)	0.1053 (0.2017)
Log(total education)			0.0097 (0.0384)	0.0141 (0.0316)			-0.0667 (0.0799)	0.0018 (0.1201)
Large negative TOT shock				-0.0460 (0.0329)				0.0298 (0.0340)
Political institutions				-0.0003 (0.0008)				0.0064 (0.0137)
Openness				0.0700 (0.0545)				0.0442 (0.0439)
Debt liabilities				-0.0074 (0.0064)				-0.0197 (0.0281)
Constant	0.8909*** (0.2731)	1.1022*** (0.3193)	1.1267*** (0.2409)	1.1927*** (0.3281)	0.8033*** (0.1711)	0.2793 (0.4917)	0.1106 (0.4123)	0.0000 (0.0000)

Robustness example: growth spells

Robustness to the sample specification

Alternative samples: inequality, redistribution, and the duration of growth spells

	Dependent Variable: Growth spell duration		
	Full	Baseline	Restricted
	(1)	(2)	(3)
Net inequality	1.052** (0.0251)	1.060** (0.0266)	1.064 (0.0751)
Redistribution x Top 25th percentile	1.082*** (0.0302)	1.098*** (0.0322)	0.981 (0.1097)
Redistribution x Bottom 75th percentile	1.009 (0.0659)	0.987 (0.0690)	0.999 (0.1623)
Log(initial income)	1.032 (0.0301)	1.024 (0.0318)	1.085 (0.0797)
Number of observations	801	640	364
Number of total spells / number of complete spells	77/31	62/28	31/8

- *As in the growth regressions, the full sample results follow the baseline*
- *Unlike the growth regressions, in the more restricted sample, which differs in eliminating from consideration the data from pre-1985 developing countries, the data are uninformative*

Conclusions



Key Takeaways

- Controlling for redistribution, inequality is still a robust determinant *both* of the pace of medium-term growth and of the duration of growth spells
- Little evidence for a harmful effect of fiscal redistribution at a macro level
- Mindful about over-interpreting these results, especially for policy purposes
- Extreme caution about redistribution—and thus inaction—is unlikely to be appropriate in many cases
- On average, across countries and over time, governments' efforts to redistribute did not lead to bad growth outcomes, unless they were extreme
- Resulting narrowing of inequality helped support faster and more durable growth